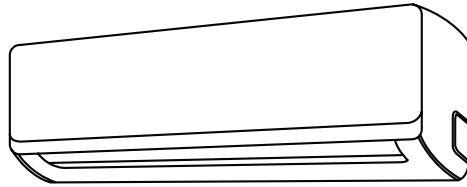


## SERVICE MANUAL

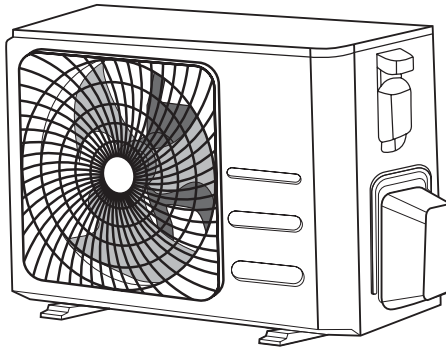
# 4DHV Mini-Split Series



This is a safety alert symbol and should never be ignored. When you see this symbol on labels or in manuals, be alert to the potential for personal injury or death.



DWH Wall Mount Single Zone  
Air Conditioning Indoor Unit



4DHV Single Zone Air  
Conditioning Outdoor Unit

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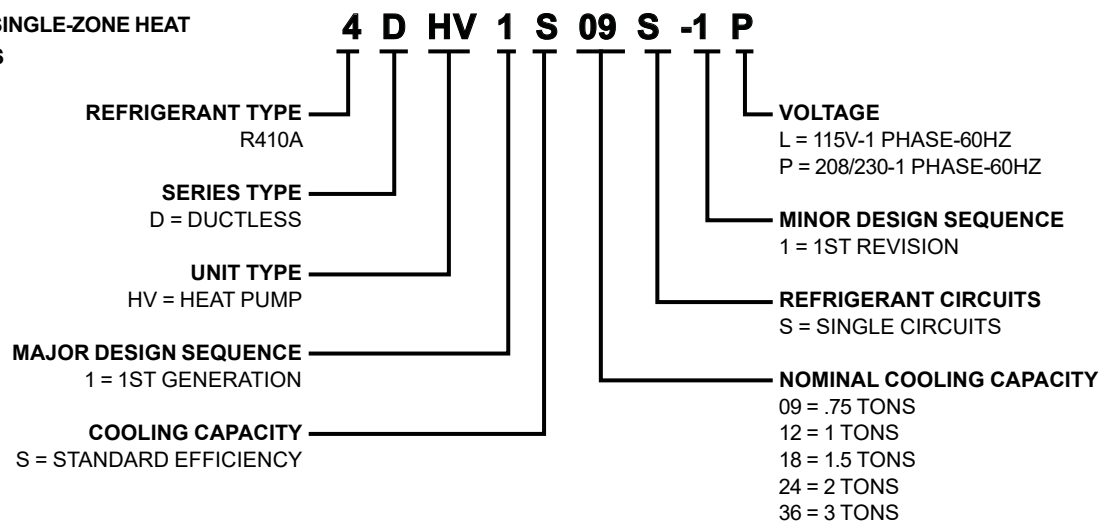
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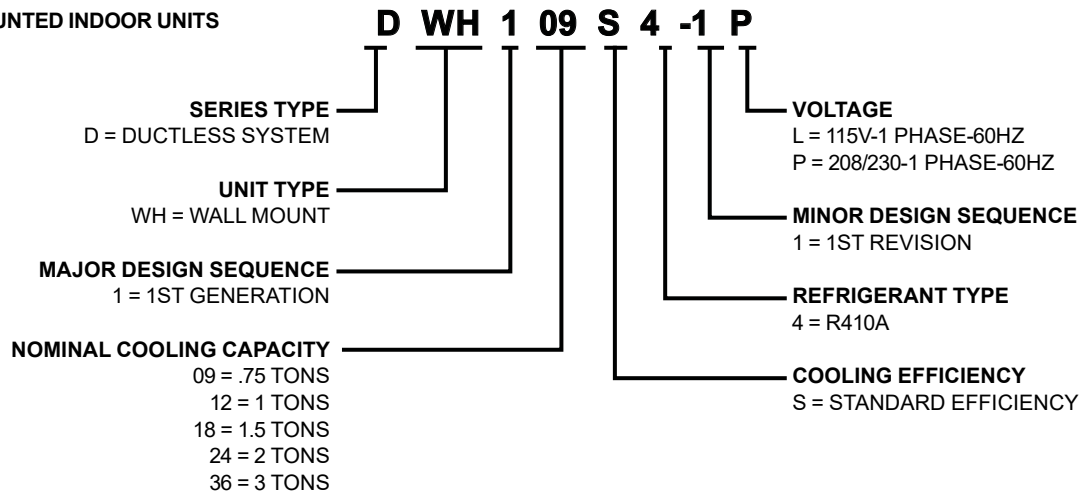
(P) 508067-01

# Model Number Identification

## OUTDOOR SINGLE-ZONE HEAT PUMP UNITS



## WALL-MOUNTED INDOOR UNITS



## Specifications - Outdoor Units

Model Number		4DHV1S09S	4DHV1S12S	4DHV1S18S	4DHV1S24S	4DHV1S36S	
Nominal Size- Tons		0.75	1	1.5	2	3	
Ambient Temp. Operating Range-°F	Cooling	5 - 122				-13 - 122	
	Heating	5 - 86				-13 - 86	
Sound Data	dBA	52	55	57.5	58	59	
Refrigerant	Charge Furnished (R410a) - oz.	1lb. 14 oz.		2lbs. 12 oz.	3lbs. 15 oz.	7 lbs. 8 oz.	
	Max Line Length - ft.	25					
	Charge Required/ Additional Ft. - oz.	0.16			0.32		
Compressor	Type	(1) Rotary					
	Refrigerant Oil Type	Ester Oil VG74					
	Refrigerant Oil Charge - Oz.	10.5		14.9	22.7		
Connections - in.	Liquid/Gas pipe (flare)	1/4" / 3/8"	1/4" / 1/2"		3/8" / 5/8"		
	Maximum refrigerant pipe length - ft.	82		98		213	
	Max. Difference in level of indoor unit - ft.	33		66		98	
Outdoor Fan	(No.) Diameter - in.	(1) 16-3/4	(1) 16-7/8		(1) 19-1/4	(1) 17	
	Total air volume - cfm	1175			1825	2130	
	rpm	800 / 650	800 / 650 (115V) 800 / 750 / 650 (208/230V)	800 / 750 / 650		900	
Outdoor Coil	Number of rows	1		2		3	
	Fins per inch	21				18	
	Fin type	Hydrophilic Aluminum					
	Tube outside diameter - in.	1/4				5/16	
	Tube Type	Rifled Copper Tubing					
	Net face area - sq. ft.	4.04	4.72	4.67	5.12	8.13	
	Application area - sq. ft.	129 - 189	172 - 252	251 - 368	330 - 484	515 - 755	
Design Pressure	PSIG	550/340					
Net/Shipping Weight (lbs.)	115V	67 / 72	71 / 77	---	---	---	
	208/230V	67 / 72	67 / 73	80 / 86	106 / 113	146 / 158	
<b>Electrical Data</b>							
Electrical Char. - 60 Hz - 1 Phase		115V	208/230V	115V	208/230V	208/230V	208/230V
	Maximum Overcurrent Protection (amps)	20	15	20	15	20	25
	Minimum Circuit Ampacity	16	10	15		20	25
	Compressor rated Load Amps	11.5	6.4	10.1	6.8	10	15
Outdoor Fan Motor	Rated Load Amps	0.6	0.5	0.55	0.45	0.5	0.6
	Output - W	34				115	120

NOTE - Extremes of operating range are plus and minus 10% of line voltage.

1 HACR type circuit breaker or fuse.

2 Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

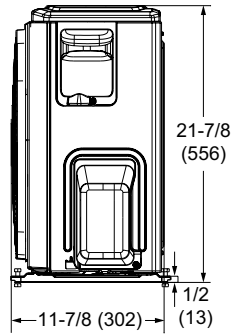
## Specifications - Wall Mounted Indoor Units

Model Number		DWH109S4		DWH112S4		DWH118S4	DWH124S4	DWH136S4
<b>Nominal Size- Tons</b>		0.75		1		1.5	2	3
<b>Electrical Char.</b>	<b>60 Hz - 1 Phase</b>	115V	208/230V	115V	208/230V	208/230V	208/230V	208/230V
	<b>Rated Load Amps</b>	0.7	0.06	0.7	0.06	0.11	0.37	0.5
	<b>Input (W)</b>	35.2	50	35.2	50	36	116	72
	<b>Output (W)</b>	20				30	60	
<b>Room Temp Range (°F)</b>	<b>Cooling</b>	62 - 90						
	<b>Heating</b>	32 - 86						
<b>Air Volume (CFM)</b>	<b>High/Med/Low</b>	247/182/129	309/285/187	294/212/171	324/282/212	449/393/262	706/588/450	794/647/500
<b>Sound Data (dBA)</b>	<b>High/Med/Low</b>	38 / 32 / 25		38 / 30 / 28	38 / 32 / 24	43 / 35 / 30.5	48 / 42.5 / 34	48.5 / 44 / 38
<b>Connections (in.)</b>	<b>Liquid/Gas - O.D. - Flare</b>	1/4" / 3/8"		1/4" / 1/2"		1/4" / 1/2"	3/8" / 5/8"	
	<b>Drain - O.D.</b>	1						0.69
<b>Weight (lbs.)</b>	<b>Net/ Packaging</b>	18 / 23		19 / 25		25 / 33	31 / 40	40 / 50

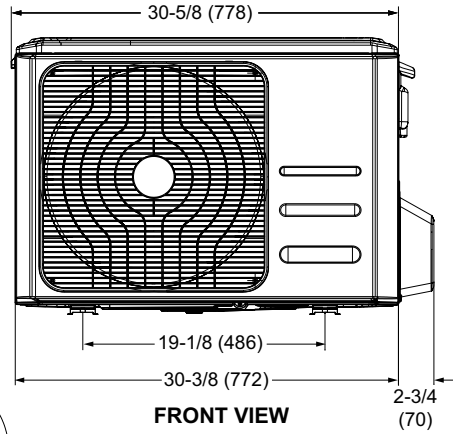


**Dimensions - Outdoor Units - Inches (MM)**

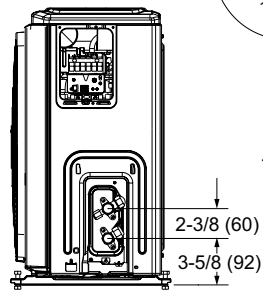
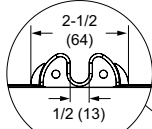
**4DHV1S09S**



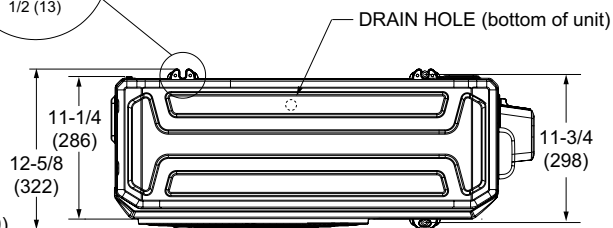
**SIDE VIEW**



**FRONT VIEW**



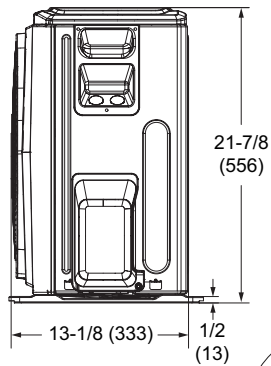
**SIDE VIEW**



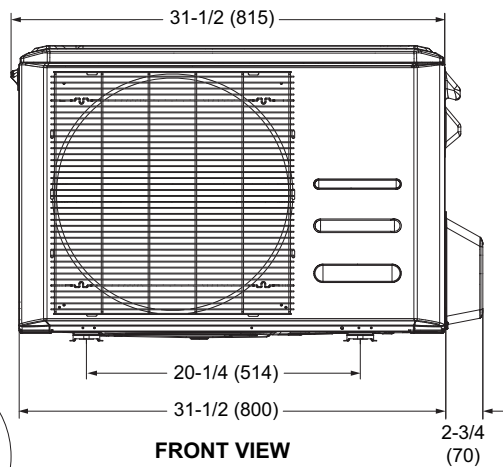
**BOTTOM VIEW**

DRAIN HOLE (bottom of unit)

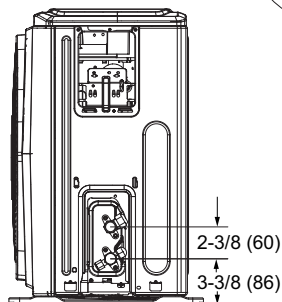
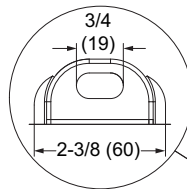
**4DHV1S12S, 4DHV1S18S**



**SIDE VIEW**



**FRONT VIEW**

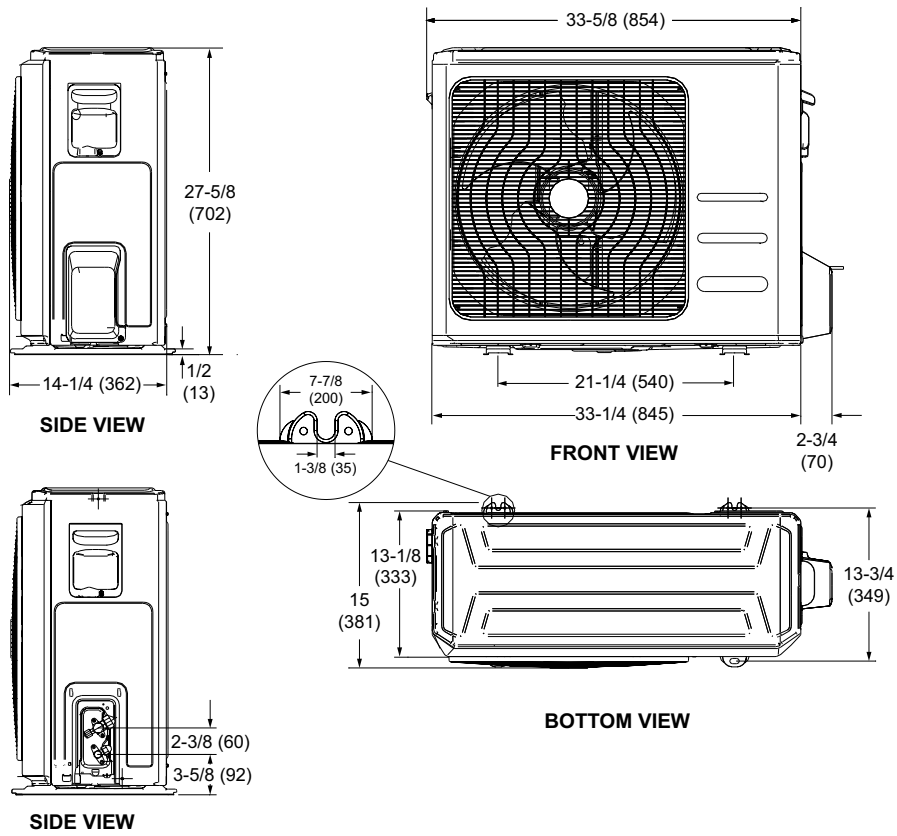


**SIDE VIEW**

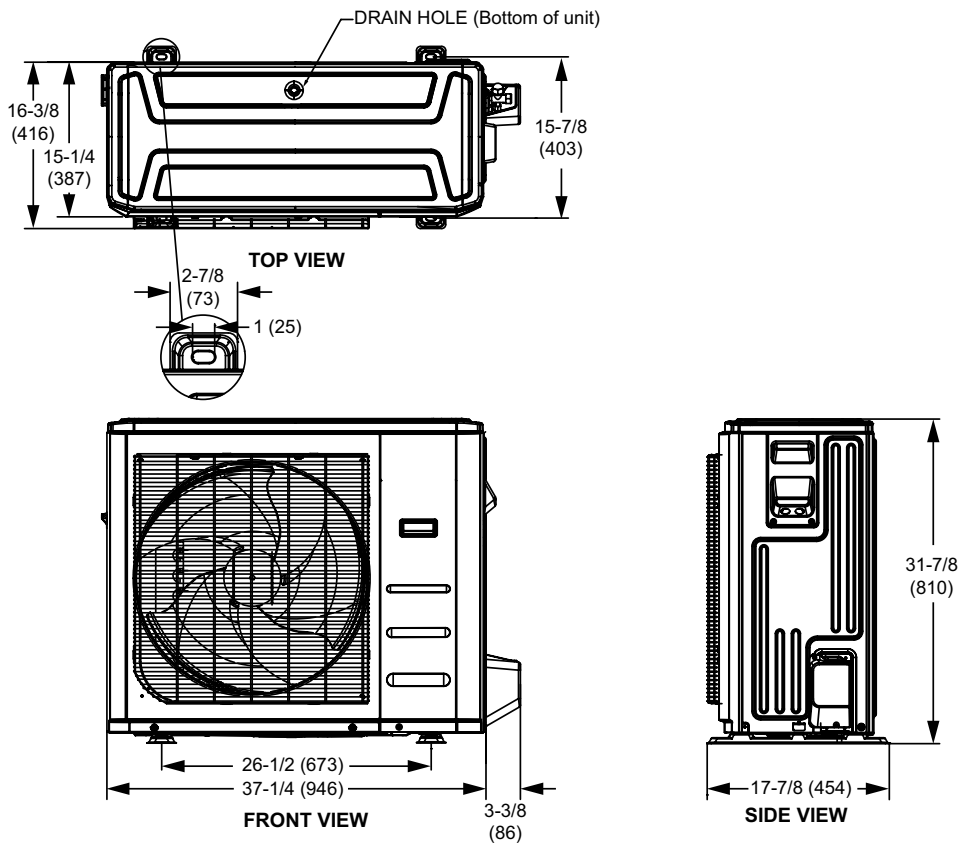


**BOTTOM VIEW**

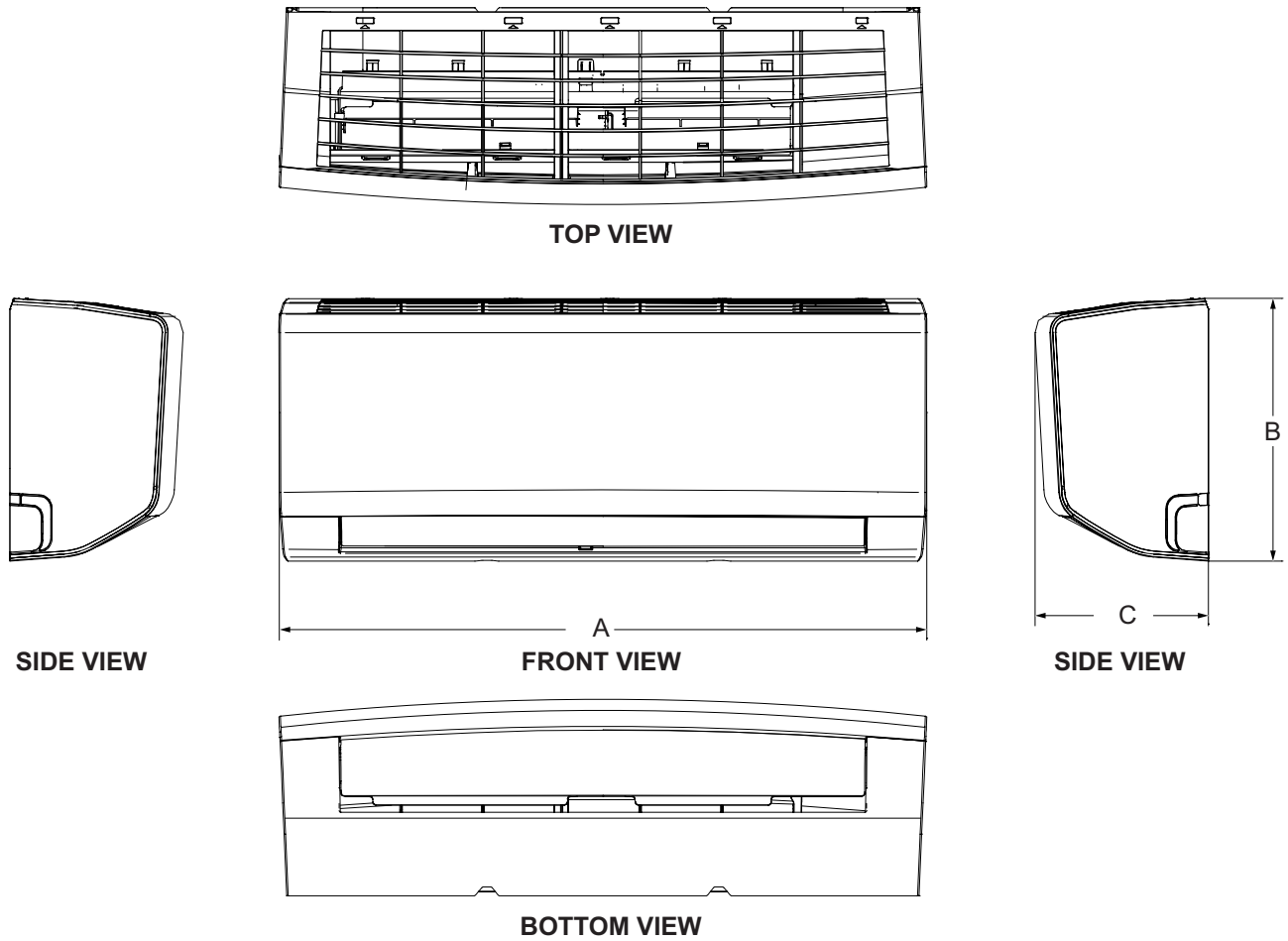
**4DHV1S24S**



**4DHV1S36S**

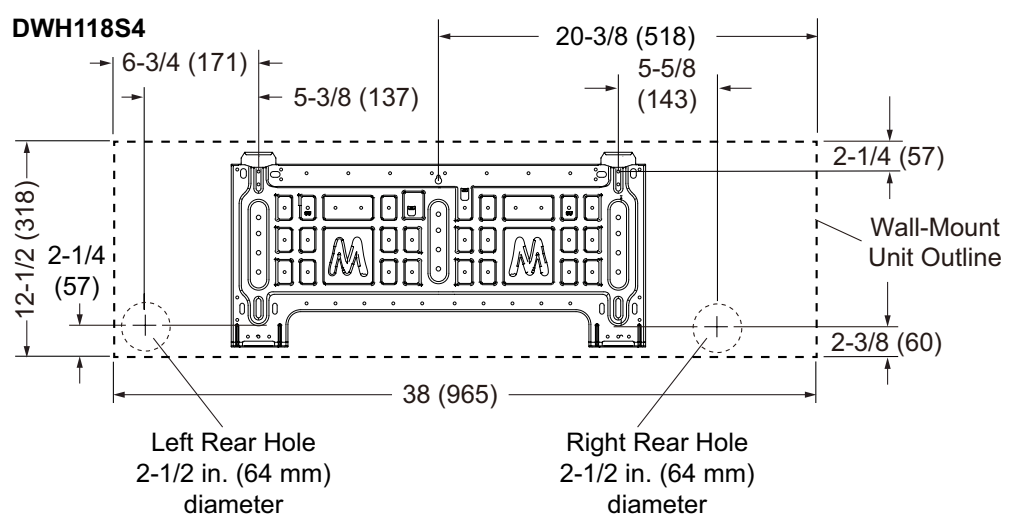
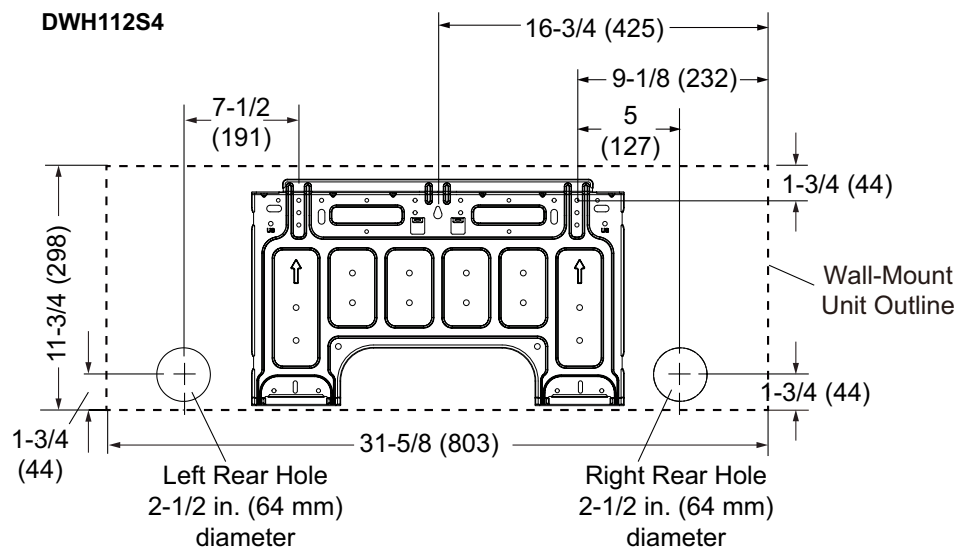
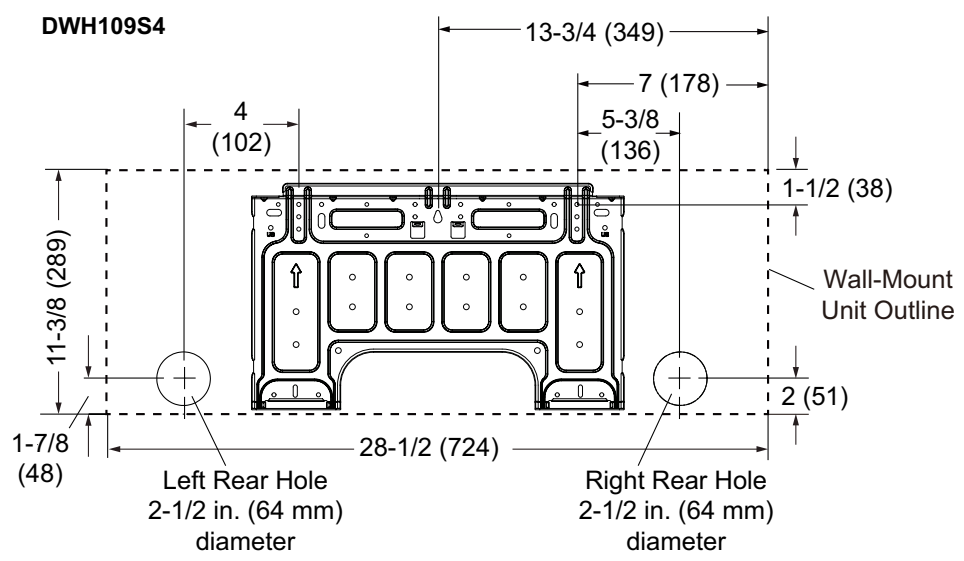


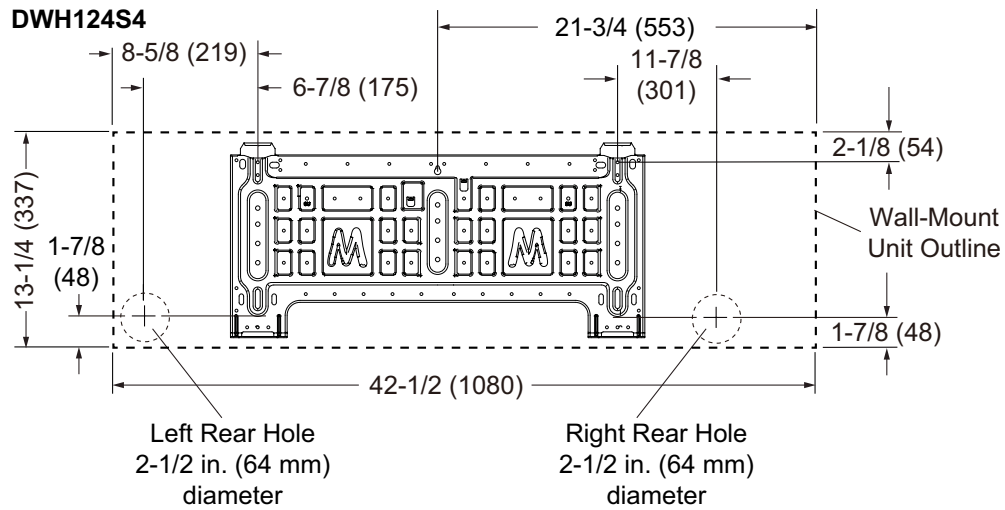
**Dimensions - Wall Mounted Indoor Units - Inches (MM)**



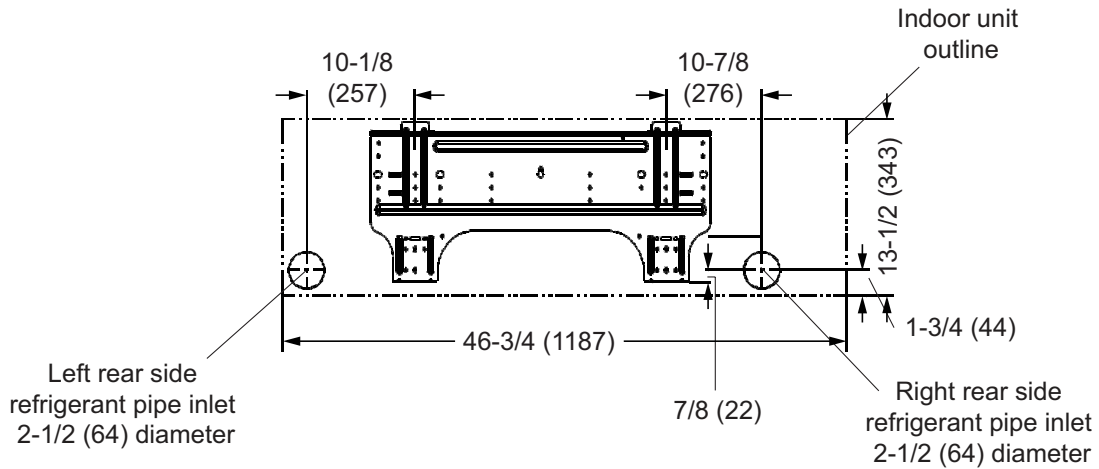
Size	A		B		C	
	in.	mm	in.	mm	in.	mm
-09	29-5/8	752	11-3/8	289	8-5/8	219
-24	32-3/4	832	11-3/4	298	8-3/4	222
-18	39-1/8	994	12-1/2	318	9-7/8	251
-24	44	1118	13-1/4	337	10-1/4	260
-36	46-3/4	1187	13-1/2	343	10-1/4	260

**Dimensions - Wall Mounted Indoor Units - Wall Plates - Inches (MM)**





**DWH136S4**



### AHRI System Matches

Indoor Unit Type	Outdoor Unit	Indoor Unit	Cooling Capacity	SEER	EER	Heat Capacity 47F	HSPF (IV)
Wall-Mounted Non-Ducted	4DHV1S09S-1L	DWH109S4-1L	9000	19	11.5	10000	10
	4DHV1S09S-1P	DWH109S4-1P	9000	18	11	9000	9.5
	4DHV1S12S-1L	DWH112S4-1L	12000	19	10.5	12000	9.5
	4DHV1S12S-1P	DWH112S4-1P	12000	19	11	12000	9.5
	4DHV1S18S-1P	DWH118S4-1P	18000	19	11	18000	10
	4DHV1S24S-1P	DWH124S4-1P	24000	17	9.5	24000	9.5
	4DHV1S36S-1P	DWH136S4-1P	36000	16	8.6	36000	8.5

Ratings are AHRI certified to AHRI Standard 210/240-2008

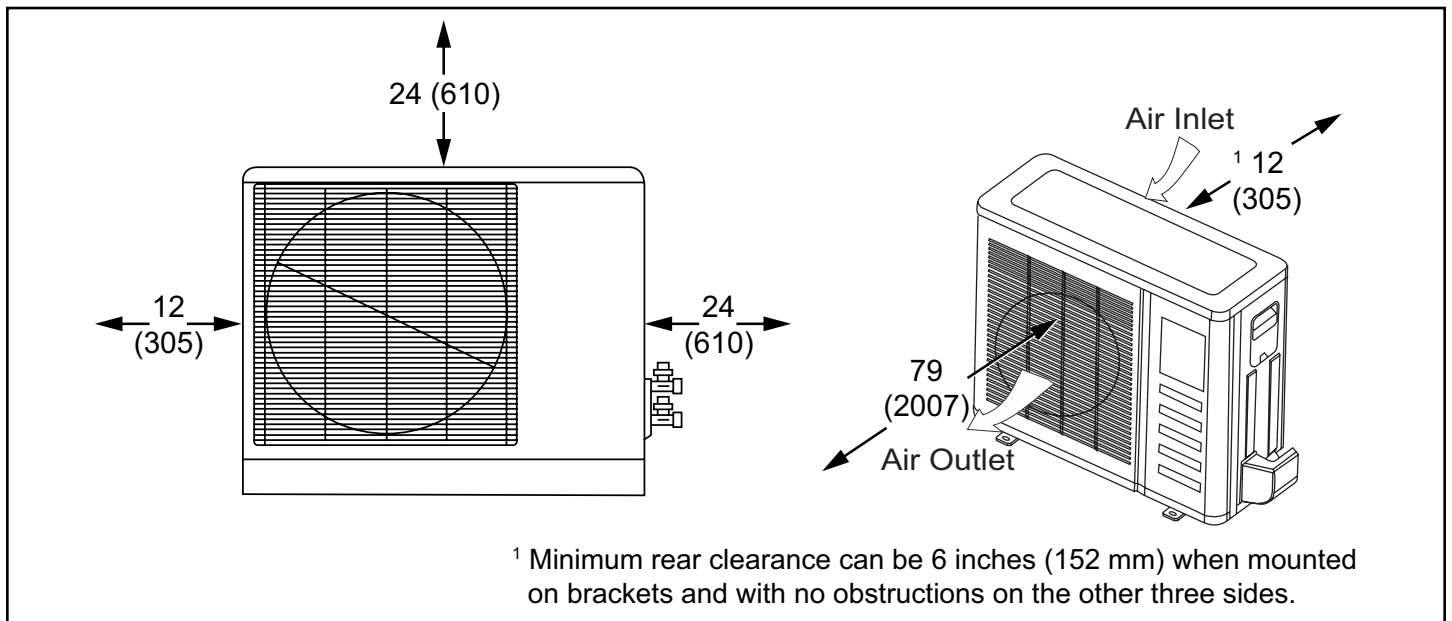
Cooling Ratings - 80°F dry bulb/67°F wet bulb entering indoor coil air and 95°F wet bulb/75°F dry bulb outdoor air temperature.

High Temperature Heating Ratings - 70°F dry bulb/60°F wet bulb entering indoor coil air and 47°F dry bulb/43°F wet bulb outdoor air temperature.

Low Temperature Heating Ratings - 70°F dry bulb/60°F wet bulb entering indoor coil air and 17°F dry bulb/15°F wet bulb outdoor air temperature.

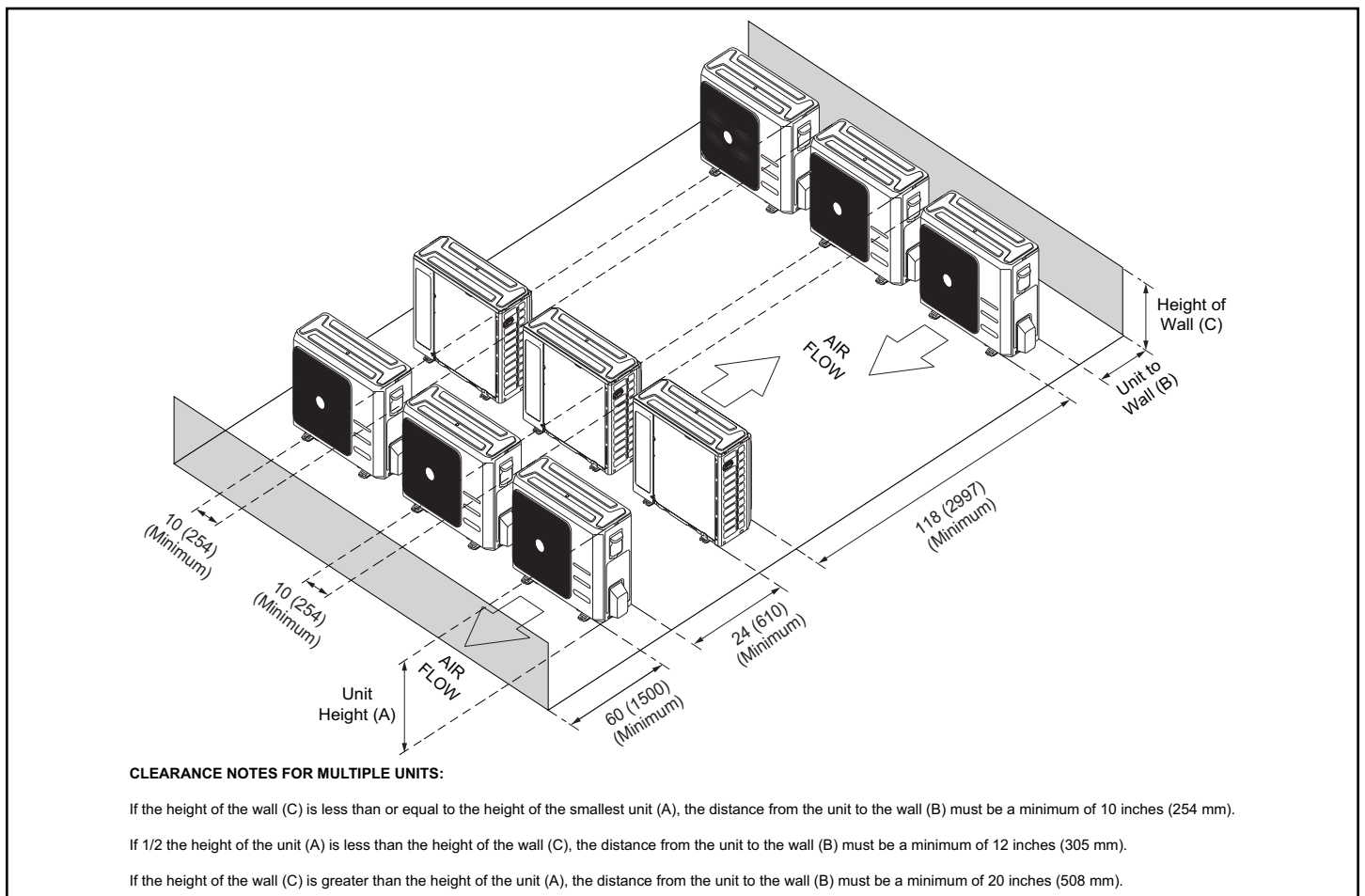
To convert HSPF from Region IV to Region V - Divide by 1.15.

