

PIONEER®

CENTRAL SPLIT AIR CONDITIONER

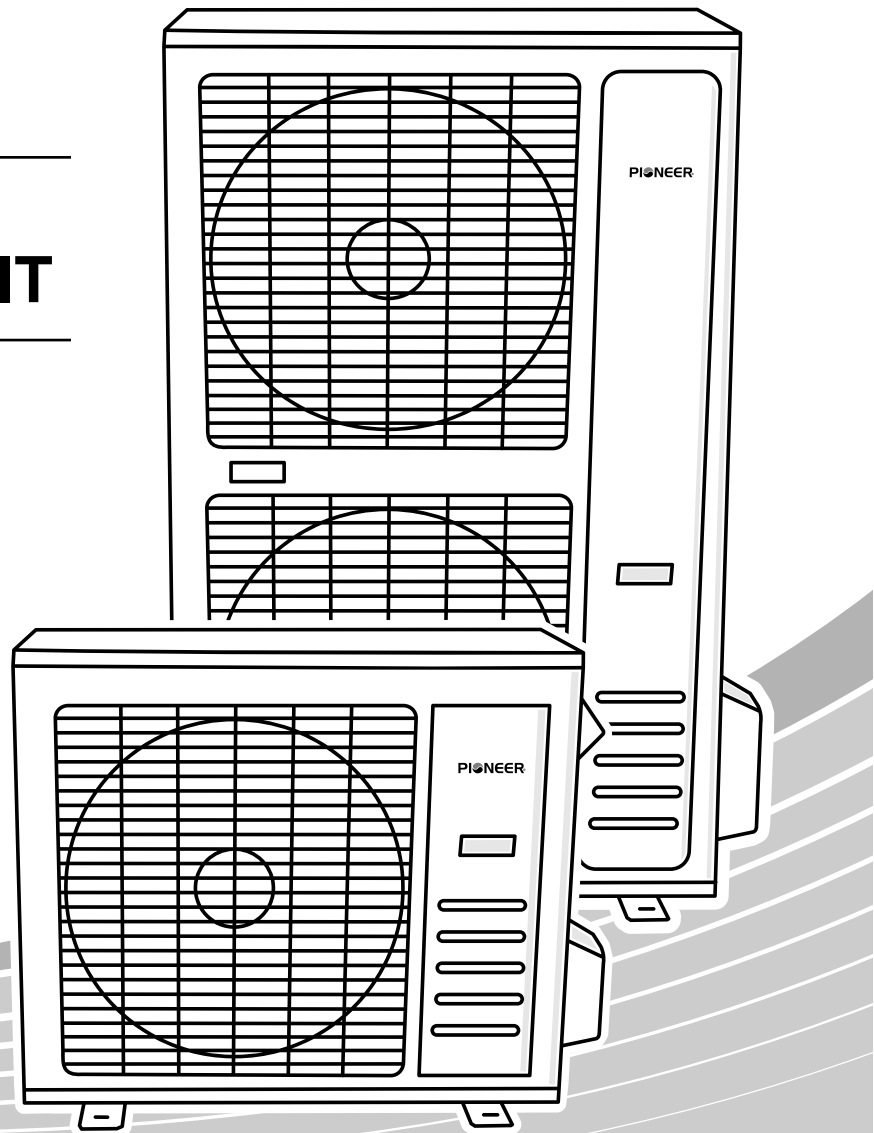
Technical & Service Manual v3.0

HIGH EFFICIENCY CONDENSING UNIT

Models:

- YH024GHFI18RT2
- YH036GHFI18RT2
- YH060GHFI18RT2

-
- R-410A REFRIGERANT
 - 208~230 V, 1 Phase, 60 Hz
 - 18 SEER



IMPORTANT NOTICE: Thank you very much for purchasing this Air Conditioner. Please read this manual carefully before installing or operating your new air conditioning system. Be sure to save this manual for future reference.