## Outdoor Unit



**Figure 1. Outdoor Unit Clearances - Inches (mm)**

## Multiple Outdoor Units



**Figure 2. Multiple Outdoor Unit Clearances - Inches (mm)**

## Indoor Unit

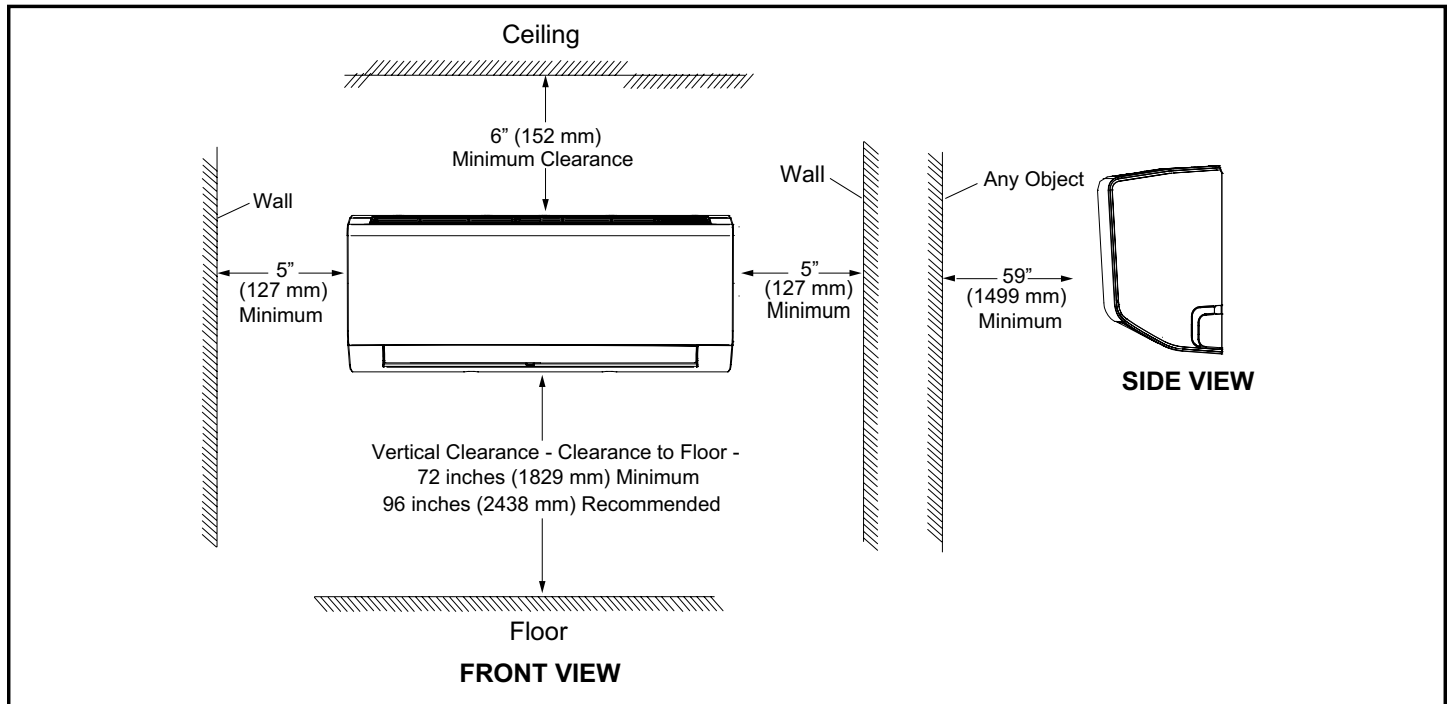


Figure 3. Indoor Unit Clearances - Inches (mm)

## Refrigeration Pipe Work

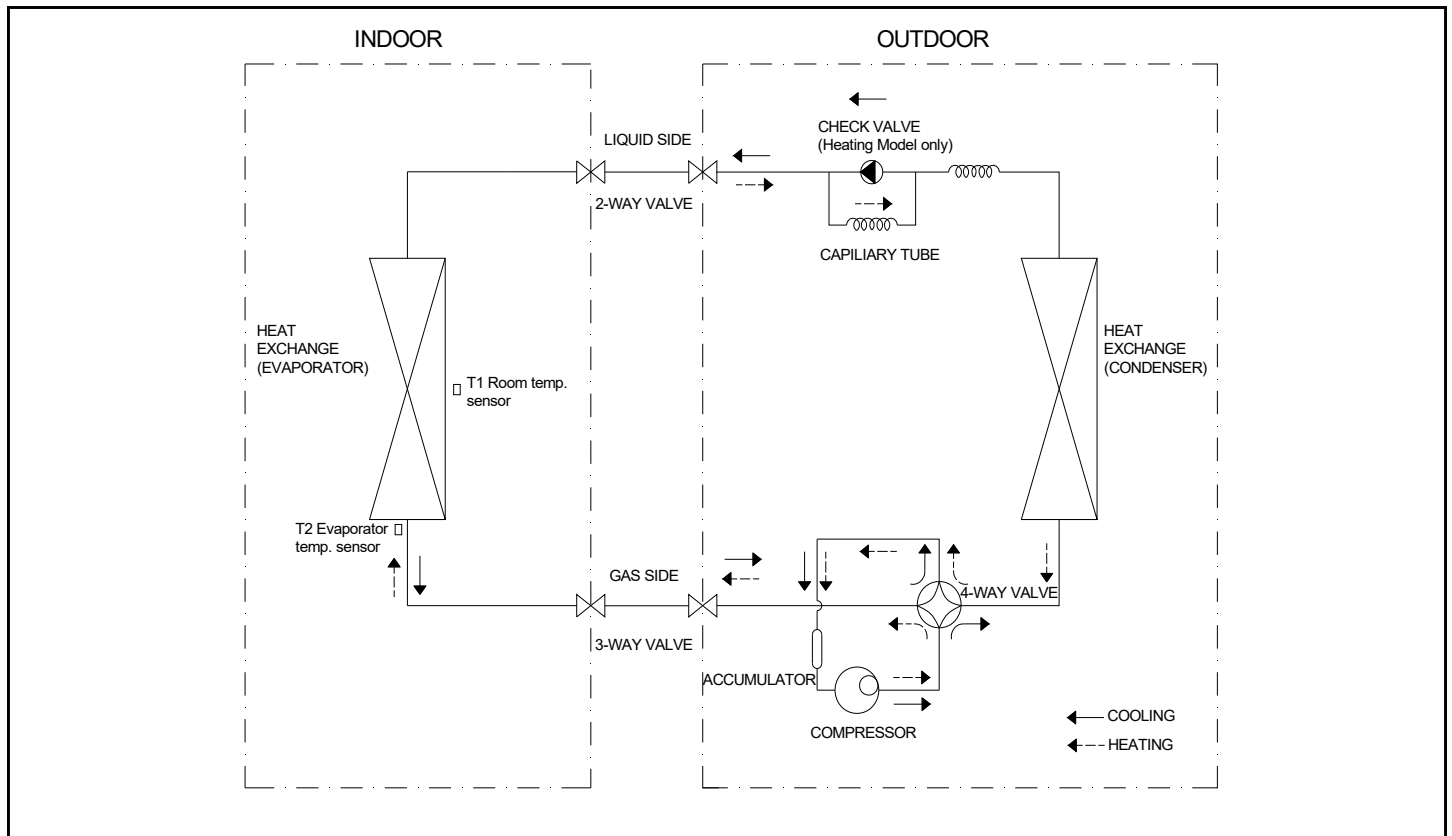
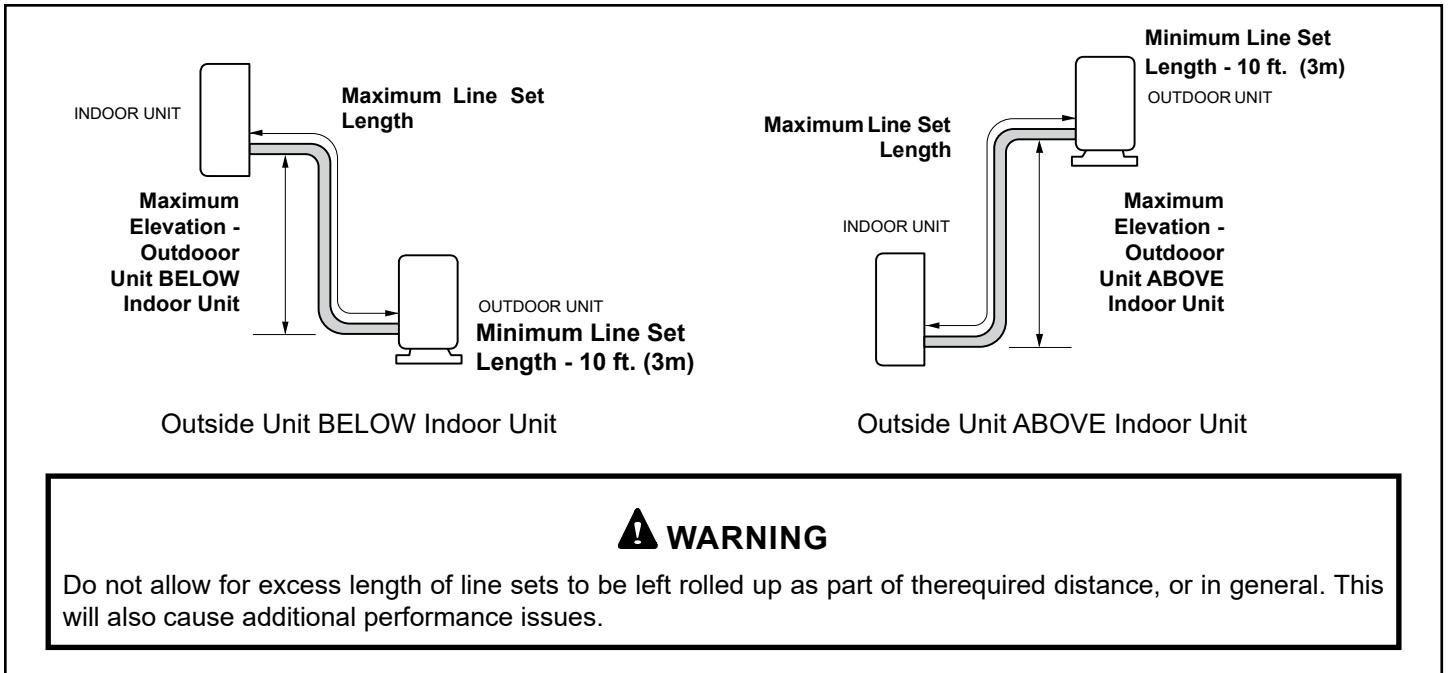


Figure 4. Single-Zone Refrigerant Cycle Diagram



**Figure 5. Single-Zone Piping Limitations**

Each system size has a line set length and vertical elevation parameters.

System Size (KBtu)	Line Set Diameters (in.)		Maximum Elevation Outdoor Unit BELOW Indoor Unit - Feet (Meters)	Maximum Elevation Outdoor Unit ABOVE Indoor Unit - Feet (Meters)	Maximum Line Set Length - Feet (Meters)	Additional Refrigerant for greater than 25 Foot Line Set Length
	Liquid	Gas				
09	1/4	3/8	82 (25)	33 (10)	82 (25)	For the additional charging, we recommend 0.161 oz. for 1/4" liquid line and 0.322 oz. for 3/8" liquid line per foot.
12	1/4	1/2	82 (25)	33 (10)	82 (25)	
18	1/4	1/2	98 (30)	66 (20)	98 (30)	
24	3/8	5/8	98 (30)	66 (20)	98 (30)	
36	3/8	5/8	98 (30)	98 (30)	213 (65)	

**Table 1. Line Set Guide**



## Outdoor Unit Connections and Line Set Usage

Description	Catalog No.	Size				
		09	12	18	24	36
<b>OUTDOOR UNIT</b>						
Line Sets	1/4 in. x 3/8 in. x 25 ft.	90X53	•	N/A		
	1/4 in. x 3/8 in. x 50 ft.	X0258	•	N/A		
	1/4 in. x 1/2 in. x 25 ft.	90X52	N/A	•	•	N/A
	1/4 in. x 1/2 in. x 50 ft.	X0259	N/A	•	•	N/A
	3/8 in. x 5/8 in. x 25 ft.	X8406	N/A		•	•
	3/8 in. x 5/8 in. x 50 ft.	X8407	N/A		•	•

**Table 2. Outdoor Unit Connections and Line Set Usage**

Indoor Unit			Extension Pipe Diameter (mm/inches)	
Model	Pipe Diameter (mm/inches)			
9K	Liquid	6.35 (1/4)	Liquid	6.35 (1/4)
	Gas	9.52 (3/8)	Gas	9.52 (3/8)
12K and 18K	Liquid	6.35 (1/4)	Liquid	6.35 (1/4)
	Gas	12.7 (1/2)	Gas	12.7 (1/2)
24K	Liquid	9.52 (3/8)	Liquid	9.52 (3/8)
	Gas	15.9 (5/8)	Gas	15.9 (5/8)
36K	Liquid	9.52 (3/8)	Liquid	9.52 (3/8)
	Gas	15.9 (5/8)	Gas	15.9 (5/8)

**Table 3. Pipe Diameter - MM (Inches)**

### CAUTION

Refrigerant pipe diameter is different according to indoor unit to be connected. When using the extension pipe, refer to Table 4.

When refrigerant pipe diameter is different from that of the outdoor unit connector (18K indoor unit) an additional adapter is required.

Outside Diameter		Torque	Additional Tightening
MM	Inches	v.cm	N.cm
Φ6.35	1/4	1500 (153kgf.cm)	1600 (163kgf.cm)
Φ9.52	3/8	2500 (255kgf.cm)	2600 (265kgf.cm)
Φ12.7	1/2	3500 (357kgf.cm)	3600 (367kgf.cm)

**Table 4. Torque Requirements**

### COOLING CAPACITY - 09 (115V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb / Wet Bulb)							
	65°F / 54°F		70°F / 59°F		75°F / 63°F		80°F / 67°F	
	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh
-13	7.47	5.29	7.90	5.59	8.29	5.97	8.64	6.22
-5	7.99	5.63	8.45	5.96	8.96	6.53	9.29	6.61
-4	8.25	5.69	8.72	6.01	9.05	6.25	9.48	6.45
0	8.73	5.94	9.13	6.21	9.63	6.55	9.98	6.73
5	8.99	6.21	9.56	6.61	9.93	6.82	10.39	7.17
15	9.03	6.39	9.61	6.80	10.08	7.19	10.50	7.42
25	9.22	6.54	9.65	6.84	10.23	7.28	10.60	7.60
35	9.37	6.57	9.74	6.84	10.23	7.26	10.71	7.56
45	9.30	6.85	9.95	7.33	10.43	7.80	10.81	7.94
55	9.50	7.33	9.99	7.71	10.43	7.90	10.92	8.27
65	9.65	6.82	10.14	7.17	10.64	7.52	11.02	7.79
75	9.57	6.88	10.18	7.32	10.63	7.64	11.13	8.00
85	9.77	7.12	10.22	7.44	10.78	7.85	11.23	8.18
95	9.89	6.94	10.35	7.25	10.91	7.65	11.31	7.93
105	9.29	6.74	9.78	7.09	10.26	7.44	10.74	7.79
110	8.59	6.70	9.09	7.09	9.64	7.52	9.99	7.79
115	8.08	6.87	8.55	7.27	8.87	7.54	9.29	7.90
122	7.48	6.66	7.78	6.92	8.16	7.26	8.55	7.61

### HEATING CAPACITY - 09 (115V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb)			
	60°F	65°F	70°F	75°F
	Total mBtuh	Total mBtuh	Total mBtuh	Total mBtuh
-13	4.49	4.34	4.11	3.94
-5	5.45	5.30	5.01	4.83
0	6.20	6.01	5.69	5.46
5	6.90	6.70	6.32	6.07
17	8.23	7.95	7.53	7.26
19.4	8.57	8.23	7.83	7.55
24.8	8.97	8.62	8.19	7.86
32	9.33	9.01	8.54	8.20
35	9.68	9.35	8.84	8.53
39.2	10.50	10.21	9.64	9.16
44.6	11.71	11.39	10.74	10.21
47	12.79	12.33	11.68	11.03
53.6	13.77	13.28	12.56	12.00
57	14.21	13.76	13.00	12.48

### COOLING CAPACITY - 09 (208/230V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb / Wet Bulb)							
	65°F / 54°F		70°F / 59°F		75°F / 63°F		80°F / 67°F	
	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh
-13	7.13	5.07	7.38	5.22	7.97	5.67	8.43	5.94
-5	7.62	5.45	7.98	5.74	8.62	6.16	9.07	6.47
-4	7.73	5.65	8.19	5.96	8.79	6.43	9.25	6.71
0	8.13	5.71	8.52	5.98	9.35	6.57	9.74	6.82
5	8.42	6.03	8.93	6.47	9.64	6.91	10.15	7.26
15	8.50	6.22	9.12	6.74	9.89	7.24	10.30	7.54
25	8.73	5.94	9.20	6.20	9.93	6.76	10.46	7.04
35	8.97	6.18	9.39	6.44	10.08	6.95	10.61	7.33
45	9.04	6.17	9.42	6.45	10.23	6.98	10.77	7.31
55	9.12	6.63	9.61	6.99	10.49	7.62	10.92	7.90
65	9.25	6.74	9.75	7.10	10.52	7.66	11.08	8.07
75	9.50	6.66	9.95	6.97	10.62	7.45	11.24	7.88
85	9.58	6.81	10.04	7.09	10.84	7.71	11.41	8.04
95	9.71	7.15	10.29	7.58	10.99	8.09	11.62	8.69
105	9.12	7.12	9.62	7.50	10.38	8.10	10.93	8.52
110	8.58	7.29	9.09	7.73	9.71	8.25	10.27	8.73
115	8.01	7.13	8.50	7.56	9.17	8.16	9.66	8.59
122	7.43	6.83	7.87	7.24	8.54	7.85	8.89	8.18

### HEATING CAPACITY - 09 (208/230V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb)			
	60°F	65°F	70°F	75°F
	Total mBtuh	Total mBtuh	Total mBtuh	Total mBtuh
-13	5.86	5.67	5.37	5.12
-5	6.98	6.75	6.39	6.10
0	8.10	7.84	7.41	7.11
5	8.96	8.69	8.23	7.94
17	10.80	10.48	9.91	9.52
19.4	10.86	10.53	9.96	9.56
24.8	10.94	10.61	10.02	9.67
32	10.98	10.67	10.07	9.56
35	11.10	10.73	10.16	9.60
39.2	11.61	11.23	10.62	10.14
44.6	12.56	12.14	11.47	11.01
47	13.11	12.58	11.96	11.54
53.6	13.55	13.00	12.35	11.86
57	13.82	13.34	12.66	12.03

### COOLING CAPACITY - 12 (115V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb / Wet Bulb)							
	65°F / 54°F		70°F / 59°F		75°F / 63°F		80°F / 67°F	
	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh
-13	9.07	6.41	9.59	6.78	10.06	7.25	10.48	7.55
-5	9.69	6.84	10.26	7.23	10.88	7.92	11.27	8.02
-4	10.01	6.90	10.58	7.29	10.98	7.58	11.50	7.82
0	10.59	7.21	11.08	7.54	11.68	7.95	12.11	8.16
5	10.91	7.54	11.60	8.02	12.04	8.28	12.61	8.70
15	10.99	7.78	11.69	8.28	12.26	8.75	12.77	9.03
25	11.24	7.97	11.76	8.34	12.47	8.88	12.92	9.25
35	11.46	8.04	11.92	8.36	12.51	8.88	13.10	9.25
45	11.36	8.37	12.15	8.95	12.75	9.53	13.21	9.70
55	11.55	8.91	12.14	9.37	12.68	9.60	13.27	10.05
65	11.52	8.14	12.12	8.56	12.71	8.98	13.17	9.31
75	11.53	8.29	12.26	8.82	12.80	9.20	13.40	9.64
85	11.28	8.22	11.80	8.59	12.45	9.07	12.97	9.44
95	10.96	7.69	11.46	8.04	12.09	8.48	12.53	8.78
105	10.08	7.31	10.60	7.69	11.13	8.07	11.65	8.45
110	9.27	7.23	9.81	7.65	10.40	8.11	10.78	8.41
115	8.72	7.41	9.22	7.84	9.57	8.14	10.02	8.52
122	7.98	7.10	8.30	7.39	8.71	7.75	9.12	8.12

### HEATING CAPACITY - 12 (115V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb)			
	60°F	65°F	70°F	75°F
	Total mBtuh	Total mBtuh	Total mBtuh	Total mBtuh
-13	4.66	4.51	4.24	4.07
-5	5.56	5.38	5.05	4.87
0	6.41	6.21	5.82	5.59
5	7.13	6.89	6.47	6.21
17	8.50	8.21	7.70	7.39
19.4	8.96	8.70	8.15	7.86
24.8	9.70	9.42	8.81	8.37
32	10.42	10.05	9.46	8.94
35	11.21	10.81	10.16	9.71
39.2	11.75	11.36	10.66	10.18
44.6	12.65	12.22	11.46	11.01
47	13.37	12.90	12.11	11.69
53.6	13.94	13.51	12.67	12.23
57	14.37	13.92	13.05	12.53

### COOLING CAPACITY - 12 (208/230V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb / Wet Bulb)							
	65°F / 54°F		70°F / 59°F		75°F / 63°F		80°F / 67°F	
	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh
-13	8.64	5.88	9.05	6.16	9.68	6.59	10.35	7.04
-5	9.24	6.38	9.68	6.69	10.46	7.23	11.13	7.69
-4	9.37	6.63	9.82	6.96	10.73	7.60	11.35	8.04
0	9.98	7.08	10.28	7.29	11.23	7.97	11.95	8.47
5	10.33	7.43	10.89	7.83	11.77	8.46	12.45	8.95
15	10.35	7.54	10.92	7.95	11.73	8.55	12.55	9.14
25	10.44	7.32	10.95	7.67	11.90	8.34	12.66	8.87
35	10.68	7.74	11.13	8.07	12.08	8.76	12.79	9.27
45	10.64	7.86	11.09	8.20	12.05	8.91	12.82	9.48
55	10.78	7.84	11.24	8.17	12.35	8.98	13.07	9.50
65	11.06	8.05	11.66	8.49	12.59	9.17	13.32	9.70
75	11.20	7.85	11.81	8.28	12.69	8.90	13.57	9.51
85	11.40	8.06	11.96	8.45	12.99	9.18	13.82	9.77
95	11.60	9.05	12.16	9.49	13.29	10.36	14.06	10.97
105	10.84	9.00	11.29	9.37	12.20	10.13	12.98	10.77
110	9.25	7.87	9.65	8.20	10.54	8.96	11.15	9.48
115	8.56	7.61	8.92	7.94	9.75	8.68	10.37	9.23
122	7.92	7.21	8.25	7.51	9.02	8.20	9.54	8.68

### HEATING CAPACITY - 12 (208/230V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb)			
	60°F	65°F	70°F	75°F
	Total mBtuh	Total mBtuh	Total mBtuh	Total mBtuh
-13	5.93	5.69	5.45	5.24
-5	7.06	6.78	6.49	6.27
0	7.86	7.54	7.21	6.89
5	8.74	8.38	8.02	7.70
17	10.26	9.86	9.43	8.96
19.4	10.98	10.54	10.08	9.68
24.8	11.93	11.45	10.94	10.56
32	12.86	12.36	11.79	11.26
35	13.65	13.09	12.50	12.00
39.2	14.09	13.58	12.96	12.50
44.6	15.08	14.54	13.86	13.30
47	15.79	15.17	14.50	13.78
53.6	16.37	15.73	15.02	14.20
57	16.88	16.22	15.47	14.70

### COOLING CAPACITY - 18 (208/230V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb / Wet Bulb)							
	65°F / 54°F		70°F / 59°F		75°F / 63°F		80°F / 67°F	
	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh
-13	14.50	10.01	15.34	10.60	15.84	10.95	16.86	11.65
-5	15.50	10.98	16.40	11.62	17.13	12.13	18.12	12.84
-4	15.72	10.64	16.64	11.27	17.57	11.89	18.49	12.52
0	16.28	11.85	17.24	12.55	18.20	13.25	19.26	14.02
5	16.98	12.31	17.97	13.03	18.87	13.67	19.86	14.39
15	17.00	12.75	18.00	13.50	18.90	14.18	20.00	15.00
25	16.68	11.92	17.96	12.83	18.75	13.40	19.74	14.10
35	16.75	11.75	17.63	12.36	18.40	12.91	19.48	13.66
45	16.54	12.04	17.41	12.67	18.38	13.37	19.35	14.08
55	16.33	11.84	17.20	12.46	18.06	13.09	19.22	13.93
65	16.13	11.60	17.27	12.42	18.04	12.97	19.09	13.72
75	16.21	11.80	17.06	12.43	18.01	13.12	18.96	13.81
85	16.00	11.82	16.85	12.45	17.79	13.15	18.83	13.91
95	15.81	12.49	16.93	13.38	17.78	14.04	18.71	14.78
105	15.36	12.44	16.17	13.09	16.97	13.75	17.96	14.55
110	14.35	11.91	15.28	12.68	16.04	13.31	16.89	14.01
115	13.34	12.01	14.21	12.79	14.84	13.36	15.79	14.21
122	12.42	11.55	13.00	12.09	13.73	12.76	14.52	13.51

### HEATING CAPACITY - 18 (208/230V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb)			
	60°F	65°F	70°F	75°F
	Total mBtuh	Total mBtuh	Total mBtuh	Total mBtuh
-13	6.96	6.69	6.46	6.27
-5	8.30	7.97	7.69	7.38
0	9.23	8.82	8.55	8.25
5	10.25	9.81	9.50	9.21
17	11.92	11.42	11.04	10.54
19.4	12.40	11.90	11.49	10.97
24.8	13.12	12.60	12.15	11.67
32	13.84	13.29	12.80	12.29
35	14.77	14.23	13.70	13.22
39.2	16.28	15.58	15.05	14.45
44.6	18.33	17.54	16.93	16.08
47	19.81	18.88	18.28	17.27
53.6	21.20	20.20	19.54	18.56
57	21.79	20.85	20.12	19.32

### COOLING CAPACITY - 24 (208/230V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb / Wet Bulb)							
	65°F / 54°F		70°F / 59°F		75°F / 63°F		80°F / 67°F	
	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh
-13	18.76	14.06	19.78	14.81	20.90	15.83	22.47	17.19
-5	20.06	15.12	21.38	16.13	22.59	16.80	24.16	18.14
-4	20.34	14.76	21.94	15.92	23.05	16.73	24.66	18.10
0	21.23	15.30	22.75	16.40	23.64	17.06	25.42	18.33
5	21.53	17.12	23.08	18.36	24.25	19.25	25.94	20.46
15	21.18	17.10	22.98	18.55	24.01	19.29	25.68	20.55
25	21.22	16.54	22.36	17.43	23.63	18.36	25.41	19.45
35	20.90	16.27	22.29	17.35	23.55	18.34	25.18	19.31
45	20.59	15.52	22.21	16.75	23.33	17.59	24.95	18.82
55	20.64	14.98	22.13	16.06	22.99	16.68	24.72	17.94
65	20.33	14.66	21.80	15.72	22.90	16.51	24.49	17.66
75	20.02	15.92	21.72	17.27	22.69	18.04	24.26	19.30
85	20.17	16.28	21.25	17.16	22.46	18.13	24.15	19.50
95	19.95	15.55	21.28	16.58	22.48	17.52	24.04	18.73
105	18.94	14.75	20.43	15.91	21.47	16.71	22.96	17.88
110	18.02	14.67	19.32	15.72	20.18	16.34	21.58	17.33
115	16.75	15.44	17.96	16.56	18.77	17.08	20.18	18.29
122	15.32	14.68	16.62	15.93	17.36	16.64	18.56	17.80

### HEATING CAPACITY - 24 (208/230V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb)			
	60°F	65°F	70°F	75°F
	Total mBtuh	Total mBtuh	Total mBtuh	Total mBtuh
-13	12.34	11.86	11.47	11.07
-5	14.70	14.13	13.65	13.04
0	16.35	15.71	15.17	14.48
5	17.95	17.20	16.67	16.00
17	21.14	20.26	19.61	18.53
19.4	21.54	20.60	19.96	18.96
24.8	22.07	21.09	20.44	19.52
32	22.55	21.59	20.90	20.06
35	23.23	22.24	21.51	20.75
39.2	25.25	24.15	23.36	22.42
44.6	28.28	27.15	26.24	25.32
47	29.63	28.33	27.46	26.36
53.6	30.72	29.39	28.45	27.02
57	31.83	30.44	29.44	27.82

### COOLING CAPACITY - 36 (208/230V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb / Wet Bulb)							
	65°F / 54°F		70°F / 59°F		75°F / 63°F		80°F / 67°F	
	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh	Total mBtuh	Sensible mBtuh
-13	28.48	25.99	29.62	26.67	30.37	27.58	30.86	28.29
-5	30.31	27.45	30.83	28.06	32.02	28.64	32.55	28.92
0	30.48	27.83	31.70	28.68	32.20	29.10	32.74	29.88
5	31.32	28.03	31.73	28.29	32.52	29.63	33.99	30.40
15	31.35	28.12	32.08	29.21	33.03	30.55	34.10	30.85
25	31.39	28.18	31.83	29.05	33.06	30.67	34.50	30.98
35	31.45	28.58	32.27	29.21	33.52	30.94	35.17	31.42
45	32.09	28.28	33.09	28.90	33.91	30.62	35.27	31.63
55	31.71	28.94	32.40	29.32	33.79	30.79	35.65	31.42
65	30.85	28.34	32.33	29.73	32.81	30.47	34.97	32.32
75	30.67	28.48	31.90	29.24	32.70	30.49	35.08	32.07
85	30.14	27.66	30.80	28.53	31.57	28.99	35.31	32.42
95	29.02	26.72	29.78	27.92	30.53	28.11	36.52	33.35
105	25.83	23.85	26.87	24.35	27.54	25.15	34.07	28.73
110	24.33	22.02	25.08	23.08	26.26	23.83	30.70	26.02
115	23.30	21.44	24.43	22.29	25.04	22.66	29.36	24.22
122	23.05	20.03	23.77	21.10	24.36	22.05	28.94	23.87

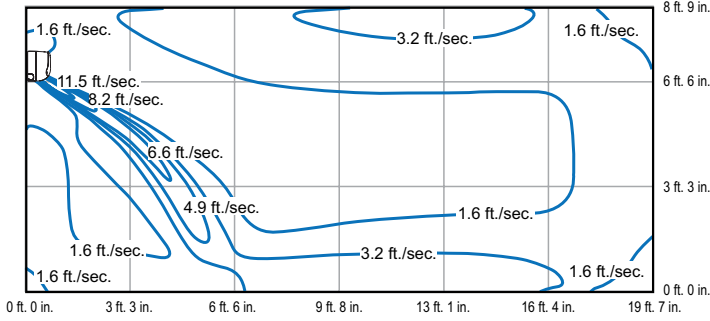
### HEATING CAPACITY - 36 (208/230V)

Outdoor Temperature - °F (Dry Bulb)	Indoor Temperature - °F (Dry Bulb)			
	60°F	65°F	70°F	75°F
	Total mBtuh	Total mBtuh	Total mBtuh	Total mBtuh
-13	17.74	16.76	15.74	14.74
-5	20.09	19.08	18.08	17.08
0	24.16	23.16	22.16	21.15
5	25.14	24.18	23.14	22.14
17	26.16	25.18	24.12	23.16
19.4	27.96	26.94	24.72	23.78
24.8	30.46	28.23	27.23	26.28
32	31.75	30.70	29.70	28.75
35	34.22	33.22	32.22	31.27
39.2	36.72	34.57	34.78	33.80
44.6	38.10	37.13	36.10	35.13
47	39.49	38.59	37.56	36.49
53.6	39.70	38.73	37.70	36.70
57	39.85	38.88	37.85	36.91

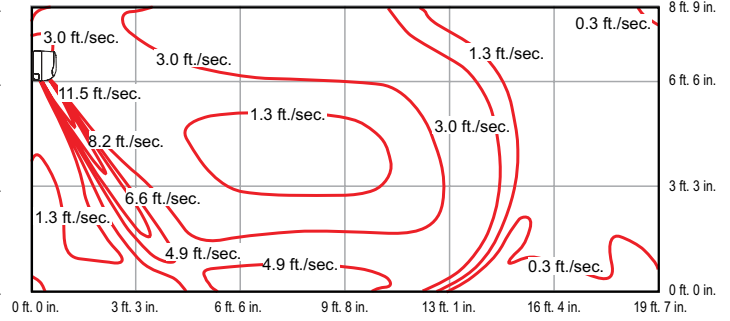


# Air Throw Data - Wall-Mounted Indoor Units

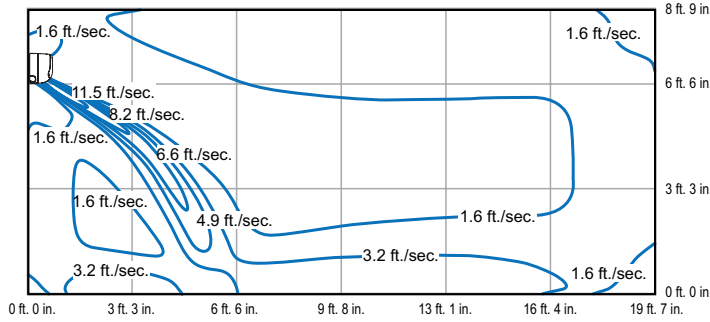
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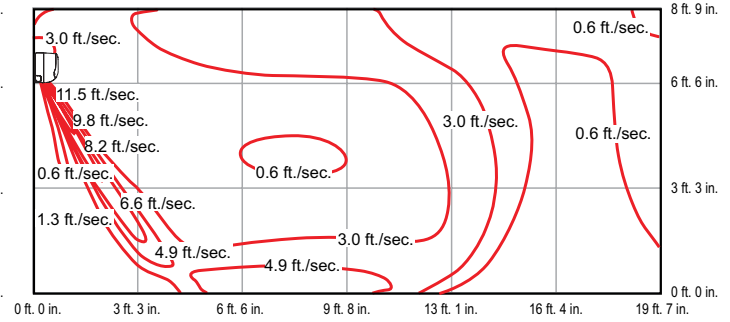
**DWH109S4 - HEATING**



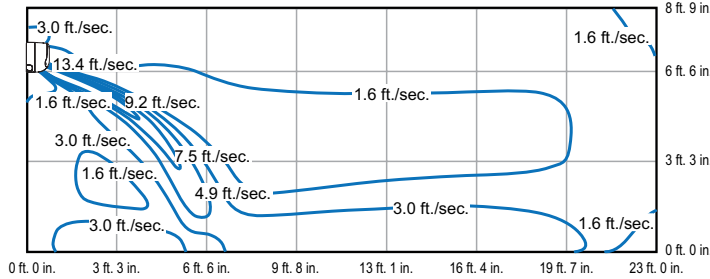
**DWH112S4 - COOLING**



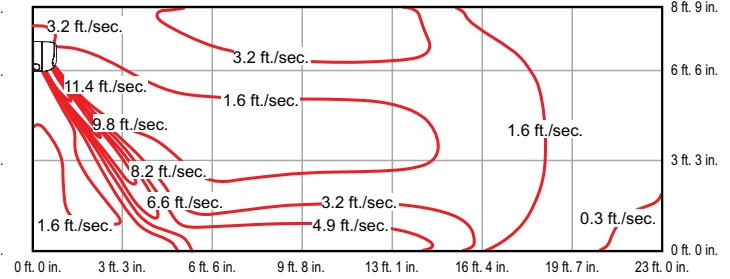
**DWH112S4 - HEATING**



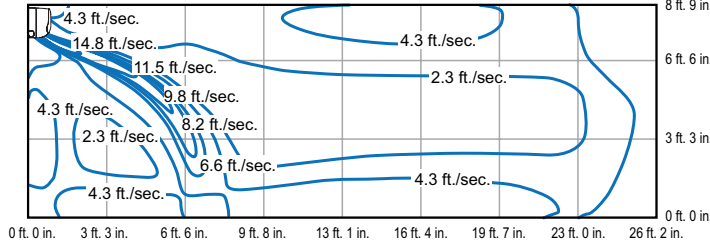
**DWH118S4 - COOLING**



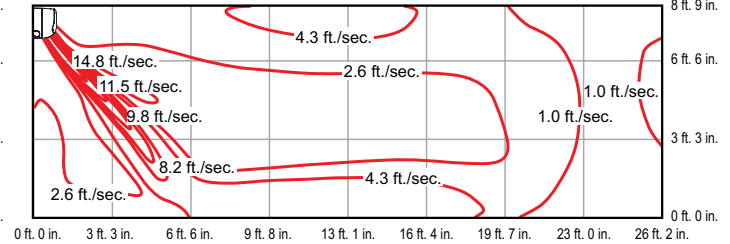
**DWH118S4 - HEATING**



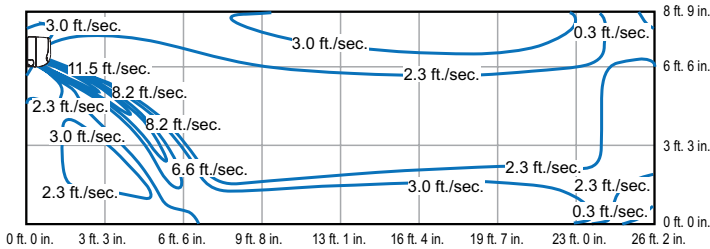
**DWH124S4 - COOLING**



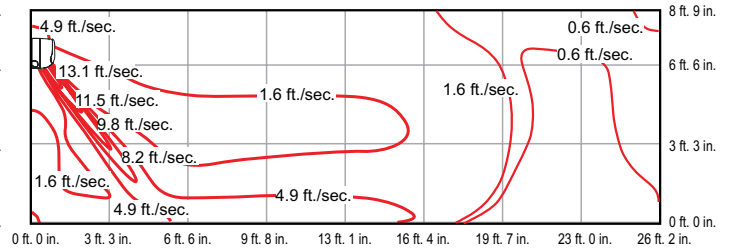
**DWH124S4 - HEATING**



**DWH136S4 - COOLING**



**DWH136S4 - HEATING**



## Power and Communication Wiring for Systems

### ⚠ CAUTION

This unit must be properly grounded and protected by a circuit breaker. The ground wire for the unit must not be connected to a gas or water pipe, a lightning conductor or a telephone ground wire.

Do not connect power wires to the outdoor unit until all other wiring and piping connections have been completed.

Install all wiring at least 3 feet (1 m) away from televisions, radios or other electronic devices in order to avoid the possibility of interference with the unit operation.

Do not install the unit near a lighting appliance that includes a ballast. The ballast may affect remote control operation.

In the U.S.A., wiring must conform with current local codes and the current National Electric Code (NEC). In Canada, wiring must conform with current local codes and the current Canadian Electrical Code (CEC).

### Overview

Refer to unit nameplate for minimum circuit ampacity and maximum over-current protection size.

- All indoor units are powered by the outdoor unit.
- Make all electrical power wiring connections at the outdoor unit.
- Size outdoor unit power per local code and power requirements.
- Connect wiring between indoor and outdoor terminals.
- Refer to unit name plate for rated voltage.
- Be sure to reattach all electrical box covers after connections are complete.
- Follow NEC/CEC standards and all local and state codes during wiring installation.

See Table 5 on page 23 and Table 6 on page 28 for wiring requirements.

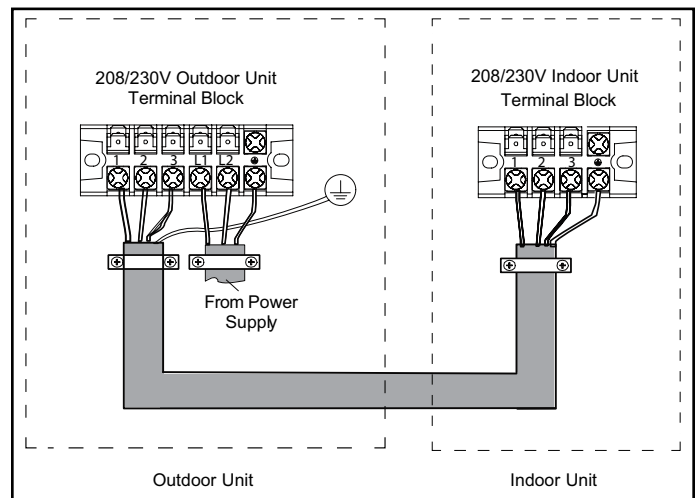


Figure 6. Single Zone Wiring - 36K

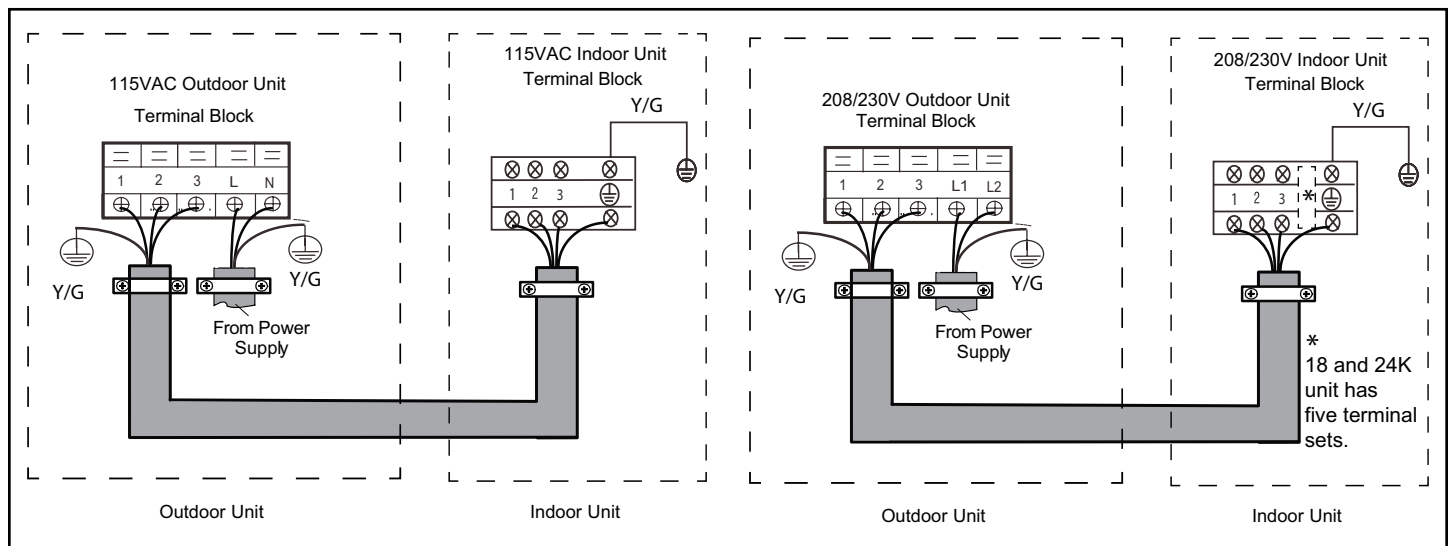


Figure 7. Single Zone Wiring - 09K, 12K, 18K and 24K

## ⚠ WARNING

Isolate the power supply before accessing unit electrical terminals.

Install unit so that unit disconnect is accessible.

Follow all local and national codes, as well as this installation instruction, during installation. Do NOT overload electrical circuit, as this may lead to failure and possible fire.

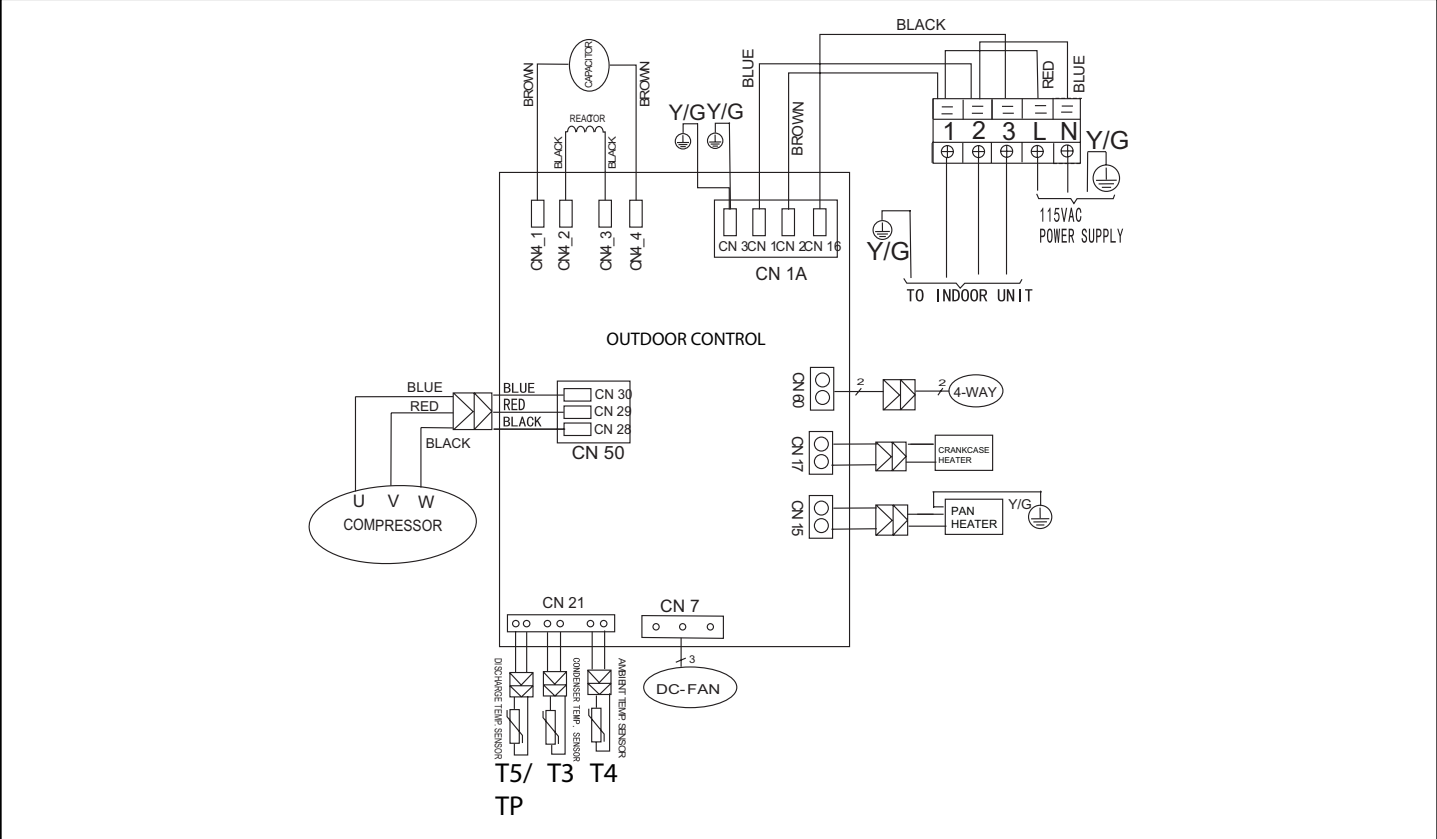
Use specified wiring and cable to make electrical connections. Clamp cables securely and make sure that connections are tight to avoid strain on wiring. Insecure wiring connections may result in equipment failure and risk of fire. Wiring must be installed so that all cover plates can be securely closed.

Systems and Terminal Designations	System Capacity	System Voltage	Number of Conductors	Wire Type	Wire Gauge / MCA
Indoor to Outdoor Wiring (Communication/Power) 1, 2, 3 and GND	09K	115VAC	4	Stranded and unshielded	16AWG / 16A
Outdoor to Main Power L, N and GND	09K	115VAC	3		14AWG / 15A
Indoor to Outdoor Wiring (Communication/Power) 1, 2, 3 and GND	12K	115VAC	4		16AWG / 15A
Outdoor to Main Power L, N and GND	12K	115VAC	3		14AWG / 15A
Indoor to Outdoor Wiring (Communication/Power) 1, 2, 3 and GND	09K	208/230VAC	4		16AWG / 10A
Outdoor to Main Power L, N and GND	09K	208/230VAC	3		16AWG / 9A
Indoor to Outdoor Wiring (Communication/Power) 1, 2, 3 and GND	12K	208/230VAC	4		16AWG / 11A
Outdoor to Main Power L1, L2 and GND	12K	208/230VAC	3		16AWG / 9A
Indoor to Outdoor Wiring (Communication/Power) 1, 2, 3 and GND	18K	208/230VAC	4		16AWG / 15A
Outdoor to Main Power L1, L2 and GND	18K	208/230VAC	3		16AWG / 18A
Indoor to Outdoor Wiring (Communication/Power) 1, 2, 3 and GND	24K	208/230VAC	4		16AWG / 20A
Outdoor to Main Power L1, L2 and GND	24K	208/230VAC	3		14AWG / 18A
Indoor to Outdoor Wiring (Power only) - L1, L2 and GND	36K	208/230VAC	3		16AWG
Indoor to Outdoor Wiring (Communication only) S1, S2 and GND	36K	208/230VAC	3		Stranded and shielded
Outdoor to Main Power L1, L2 and GND	36K	208/230VAC	3	Stranded and unshielded	10AWG / 30A

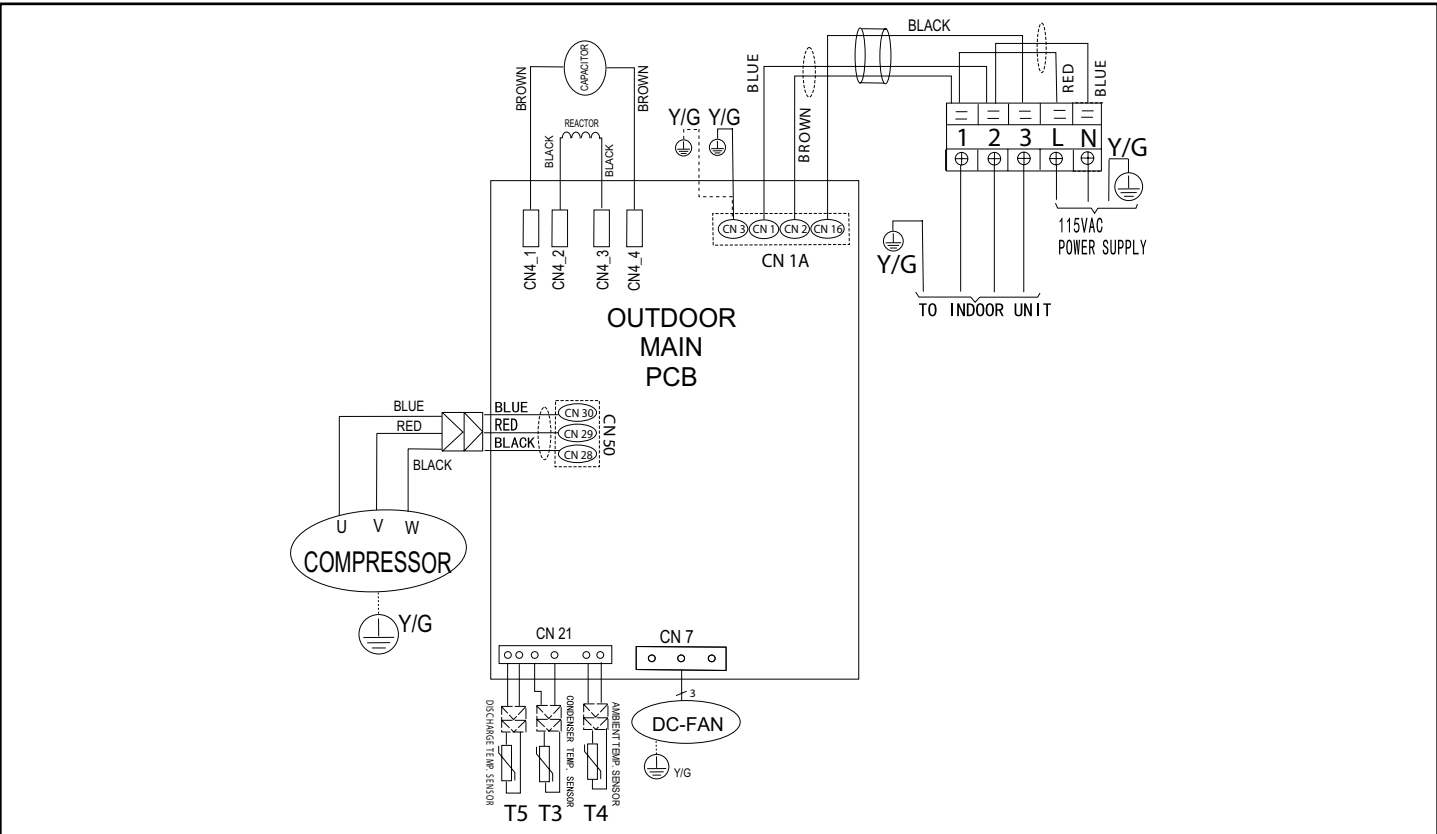
MCA = Minimum Circuit Amps

**Table 5. Single Zone Installation Wiring Requirements**

# Wiring Diagrams



**Figure 8. 9K - 115VAC Outdoor Unit Wiring Diagram**



**Figure 9. 12K - 115VAC Outdoor Unit Wiring Diagram**

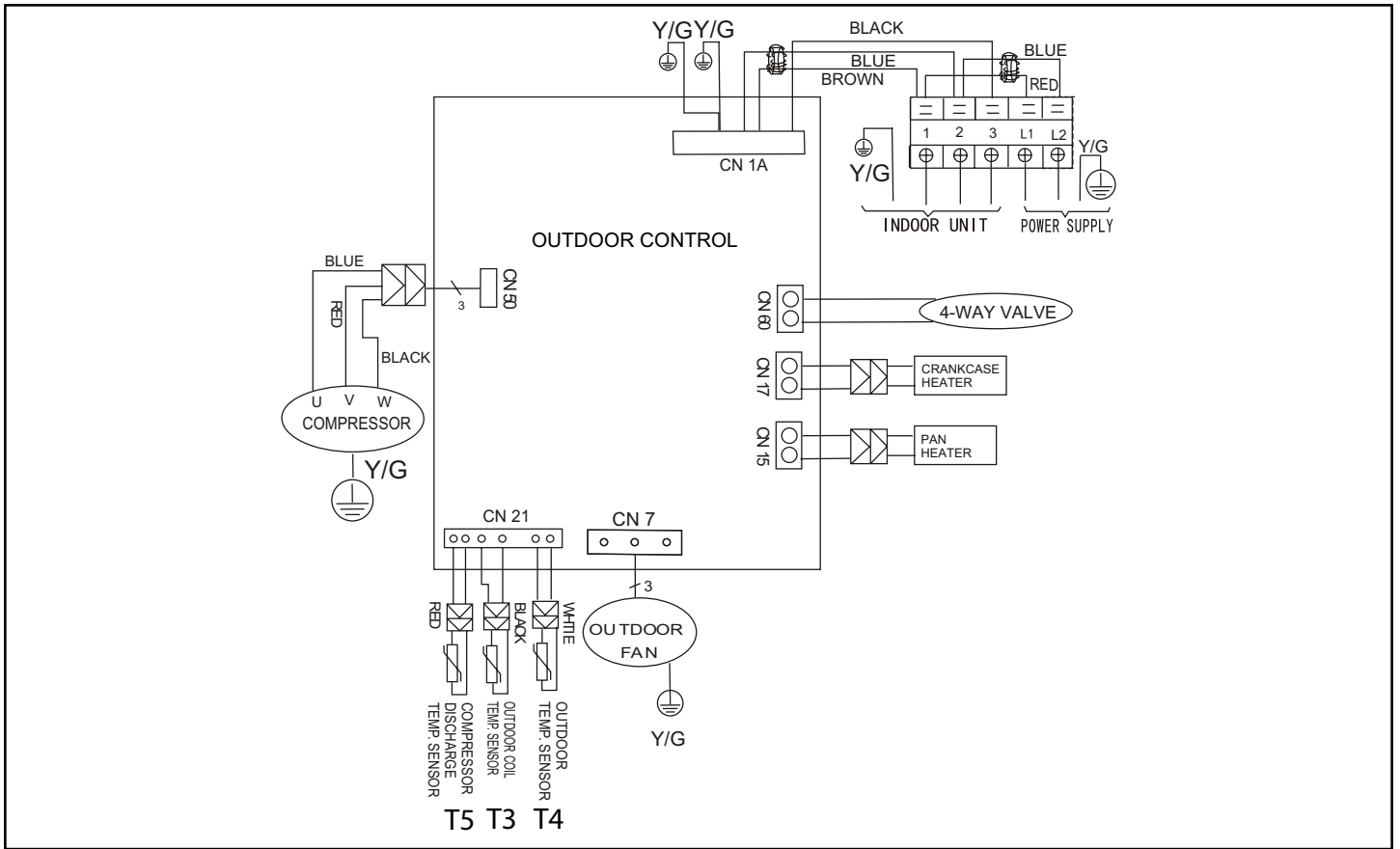


Figure 10. 09K, 12K and 18K - 208/230VAC Outdoor Unit Wiring Diagram

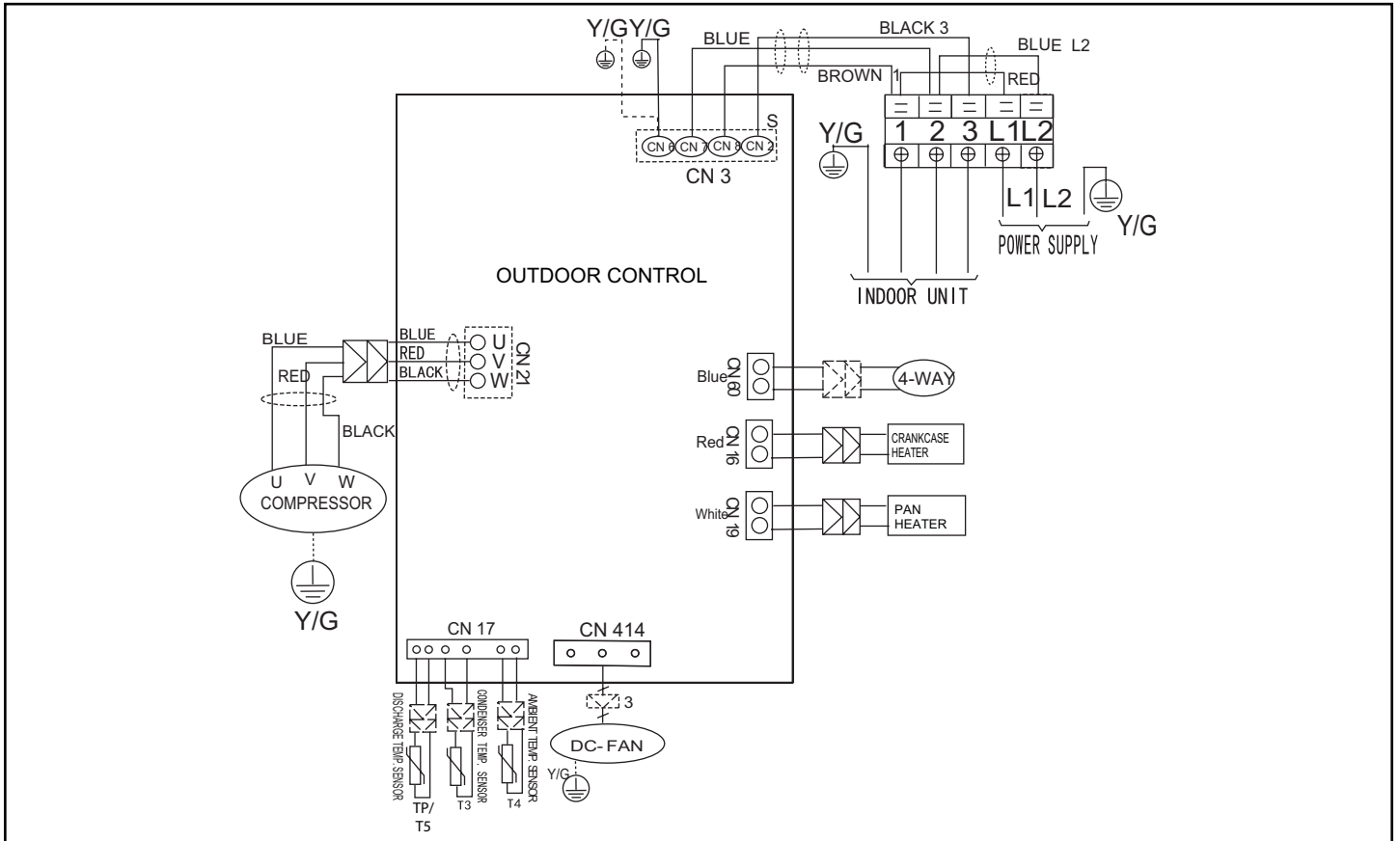


Figure 11. 24K - 208/230VAC Outdoor Unit Wiring Diagram

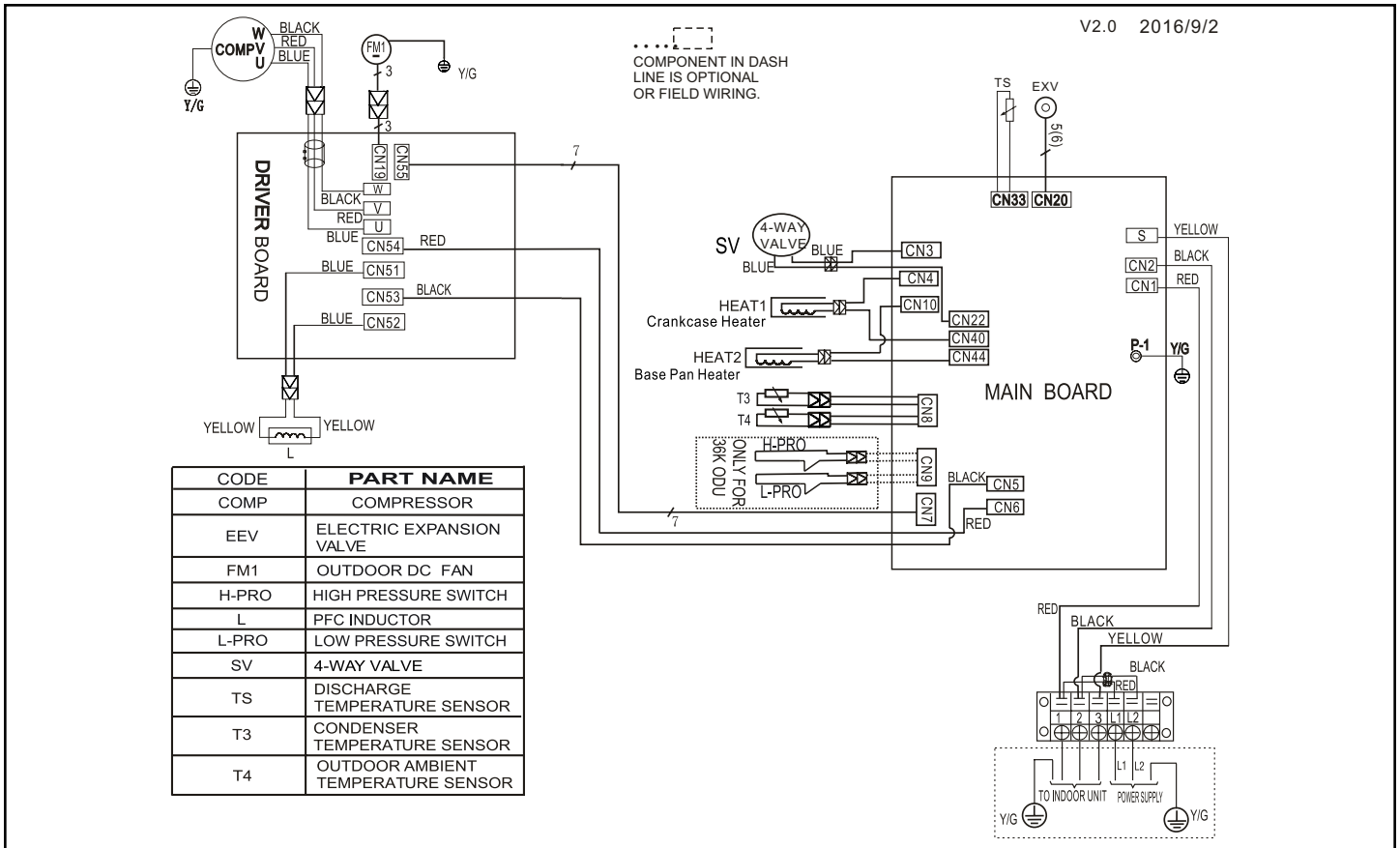


Figure 12. 36K 208/230VAC Outdoor Unit Wiring Diagram

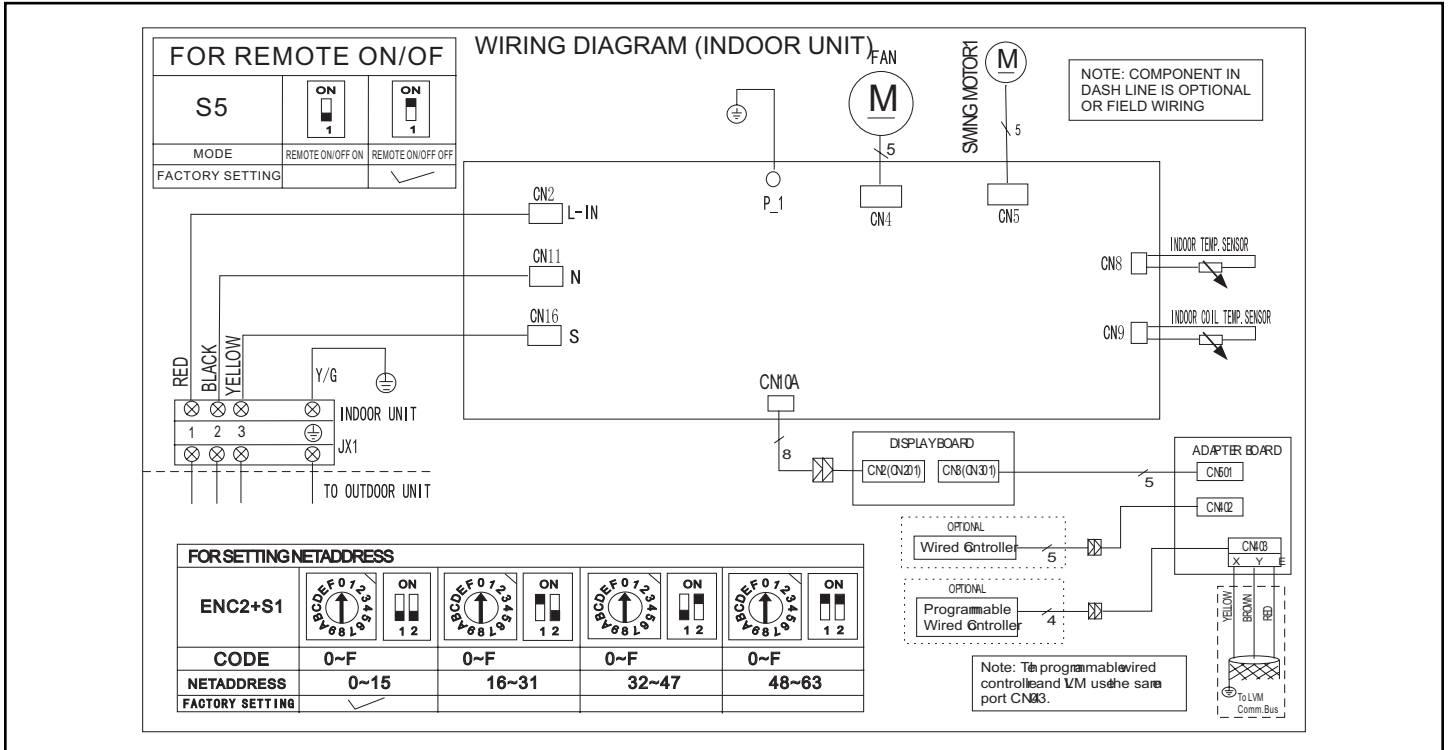


Figure 13. 09K, 12K, 18K and 24K - 115V and 208/230VAC Indoor Unit Wiring Diagram

WIRING DIAGRAM (INDOOR UNIT)  
V1.2  
2016/7/7

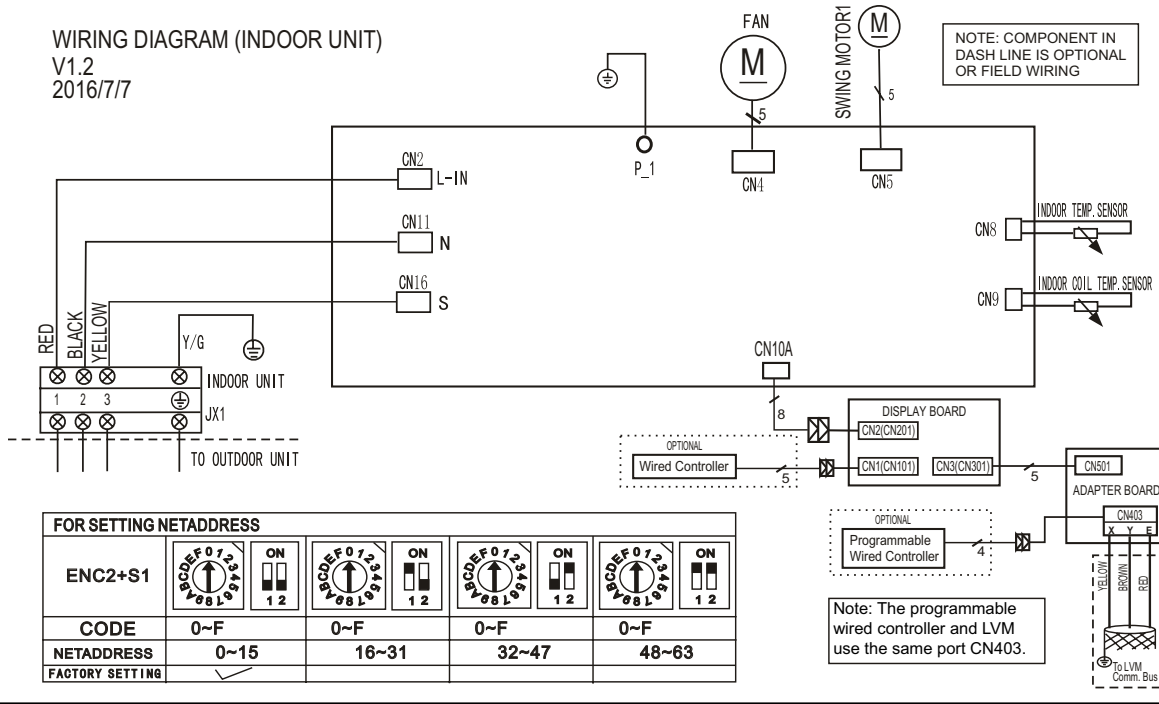


Figure 14. 36K - 208/230VAC Indoor Unit Wiring Diagram

## Wireless Remote

### **⚠ IMPORTANT**

Frequent changes to operating mode may cause system malfunction. Allow at least one minute between mode changes for the system to stabilize.

### Requirements

Using the remote controller

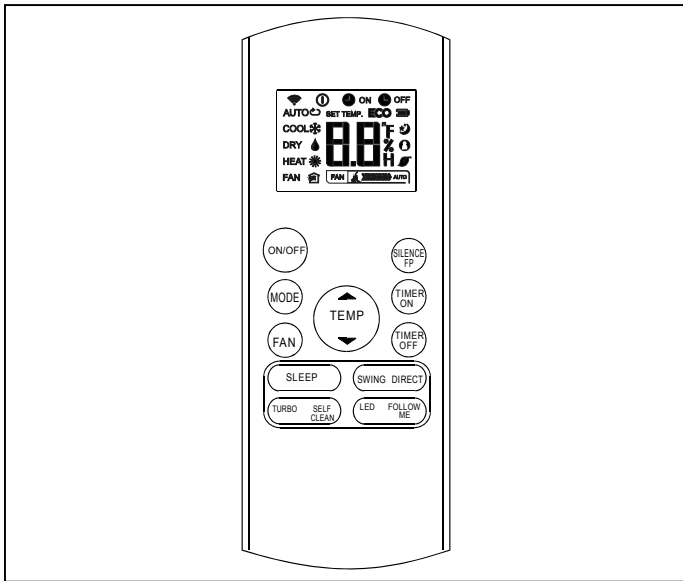
- Point the remote controller directly at the indoor unit.
- Stand within 26 feet (8 meters) of the indoor unit.
- Do not block the signal between the remote controller and indoor unit.

**NOTE:** The remote controller will not function without a clear line of sight to the indoor unit.

- Do not submerge the remote controller in liquid.
- Do not expose to direct sunlight.
- Do not drop or step on remote controller.
- Remote control holder

Use field-provided fasteners to attach the remote controller holder to any suitable vertical surface such as a wall.

### Remote Control Specifications



**Figure 15. Remote Control Buttons**

- Up arrow button. Press to increase the temperature setpoint or to scroll through settings options.
- On/Off button. Press to turn the system on or off.
- Mode button. Press to scroll through the operation modes:  
Auto → Cool → Dry → Heat → Fan

Function	Specifications
Rated voltage	3.0 VDC (2 AAA batteries)
Min voltage for sending signal to CPU	2.4 VDC
Effective transmitting distance	26 feet (8 meters)
Operation conditions	23°F to 140°F (-5 to 60°C)

**Table 6. Specifications**

- Fan speed. Press to scroll through the fan speeds: Auto → Low → Med → High.
- Sleep button. Press to activate “night-mode”. This will automatically increase (cooling) or decrease (heating) the setpoint 2°F (1°C) increment per hour for the first two hours. The modified setpoint will be set for five hours. After seven total hours the indoor unit will turn off.

**NOTE:** SLEEP mode is only available when the unit is in COOL, HEAT or AUTO mode.

- Turbo button. Press to active turbo mode. In both heating and cooling modes only, the indoor fan will ramp up to reach the setpoint more quickly. After reaching the setpoint or after 30 minutes, the indoor unit will resume the previous operating conditions.
- Self Clean button. Press to activate self cleaning mode. In cooling or dry mode only, the indoor unit will temporarily change operation to allow condensate on the indoor unit coil to evaporate, and then will return to the previous operating conditions.

- Down arrow button. Press to decrease the temperature setpoint or scroll through settings options.
- Silence button. Press and release to activate quiet mode operation. The indoor unit will change operation to provide the quietest sound possible.

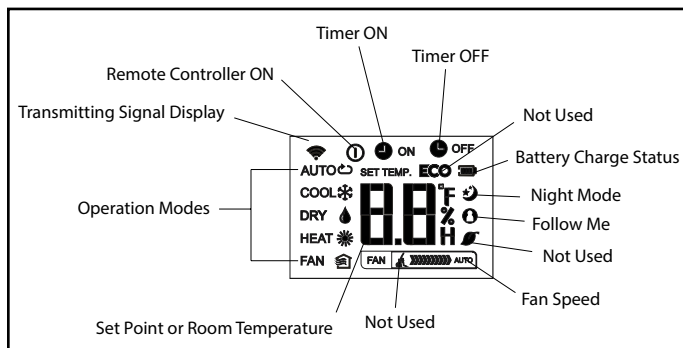
**NOTE:** Quiet mode operation may result in insufficient cooling or heating capacity. Press and release the Silence button again to stop quiet mode operation.

- FP button. Press and hold for two seconds to activate frost prevention mode. In heating mode only, the indoor unit will operate at a 46°F set point and the indoor unit display will show “FP”. To cancel, push the “ON/OFF”, “SLEEP”, “FP”, “MODE”, “FAN SPEED” or “UP/DOWN” buttons.
- Timer ON button. Press to set the number of hours of delay before the indoor unit begins operation.
- Timer OFF button. Press to set the number of hours of delay before the indoor unit stops operation.
- Swing button. Press once to initiate louver up and down oscillation. Press again to stop louver oscillation. Louvers remain in place where stopped. Not available in all indoor unit models.
- Direct (Direction) button. Press to move louvers up and down in 6 degree increments. Louvers remain in place where stopped.



- LED button. Press the LED button to turn on the indoor unit display. Press the button again to turn off the display.
- Follow Me button. Press to activate the wireless remote air temperature sensor. This will also transfer the temperature sensing function from the indoor unit to the remote. The indoor unit's air temperature sensor will be disabled. The indoor unit will regulate the room temperature based on the temperature sensor in the remote controller, rather than the sensor in the indoor unit.
- The remote controller will send the indoor unit a signal every three minutes. If the indoor unit doesn't receive the signal for seven minutes, or if the button is pressed again, the Follow Me function will terminate.
- The remote controller must remain pointed toward the indoor unit and must be within 26 feet (8 meters) of the unit. Do not remove the controller from the room or obstruct the signal of the remote controller during Follow Me operation.

## Display



**Figure 16. Remote Display**

- Remote controller On. Icon displays to indicate that the remote controller is on.
- Transmitting display. Icon blinks once when a signal is sent from the wireless remote controller.
- Operation mode. These icons show the current mode of operation. Press the mode button to scroll through the operation modes:  
Auto → Cool → Dry → Heat → Fan
- Setpoint or Room Temperature. Displays the setpoint temperature during normal operation. Displays the room temperature when in Follow me mode. Adjust the setpoint with up & down arrow buttons. No display when unit is in Fan mode.
- Remote controller On. Icon displays to indicate that the remote controller is on.
- Transmitting display. Icon blinks once when a signal is sent from the wireless remote controller.

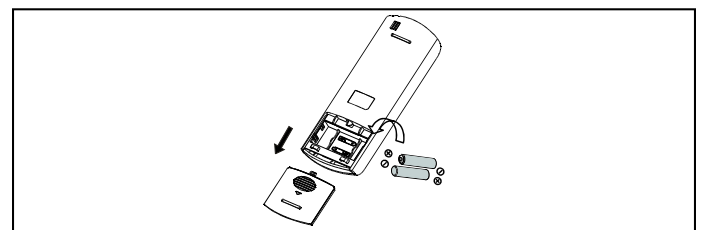
- Operation mode. These icons show the current mode of operation. Press the mode button to scroll through the operation modes:  
Auto → Cool → Dry → Heat → Fan
- Setpoint or Room Temperature. Displays the setpoint temperature during normal operation. While in follow me mode the wireless remote will display the room temperature and the wall unit will display the target set point temperature to be reached. Adjust the setpoint with up and down arrow buttons. No display when unit is in Fan mode.
- Timer ON/OFF. These icons light up to indicate that the indoor unit has a timed auto-start or auto-stop set up.
- Battery charge status. Icon displays charge status of wireless remote controller batteries.
- Sleep mode. Icon displays to indicate that sleep mode operation is on.
- Follow me. This icon displays when the air temperature sensor in the wireless remote controller is the sensor being used by the indoor unit. When this function is off, the indoor unit uses a built-in sensor.
- Fan speed. Displays the current fan speed.

## Operating Instruction

### Batteries

1. Remove battery cover from back of remote.
2. Insert batteries into battery compartment.
3. Replace cover on controller.

**NOTE:** ON/OFF Timer, setpoint, fan speed and all other functions will have to be reset whenever the batteries are completely discharged or are replaced.



**Figure 17. Replacing Batteries**

## **⚠ WARNING**

Do not mix old and new batteries or batteries of different types.

Do not leave the batteries in the remote controller if the controller will not be used for an extended amount of time.

Dispose of used batteries following local and state waste management standards.

### **Select Fahrenheit or Celsius**

Press and hold the Up and Down buttons at the same time for three seconds to toggle between Fahrenheit and Celsius.

### **To Set the Operation Mode**

Press the Mode button to scroll through the mode selections.

- Auto – System operates in cooling or heating mode as determined by the setpoint and the room temperature.
- Cool – System operates in cooling mode.
- Dry – System removes humidity according to preset conditions (fan speed and setpoint temperature, not a humidistat sensor). Cannot adjust fan speed.
- Heat – System operates in heating mode.
- Fan – This is for Fan only, no heating or cooling.