SAFETY SUMMARY

IMPORTANT NOTICE

- We pursue a policy of continuing improvement in design and performance of products. The right is therefore reserved to vary specifications without notice.
- We cannot anticipate every possible circumstance that might involve a potential hazard.
- This air conditioner is designed for standard air conditioning only. Do not use this air conditioner for other purposes such as drying clothes, refrigerating foods or for any other cooling or heating process. Do not let the air-out face animals or plants, it might have an adverse effect on them.
- The installer and system specialist shall secure safety against leakage according to local regulations or standards.
- Signal words (DANGER, WARNING and CAUTION) are used to identify levels of hazard seriousness. Definitions for identifying hazard levels are provided below with their respective signal words.

▲ DANGER

: Immediate hazards which WILL result in severe personal injury or death.

▲ WARNING

: Hazards or unsafe practices which COULD result in severe personal injury or death.

▲ CAUTION

: Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.

NOTE

: Useful information for operation and/or maintenance.

- Installation should be performed by the dealer or another professional personnel. Improper installation may cause water leakage, electrical shock, or fire.

▲ DANGER

- Do not perform installation work, refrigerant piping work, drain piping and electrical wiring connection without referring to our installation manual. If the instructions are not followed, it may result in water leakage, electric shock or fire.
- Use refrigerant R410A in the refrigerant cycle.
- Do not pour water into the indoor or outdoor unit. These products are equipped with electrical parts. If poured, it will cause a serious electrical shock.
- Do not open the service cover or access panel for the indoor or outdoor units without turning OFF the main power supply.
- Do not touch or adjust safety devices inside the indoor or outdoor units. If these devices are touched or readjusted, it may cause a serious accident.
- Refrigerant leakage can cause difficulty in breathing due to insufficient air. Turn OFF the main switch, extinguish any naked flames and contact your service contractor, if refrigerant leakage occurs.
- Do perform air-tight test. Do not charge oxygen, acetylene or other flammable and poisonous gas into the refrigerant cycle when performing a leakage test or an air-tight test. These types of gas are extremely dangerous and can cause an explosion. It is recommended that nitrogen be used for this test.
- The installer and system specialist shall secure safety against refrigerant leakage according to local regulations or standards.
- Use an ELB (Electric Leakage Breaker). In the event of a fault, there is danger of an electric shock or a fire if it is not used.

▲ WARNING

- Do not use any sprays such as insecticide, lacquer, hair spray or other flammable gas within approximately one (1) meter from the system.

- If circuit breaker or fuse is often activated, stop the system and contact your service contractor.
- Check that the ground wire is securely connected. If the unit is not correctly grounded, it will lead to electric shock. Do not connect the ground wiring to gas piping, water piping, lightning conductor or ground wiring for telephone.
- Before performing any brazing work, check to ensure that there is no flammable material around when using refrigerant. Be sure to wear leather gloves to prevent cold injuries.
- Protect the wires, electrical parts, etc. from rats or other small animals.
If not protected, rats may gnaw at unprotected parts, which may lead to fire.
- Fix the cables securely. External forces on the terminals could lead to fire.
- Install the air conditioner on a solid base that can support the unit weight. An inadequate base or incomplete installation may cause injury in the event the unit falls off the base. Incomplete connections or clamping may cause terminal overheating or fire.
- Make sure that the outdoor unit is not covered with snow or ice before operation.

 **CAUTION**

- Do not step or put any material on the product.
- Do not put any foreign material on the unit or inside the unit.

NOTE

- It is recommended that the room be ventilated every 3 to 4 hours.
- The air conditioner may not work properly under the following circumstances.
The power transformer provides the same power or power as the air conditioner. The electrical equipment is too close to the power supply of the air conditioner. With the sharp change of power consumption and switching action, the power supply of the air conditioner will generate a large induction surge voltage.

CHECKING PRODUCT RECEIVED

- Upon receiving this product, inspect it for any shipping damage. Claims for damage, either apparent or concealed, should be filed immediately with the shipping company.
- Check the model number, electrical characteristics (power supply, voltage and frequency) and accessories to determine if they are correct.
The standard utilization of the unit shall be explained in these instructions.
Therefore, the utilization of the unit other than those indicated in these instructions is not recommended.
Please contact your local agent, as the occasion arises.