To set (or change) the room temperature setting (setpoint)

Press the up and down arrow buttons to adjust the setpoint.

### **Auto Mode**

1. Press the Power button, an LED light on the indoor unit displays.
2. Press the Mode button until the display shows AUTO.
3. Adjust temperature setpoint using up and down arrow buttons (range 62°F – 86°F).

**NOTE:** Fan speed is auto and is not adjustable.

### **Cool/Heat/Fan Mode**

1. Press the Mode button to select Cool, Heat, or Fan.
2. Adjust the temperature setpoint using up and down arrow buttons (range 62°F – 86°F).
3. Press the Fan Speed button to select Auto, Low, Med, or High fan speed.

**NOTE:** Temperature set point is not displayed in Fan mode.

### **Dry Mode**

1. Press the Power button. An LED light on the indoor unit displays.
2. Press the Mode button to select Dry.
3. Adjust the temperature set point using up and down arrow buttons.

**NOTE:** Fan speed is not adjustable in dry mode. Using dry mode will over shoot the set point by 6 - 8 degrees. There is no humidity sensor.

### **Timer Operation**

Timer ON and Timer OFF are used to turn on and turn off the indoor unit at selected intervals.

#### **Timer ON Operation**

1. Press the Timer ON button. The Timer ON icon, the last auto-on time, and “h” will display.
2. Press the Timer ON button again to set the amount of time before the indoor unit begins operation. Each press will increase the time in half hour increments until 10 hours, then the increment becomes 1 hour.

#### **Timer OFF Operation**

1. Press the Timer OFF button. The Timer OFF icon, the last auto-off time, and “h” will display.
2. Press the Timer OFF button again to set the amount of time before the indoor unit stops operation. Each press will increase the time in half hour increments until 10 hours, then the increment becomes 1 hour.

#### **Modify Timer ON/OFF settings**

1. Press either the Timer ON button or the Timer OFF button to modify that setting.
2. Use the up arrow and down arrow buttons to change the timed operation intervals.
3. Set the timer to 0.0 to turn off timed operation.

## Connection to Centralized Controller

### Set Indoor Unit Address for Centralized Control (Used with VRF Only)

All indoor units connected to a centralized controller must have a unique address. Use the S1 dip switch and the S2 dial switch to set the address for each indoor unit. Figure 18 shows how to set the unique addresses.

All indoor units are factory set to "0". To change the address to "1", move the dial switch to the 1 position, do not adjust the dip switches. To change the address to "35", move dip switch 1 to the UP position and move the dial switch to the 3 position.





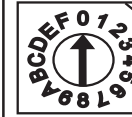

FOR SETTING ADDRESS						
S1+S2						
RANGE	0 ~ F	0 ~ F	0 ~ F	0 ~ F	0 ~ F	0 ~ F
ADDRESS	0 ~ 15	16 ~ 31	32 ~ 47	48 ~ 63		
DIP SWITCH HANDLES	LEFT - DOWN RIGHT - DOWN	LEFT - DOWN RIGHT - UP	LEFT - UP RIGHT - DOWN	LEFT - UP RIGHT - UP		
FACTORY SETTING	<input checked="" type="checkbox"/>					

Figure 18. Dip Switches

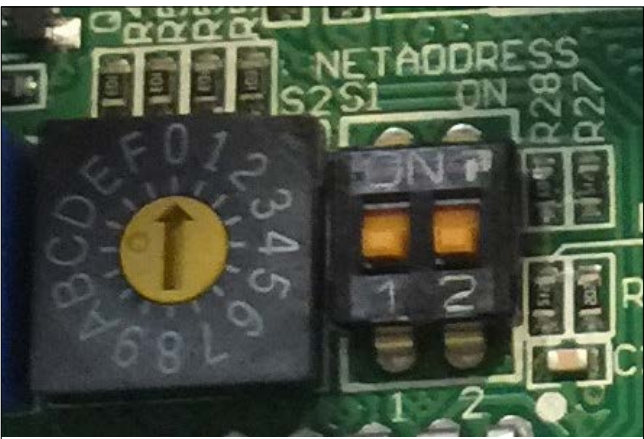

	
Indoor Unit Address is 0 Both dip switch handles are DOWN, dial points to 0.	Indoor Unit Address is 32 Dip switch 1 is UP and dip switch 2 is DOWN, dial points to 0.
Switch location and color varies for each indoor unit. Two examples are shown above.	

Figure 19. Dip Switch Settings

## Indoor Unit Connection Points for Centralized Controller

Mini-split indoor units can be connected to a centralized controller or a BACnet or LonWorks gateway using the XYE terminals on the indoor unit main board.

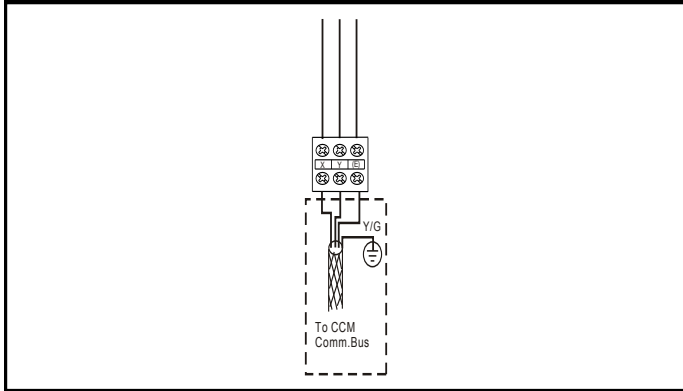


Figure 20. Indoor Unit Connection Points (Typical Wiring Diagram)

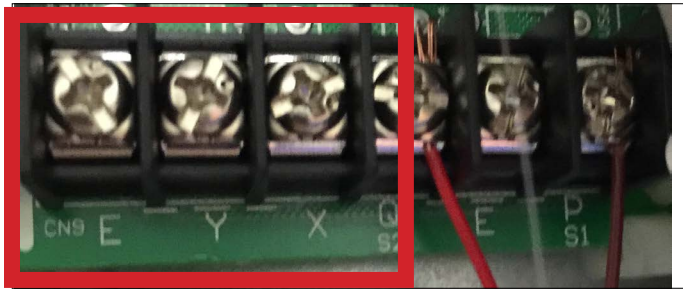


Figure 21. Typical Indoor Unit Connection Points

## Dry Mode Operation - Indoor Units

### Procedure

1. Press the MODE button to select DRY mode.
2. Press the UP/ DOWN button to select the desired temperature. The temperature setting range is from 62°F to 86°F in one degree increments.

**NOTE:** The blower is preset at a low speed and cannot be changed therefore it will get cold and most likely will overshoot the temperature setting by 6-10 degrees depending on the room size or other various factors. Also the Follow Me mode does not operate in this mode. The Follow Me mode is only available when a return air sensor is utilized. Typically in most cases the Follow Me mode will not be sufficient to remove excessive humidity.

**NOTE:** In addition, the outdoor units do not have a humidistat installed therefore they are unable to determine humidity levels. This product is not recommended as a main source for dehumidification. Note, this will overshoot the temperature by 6-8 degrees below what was set for dry mode.

**NOTE:** Using this mode will overshoot the temp by 6-8 degrees below what was set for dry mode.

### Dry Mode Operation Sequence

When in dry mode operation the unit is actually in cooling mode with a low speed blower operation. The compressor will stop when the room temperature is two degrees Celsius lower than the temperature setting.

However there is a temperature compensation for cooling mode that is two degrees Celsius. So the unit will stop when the temperature is four degrees Celsius lower than the room temperature settings.

**NOTE:** Four degrees Celsius is equivalent to 8°F difference.

### Test Run - Indoor Units

Only perform test run after you have completed the following steps:

- Electrical Safety Checks – Confirm that the unit's electrical system is safe and operating properly
- Gas Leak Checks – Check all flare nut connections and confirm that the system is not leaking
- Confirm that gas and liquid (high and low pressure) valves are fully open.

### Test Run Instructions

You should perform the Test Run for at least 30 minutes.

1. Connect power to the unit.
2. Press the ON/OFF button on the remote controller to turn it on.
3. Press the mode button to scroll through the functions, one at a time:
4. Let each function run for five minutes, and perform the following checks:

Checks	Pass	Fail
No electrical leakage		
Unit is properly grounded		
All electrical terminals properly covered		
Indoor and outdoor units are solidly installed		
All pipe connection points do not leak		
Water drains properly from drain hose		
All piping is properly insulated		
Unit performs COOL function properly		
Unit performs HEAT function properly		
Indoor unit louvers rotate properly		
Indoor unit responds to wireless remote		

**Table 7. Test Run Checklist**

### Double-Check Pipe Connections

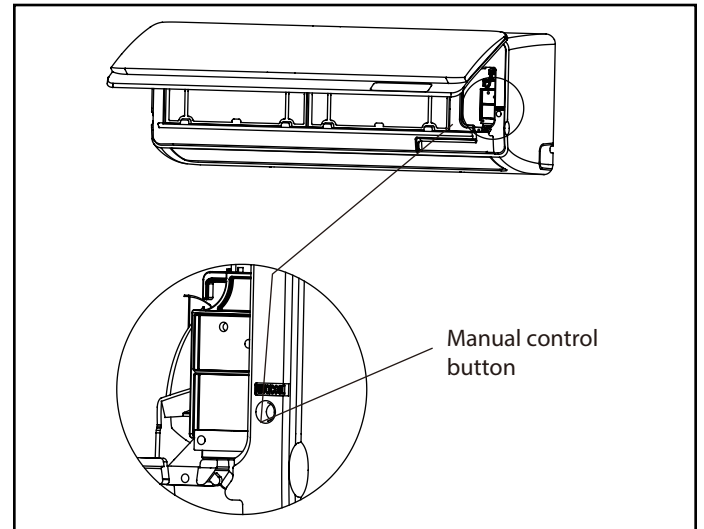
During operation, the pressure of the refrigerant circuit will increase. This may reveal leaks that were not present during your initial leak check. Take time during the Test Run to double-check that all refrigerant pipe connection points do not have leaks.

- Using remote control, return unit to the normal operating temperature.
- Using insulation tape, wrap the indoor refrigerant pipe connections that you left uncovered during the indoor unit installation process.

### Ambient Temperature is Below 63°F (17°C)

You can't use the remote controller to turn on the COOL function when the ambient temperature is below 17°C. In this instance, you can use the MANUAL CONTROL button to test the COOL function.

- Lift the front panel of the indoor unit, and raise it until it clicks in place.
- The MANUAL CONTROL button is located on the right-hand side of the unit. Press it one time to select the COOL function. First push is FC force cooling, which will display on the wall unit as FC which is used for high speed charging 30 minute time.
- Perform Test Run as normal.
- Push the button one time is for FC force cooling, which will displayed on wall unit as FC. This is used for high speed charging 30 minute time.
- Push the button two times for cooling set 75°F and unit is in auto mode. Temperature is set at 75°F with no changing of set temperature.



**Figure 22. Manual Button Location**

## Installation Requirements

### Gas Leak Check with Soap Water

Apply soap water or a liquid neutral detergent on the connections with a soft brush to check for leakage in the pipe connecting points. If bubbles emerge, the pipes are leaking.

### Air and Moisture

Air and moisture in the refrigerant system cause the following problems:

- Increases in system pressure
- Increases in operating current
- Decreases in cooling and heating efficiency
- Blocks in capillary tubing caused by moisture in the refrigerant circuit freezing
- Corrosion of parts in the refrigerant system caused by water

The indoor units and the pipes between indoor and outdoor units must be tested for leakages and evacuated to remove gas and moisture from the system.

### Air Purging using a Vacuum Pump

1. Completely tighten the flare nuts on the indoor and outdoor units. Confirm that both the two-way and three-way valves are set to the closed position.
2. Connect the charge hose with the push pin of the Handle Lo to the three-way valve gas service port.
3. Connect the charge hose of the Handle Hi to the vacuum pump.
4. Fully open the Handle Lo of the manifold valve.
5. Turn on the vacuum pump to begin evacuation.
6. Conduct a 30-minute evacuation. Check whether the compound meter indicates - 0.1Mpa(14.5Psi). If the meter does not indicate -0.1Mpa (14.5Psi) after 30 minutes has elapsed, continue evacuation for 20 more minutes. If the pressure does not reach - 0.1Mpa (14.5Psi) after 50 minutes has elapsed, check if there are any leaks.
7. Fully close the Handle Lo valve of the manifold valve and turn off the vacuum pump. After five minutes, confirm that the gauge needle is not moving.
8. Turn the flare nut on the three-way valve 45° counter-clockwise for 6-7 seconds. Once gas begins to come out, tighten the flare nut. Make sure the pressure display on the pressure indicator is higher than atmospheric pressure. Then remove the charge hose from the three-way valve.
9. Fully open the two-way and three-way valves and securely tighten the cap on the three-way valve.

### Adding Refrigerant if Pipe Length Exceeds Charge Less Pipe Length

Connect the charge hose to the charging cylinder and open the two-way and three-way valves. With the charge hose you disconnected from the vacuum pump, connect it to the valve at the bottom of the cylinder.

If the refrigerant is R-410A, place the cylinder bottom-up to ensure liquid charging is possible.

1. Purge the air from the charge hose.
2. Open the valve at the bottom of the cylinder and press the check valve on the charge set (be careful of the liquid refrigerant).
3. Place the charging cylinder onto the electronic scale and record the weight.
4. Turn on the air conditioner in cooling mode.
5. Open the valves (Low side) on the charge set. Charge the system with liquid refrigerant.
6. When the electronic scale displays the proper weight (refer to the table), disconnect the charge hose from the three-way valve's service port immediately and turn off the air conditioner before disconnecting the hose.
7. Mount the valve stem caps and the service port Use a torque wrench to tighten the service port cap to a torque of 18N.m (13.27 ft·lbs).
8. Be sure to check for gas leaks.

### Add Refrigerant after Long-Term System Operation

1. Connect the charge hose to the three-way service port and open the two-way and three-way valve.
2. Connect the charge hose to the valve at the bottom of the cylinder. If the refrigerant is R-410A, place the cylinder bottom-up to ensure liquid charge.
3. Purge the air from the charge hose.
4. Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air (be careful of the liquid refrigerant).
5. Place the charging cylinder onto the electronic scale and record the weight.
6. Turn on the air conditioner in cooling mode.
7. Open the valves (Low side) on the charge set and charge the system with liquid refrigerant.
8. When the electronic scale displays the proper weight (refer to the gauge and the pressure of the low side), disconnect the charge hose from the three-way valve's service port immediately and turn off the air conditioner before disconnecting the hose.

9. Mount the valve stem caps and the service port. Use torque wrench to tighten the service port cap to a torque of 18N.m(13.27 ft-lbs).
10. Be sure to check for gas leaks.

### **Servicing Indoor Unit Refrigeration Circuit** **Collecting Refrigerant into Outdoor Unit**

1. Confirm that both the two-way and three-way valves are set to the opened position
2. Remove the valve stem caps and confirm that the valve stems are in the opened position.
3. Be sure to use a hexagonal wrench to operate the valve stems.
4. Connect the charge hose with the push pin of handle lo to the three-way valves gas service port.
5. Air purging of the charge hose - Open the handle Lo valve of the manifold valve slightly to purge air from the charge hose for five seconds and then close it quickly.
6. Set the two-way valve to the close position.
7. Operate the air conditioner at the cooling cycle and stop it when the gauge indicates 0.1MPa (14 psi).
8. Set the three-way valve to the closed position immediately
9. Do this quickly so that the gauge ends up indicating 0.3 to 0.5Mpa (43 - 72 psi).
10. Disconnect the charge set, and tighten the two-way and three-way valve's stem nuts.
11. Use a torque wrench to tighten the three-way valves service port cap to a torque of 18N.m.
12. Be sure to check for gas leakage.

### **Air Purging with Vacuum Pump**

1. Completely tighten the flare nuts of the indoor and outdoor units, confirm that both the two-way and three-way valves are set to the closed position.
2. Connect the charge hose with the push pin of handle lo to the three-way valves gas service port.
3. Connect the charge hose of handle hi connection to the vacuum pump.
4. Fully open the handle Lo of the manifold valve.
5. Operate the vacuum pump to evacuate.
6. Make evacuation for 30 minutes and check whether the compound meter indicates - 0.1Mpa (500 microns). If the meter does not indicate - 0.1Mpa (500 microbars) after pumping 30 minutes, it should be pumped 20 minutes more. If the pressure can't achieve -0.1Mpa (500 microbars) after pumping 50 minutes, please check if there are some leakage points.

7. Fully close the handle Lo valve of the manifold valve and stop the operation of the vacuum pump. Confirm that the gauge needle does not move (approximately five minutes after turning off the vacuum pump).
8. Turn the flare nut of the three-way valves about 45° counterclockwise for six or seven seconds after the gas coming out, then tighten the flare nut again. Make sure the pressure display in the pressure indicator is a little higher than the atmosphere pressure. Then remove the charge hose from the three-way valve.
9. Fully open the two-way valve and three-way valve and securely tighten the cap of the three-way

### **Evacuation after Servicing the Outdoor Unit Refrigeration Circuit** **Evacuation of the Complete Refrigeration Circuit, Indoor and Outdoor Unit**

1. Confirm that both the two-way and three-way valves are set to the opened position.
2. Connect the vacuum pump to three-way valve's service port.
3. Evacuation for approximately one hour. Confirm that the compound meter indicates - 0.1Mpa (500 Microns / 29.9 in. hg).
4. Close the valve (Low side) on the charge set, turn off the vacuum pump, and confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).
5. Disconnect the charge hose from the vacuum pump.

### **Refrigerant Charging**

1. Connect the charge hose to the charging cylinder, open the two-way valve and the three-way valve.
2. Connect the charge hose which you disconnected from the vacuum pump to the valve at the bottom of the cylinder. If the refrigerant is R-410A, make the cylinder bottom up to ensure liquid charge.
3. Purge the air from the charge hose
4. Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air (be careful of the liquid refrigerant).
5. Put the charging cylinder onto the electronic scale and record the weight.
6. Open the valves (Low side) on the charge set and charge the system with liquid refrigerant. If the system cannot be charge with the specified amount of refrigerant, or can be charged with a little at a time (approximately 150g each time) , operating the air conditioner in the cooling cycle; however, one time is not sufficient, wait approximately 1 minute and then repeat the procedure.



7. When the electronic scale displays the proper weight, disconnect the charge hose from the 3- way valve's service port immediately.
8. If the system has been charged with liquid refrigerant while operating the air conditioner, turn off the air conditioner before disconnecting the hose.
9. Mounted the valve stem caps and the service port. Use torque wrench to tighten the service port cap to a torque of 18N·m (13.27 ft·lbs).
10. Always leak check after servicing the refrigerant system.

There are one low-pressure centralized valve and one high-pressure centralized valve, it will be more time saving when vacuum and recycle refrigerant. But refer to the previous instruction when vacuum and recycle refrigerant.

## Electronic Function

### Abbreviation

- T1: Indoor ambient temperature
- T2: Middle indoor heat exchanger coil temperature
- T3: Outdoor heat exchanger pipe temperature
- T4: Outdoor ambient temperature
- T5: Compressor discharge temperature

### Electric Control Working Environment.

- Input voltage: 230V.
- Input power frequency: 60Hz.
- Indoor fan standard working amp.: <1A
- Outdoor fan standard working amp.: <1.5A.
- Four-way valve standard amp.: <1A

## Adding Refrigerant - Single-Zone Systems

The outdoor unit is factory-charged with refrigerant. Calculate the additional refrigerant required according to the diameter and the length of the liquid pipe between the outdoor unit and indoor unit connections.

Be sure to add the proper amount of additional refrigerant. Failure to do so may result in reduced performance.

See Table 1 on page 12 for how much refrigerant needs to be added based on pipe length.

**NOTE:** *Interconnecting pipe work between outdoor and indoor units must be 10 ft. or longer.*

**NOTE:** *Do not remove refrigerant for line lengths less than 25 ft. R-410A is a blended refrigerant. If you must remove charge, it is necessary to remove the entire charge and weigh in the new charge.*

## Single-Zone Outdoor Unit LED Locations

Single-zone outdoor units display flash codes on the main board. The main board is accessed through the top of the unit. Indoor units will display more detailed error codes.

These outdoor units do not have a SW1 spot check push button switch. Diagnostic is performed through a series of blue, red and green LEDs.

**NOTE:** *The control on all single-zone outdoor units is mounted with all LEDs down and cannot be seen unless the control is removed.*

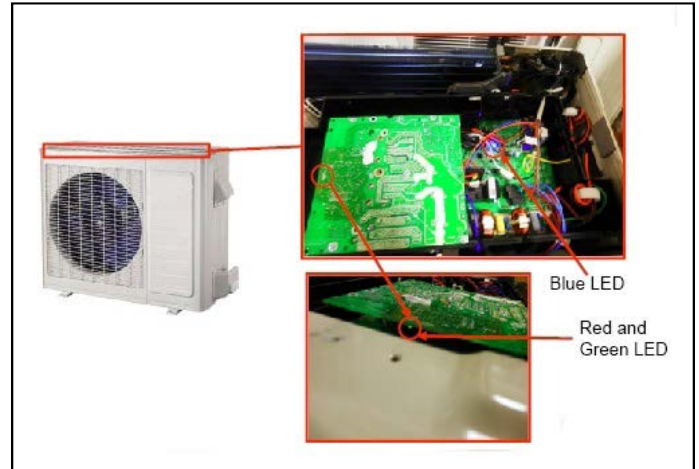


Figure 23. Typical Location of Outdoor Unit LEDs



## Specifications and Operations

CN8	Indoor ambient temperature
CN9	Coil temperature of indoor heat exchanger
T3	Pipe temperature of outdoor heat exchanger
T4	Outdoor ambient temperature
T5	Compressor discharge temperature

**Table 8. Electronic Functions Abbreviations**

Input voltage: 230V
Input power frequency: 60Hz
Indoor fan normal working amp. is less than 1A
Outdoor fan normal working amp is less than 1.5A
Four-way valve normal working amp is less than 1A

**Table 9. Electronic Control Working Environment**

Three minutes delay at restart for compressor
One minute delay for the first time start-up and three minutes delay for others
Temperature protection of compressor discharge
When the compressor discharge is getting higher, the running frequency will be limited as below rules:
If 215.6°F (102°C) < T5 < 244.4°F (115°C), decrease the frequency to the lower level every two minutes until to F1.
If T5 < 244.4°F (115°C) for ten seconds, the compressor will stop and restart till T5 < 194°F (90°C)

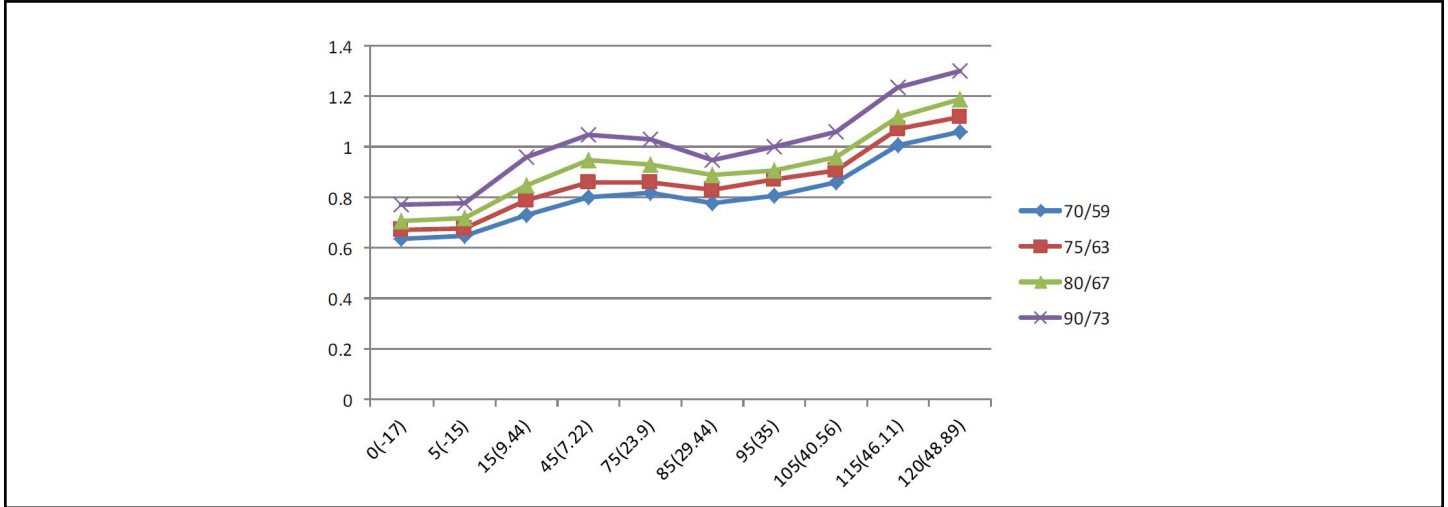
**Table 10. Main Protection**

If the indoor units cannot receive the feedback signal from the outdoor units for two minutes, the unit will stop and display failure.	
High Condenser Col Temp Protection	When T3>149°F (65°C) for three seconds, the compressor will stop while the indoor fan and outdoor fan will continue.
	When T3<125.6°F (52°C), the protection will release and the compressor will restart after three minutes.
Running Rules	If the compressor frequency keeps lower than RET_OIL_FREQ1_ADD for RET_OIL_TIME1_ADD,the AC will rise the frequency to RET_OIL_FREQ2_ADD for RET_OIL_TIME2_

**Table 11. Indoor/Outdoor Units Communication Protection**

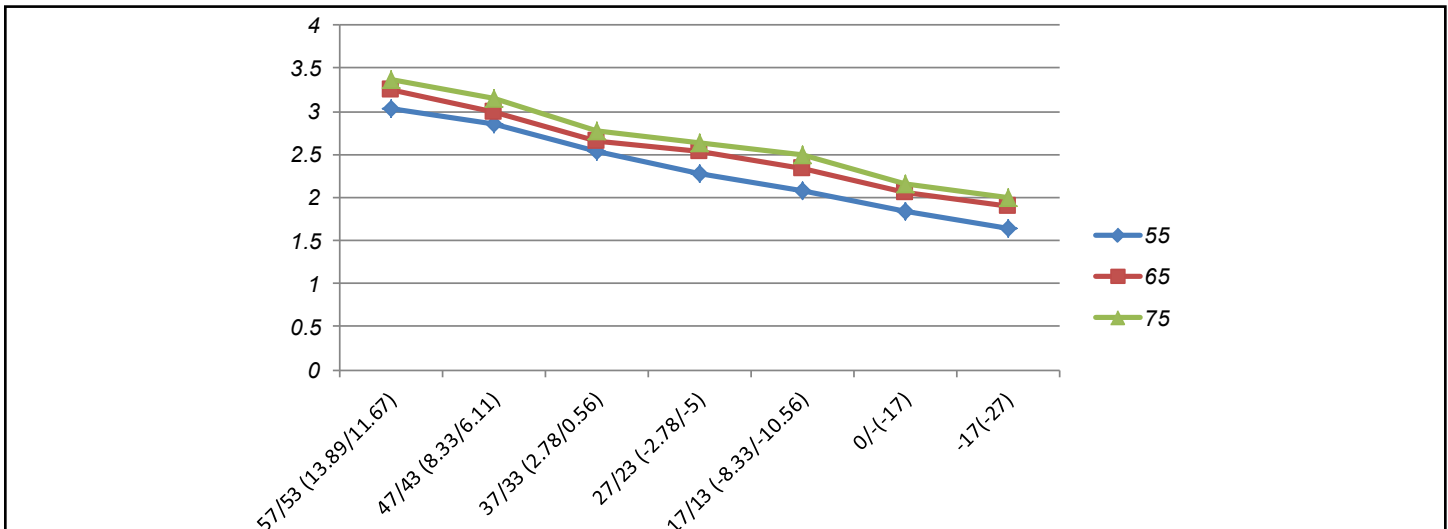
°F(°C)	ODU(DB) IDU(DB/WB)	0 (-17)	5 (-15)	15 (9.44)	45 (7.22)	75 (23.89)	85 (29.44)	95 (35)	105 (40.56)	115 (46.11)	120 (48.89)
PSI	70/59 (21.11/15)	93	94	106	116	119	113	117	125	147	154
	75/63 (23.89/17.22)	97	99	115	125	124	120	126	132	155	162
	80/67 (26.67/19.44)	103	104	123	138	135	129	132	140	162	173
	90/73 (32.22/22.78)	112	113	139	152	149	138	145	154	180	189

Table 12. Cooling - Fahrenheit (Celsius)



°F(°C)	ODT / IDT	57/53 (13.89/11.67)	47/43 (8.33/6.11)	37/33 (2.78/0.56)	27/23 (-2.78/-5)	17/13 (-8.33/- 10.56)	0/-2 (-17/-19)	-17/-18 (-27/-28)
PSI	55	439	413	367	330	302	268	239
	65	471	435	386	368	339	297	276
	75	489	457	381	381	362	312	290

Table 13. Heating - Fahrenheit (Celsius)



### Capacity Request Calculations

Total capacity Request =  $\sum(\text{Norm code} \times \text{HP}) / 10 \times \text{modify rate} + \text{correction}$ .

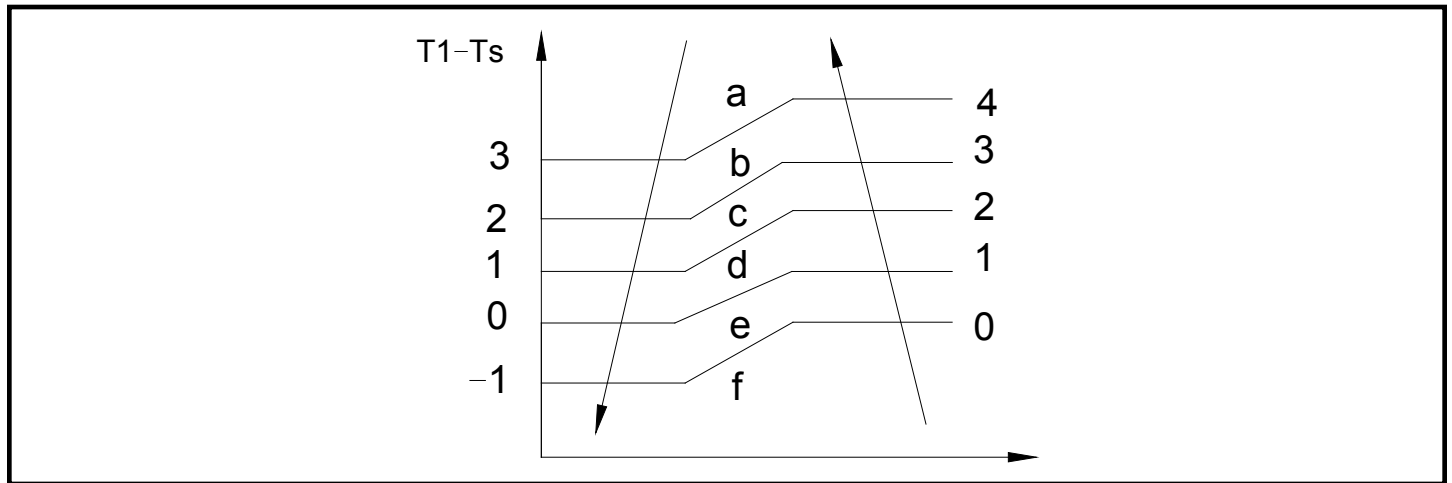


Figure 24. Cooling Mode

Capacity Area	a	b	c	d	e	f
Norm Code (N)	3	2	1.5	1	.5	0

**NOTE:** The final result is integer.

Plus all the indoor capacity request together, then modify it by T4.

When there is only one indoor unit:

	Outdoor Temperature (T4)		
<b>Cooling</b>	>29°C	18°C to 29°C	<17°C
	>84.2°F	64.4°F to 84.2°F	<62.6°F
<b>Modify Rate</b>	100%	60%	40%

When there is more than one indoor unit:

	Outdoor Temperature (T4)		
<b>Cooling</b>	>25°C	17°C - 25°C	<17°C
	>77°F	62.6°F - 77°F	<62.6°F
<b>Modify Rate</b>	100%	80%	40%

**NOTE:** The final result is integer.

In low ambient cooling mode, modify rate is fixed as 40%.

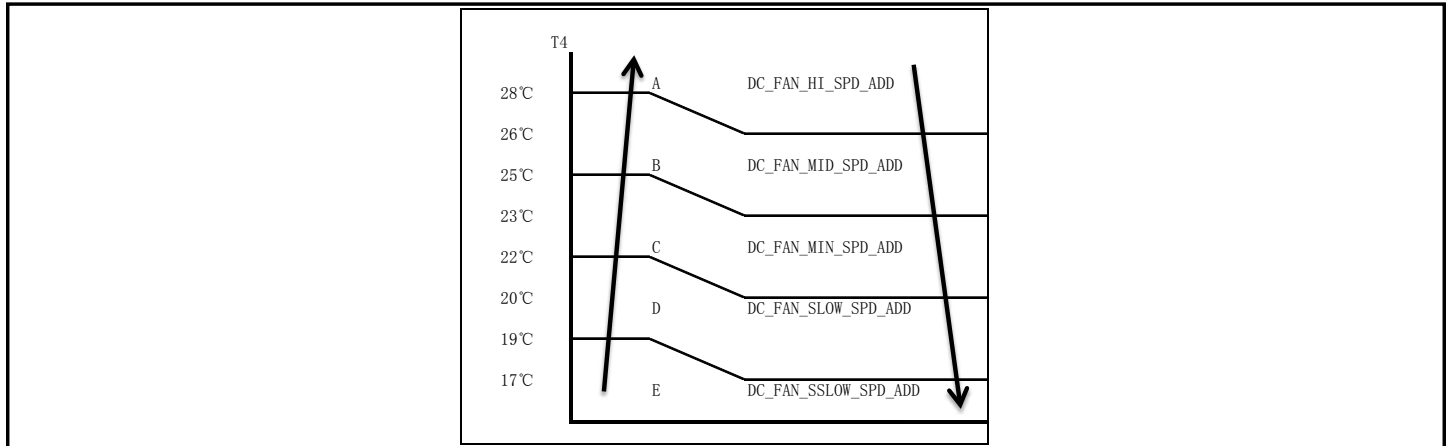
According to the final capacity request to confirm the operating frequency, as following table.

<b>Frequency (Hz)</b>	0	COOL_ F1	COOL_ F2	...	COOL_ 15	COOL_ 16
<b>Amendatory Capacity Demand</b>	0	1	2	...	15	16

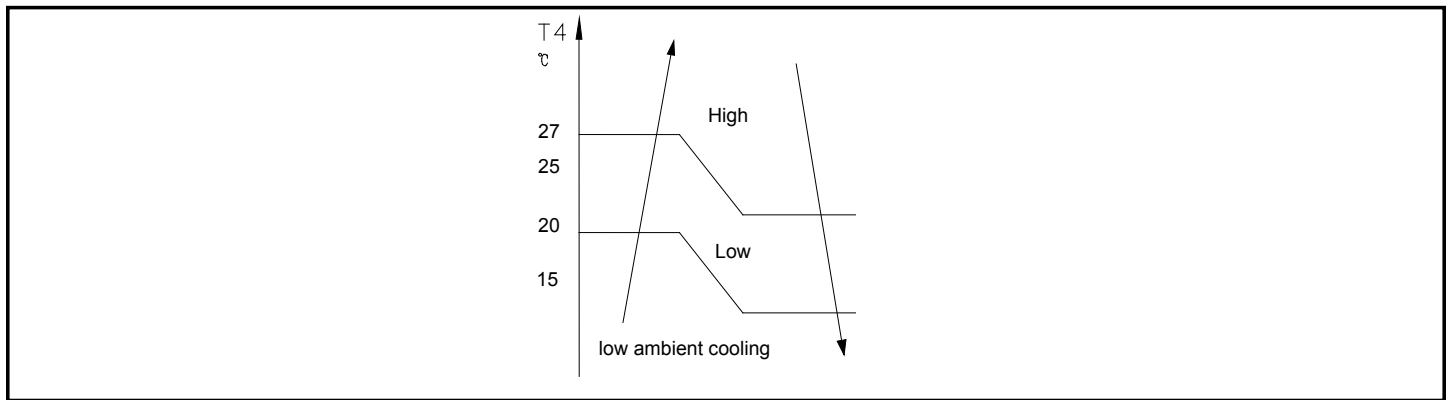
Meanwhile the maximum running frequency will be adjusted according to the outdoor ambient temp.

## Outdoor Fan Control Cooling Mode

Normally the system will choose the running fan speed according to ambient temperature:



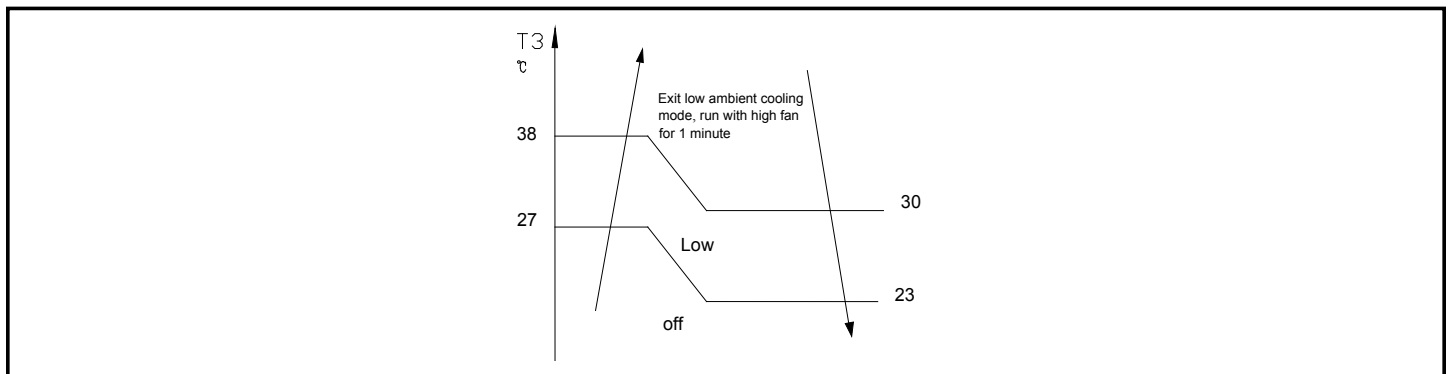
When low ambient cooling is valid:



Outdoor fan speed control logical (low ambient cooling).

When  $T4 < 15^{\circ}\text{C}$  ( $59^{\circ}\text{F}$ ) and  $T3 < 30^{\circ}\text{C}$  ( $86^{\circ}\text{F}$ ), the unit will enter into low ambient cooling mode. The outdoor fan will choose speed according to  $T3$ .

When  $T3 \geq 38^{\circ}\text{C}$  ( $100.4^{\circ}\text{F}$ ) or when  $T4 \geq 20^{\circ}\text{C}$  ( $68^{\circ}\text{F}$ ), the outdoor fan will choose the speed according to  $T4$  again.

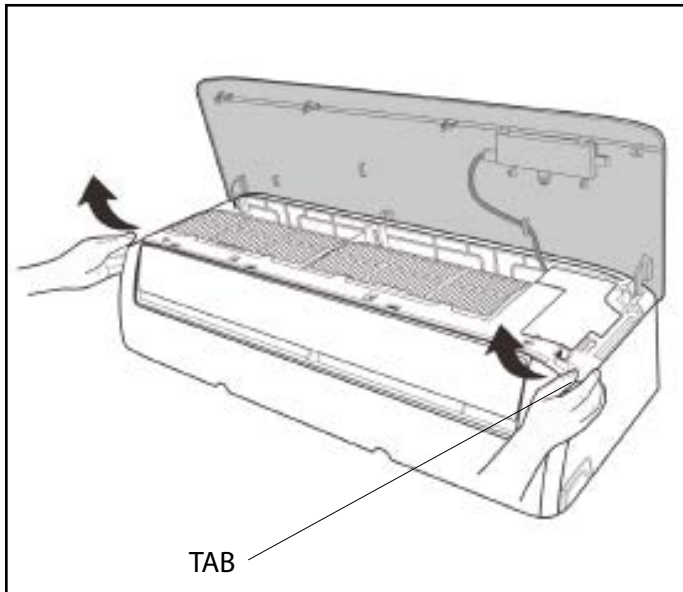


## Indoor and Outdoor Unit Disassembly

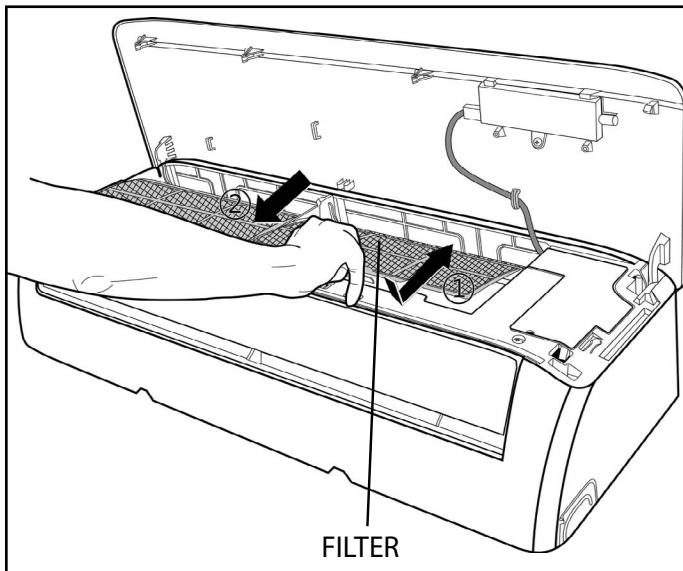
**NOTE:** This section is for reference only. Actual unit appearance may vary.

### Indoor Unit (All Models) Front Panel

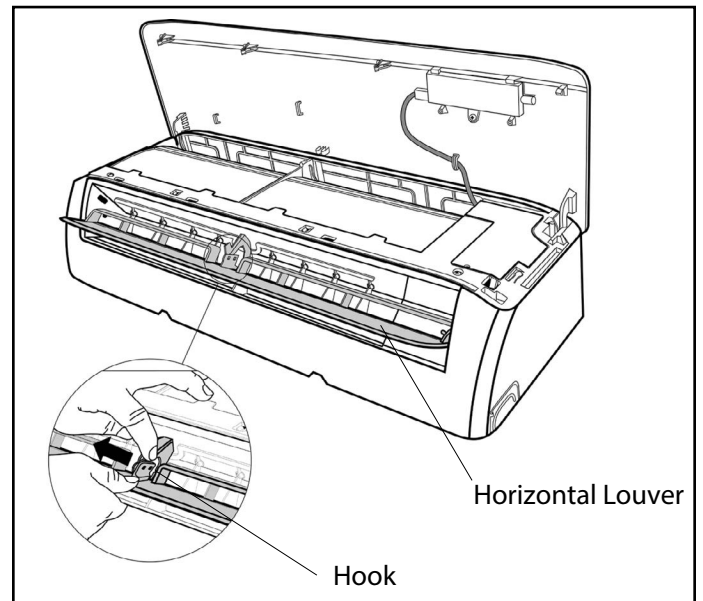
1. Hold the front panel by the tabs on the both sides and lift it.



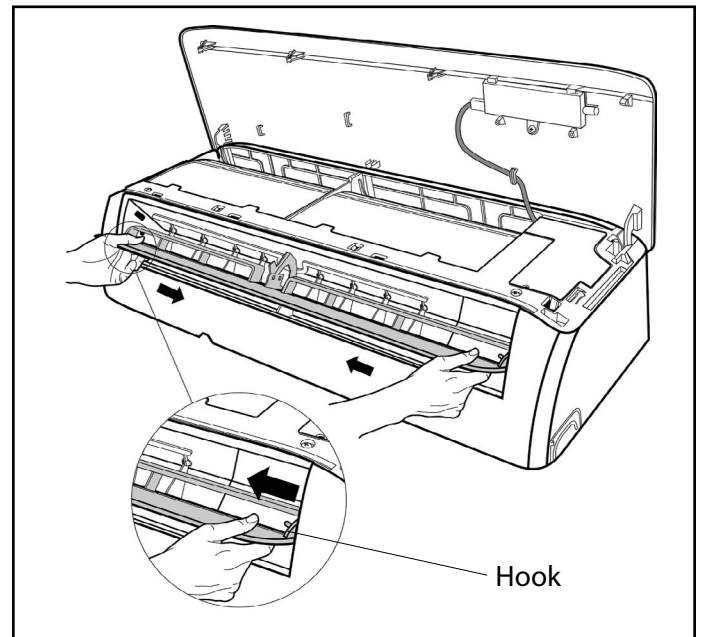
2. Push up the bottom of an air filter (step 1), and then pull it out downwards (step 2).



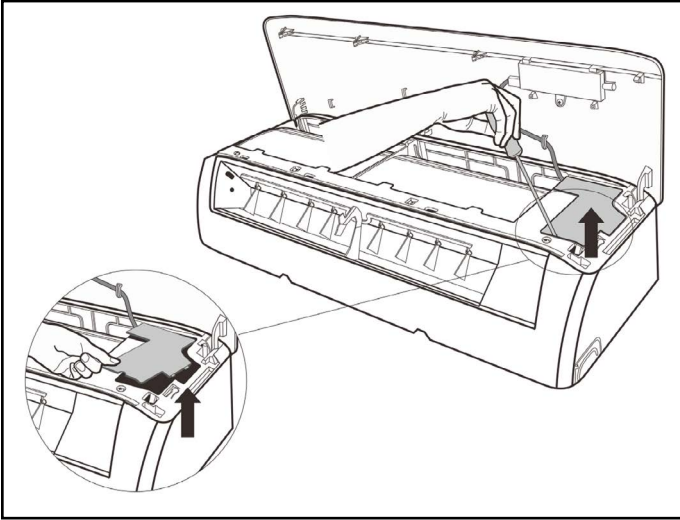
3. Open the horizontal louver and push the hook towards left to open it.



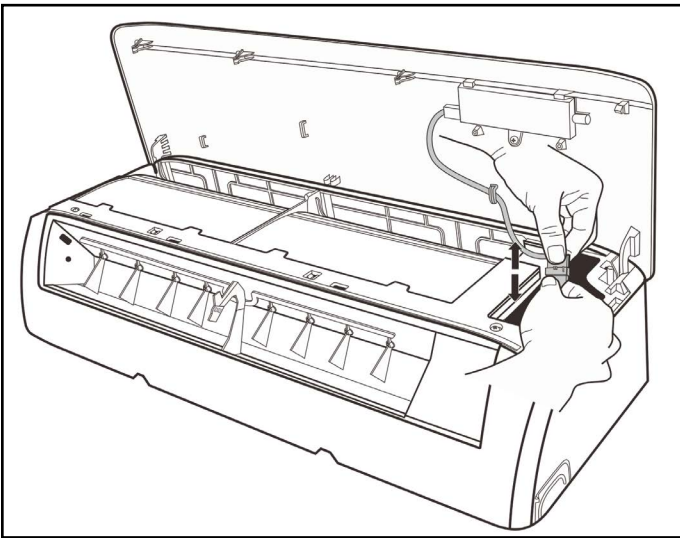
4. Bend the horizontal louver lightly by both hands to loosen the hooks, then remove the horizontal louver.



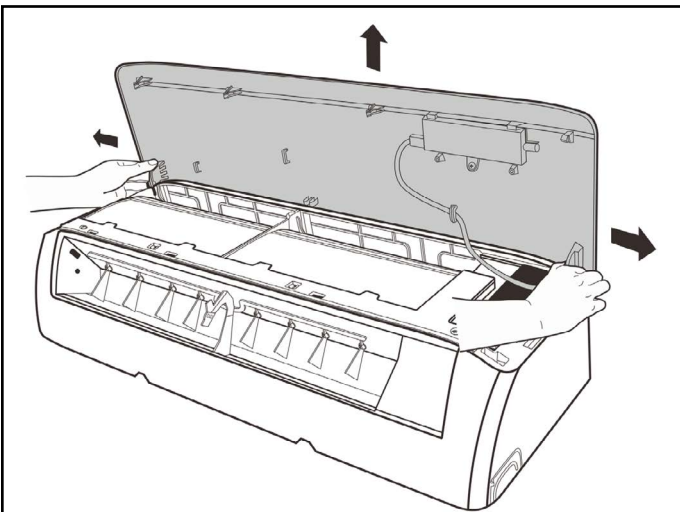
5. Pry the electrical cover by a screw driver, and rotate it towards left, then remove it.



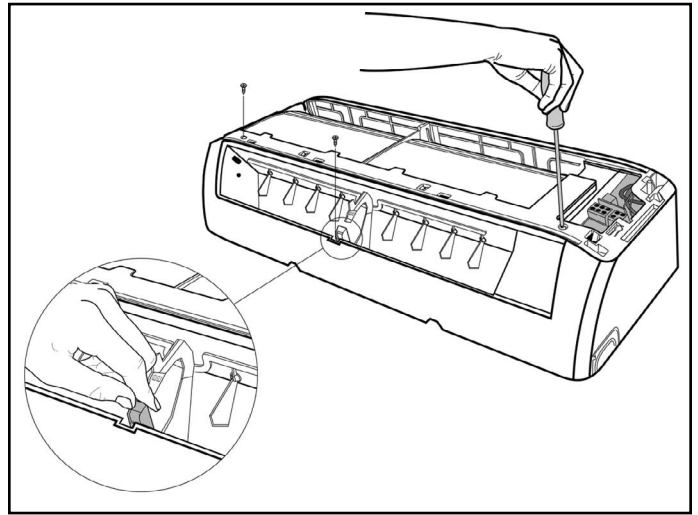
6. Disconnect the connector for display board.



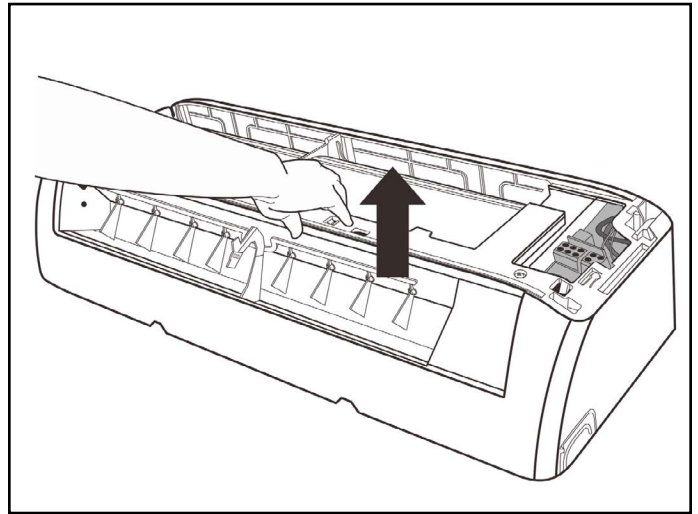
7. Slide the front panel side to side to release each axis.



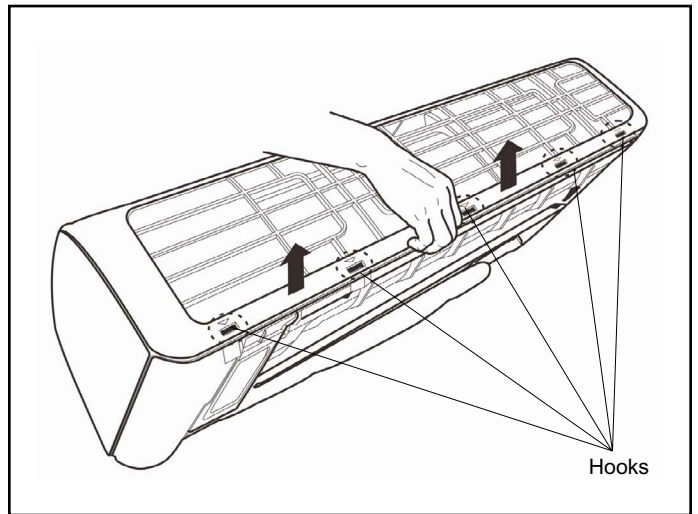
8. Open the screw cap and then remove the three screws.



9. Release the hooks with hands.

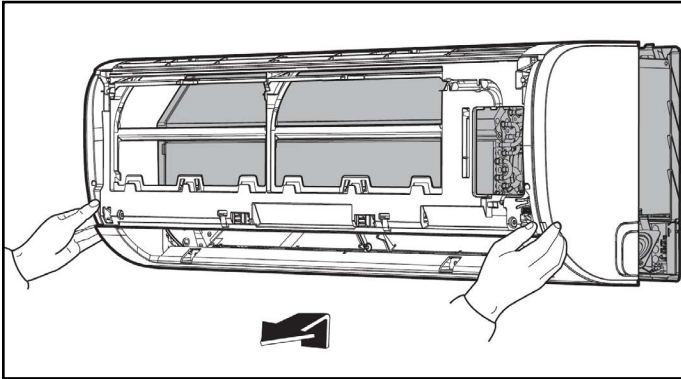


10. Release the five hooks in the back.

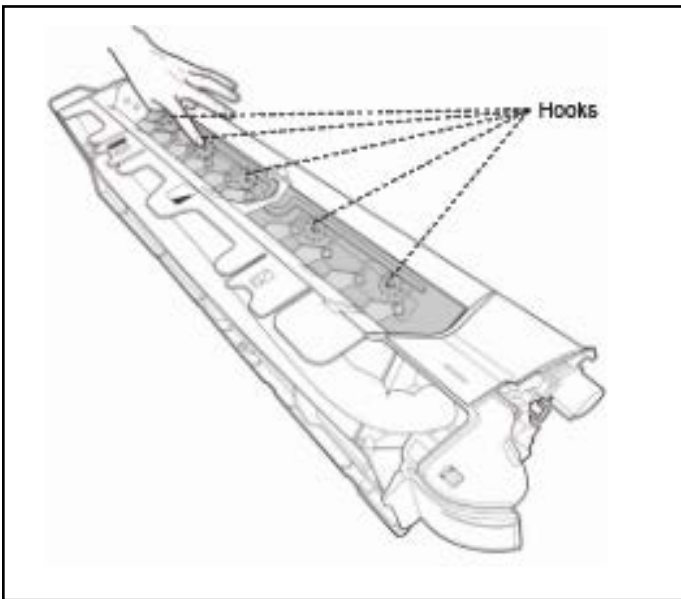




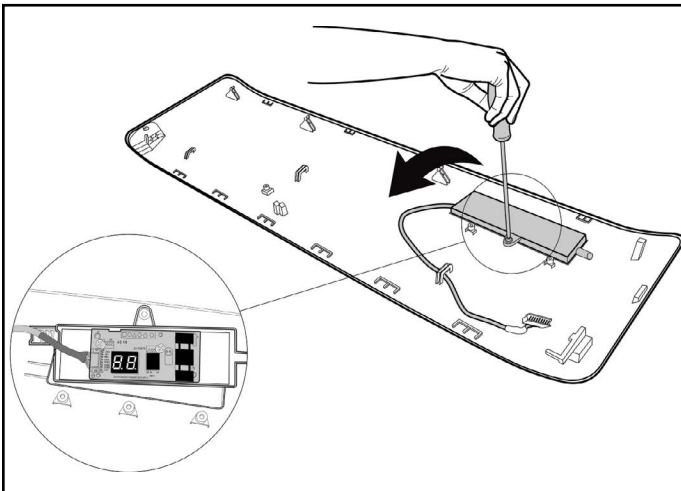
11. Pull out the panel frame while pushing the hook through a clearance between the panel frame and the heat exchanger.



12. Release the 5 hooks of the vertical blades, then pull the vertical blades rightward and remove it.



13. Remove 1 screw of the display board.
14. Rotate the display board in the direction shown in the right picture.

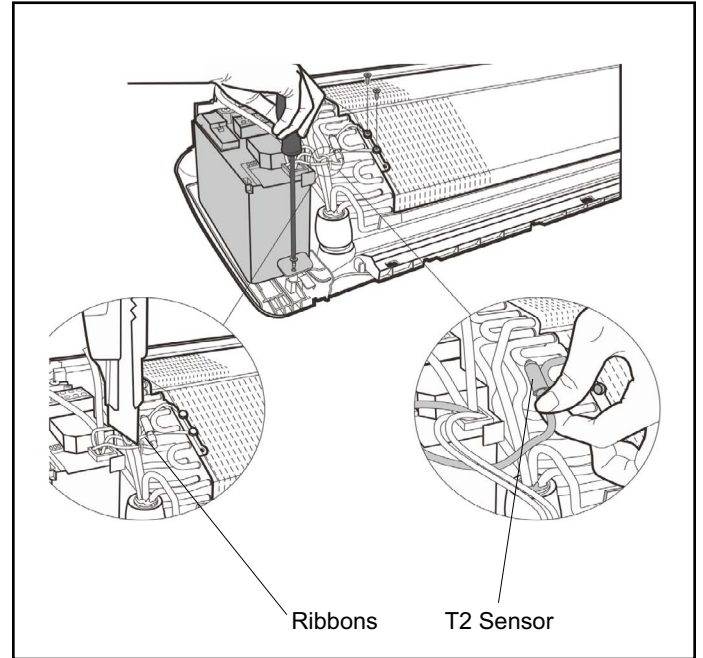


## Electrical Parts

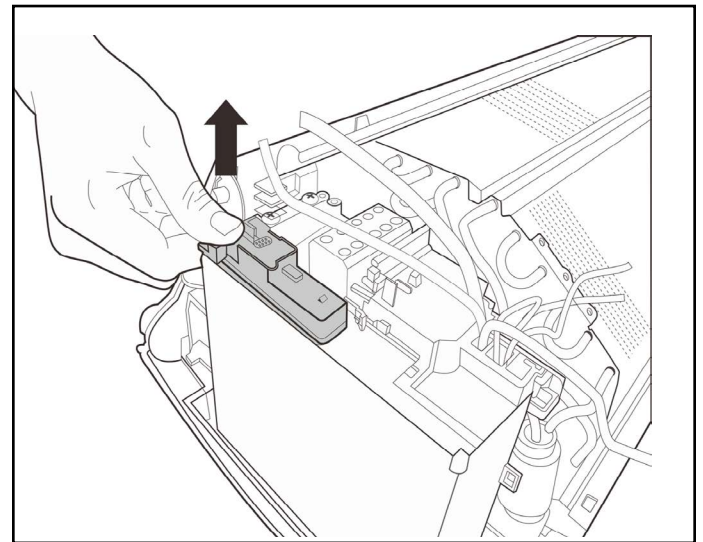
**NOTE:** When handling electrical parts use anti-static gloves.

**NOTE:** Remove the front panel (see Step 1 on page 41) before disassembling electrical parts.

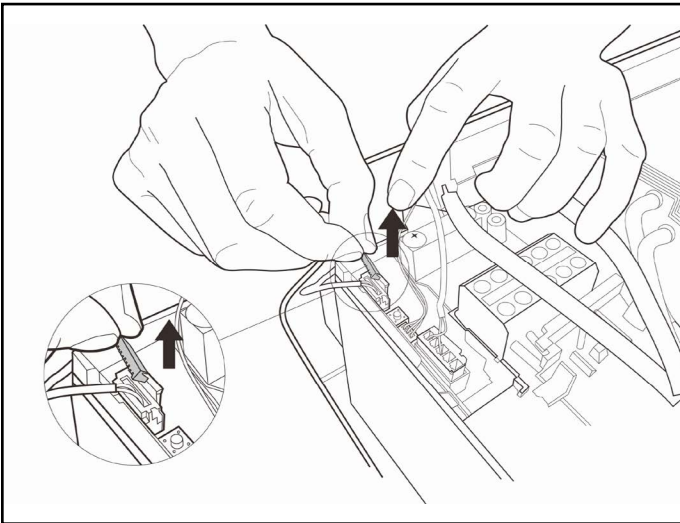
1. Cut the ribbon by a shear, then pull out the coil temperature sensor (T2).
2. Remove one fixing screw of the electronic control box and two screws used for the ground connection.



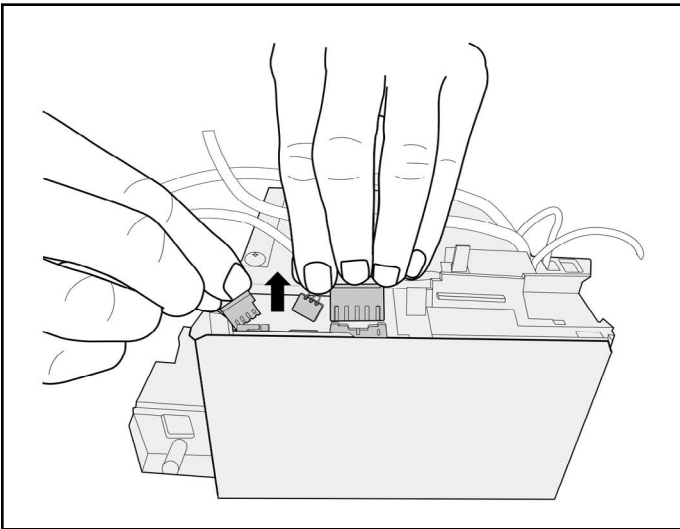
3. An upward force is maintained until the cover of electronic control box is removed.



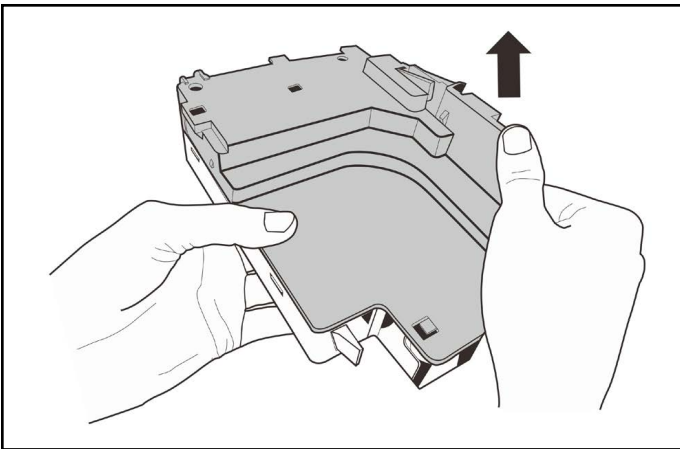
4. Remove the fixed devices of the connectors.



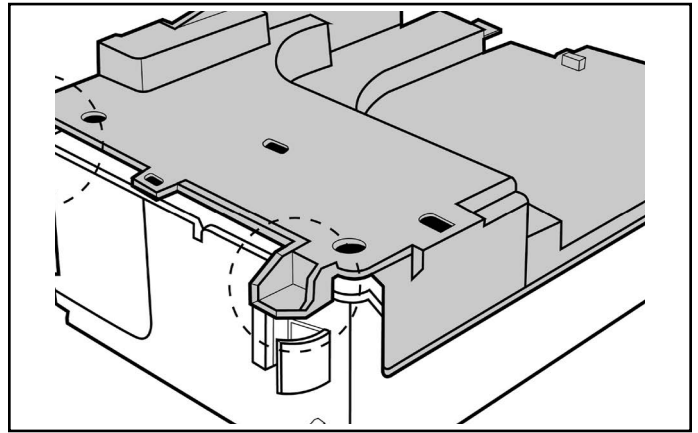
5. Disconnect the connectors of fan motor, the step motor and the T2 sensor.



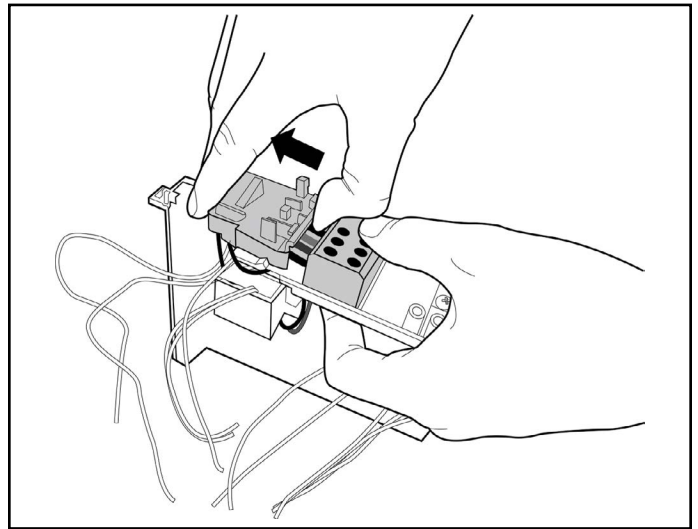
6. Open the left side plate of electronic control box.



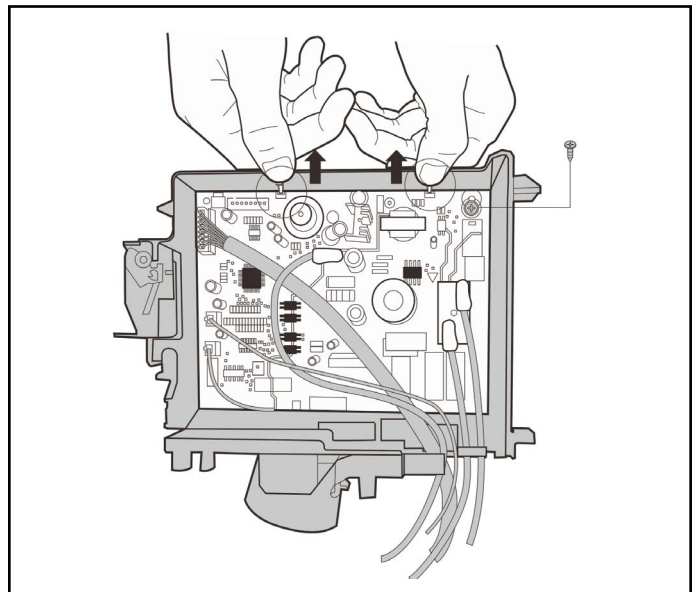
7. Open the two clips on the front of the electric box.



8. Open the upper cover plate of electronic control box.

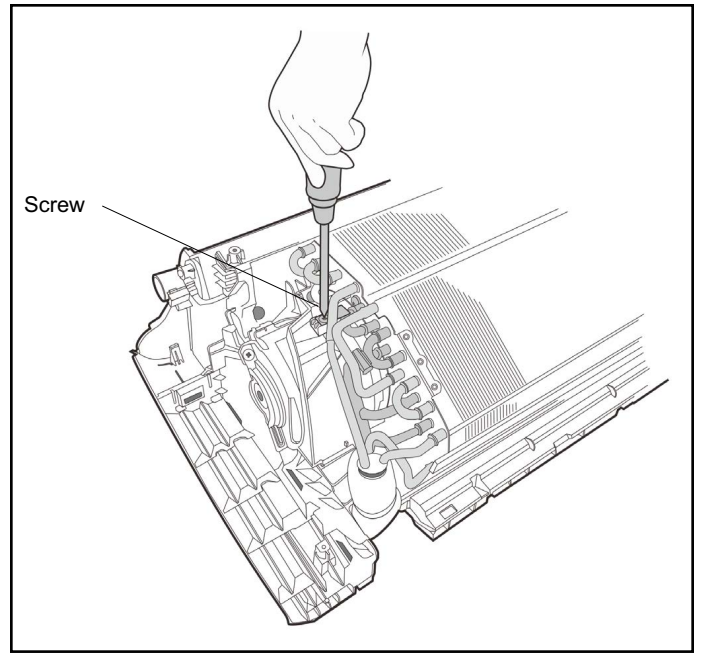
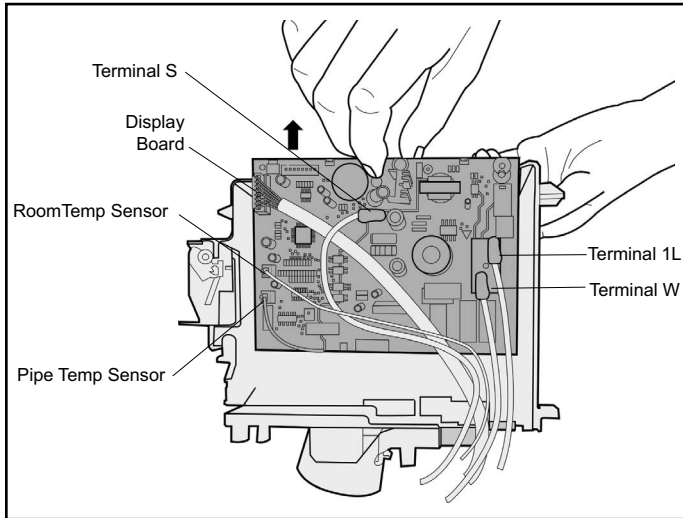


9. Remove 1 screw and open the 2 clips along the direction indicated in image below.





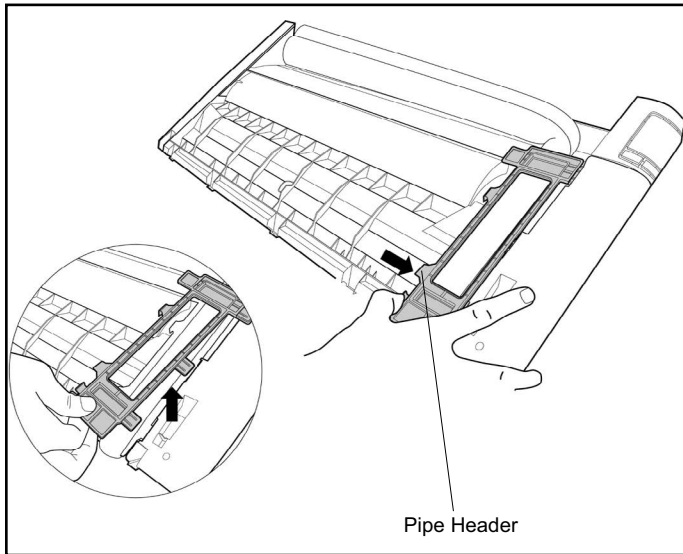
10. Pull out the electrical main board along the direction indicated in below image to remove it.



### Evaporator

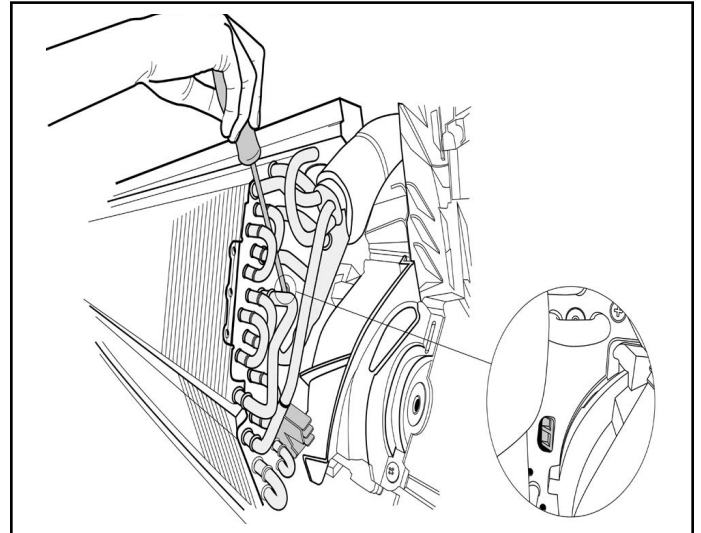
**NOTE:** Remove the front panel and electrical parts before disassembling evaporator (see both "Front Panel" on page 41 and "Electrical Parts" on page 43).

1. Disassemble the pip holder located at the rear of the unit.

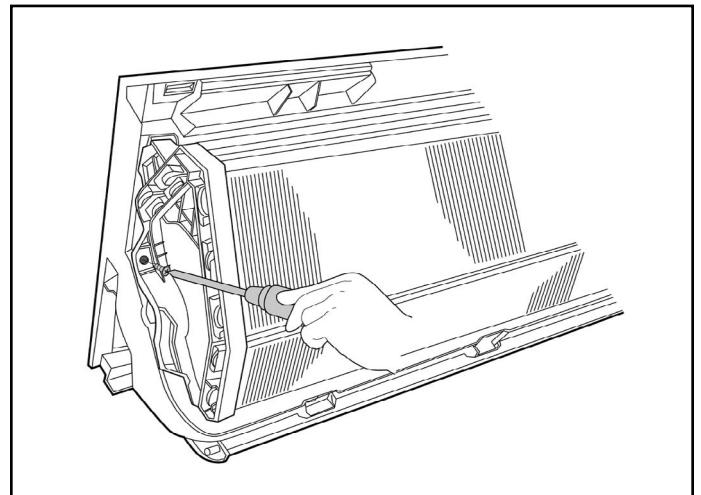


2. Remove the one screw on the evaporator located at the fixed plate.

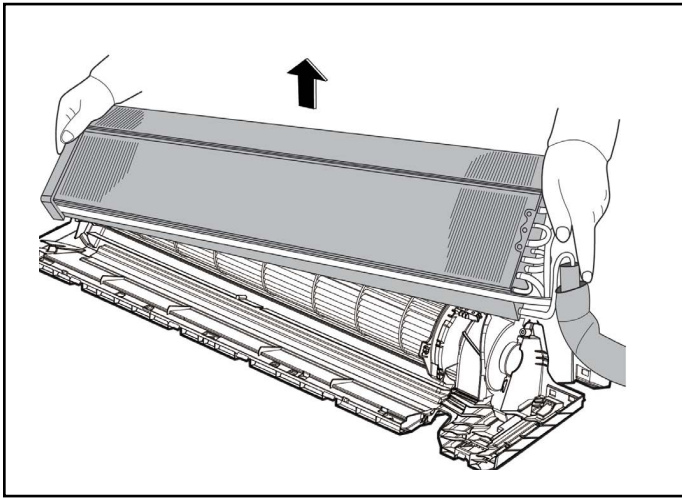
3. Release the hook on the evaporator.



4. Remove the one screw on the evaporator located out the fixed plate.



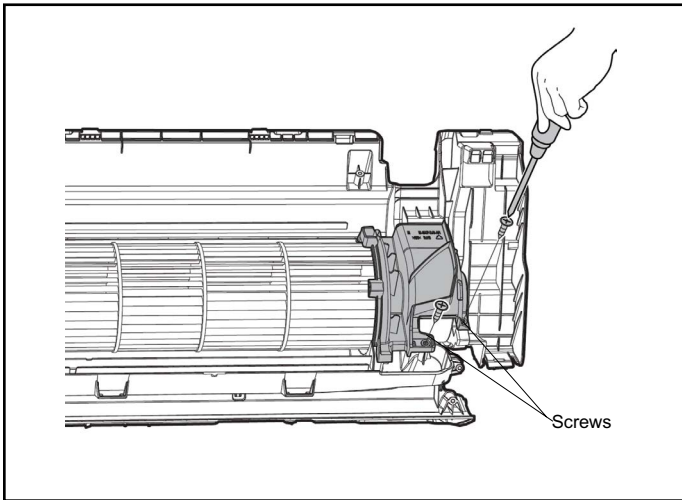
5. Pull out the evaporator.



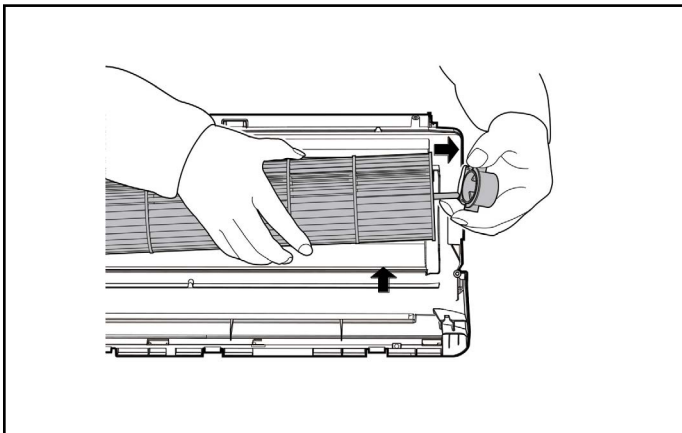
### Fan Motor and Fan

**NOTE:** Remove the front panel and electrical parts before disassembling fan motor and fan (see both "Front Panel" on page 41 and "Electrical Parts" on page 43).

1. Remove the two screws and remove the fixing board of the fan motor.

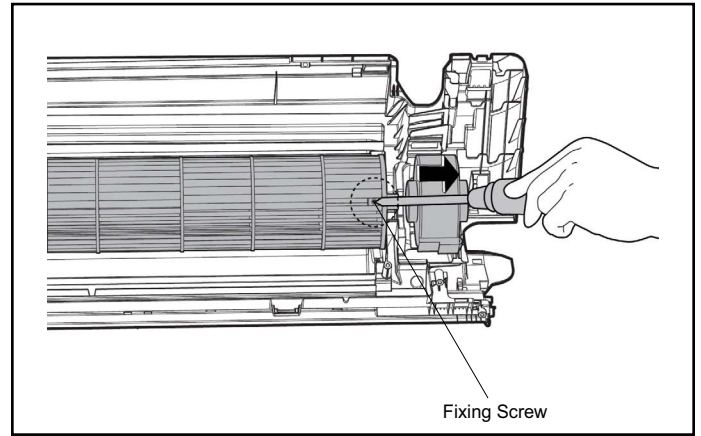


2. Remove the bearing sleeve.



3. Remove the fixing screw.

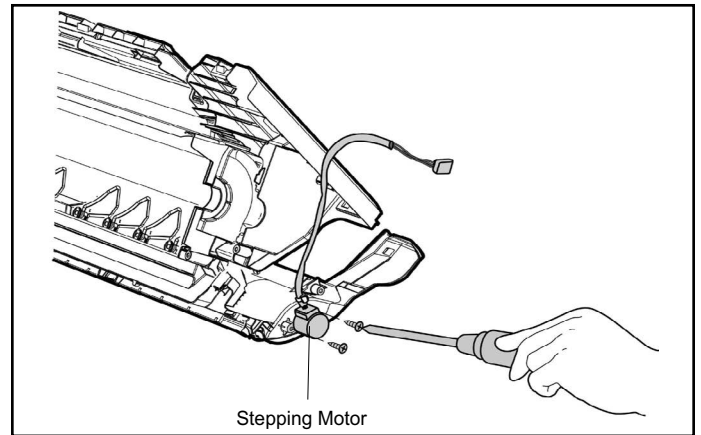
4. Pull out the fan motor and fan assembly from the side.



### Step Motor

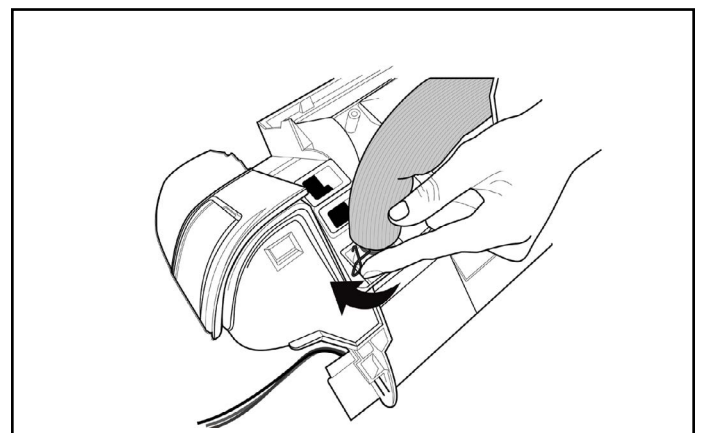
**NOTE:** Remove the front panel and electrical parts before disassembling step motor (see both "Front Panel" on page 41 and "Electrical Parts" on page 43).