 • *The figures in this manual are based on the external view of a standard model. Consequently, the shape may differ from that of the air conditioner you have selected.*

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1. GENERAL

1. General

1.1 Features

➤ **360 DC inverter driven technology**

With 360 all DC inverter driven technology, realize the compressor driving direction the same with rotary direction. Optimize energy-saving, and keep the compressor more stable and high efficient during operation. It can also guarantee more stable temperature control and reduce noise.

➤ **Pressure sensor**

Inside the outdoor unit is the pressure sensor, which defects low pressure in cooling mode and high pressure in heating mode. The intelligent control can be realized by calculating the indoor coil temperature through the pressure valve.

➤ **Smaller outdoor dimension for installation flexibility**

The side-discharge outdoor unit, saves roughly 36% more space than traditional air conditioners. More conveniently, it can be installed on wall, yard or on the roof.

➤ **Convenient Installation**

The stop valve and connecting pipes are connected by welding, and indoor unit of other brands can freely be connected with this outdoor unit.

➤ **Comfortable temperature control**

DC inverter power control uses its full capacity at startup to cool/warm quickly. As soon as the set temperature is reached, it carefully adjusts current frequency to prevent temperature fluctuation and energy loss.

1. GENERAL

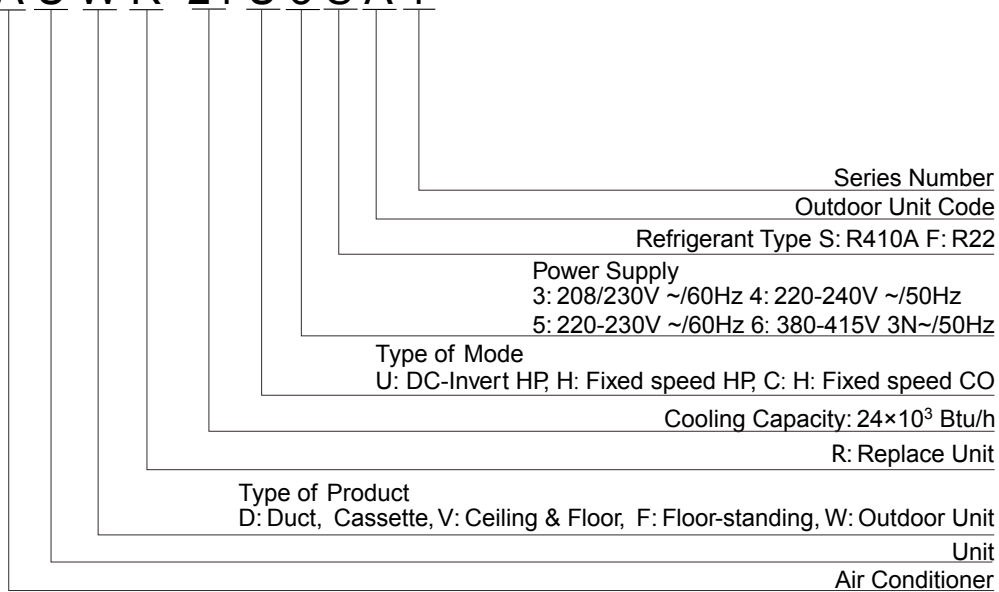
1.2 Product lineup

Model (Btu/h) Type	24K	36K	60K
Outdoor unit	●	●	●

●: available model

1.3 Nomenclature

A U W R- 24 U 3 S A 1



1. GENERAL

1.4 Unit installation

1:1 system is the only compatible combination.

(Only one indoor unit can be connected with one outdoor unit.)

1.5 Working range

Power Supply

Working Voltage	198V ~ 253V
Voltage Imbalance	Within a 3% deviation from each voltage at the main terminal of outdoor unit
Starting Voltage	Higher than 85% of the Rated Voltage

Operating temperature range

This air conditioner is designed for the following outdoor operating temperatures.

Type	Mode	Outdoor operating temperature	
		maximum	minimum
DC-Inverter Split Air Conditioner (Heat pump type)	Cooling Operation	114.8°F (46°C)	5°F (-15°C)
	Heating Operation	75°F (24°C)	-13°F (-25°C)




Storage condition

Temperature: -13°F~140°F (-25°C~60°C)

Humidity: 30%~80%

1. GENERAL

1.6 Product appearance

Model (Btu/h)	Outdoor Unit
24K	 A white rectangular outdoor air conditioning unit with a single large fan visible through a metal grille. The Pioneer logo is on the right side.
36K	 A white rectangular outdoor air conditioning unit with a single large fan visible through a metal grille. The Pioneer logo is on the right side.
60K	 A white rectangular outdoor air conditioning unit with two fans stacked vertically, both visible through metal grilles. The Pioneer logo is on the right side.

2. SPECIFICATIONS

2. Specifications

Outdoor Model		AUWR-24U3SF1	AUWR-36U3SA1	AUWR-60U3SP1	
Power Supply	V/ph/Hz	208/230/1/60	208/230/1/60	208/230/1/60	
Energy Star		--	--	--	
Cooling	Capacity	Btu/h	24000	36000	56000
	Capacity(MIN-MAX)	Btu/h	6700-26000	11800-36800	18300-59400
	Input	W	2200	3730	6560
	Current	A	9.6	16.5	26.8
	EER	W/W	3.20	2.80	2.50
	EER	Btu/h/W	10.90	9.55	8.53
	SEER	Btu/h/W	18	18	17.5
Heating	Capacity	Btu/h	24000	36000	56000
	Capacity(MIN-MAX)	Btu/h	6700-26000	8900-38200	17600-56600
	Input	W	2000	3200	5290
	Current	A	8.7	14.1	21.0
	COP	W/W	3.5	3.30	3.10
	COP	Btu/h/W	11.95	11.26	10.58
	HSPF4	Btu/h/W	10.0	11.0	10.00
	Capacity Heating (Rated) at	Btu/h	24000	36000	56000
	Capacity Heating(Rated) at 17°F	Btu/h	15300	25000	32500
Working Temperature Range	Cooling	°F	5-114.8	5-114.8	5-114.8
		°C	-15-46	-15-46	-15-46
	Heating	°F	-13-75	-13-75	-13-75
		°C	-25 - 24	-25- 24	-25- 24
Outdoor Noise Level (Sound Pressure)	dB(A)	54	56	62	
Design Pressure	H/L	MPa	3.8/1.6	3.8/1.6	3.8/1.6
	H/L	PSIG	550/240	550/240	550/240
ELECTRICAL DATA					
MIN. AMPACITY	A	15	23	35	
MAX. TD FUSE/ BREAKER	A	25	35	60	
Power and Communication Cable	No.×AWG	ODU3×12, IDU3×16,4×16	ODU3×10, IDU3×16,4×16	ODU3×8, IDU3×16,4×16	
AIR SUPPLY SYSTEM					
Outdoor Fan Motor	Model		ZWK511A805001	SIC-71FW-F8121-1	SIC-71FW-D8121-1
	Qty		1	1	2
	Output	W	60	121	121
	Capacitor	μF	NA	NA	NA
	Speed (Hi)	r/min	880	810	850
Outdoor Air Flow	m³/h	3100	3800	6300	
	CFM	1826	2235	3706	
REFRIGERATION SYSTEM					
Outdoor coil	Number of Rows		2	2	2
	Tube Pitch(a)	mm	21	21	21
		in	0.827	0.827	0.827
	Row Pitch(b)	mm	21.65	21.65	21.65
		in	0.852	0.852	0.852
	Fin Spacing	mm	1.4	1.3	1.4
		Fins Per in	18	19	18
	Coil Dimension (W×H×D)	mm	(900+866)×630×21.65	970×798×43.3	970×1344×43.3
		in	(35-5/8+34)×25-1/4×7/8	38-3/16×31-3/8×1-11/16	38-3/16×53×1-11/16
	Fin Type		Hydrophilic aluminium	Hydrophilic aluminium	Hydrophilic aluminium
Tube Outside Diameter and Type	mm	Φ 7.94, innergroove tube	Φ 7.94, innergroove tube	Φ 7.94, innergroove tube	
Number of Circuits		6	5	6	
Outdoor Throttle Type		EEV	EEV	EEV	
Compressor	Model		EATF250D22UMT	EATF250D22UMT	EATF400D64UMTA
	Type		ROTARY	ROTARY	ROTARY
	Brand		GMCC	GMCC	GMCC
	Capacity	Btu/h	26085	26085	41865
	Input	W	2080	2080	3385