1. Remove the two screws, then remove the stepping motor.

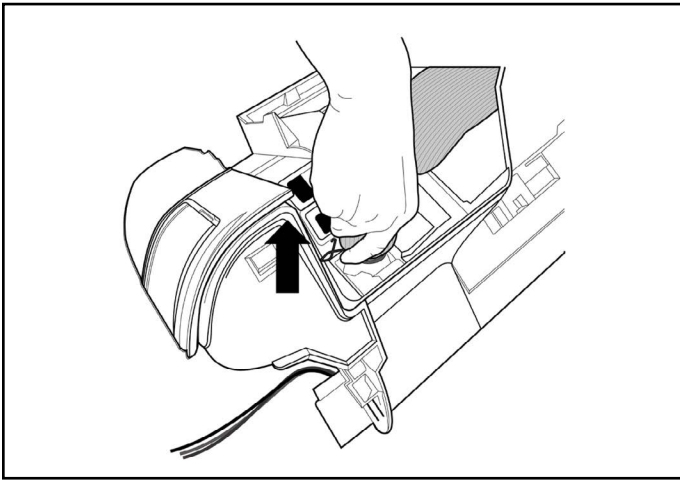


### Drain Hose

1. Rotate the fixed wire clockwise indicated in image below.



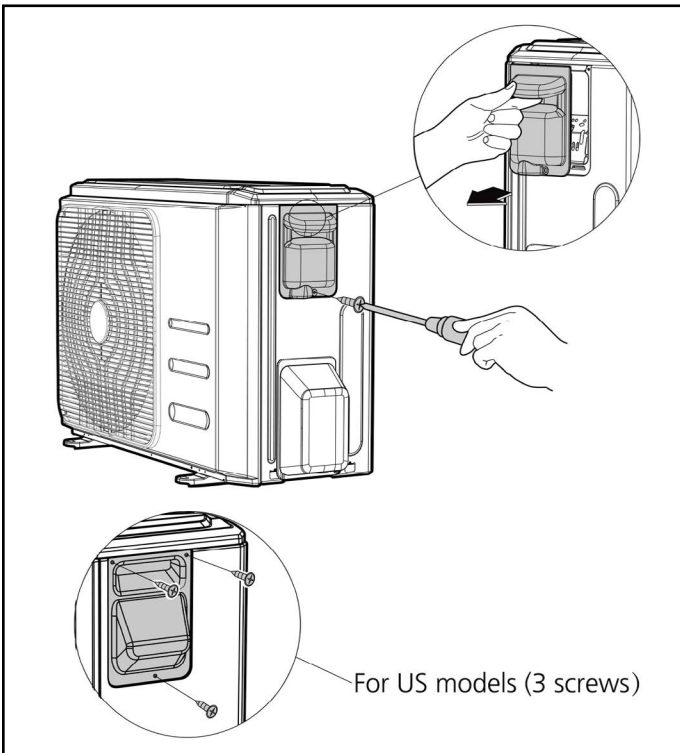
2. Pull up the drain hose to remove it.



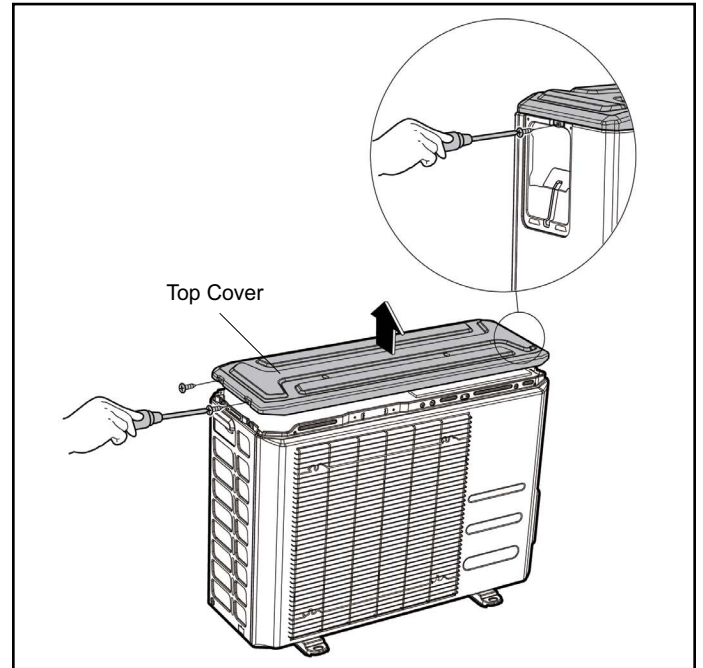
### Outdoor Unit

#### Panel Plate (4DHV1S09S, 4DHV1S12S and 4DHV1S18S)

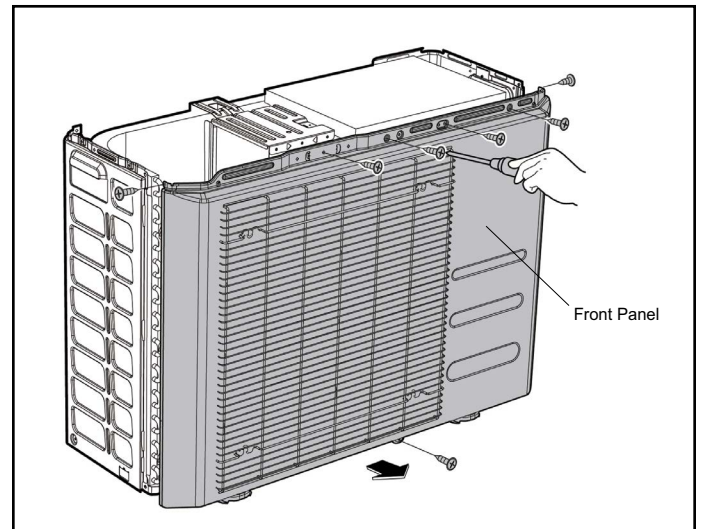
1. Turn off the air conditioner and the power breaker.
2. Remove the screw of the big handle and then remove the handle.



3. Remove the screws of the top cover and then remove top cover. One of the screws is located underneath the big handle.

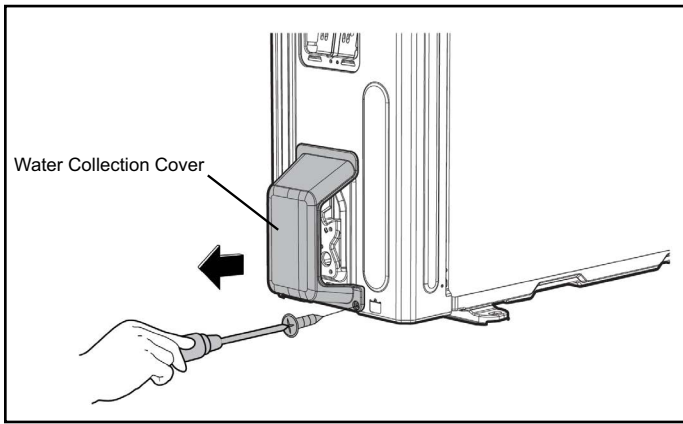


4. Remove the screws of the front panel and then remove the front panel.

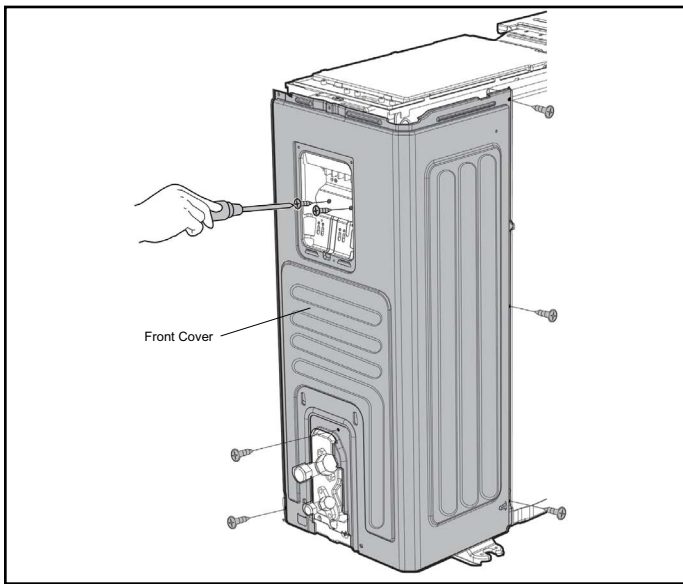




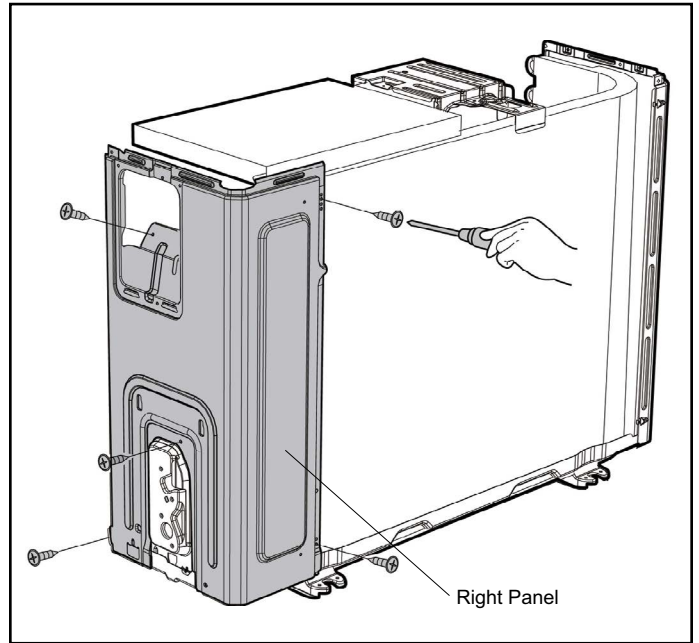
5. Remove the screw from the water collector cover.



6. Remove the screws on the rear coil guard and then remove the coil guard.

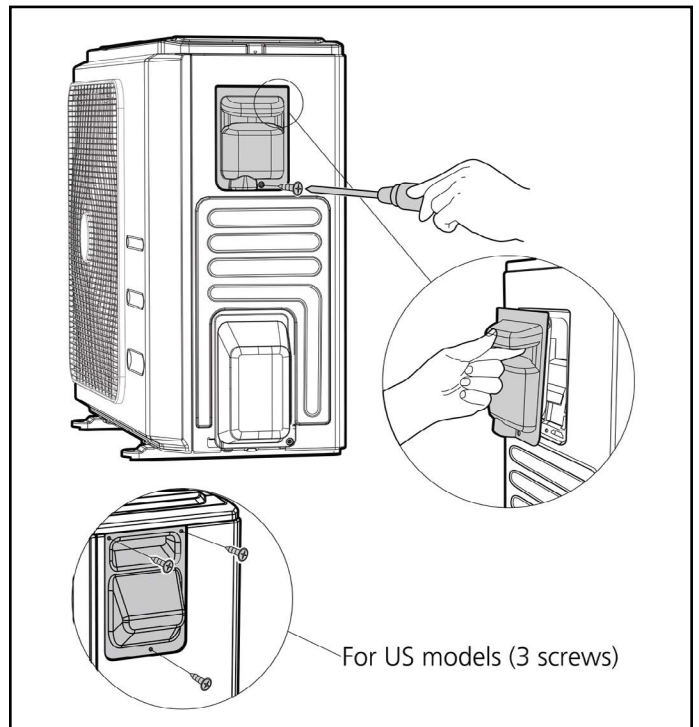


7. Remove the screws from the right panel and then remove panel.

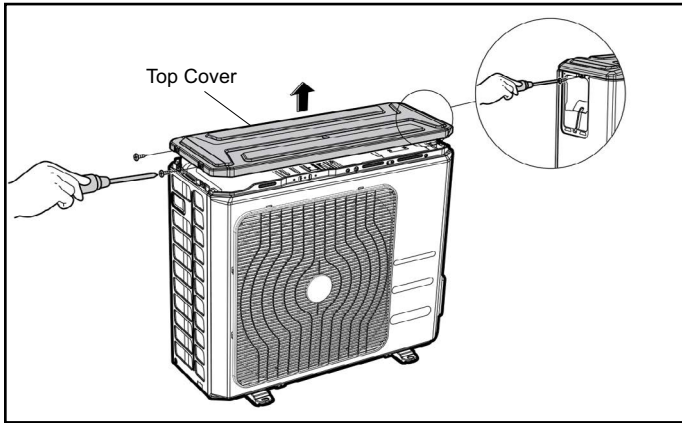


### **Panel Plate (4DHV1S24S)**

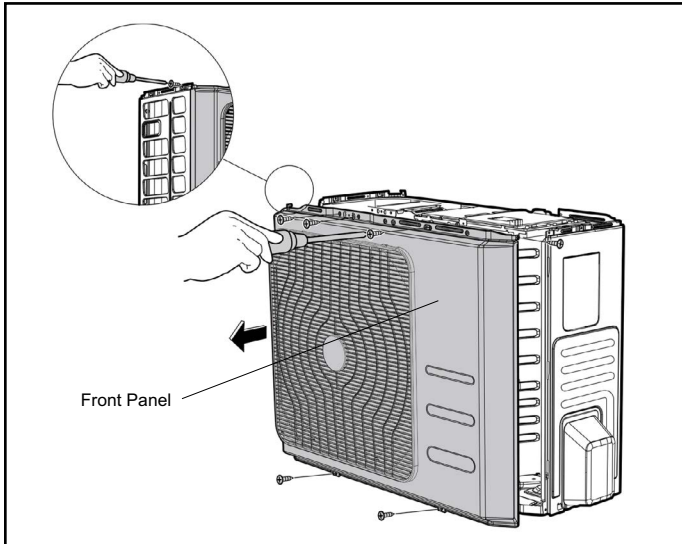
1. Turn off the air conditioner and the power breaker.
2. Remove the screws that secure the handle and then remove the handle.



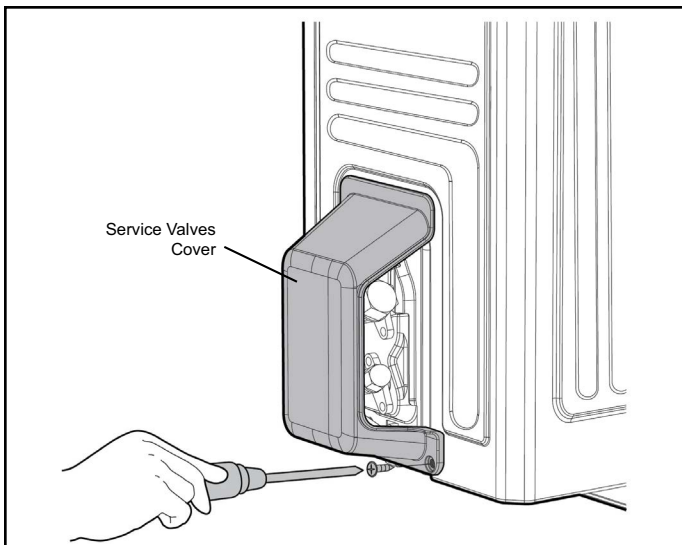
3. Remove the screws from the top cover and then remove. One of the screws is located underneath the handle.



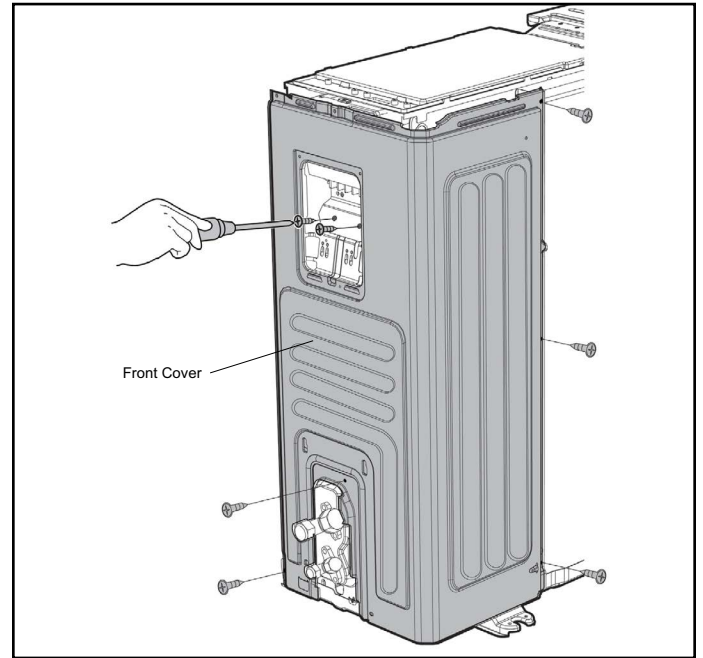
4. Remove the screws from the front panel and then remove panel.



5. Remove the screw securing the service valves cover and then remove.

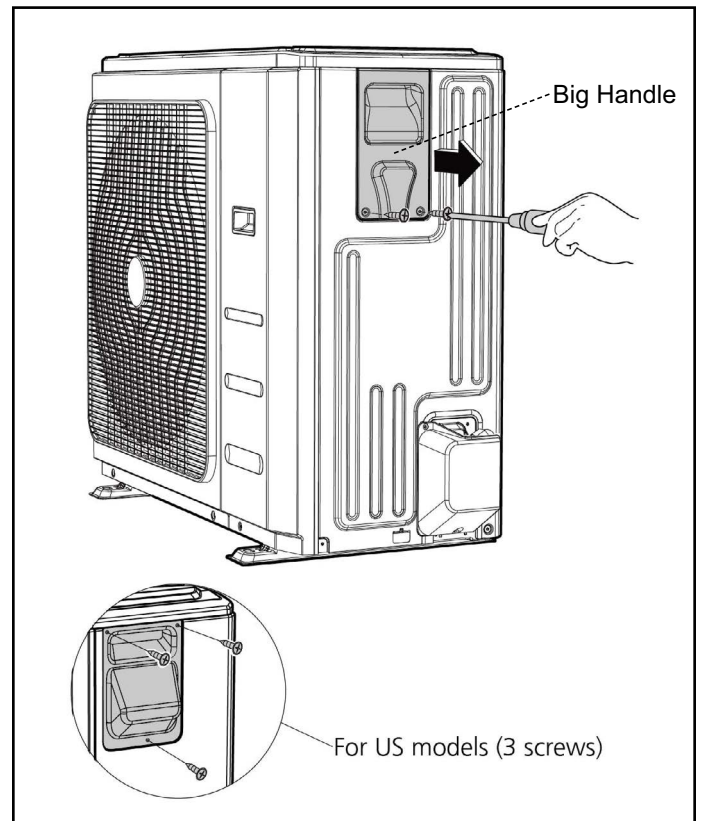


6. Remove the screws securing the right panel cover and remove panel.

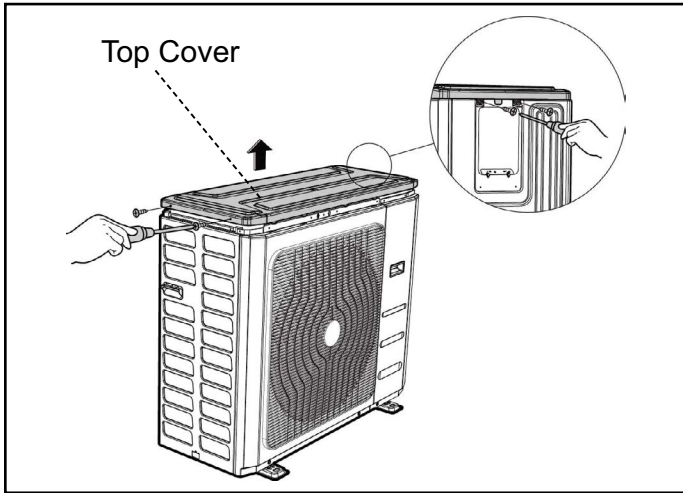


#### **Panel Plate (4DHV1S36S)**

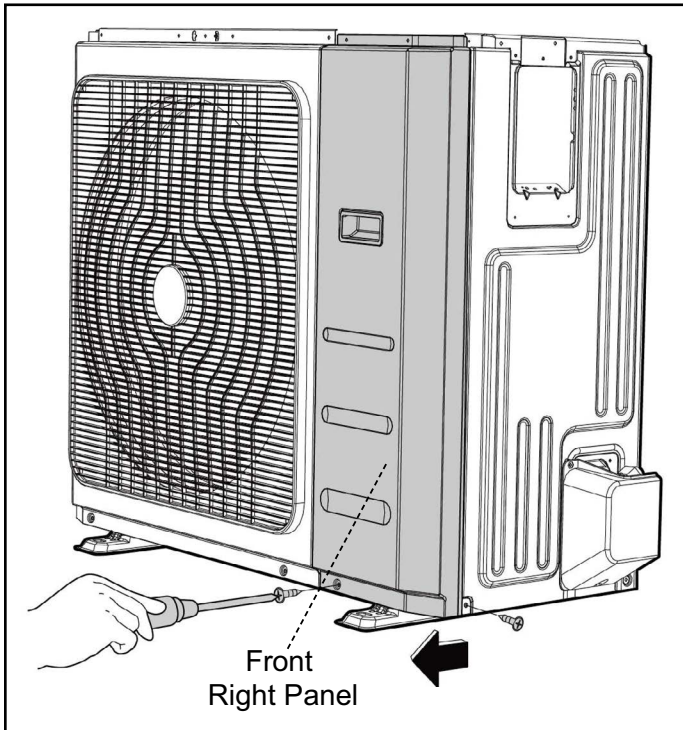
1. Turn off the air conditioner and the power breaker.
2. Remove the screws of the big handle and then remove the big handle (2 screws).



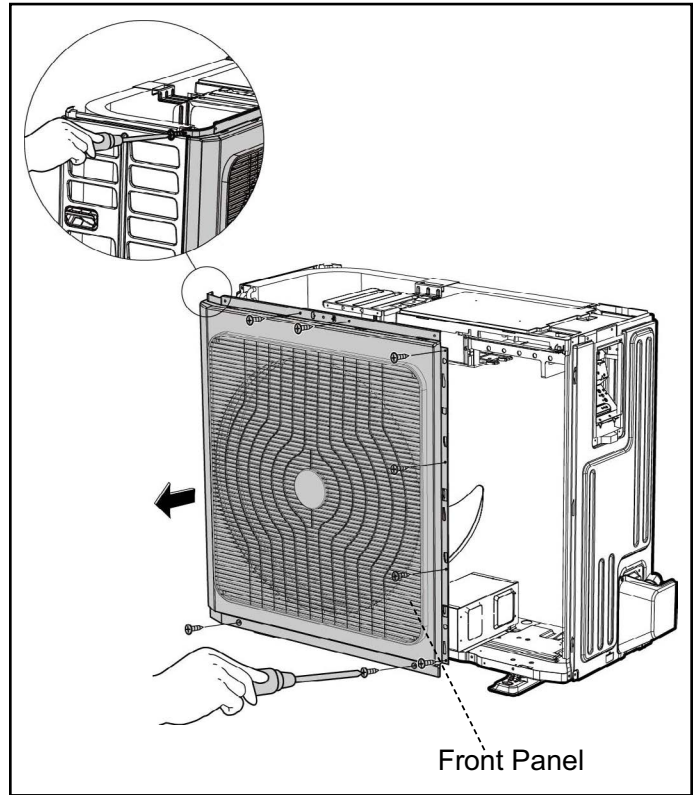
3. Remove the screws of the top cover and then remove the top cover (4 screws). Two of the screws is located underneath the big handle.



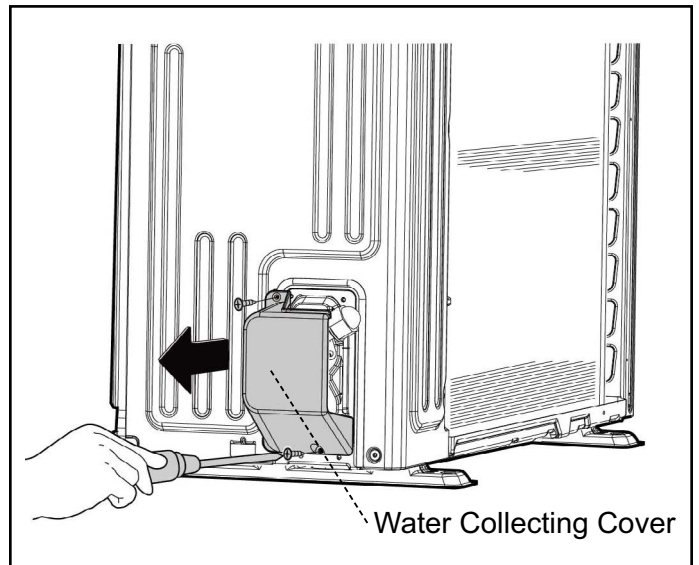
4. Remove the screws of the front right panel and then remove the front right panel (2 screws).



5. Remove the screws of the front panel and then remove the front panel (9 screws).

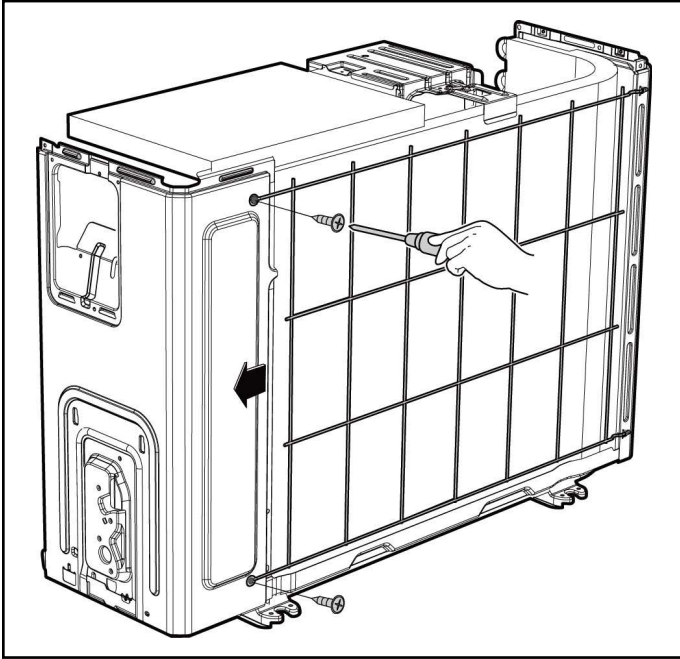


6. Remove the screws of water collecting cover and then remove the water collecting cover (2 screws).

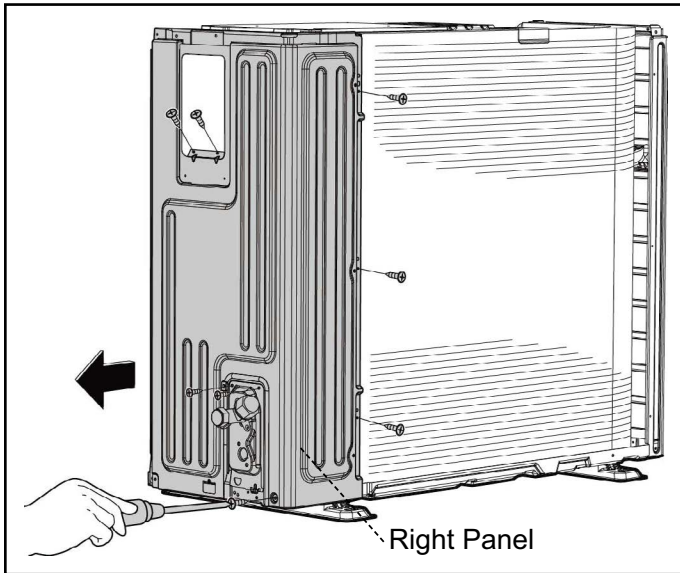




- Remove the screws of the rear net and then remove the rear net (2 screws).



- Remove the screws of the right panel and then remove the right panel (8 screws).



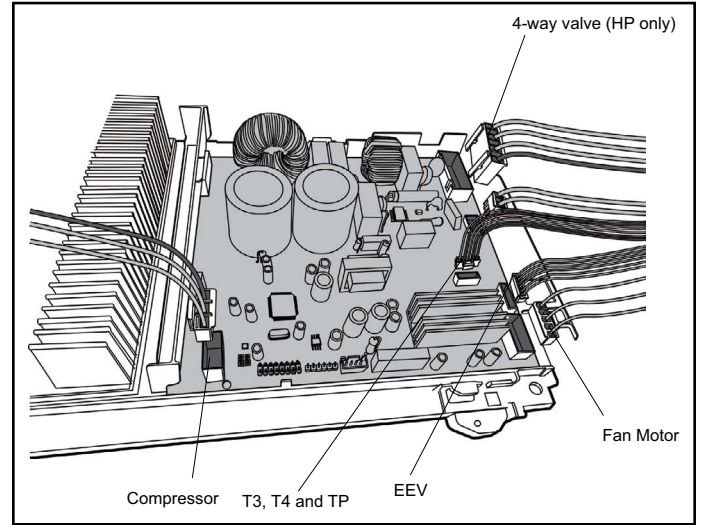
#### Electronic Components (4DHV1S09S and 4DHV1S12S)

**NOTE:** Antistatic gloves must be worn when you disassemble the electronic box.

**NOTE:** Remove the panel plate before disassembling the fan.

- Remove the connector for the compressor.
- Pull out the two blue wires connected to the expansion valve (not applicable to AC units only)
- Pull out connectors for the condenser coil temperature sensor (T3), outdoor ambient temperature sensor (T4) and discharge temperature sensor (TP).

- Disconnect the expansion valve.
- Remove electronic control box.

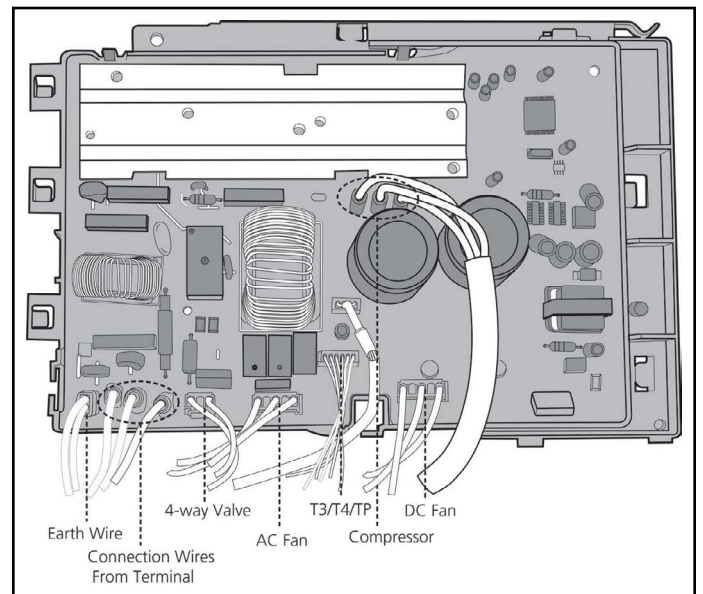


#### Electronic Components (4DHV1S18S)

**NOTE:** Antistatic gloves must be worn when you disassemble the electronic box.

**NOTE:** Remove the panel plate before disassembling the fan.

- Remove the connector for the compressor.
- Pull out connectors for the condenser coil temperature sensor (T3), outdoor ambient temperature sensor (T4) and discharge temperature sensor (TP).
- Disconnect the four-way valve wire.
- Disconnect the ground wire.
- Remove the connector for the indoor unit.
- Remove electronic control box.

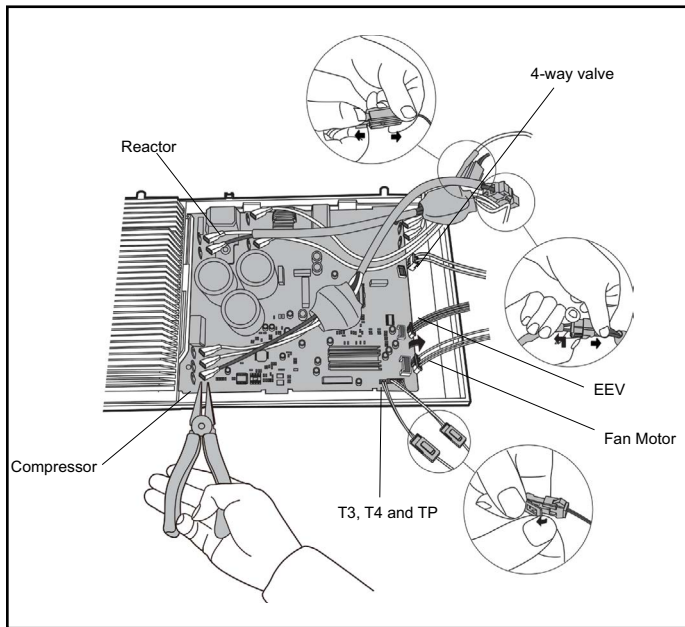


### Electronic Components (4DHV1S24S)

**NOTE:** Antistatic gloves must be worn when you disassemble the electronic box.

**NOTE:** Remove the panel plate before disassembling the fan.

1. Remove the connector for the compressor.
2. Pull out the two blue wires connected to the expansion valve (not applicable to AC units only)
3. Pull out connectors for the condenser coil temperature sensor (T3), outdoor ambient temperature sensor (T4) and discharge temperature sensor (TP).
4. Disconnect the expansion valve.
5. Remove electronic control box.

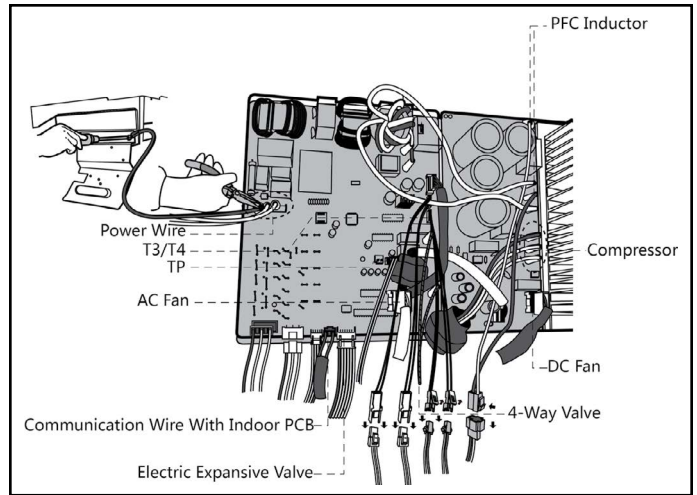


### Electronic Components (4DHV1S36S)

**NOTE:** Antistatic gloves must be worn when you disassemble the electronic box.

**NOTE:** Remove the panel plate before disassembling the fan.

1. Remove the connector for the compressor.
2. Pull out the two blue wires connected with the four way valve.
3. Pull out connectors of the condenser coil temp. sensor (T3), outdoor ambient temp. sensor (T4) and discharge temp. sensor (TP).
4. Disconnect the electronic expansion valve wire.
5. Disconnect the communication wire indoor PCB.
6. Disconnect the PFC inductor.
7. Remove electronic control box.

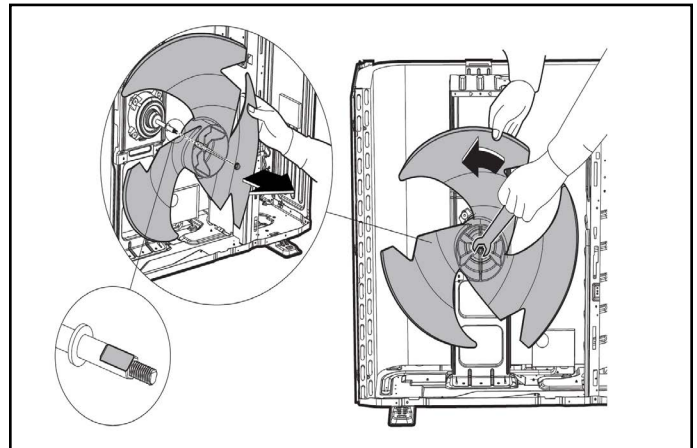


### Fan Disassembly (4DHV1S09S and 4DHV1S12S)

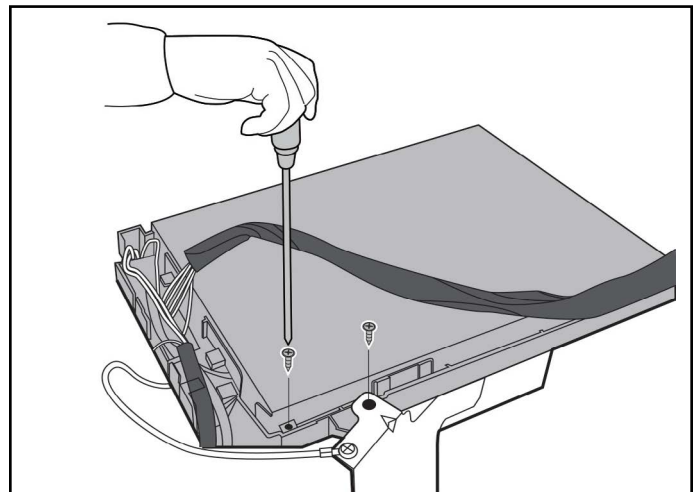
**NOTE:** Antistatic gloves must be worn when you disassemble the electronic box.

**NOTE:** Remove the panel plate before disassembling the fan.

1. Remove nut securing the fan with a spanner.

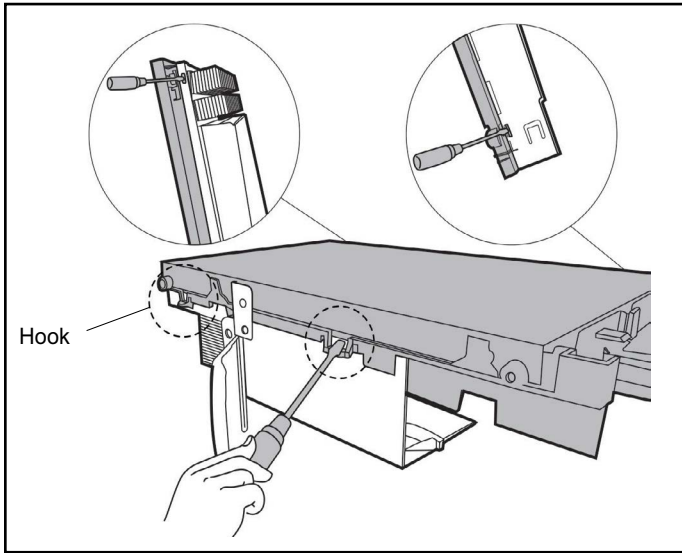


2. Remove the screws securing the top cover.

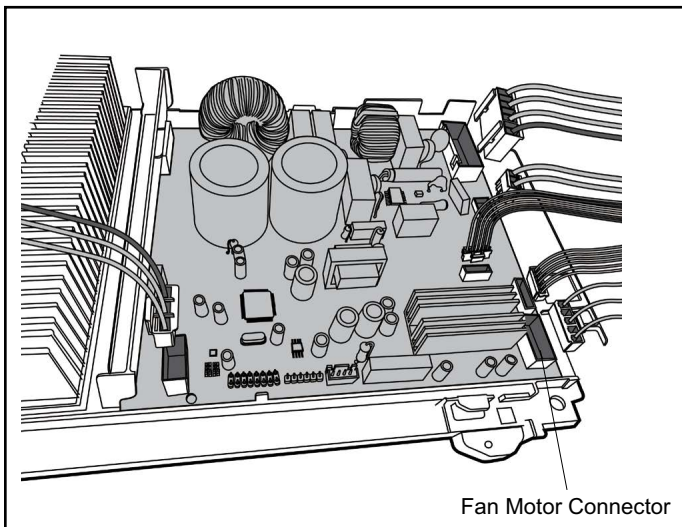




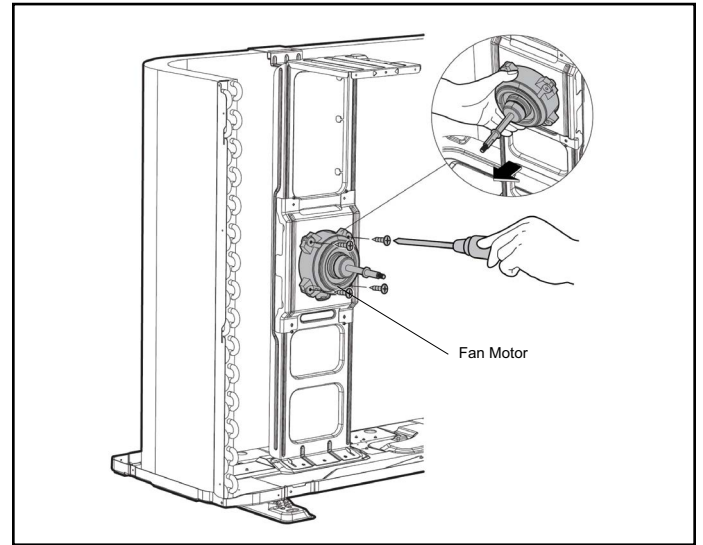
3. Release the hooks and then open the electronic control box cover.



4. Disconnect the connector from the fan motor from the electronic control board.



5. Remove the screws securing the fan motor and then remove fan assembly.

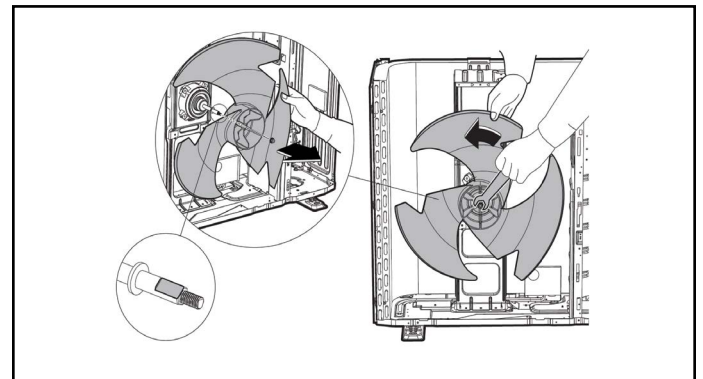


### Fan Disassembly (4DHV1S18S)

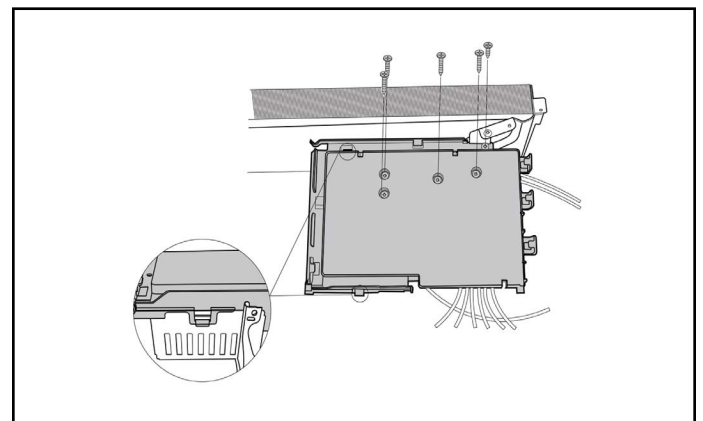
**NOTE:** Antistatic gloves must be worn when you disassemble the electronic box.

**NOTE:** Remove the panel plate before disassembling the fan.

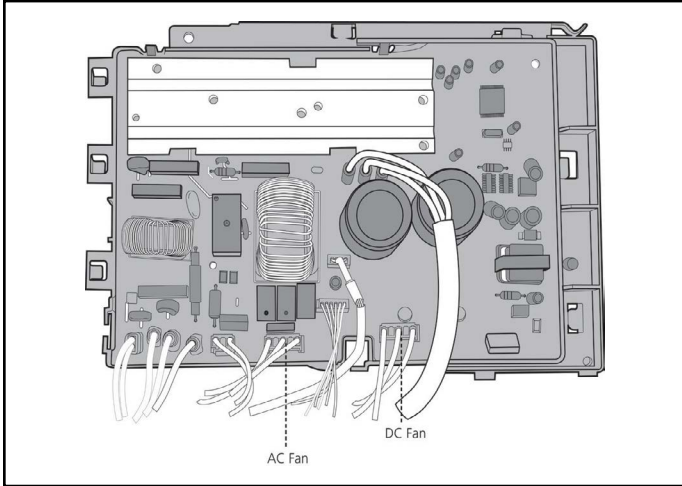
1. Remove the nut security the fan to the fan motor.



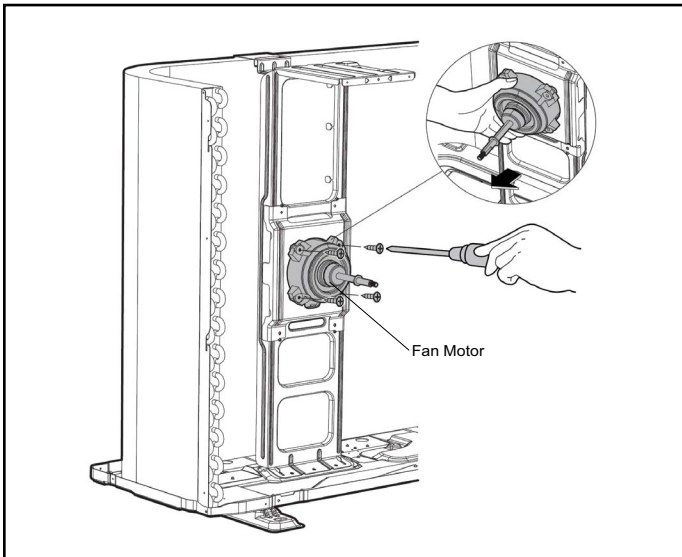
2. Remove the screws securing the cover of the electronic control box cover.



3. Disconnect connector from electronic control board plug.



4. Remove the screws securing the fan motor to body. Then remove fan motor.

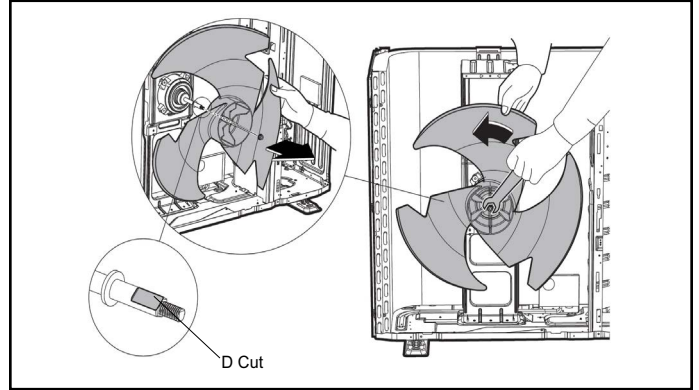


### Fan Disassembly (4DHV1S24S)

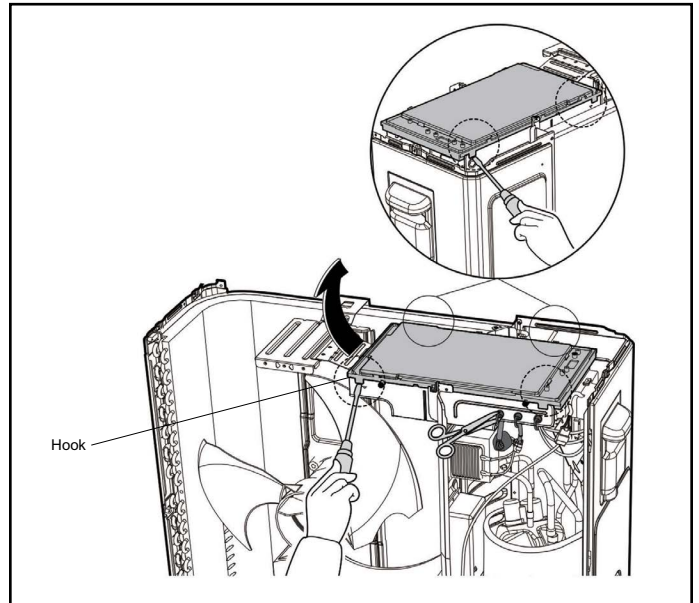
**NOTE:** Antistatic gloves must be worn when you disassemble the electronic box.

**NOTE:** Remove the panel plate before disassembling the fan.

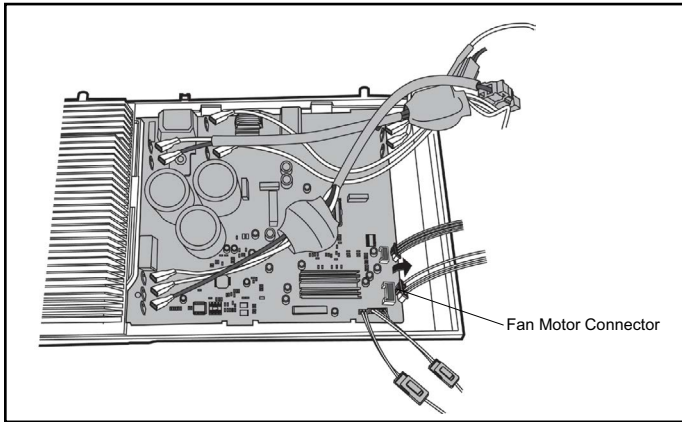
1. Remove the nut security the fan with a spanner. Then remove the fan.



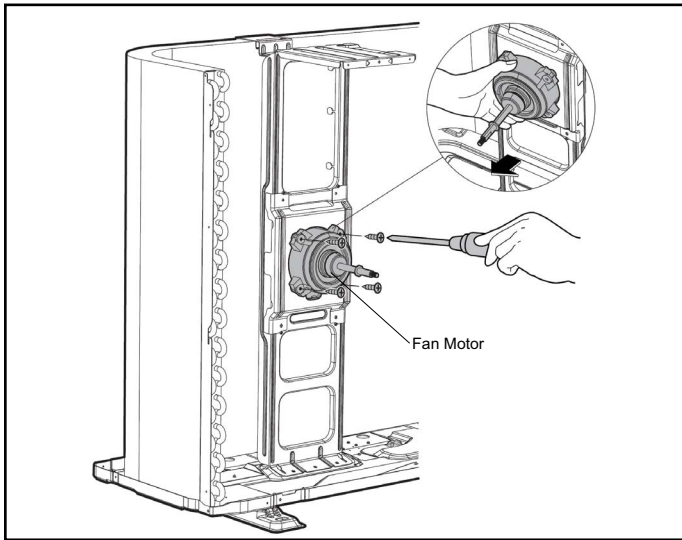
2. Release the hooks and then open the electronic control box cover.



3. Disconnect the connector for the fan motor from the electronic control board.



4. Remove the screws securing the fan motor from body. Remove the fan.

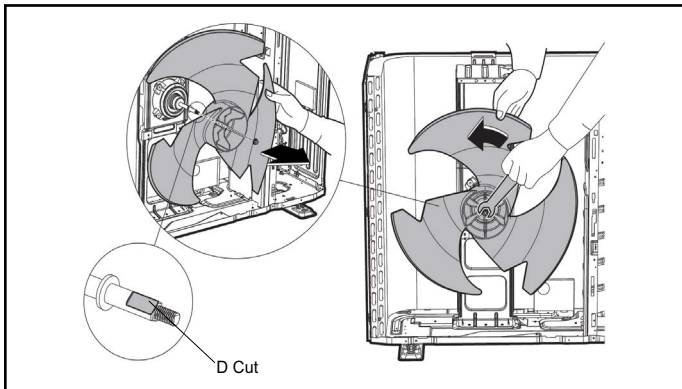


### Fan Disassembly (4DHV1S36S)

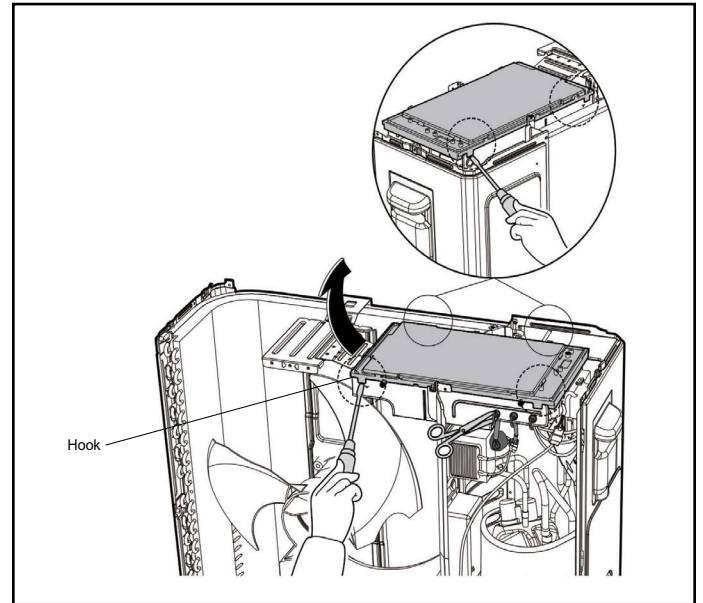
**NOTE:** Antistatic gloves must be worn when you disassemble the electronic box.

**NOTE:** Remove the panel plate before disassembling the fan.

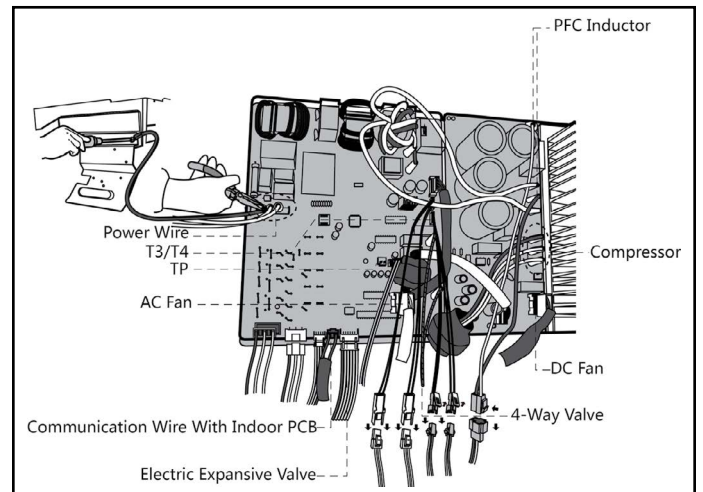
1. Remove the nut security the fan with a spanner. Then remove the fan.



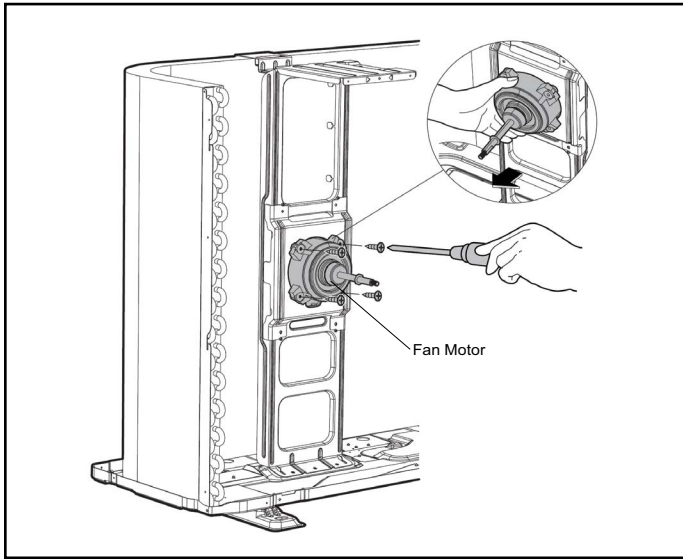
2. Release the hooks and then open the electronic control box cover.



3. Disconnect the connector for the fan motor from the electronic control board.

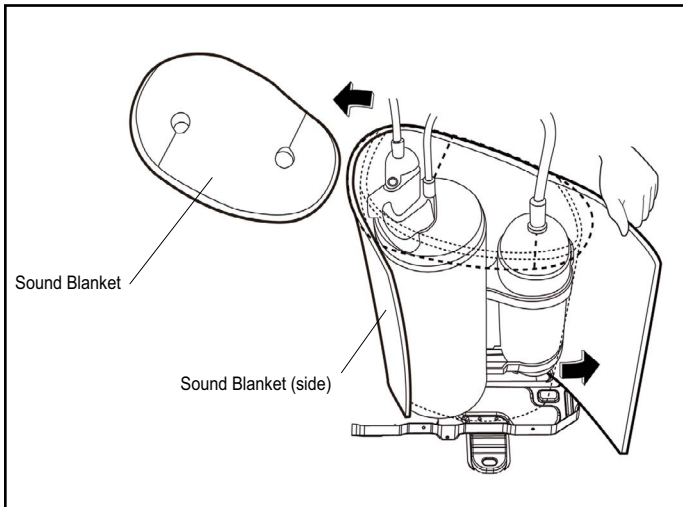


4. Remove the screws securing the fan motor from body.  
Remove the fan.



### Sound Blanket

**NOTE:** Recover refrigerant before removing the compressor.



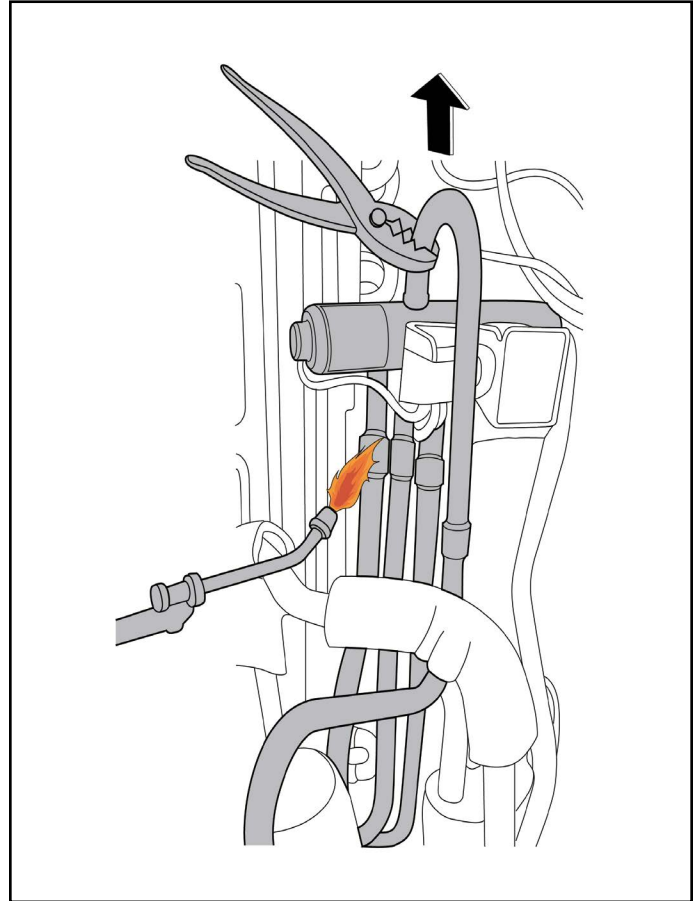
### Four-Way Valve

#### **⚠ WARNING**

Recover refrigerant from the refrigerant circuit before remove the four-way valve.

**NOTE:** Remove the panel plate, electrical parts, and fan assembly before disassembling four-way valve.

1. Heat up the brazed parts and then detach the the four-way valve and the pipe
2. Remove the four-way valve assembly with pliers.

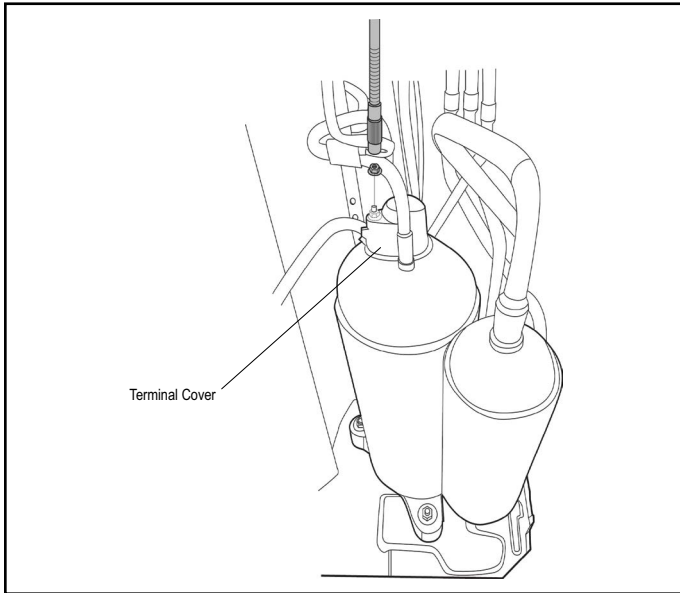




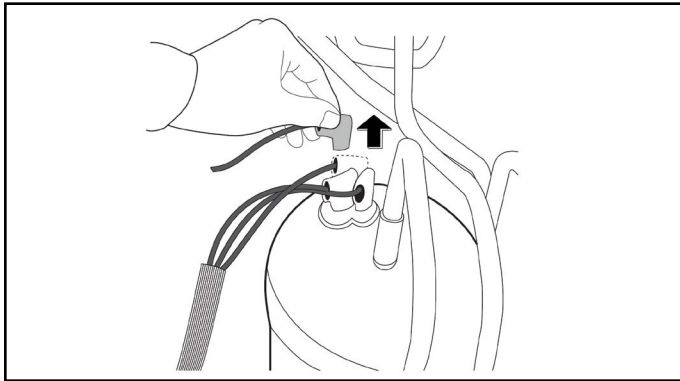
## Compressor

**NOTE:** Recover refrigerant before removing the compressor.

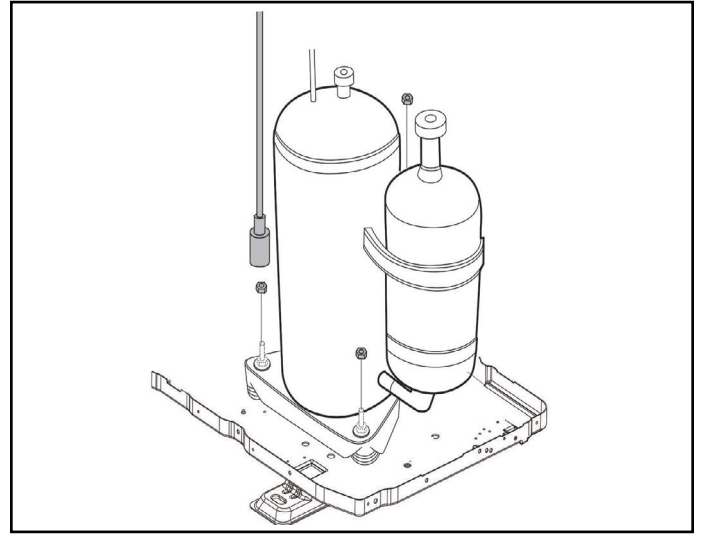
1. Remove the flange nut of the terminal cover and remove the cover.



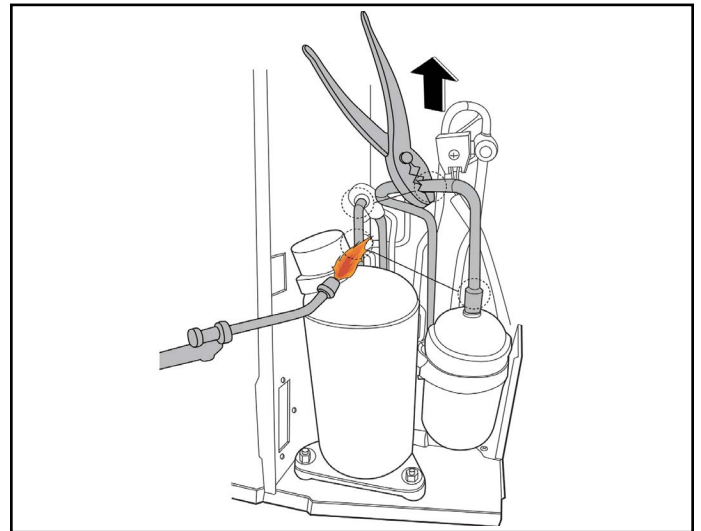
2. Disconnect all connectors.



3. Remove the hex nuts and washers which are located on the bottom of the plate which are securing the compressor.

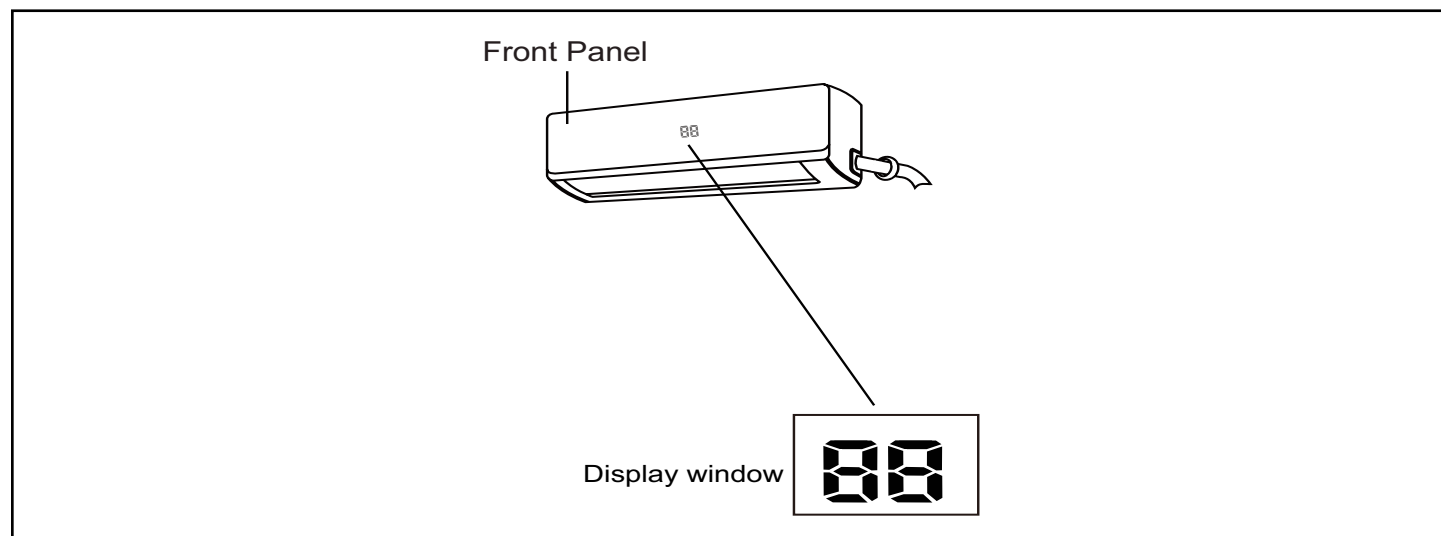


4. Heat up the brazed parts and then remove the discharge and suction pipes.
5. Lift the compressor from the base pan assembly with pliers.



## Indoor / Outdoor Unit Error Codes

All indoor units provide error code information with either a digital LED display or with Flash codes.



**Figure 25. Indoor Unit Display**

Outdoor Unit LED	Outdoor Unit LED Sequence	Indoor Unit Display	Error Information	Page Location
1 time	OFF	E0	Indoor unit EEPROM parameter error.	61
2 times	OFF	E1	Indoor / outdoor units communication error.	62
3 times	OFF	E2	Zero-crossing signal detection error.	64
4 times	OFF	E3	The indoor fan speed is operating outside of the normal range.	65
5 times	OFF	E4	Indoor room temperature sensor T1 is in open circuit or has short circuited	67
6 times	OFF	E5	Evaporator coil temperature sensor T2 is in open circuit or has short circuited.	67
7 times	OFF	EC	Refrigerant leak detected.	68
1 times	ON	F0	Overload current protection.	67
2 times	ON	F1	Outdoor ambient temperature sensor T4 open circuit or short circuit.	67
3 times	ON	F2	Condenser coil temperature sensor T3 is in open circuit or has short circuited.	67
4 times	ON	F3	Compressor discharge temperature sensor TP open circuit or short circuit.	67
5 times	ON	F4	Outdoor unit EEPROM parameter error.	61
6 times	ON	F5	The outdoor fan speed is operating outside of the normal range.	65
1 times	FLASH	p0	IPM malfunction or IGBT over-strong current protection.	69
2 times	FLASH	p1	Over voltage or over low voltage protection.	70
3 times	FLASH	p2	High temperature protection of IPM module.	71
5 times	FLASH	p4	Inverter compressor drive error.	72

**Table 14. Indoor and Outdoor Unit Error Codes**

## Troubleshooting by Error Codes

### Temperature Sensor Check

Disconnect the temperature sensor from PCB, measure the resistance value with a tester.

Temperature Sensors:

- Room temperature (T1) sensor,
- Indoor coil temperature(T2) sensor,
- Outdoor coil temperature (T3) sensor,
- Outdoor ambient temperature (T4) sensor,
- Discharge temperature (T5) or (TP) sensor.

Measure the resistance value of each winding by using the multi-meter.

### Compressor Checking

Measure the resistance value of each winding by using the tester

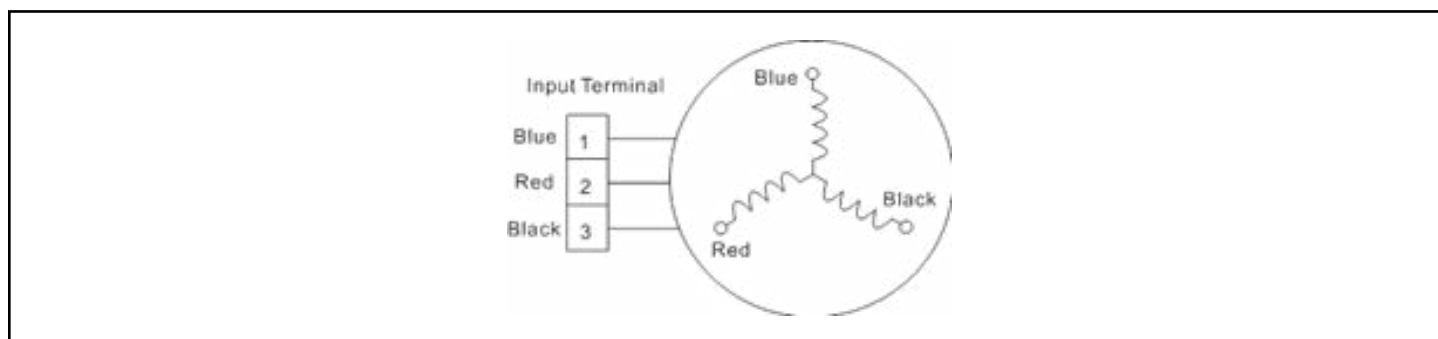


Figure 26. Input Terminal

Position	Resistance Value			
Model	ASN98D22UFZ	ASK89D29UEZD	ASN140D21UFZ	ATF235D22UMT
Blue - Red	1.57Ω (20°C/68°F)	1.99Ω (20°C/68°F)	1.28Ω (20°C/68°F)	0.75Ω (20°C/68°F)
Blue - Black				
Red - Blue				

Table 15. Compressor Terminal Resistance



### 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	Digital Tester		Normal Resistance Value
(+) Red	(-) Black		(+) Red	(-) Black	
P	N	∞ (Several M $\Lambda$ )	U	N	∞ (Several M $\Lambda$ )
	U		V		
	V		W		
	W		(+) Red		

### Normal P Voltage

Normal Voltage for P and N		
208-240V (1-phase))		
In Standby		
Around 310VDC		
In Operation		
With passive PFC module	With partial active PFC module	With fully active PFC module
>200VDC	>310VDC	>370VDC

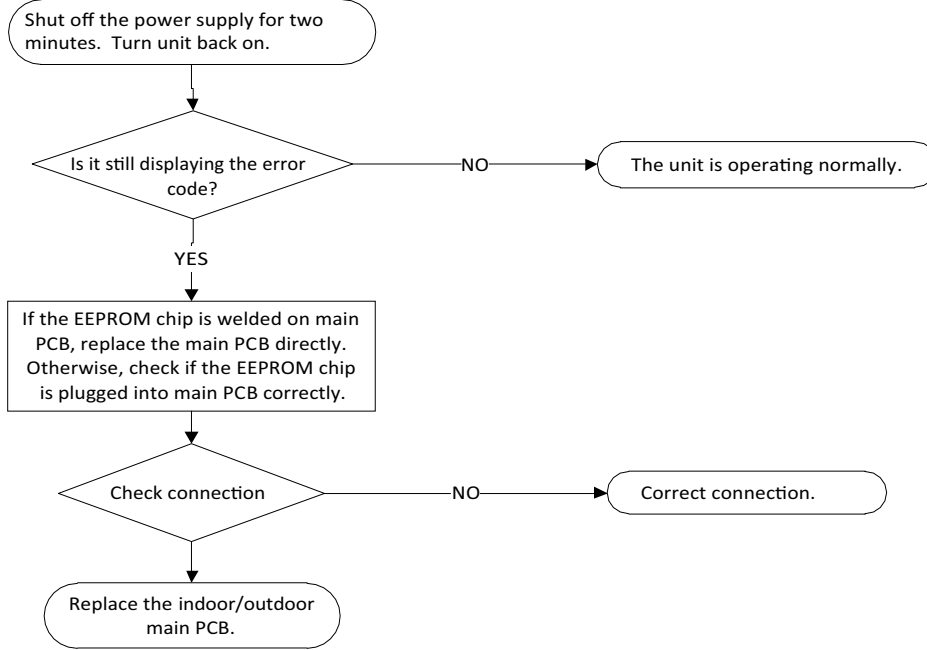


# Error Codes

## Error Code: E0/F4

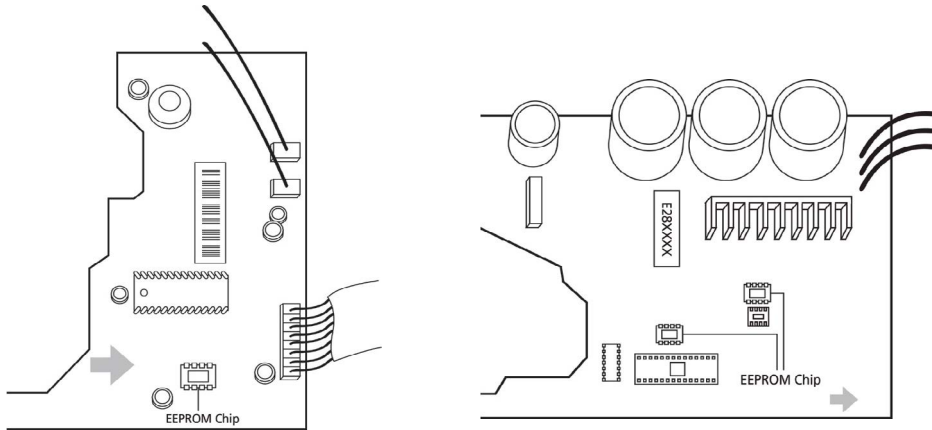
**Description:** Indoor or outdoor PCB main chip does not receive feedback from EEPROM chip.

**General Note:** Outdoor unit main control board chip is not receiving feedback from EEPROM chip.



### Remarks:

The location of the EEPROM chip on the indoor and outdoor PCB is shown in the following two images:

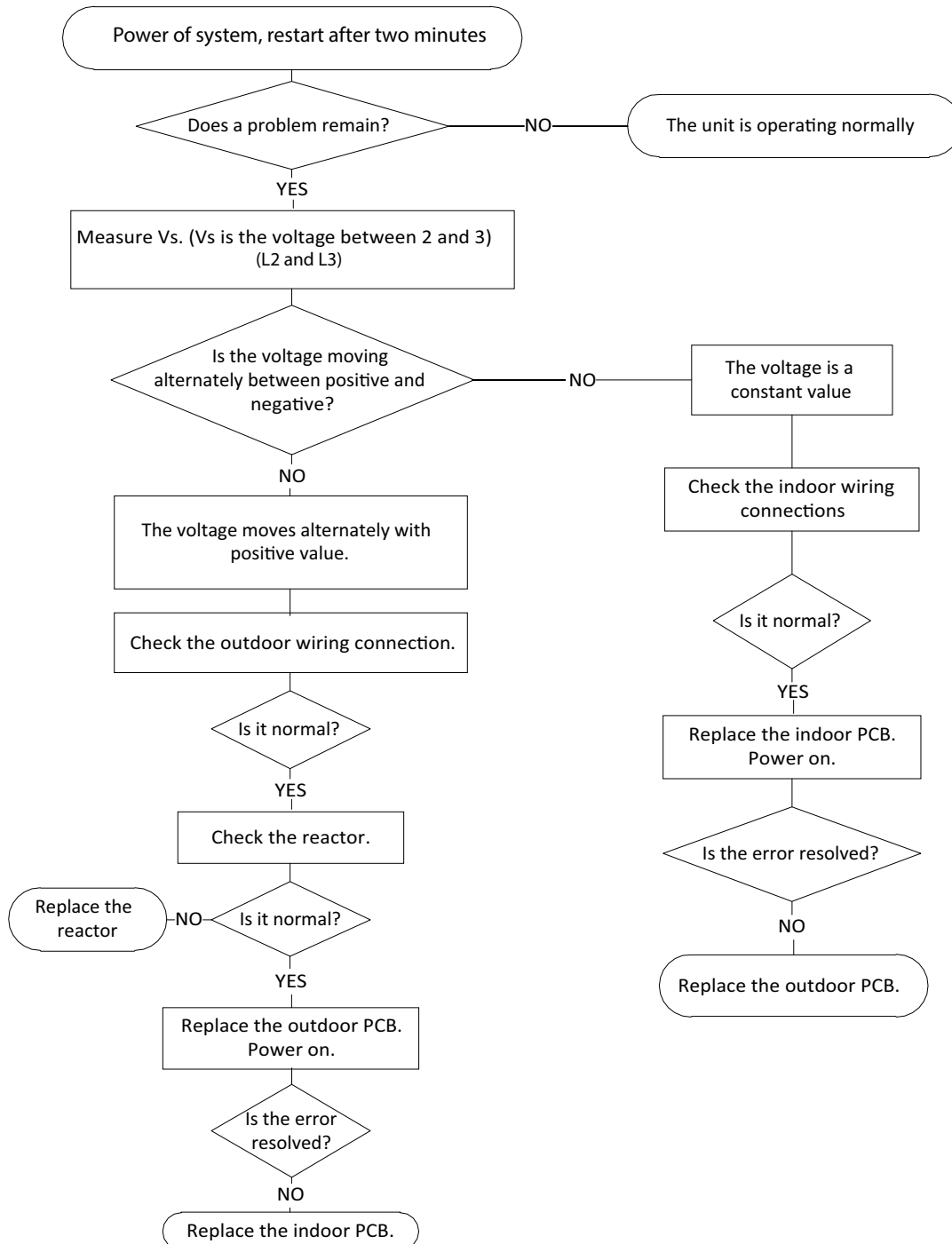


**Error Code: E1****Description:**

Communication malfunction between outdoor unit and all indoor units.