2. SPECIFICATIONS

Outdoor Model			AUWR-24U3SF1	AUWR-36U3SA1	AUWR-60U3SP1
Compressor	Rated Current(RLA)	A	9.45	9.45	15.39
	Refrigerant Oil	ml	VG74 /670	VG74 /670	VG74 /1000
oz.		VG74 /22.7	VG74 /22.7	VG74 /33.9	
Refrigerant Type/Quantity	Type		R-410A	R-410A	R-410A
	Refrigerant Charge	kg	2	2.8	4.05
		oz.	70.5	98.7	142.9
	Factory Precharge	Ft.	25	25	25
Additional Charge for Each Ft.	oz.	0.376	0.376	0.6	
Refrigerant Piping	Liquid Line OD	mm/in	Φ9.52(3/8')	Φ9.52(3/8')	Φ9.52(3/8')
	Vapor Line OD	mm/in	Φ15.88(5/8')	Φ19.05(3/4')	Φ22.22(7/8')
	Max. Pipe Length	m	50	75	75
		Ft.	164	246	246
	Max. Difference in Level	m	30	30	30
Ft.		98	98	98	
DIMENSIONS & WEIGHT					
Outdoor Unit	Dimension (W×H×D)	mm	860×670×310	950×840×340	950×1386×340
		in	33-7/8×26-3/8×12-1/4	37-3/8×33-1/8×13-3/8	37-3/8×54-5/8×13-3/8
	Packing (W×H×D)	mm	990×730×450	1110×920×460	1110×1530×460
		in	39×28-3/4×17-3/4	43-3/4×36-1/4×18-1/8	43-3/4×60-1/4×18-1/8
	Net Weight	kg	51	71	114
		lbs	112.4	156.5	251.3
	Shipping Weight	kg	55	76	126
lbs		121.3	167.5	277.5	
Qty' per 20' /40' /40'HQ (Outdoor Unit)	Set		90/186/186	52/106/106	26/53/53

NOTE:

1. Test conditions:

1.1 Rated capacity test conditions:

Cooling: Indoor: DB 80.0°F (26.7°C) /WB 67.0°F (19.4°C)

Outdoor: DB 95.0°F (35.0°C) /WB 75.0°F (23.9°C)

Heating: Indoor: DB 70.0°F (21.1°C) /WB 60.0°F (15.6°C)

Outdoor: DB 47°F (8.3°C) /WB 43°F (6.1°C)

1.2 SEER & HSPF test standard: AHRI 210/240.

2. The Sound Pressure Level is based on the following conditions:

Outdoor unit:

Measure the noise value of 3 points, which are 1 meter in front of the three sides of the unit surface

(front/left/right) and 1/2(unit height +1) meter high from floor level, and calculate the weighted average of the noise.

3. The above data was measured in an anechoic chamber. Please take into consideration the reflected sound of your specific application environment.

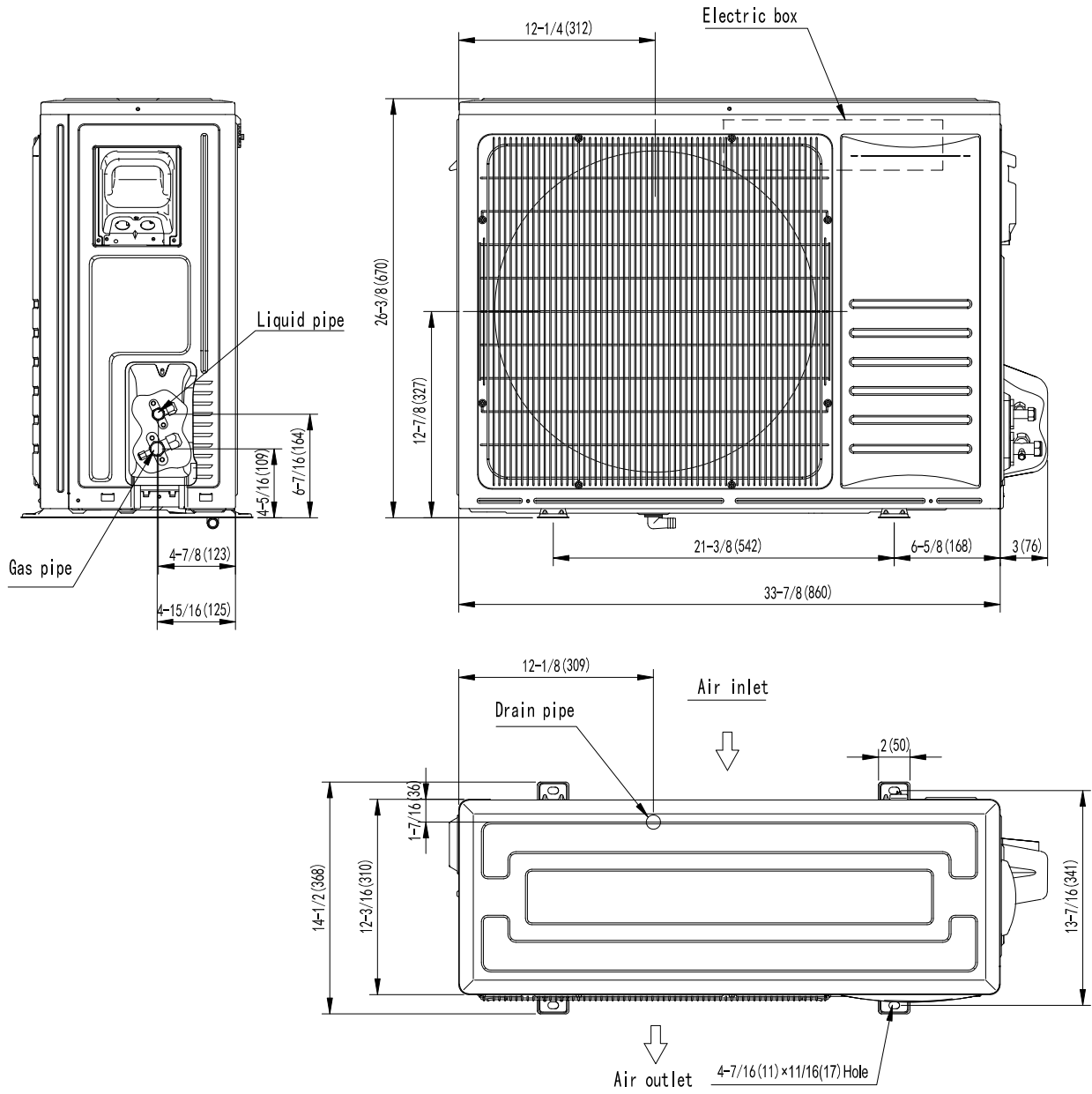
4. All specifications are subjected to change by the manufacturer without prior notice.