**General Note:**

The indoor unit has not received feedback from the outdoor unit for 110 seconds, four consecutive times



Error Code: E1 (continued)

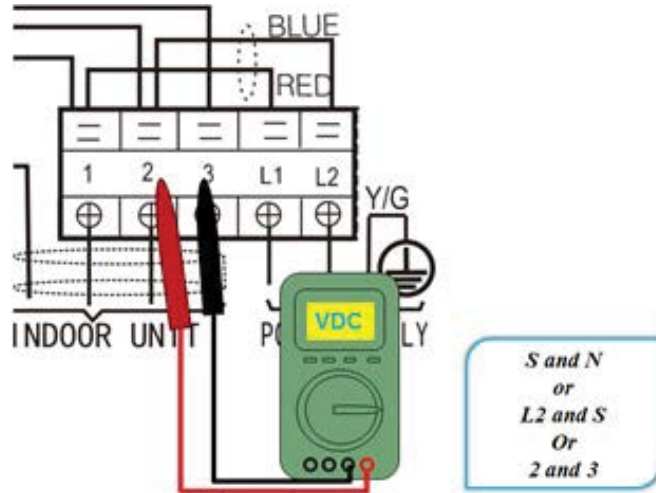
**Remarks:**

Use a multimeter to test the DC voltage between terminals 2 and 32 on outdoor unit. The multimeter red probe connects to terminal 2 and the black probe connects to terminal 3.

When AC is running normally, the voltage will move alternately between -25V to 25V.

If the outdoor unit malfunctions, the voltage will move alternately with positive values.

If indoor units has malfunction, the voltage will be a variable.



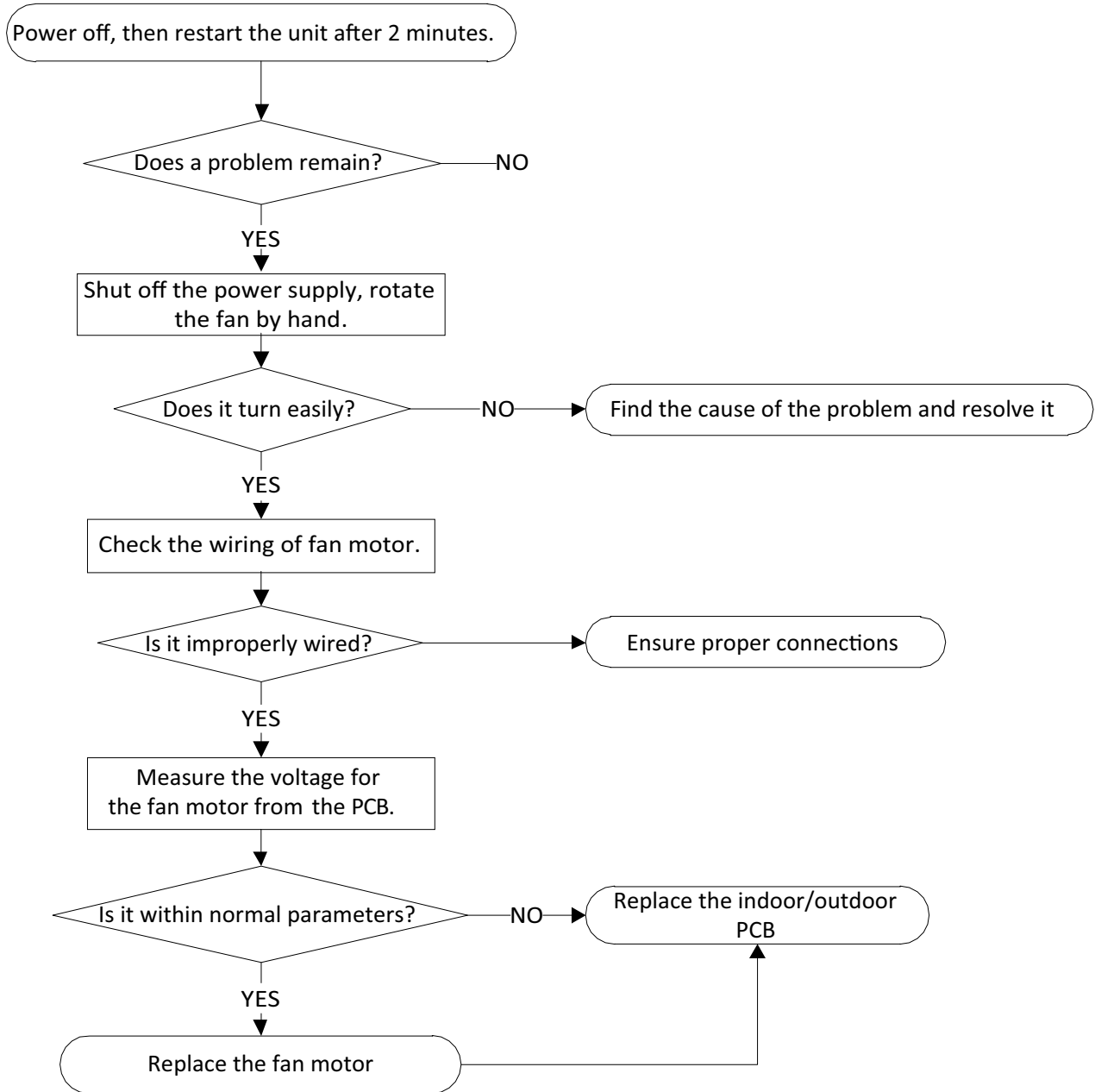
Use amultimeter to test the resistance of the reactor which does not connect to capacitor. The normal value should be around zero ohm. If not, the reactor is faulty and requires replacement.



<b>Error Code: E2</b>	
<b>Description:</b>	Zero crossing detection error diagnosis and solution
<b>General Note:</b>	When PCB does not receive zero crossing signal feedback for 4 minutes or the zero crossing signal time interval is abnormal.
<pre> graph TD     A([Check the connections and power supply.]) --&gt; B{Is it normal?}     B -- NO --&gt; C([Correct the connections. Turn on the unit when the power supply is good.])     B -- YES --&gt; D([Indoor main PCB is defective. Replace indoor main PCB.]) </pre> <p>The flowchart starts with a rounded rectangle containing the text "Check the connections and power supply.". An arrow points down to a diamond-shaped decision box containing "Is it normal?". From the diamond, a "NO" path leads right to a rounded rectangle containing "Correct the connections. Turn on the unit when the power supply is good.". A "YES" path leads down to a rounded rectangle containing "Indoor main PCB is defective. Replace indoor main PCB."</p>	

**Error Code: E3/F5**

<b>Description:</b>	Fan Speed is Operating Outside of the Normal Range.
<b>General Note:</b>	When the indoor fan speed is too low (300 RPM) during normal operations, the unit will stop and the LED will display the failure (E3). When the outdoor fan speed registers below 200 RPM or over 1500 RPM for an extended period of time, the unit will stop and the LED will display the failure (F5).

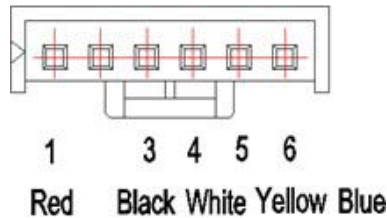


**1. Indoor or Outdoor DC Fan Motor(control chip is in fan motor)**

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 has problems and need to be replaced.

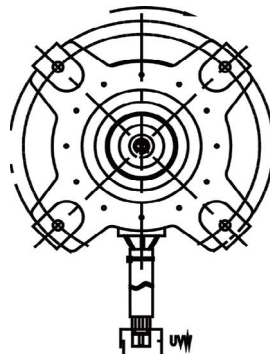
- DC motor voltage input and output (voltage: 220-240V~):

No.	Color	Signal	Voltage
1	Red	Vs/Vm	280V~380V
2	---	---	---
3	Black	GND	0V
4	White	Vcc	14-17.5V
5	Yellow	Vsp	0~5.6V
6	Blue	FG	14-17.5V



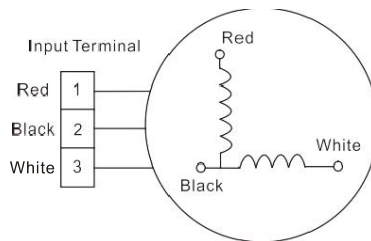
**2. Outdoor DC Fan Motor (control chip is in outdoor PCB)**

Release the UVW connector. Measure the resistance of U-V, U-W, V-W. If the resistance is not equal to each other, the fan motor must has problems and need to be replaced. otherwise the PCB must has problems and need to be replaced.



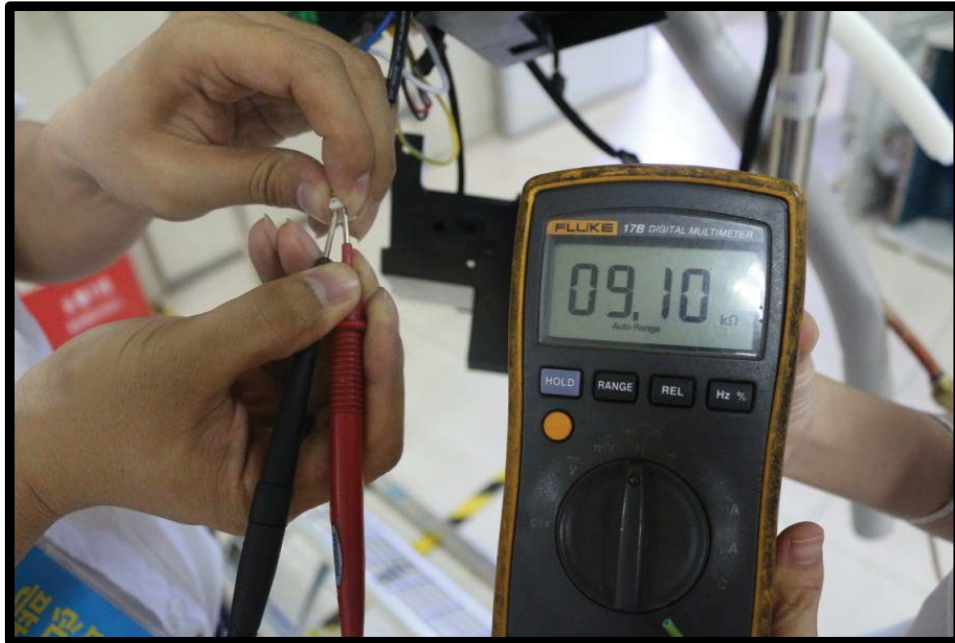
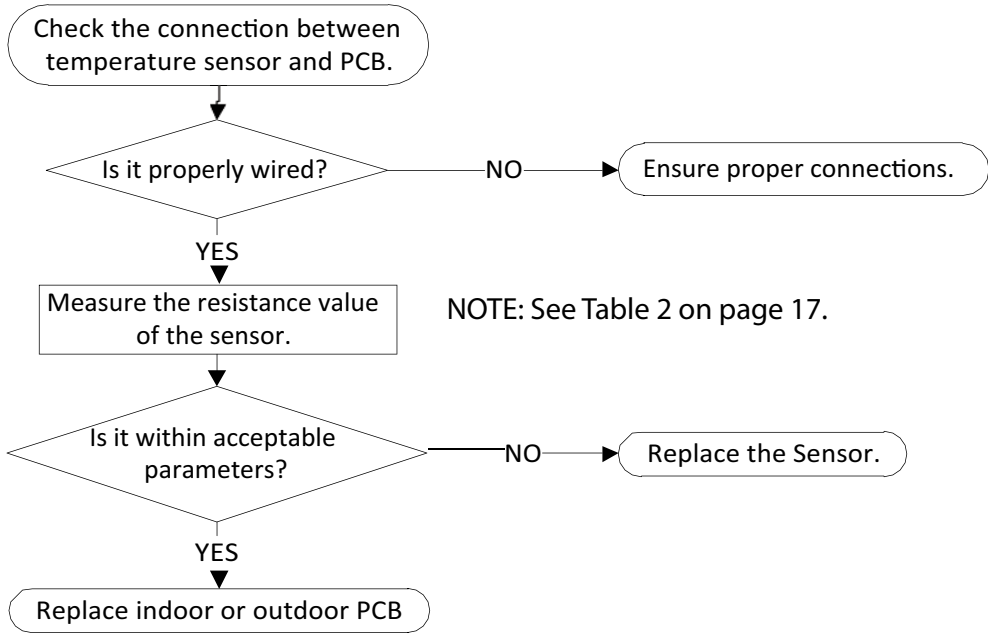
**3. Indoor AC Fan Motor**

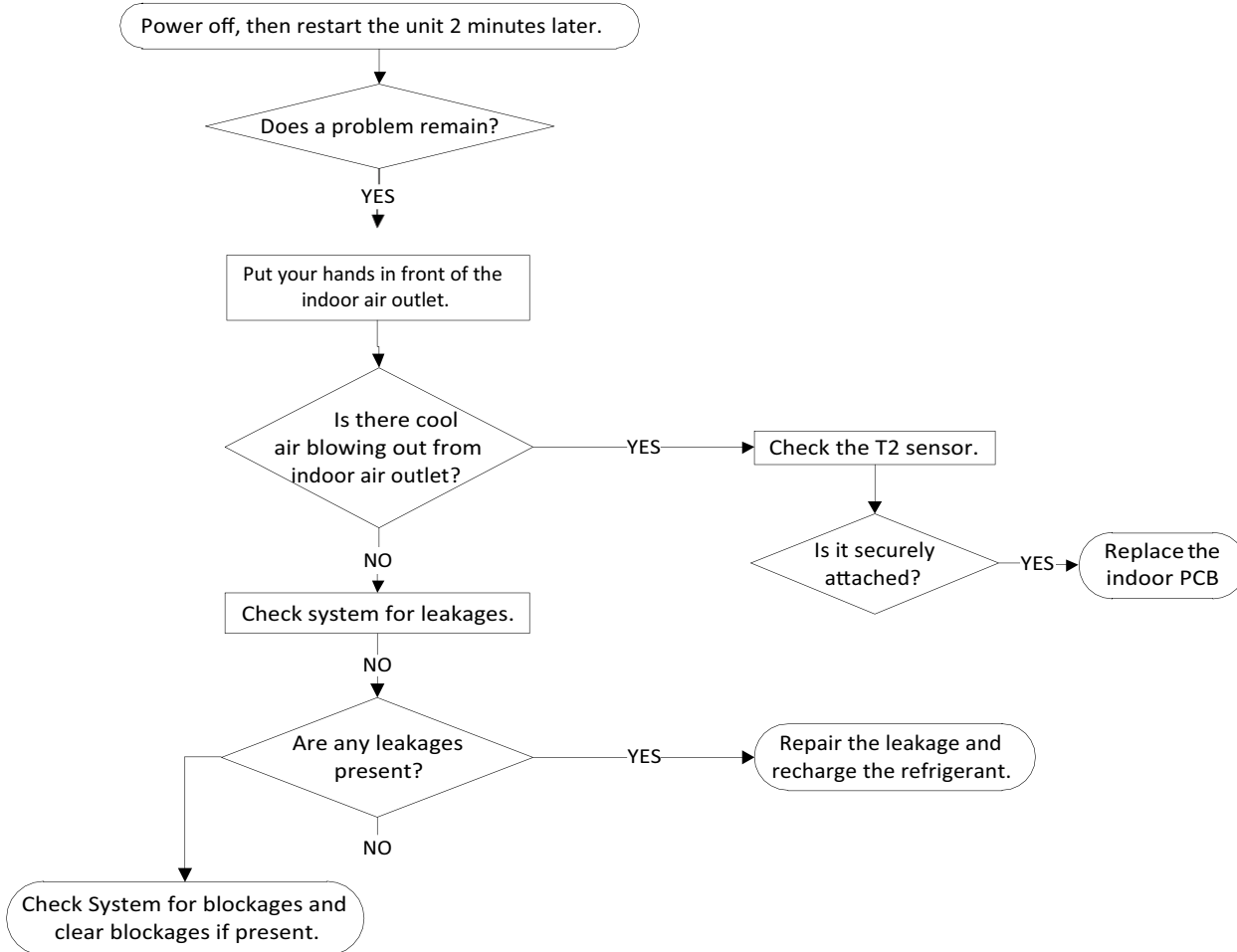
Power on and set the unit running in fan mode at high fan speed. After running for 15 seconds, measure the voltage of pin1 and pin2. If the value of the voltage is less than 100V(208~240V power supply) or 50V(115V power supply), the PCB must has problems and need to be replaced.



**Error Codes: E4, E5, F0, F1, F2 and F3**

<b>Description:</b>	Open circuit or short circuit of temperature sensor diagnosis and solution.
<b>General Note:</b>	Error displays if voltage is lower than 0.06V or higher than 4.94V.

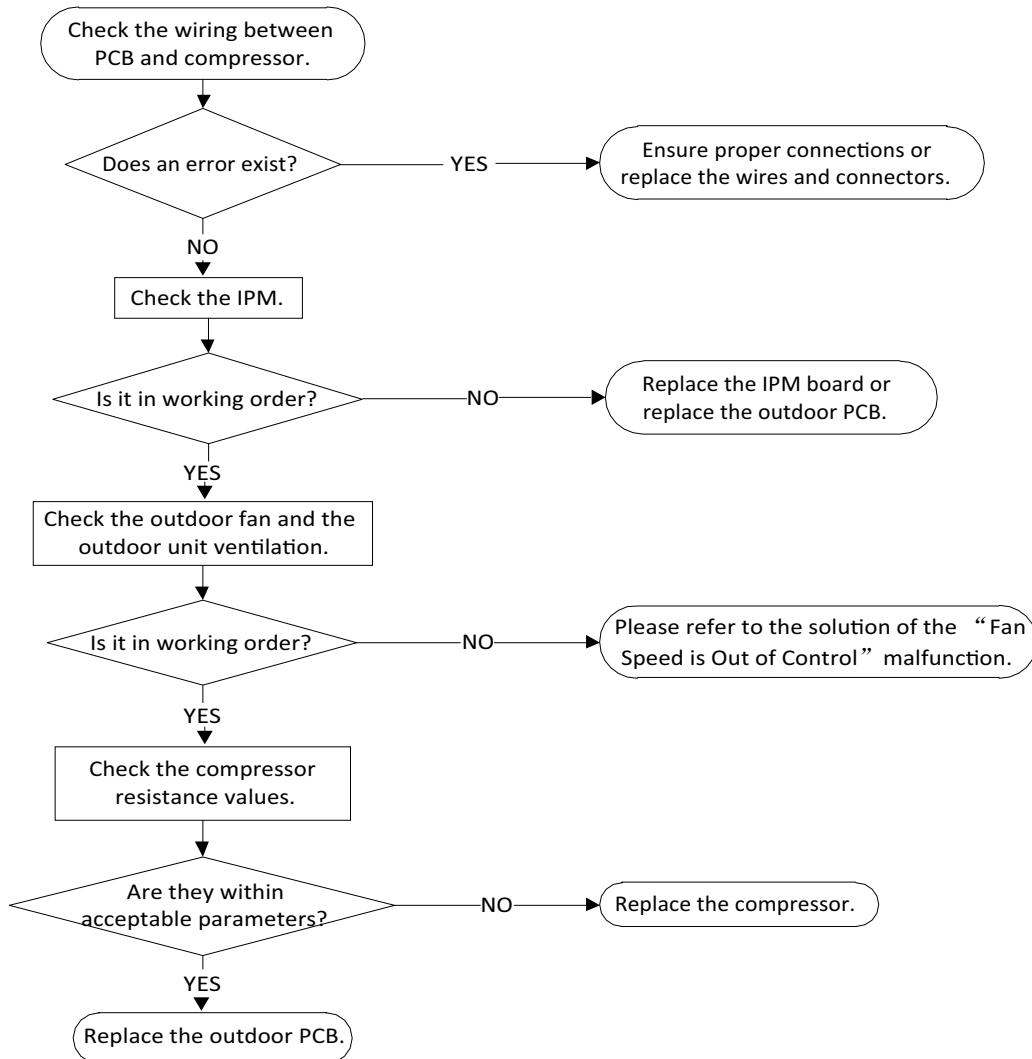


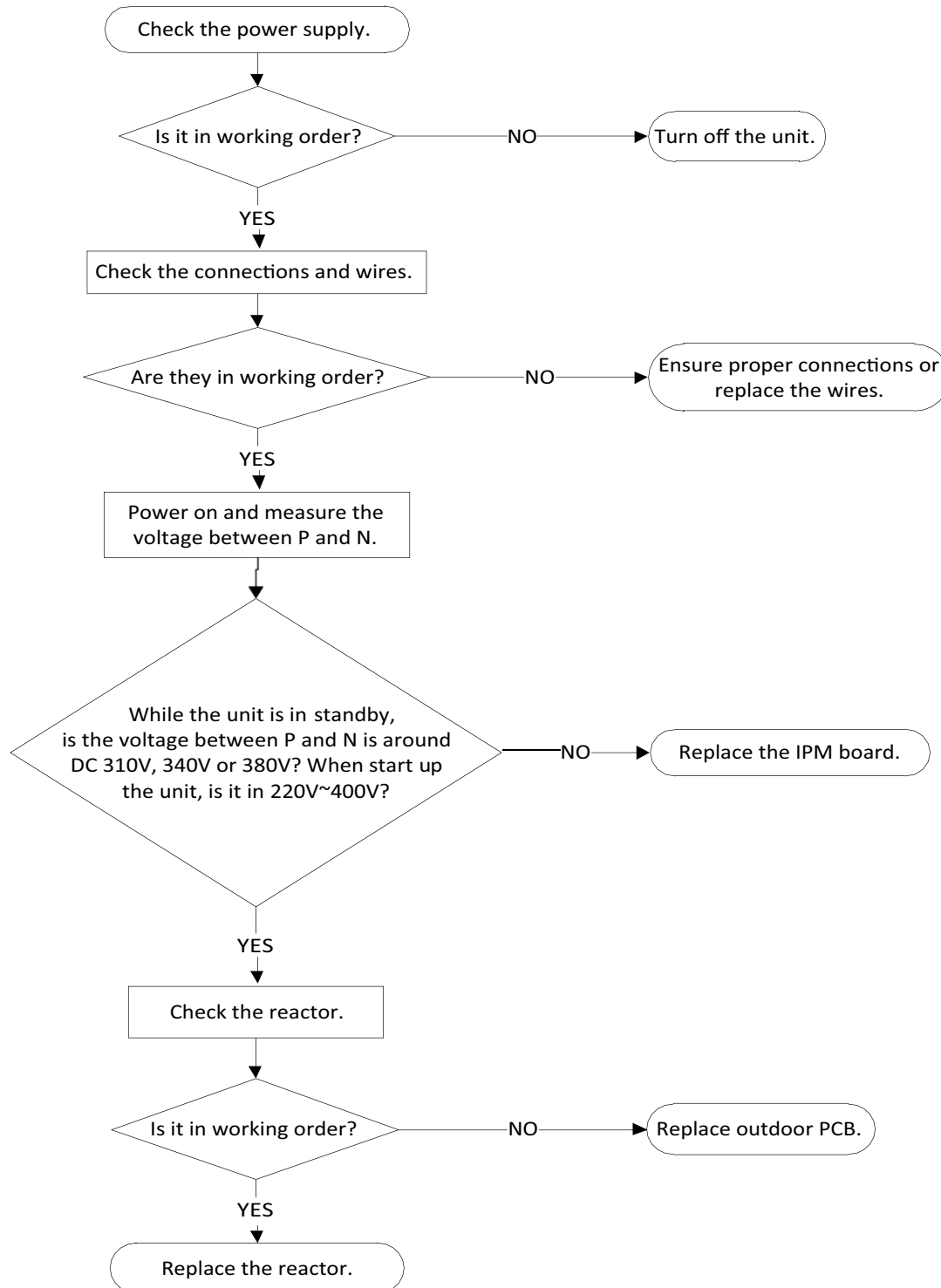
**Error Code: EC****Description:** Refrigerant Leakage Detection Diagnosis and Solution**General Note:** Define the evaporator coil temperature T2 of the compressor just starts running as Tcool.  
In the beginning eight minutes after the compressor starts up, if  $T2 < T_{cool} - 2^{\circ}\text{C}$  does not keep continuous four seconds and compressor running frequency higher than 50Hz does not keep continuous three minutes, and this situation happens three times, the display area will show "EC" and AC will turn off.

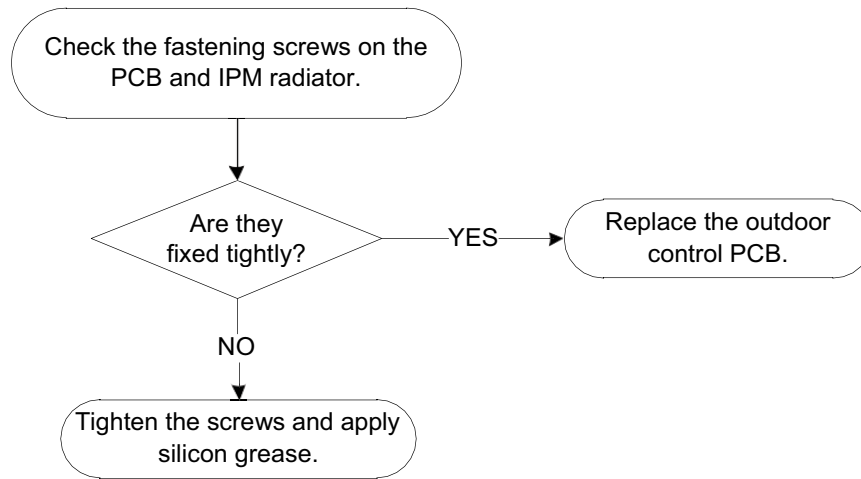


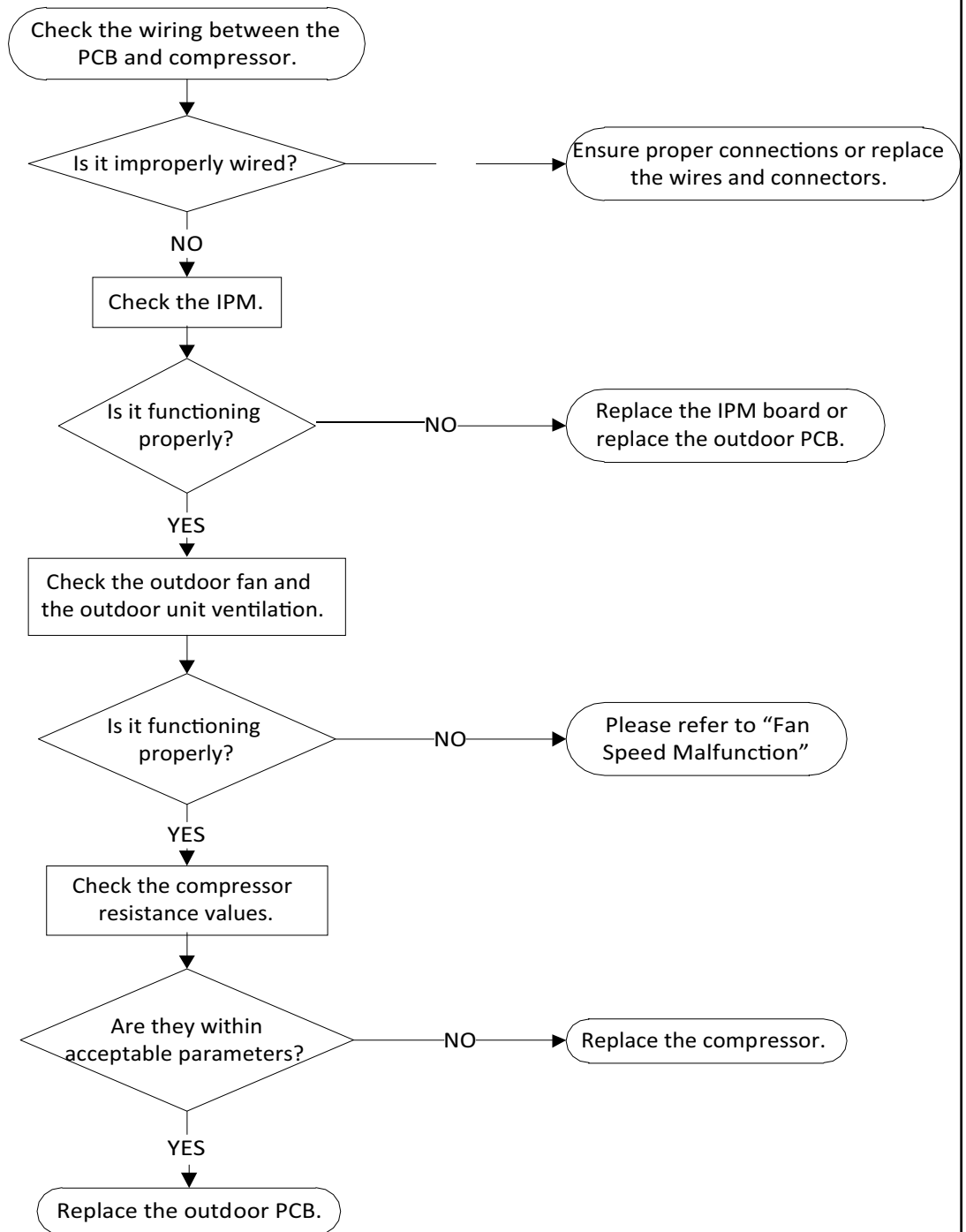
**Error Codes: P0**

<b>Description:</b>	IPM malfunction or IGBT Over-Current Protection Diagnosis and Solution)
<b>General Note:</b>	When the voltage signal the IPM sends to the compressor drive chip is abnormal, the display LED shows “P0” and the AC turn off.



**Error Code: P1****Description:** Over voltage or too low voltage protection diagnosis and solution)**General Note:** Abnormal increases or decreases in voltage are detected by checking the specified voltage detection circuit.

**Error Code: P2****Description:** High Temperature Protection of IPM module Diagnosis and Solution**General Note:** If the temperature of IPM module is higher than setting value, the LED displays this failure code.

**Error Code: P4****Description:** Inverter Compressor Drive Error Diagnosis and Solution**General Note:** An abnormal inverter compressor drive is detected by a special detection circuit, including communication signal detection, voltage detection, compressor rotation speed signal detection and so on.

## Temperature Sensor Resistance Values

°F	°C	K Ohm	°F	°C	K Ohm	°F	°C	K Ohm	°F	°C	K Ohm
-4	-20	115.266	68	20	12.6431	140	60	2.35774	212	100	0.62973
-2.2	-19	108.146	69.8	21	12.0561	141.8	61	2.27249	213.8	101	0.61148
-0.4	-18	101.517	71.6	22	11.5	143.6	62	2.19073	215.6	102	0.59386
1.4	-17	96.3423	73.4	23	10.9731	145.4	63	2.11241	217.4	103	0.57683
3.2	-16	89.5865	75.2	24	10.4736	147.2	64	2.03732	219.2	104	0.56038
5	-15	84.219	77	25	10	149	65	1.96532	221	105	0.54448
6.8	-14	79.311	78.8	26	9.55074	150.8	66	1.89627	222.8	106	0.52912
8.6	-13	74.536	80.6	27	9.12445	152.6	67	1.83003	224.6	107	0.51426
10.4	-12	70.1698	82.4	28	8.71983	154.4	68	1.76647	226.4	108	0.49989
12.2	-11	66.0898	84.2	29	8.33566	156.2	69	1.70547	228.2	109	0.486
14	-10	62.2756	86	30	7.97078	158	70	1.64691	230	110	0.47256
15.8	-9	58.7079	87.8	31	7.62411	159.8	71	1.59068	231.8	111	0.45957
17.6	-8	56.3694	89.6	32	7.29464	161.6	72	1.53668	233.6	112	0.44699
19.4	-7	52.2438	91.4	33	6.98142	163.4	73	1.48481	235.4	113	0.43482
21.2	-6	49.3161	93.2	34	6.68355	165.2	74	1.43498	237.2	114	0.42304
23	-5	46.5725	95	35	6.40021	167	75	1.38703	239	115	0.41164
24.8	-4	44	96.8	36	6.13059	168.8	76	1.34105	240.8	116	0.4006
26.6	-3	41.5878	98.6	37	5.87359	170.6	77	1.29078	242.6	117	0.38991
28.4	-2	39.8239	100.4	38	5.62961	172.4	78	1.25423	244.4	118	0.37956
30.2	-1	37.1988	102.2	39	5.39689	174.2	79	1.2133	246.2	119	0.36954
32	0	35.2024	104	40	5.17519	176	80	1.17393	248	120	0.35982
33.8	1	33.3269	105.8	41	4.96392	177.8	81	1.13604	249.8	121	0.35042
35.6	2	31.5635	107.6	42	4.76253	179.6	82	1.09958	251.6	122	0.3413
37.4	3	29.9058	109.4	43	4.5705	181.4	83	1.06448	253.4	123	0.33246
39.2	4	28.3459	111.2	44	4.38736	183.2	84	1.03069	255.2	124	0.3239
41	5	26.8778	113	45	4.21263	185	85	0.99815	257	125	0.31559
42.8	6	25.4954	114.8	46	4.04589	186.8	86	0.96681	258.8	126	0.30754
44.6	7	24.1932	116.6	47	3.88673	188.6	87	0.93662	260.6	127	0.29974
46.4	8	22.5662	118.4	48	3.73476	190.4	88	0.90753	262.4	128	0.29216
48.2	9	21.8094	120.2	49	3.58962	192.2	89	0.8795	264.2	129	0.28482
50	10	20.7184	122	50	3.45097	194	90	0.85248	266	130	0.2777
51.8	11	19.6891	123.8	51	3.31847	195.8	91	0.82643	267.8	131	0.27078
53.6	12	18.7177	125.6	52	3.19183	197.6	92	0.80132	269.6	132	0.26408
55.4	13	17.8005	127.4	53	3.07075	199.4	93	0.77709	271.4	133	0.25757
57.2	14	16.9341	129.2	54	2.95896	201.2	94	0.75373	273.2	134	0.25125
59	15	16.1156	131	55	2.84421	203	95	0.73119	275	135	0.24512
60.8	16	15.3418	132.8	56	2.73823	204.8	96	0.70944	276.8	136	0.23916
62.6	17	14.6181	134.6	57	2.63682	206.6	97	0.68844	278.6	137	0.23338
64.4	18	13.918	136.4	58	2.53973	208.4	98	0.66818	280.4	138	0.22776
66.2	19	13.2631	138.2	59	2.44677	210.2	99	0.64862	282.2	139	0.22231

**Table 16. Temperature Sensor Resistance Value Table for T1, T2, T3 and T4 (°C – K)**

## Discharge Temperature Sensor Resistance Values

°F	°C	K Ohm	°F	°C	K Ohm	°F	°C	K Ohm	°F	°C	K Ohm
-4	-20	542.7	68	20	68.66	140	60	13.59	212	100	3.702
-2.2	-19	511.9	69.8	21	65.62	141.8	61	13.11	213.8	101	3.595
-0.4	-18	455.9	71.6	22	59.98	143.6	62	12.21	215.6	102	3.392
1.4	-17	455.9	73.4	23	59.98	145.4	63	12.21	217.4	103	3.392
3.2	-16	430.5	75.2	24	57.37	147.2	64	11.79	219.2	104	3.296
5	-15	406.7	77	25	54.89	149	65	11.38	221	105	3.203
6.8	-14	384.3	78.8	26	52.53	150.8	66	10.99	222.8	106	3.113
8.6	-13	363.3	80.6	27	50.28	152.6	67	10.61	224.6	107	3.025
10.4	-12	343.6	82.4	28	48.14	154.4	68	10.25	226.4	108	2.941
12.2	-11	325.1	84.2	29	46.11	156.2	69	9.902	228.2	109	2.86
14	-10	307.7	86	30	44.17	158	70	9.569	230	110	2.781
15.8	-9	291.3	87.8	31	42.33	159.8	71	9.248	231.8	111	2.704
17.6	-8	275.9	89.6	32	40.57	161.6	72	8.94	233.6	112	2.63
19.4	-7	261.4	91.4	33	38.89	163.4	73	8.643	235.4	113	2.559
21.2	-6	247.8	93.2	34	37.3	165.2	74	8.358	237.2	114	2.489
23	-5	234.9	95	35	35.78	167	75	8.084	239	115	2.422
24.8	-4	222.8	96.8	36	34.32	168.8	76	7.82	240.8	116	2.357
26.6	-3	211.4	98.6	37	32.94	170.6	77	7.566	242.6	117	2.294
28.4	-2	200.7	100.4	38	31.62	172.4	78	7.321	244.4	118	2.233
30.2	-1	190.5	102.2	39	30.36	174.2	79	7.086	246.2	119	2.174
32	0	180.9	104	40	29.15	176	80	6.859	248	120	2.117
33.8	1	171.9	105.8	41	28	177.8	81	6.641	249.8	121	2.061
35.6	2	163.3	107.6	42	26.9	179.6	82	6.43	251.6	122	2.007
37.4	3	155.2	109.4	43	25.86	181.4	83	6.228	253.4	123	1.955
39.2	4	147.6	111.2	44	24.85	183.2	84	6.033	255.2	124	1.905
41	5	140.4	113	45	23.89	185	85	5.844	257	125	1.856
42.8	6	133.5	114.8	46	22.89	186.8	86	5.663	258.8	126	1.808
44.6	7	127.1	116.6	47	22.1	188.6	87	5.488	260.6	127	1.762
46.4	8	121	118.4	48	21.26	190.4	88	5.32	262.4	128	1.717
48.2	9	115.2	120.2	49	20.46	192.2	89	5.157	264.2	129	1.674
50	10	109.8	122	50	19.69	194	90	5	266	130	1.632
51.8	11	104.6	123.8	51	18.96	195.8	91	4.849			
53.6	12	99.69	125.6	52	18.26	197.6	92	4.703			
55.4	13	95.05	127.4	53	17.58	199.4	93	4.562			
57.2	14	90.66	129.2	54	16.94	201.2	94	4.426			
59	15	86.49	131	55	16.32	203	95	4.294		B(25/50)=3950K	
60.8	16	82.54	132.8	56	15.73	204.8	96	4.167			
62.6	17	78.79	134.6	57	15.16	206.6	97	4.045		R(90°C)=5KΩ±3%	
64.4	18	75.24	136.4	58	14.62	208.4	98	3.927			
66.2	19	71.86	138.2	59		210.2	99	3.812			

**Table 17. Temperature Sensor Resistance Value Table for TP (°C – K)**

## Pressure on Service Port (R-410A)

°F(°C)	IDT/ODT	0 (-17)	5 (-15)	15 (9.44)	45 (7.22)	75 (23.89)	85 (29.44)	95 (35)	105 (40.56)	115 (46.11)	120 (48.89)
BAR	70/59	6.4	6.5	7.3	8	8.2	7.8	8.1	8.6	10.1	10.6
BAR	75/63	6.7	6.8	7.9	8.6	8.6	8.3	8.7	9.1	10.7	11.2
BAR	80/67	7.1	7.2	8.5	9.5	9.3	8.9	9.1	9.6	11.2	11.9
BAR	90/73	7.7	7.8	9.6	10.5	10.3	9.5	10	10.6	12.4	13

°F(°C)	IDT/ODT	0 (-17)	5 (-15)	15 (9.44)	45 (7.22)	75 (23.89)	85 (29.44)	95 (35)	105 (40.56)	115 (46.11)	120 (48.89)
PSI	70/59	93	94	106	116	119	113	117	125	147	154
PSI	75/63	97	99	115	125	124	120	126	132	155	162
PSI	80/67	103	104	123	138	135	129	132	140	162	173
PSI	90/73	112	113	139	152	149	138	145	154	180	189

°F(°C)	IDT/ODT	0 (-17)	5 (-15)	15 (9.44)	45 (7.22)	75 (23.89)	85 (29.44)	95 (35)	105 (40.56)	115 (46.11)	120 (48.89)
MPA	70/59	0.64	0.65	0.73	0.8	0.82	0.78	0.81	0.86	1.01	1.06
MPA	75/63	0.67	0.68	0.79	0.86	0.86	0.83	0.87	0.91	1.07	1.12
MPA	80/67	0.71	0.72	0.85	0.95	0.93	0.89	0.91	0.96	1.12	1.19
MPA	90/73	0.77	0.78	0.96	1.05	1.03	0.95	1	1.06	1.24	1.3