3. OUTLINES AND DIMENSIONS

3. Outlines and dimensions

24K

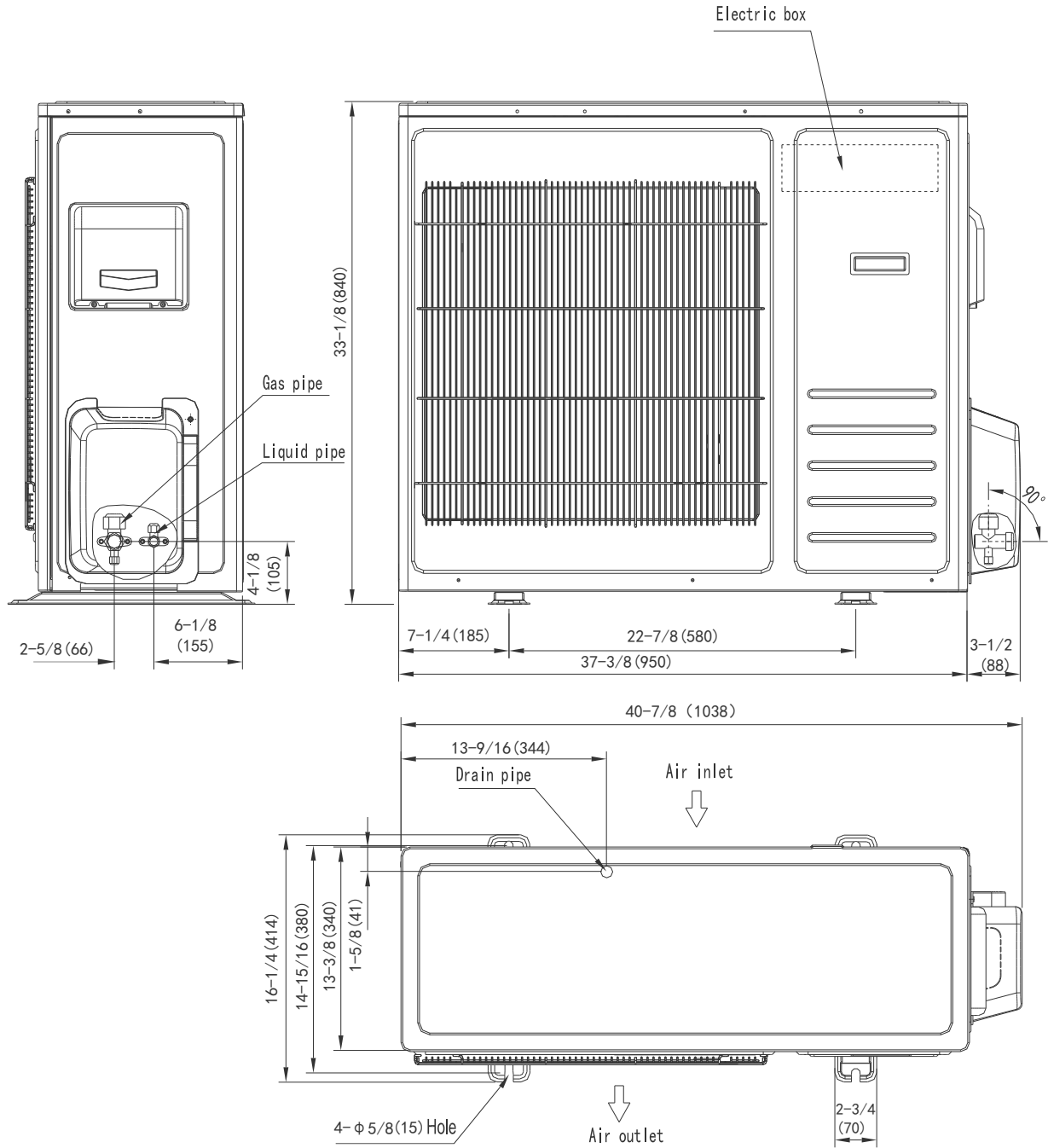
Unit : in.(mm)



3. OUTLINES AND DIMENSIONS

36K

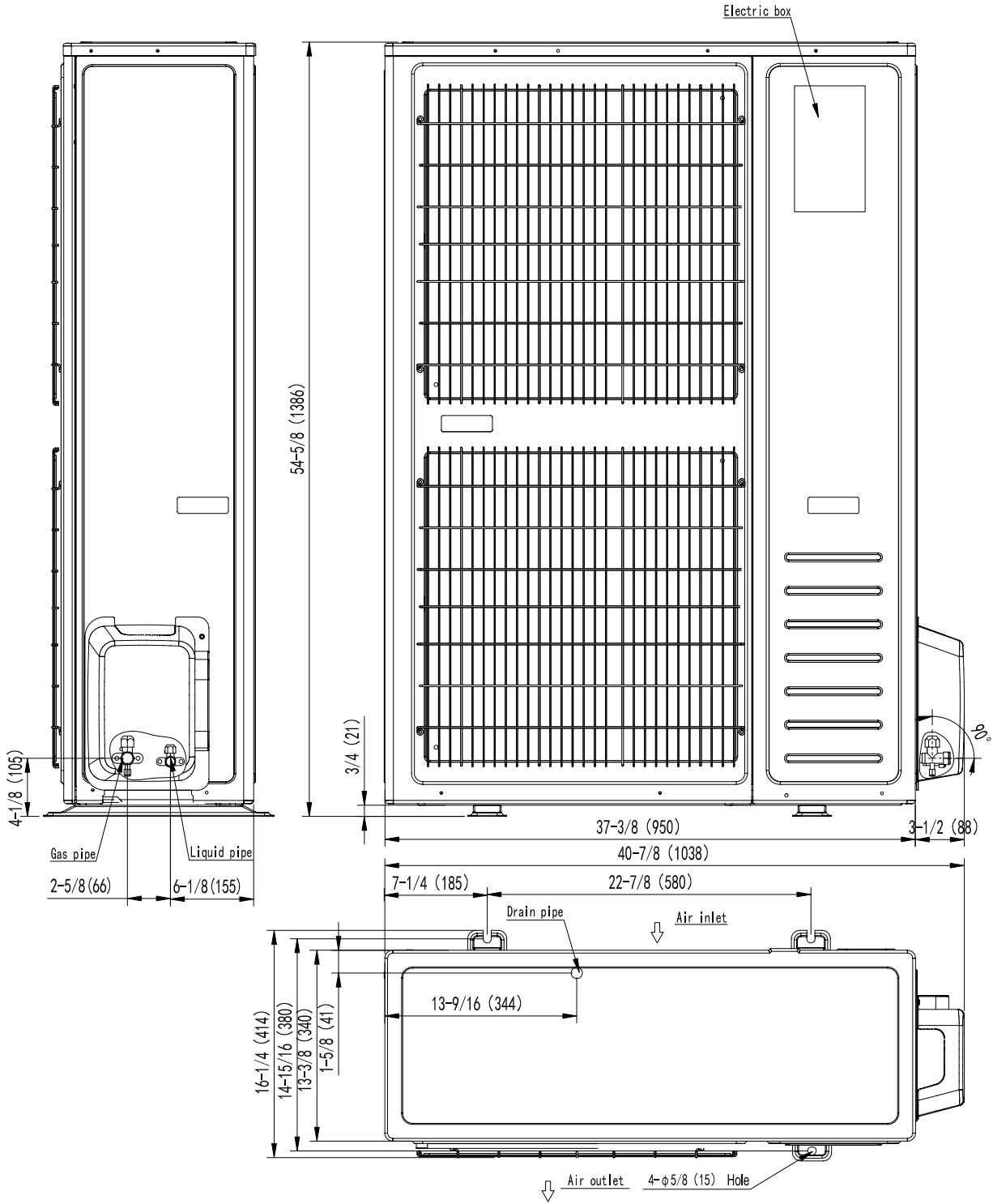
Unit : in.(mm)



3. OUTLINES AND DIMENSIONS

60K

Unit : in.(mm)



4. ELECTRICAL DATA

4. Electrical data

Outdoor unit	Power supply			Applicable voltage		ELB	
	Voltage(V)	PH	Frequency (Hz)	Umin (V)	Umax (V)	Nominal Current (A)	Nominal Sensitive Current (mA)
24K	208/230	1	60	198	253	25	30
36K	208/230	1	60	198	253	35	30
60K	208/230	1	60	198	253	60	30

NOTE:

1. The above compressor data is based on 100% capacity combination of indoor units at the rated operating frequency.
2. This data is based on the same conditions as the nominal heating and cooling capacities.
3. The compressor started by an inverter, resulting in extremely low starting current.

5. CAPACITIES AND SELECTION DATA

5. Capacities and selection data

5.1 Capacity characteristic charts

The following charts show the characteristics of outdoor unit capacity, which corresponds with the operating ambient temperature of outdoor unit.

Conditions:

- ① Pipe length / height difference: 25 ft. (7.6m) / 0 ft. (0m)
- ② Compressor at rated inverter frequency
- ③ Indoor fan speed at high fan speed
- ④ Capacity loss due to white frost and defrost operation is not included.

Performance data (Cooling operation at rated frequency) 24K outdoor unit matches 24K indoor unit

Outdoor DB	IWB (°F)	59				63				67				71			
		70	75	80	85	70	75	80	85	70	75	80	85	70	75	80	85
65	TC	20.5	20.7	21.1	21.4	21.1	21.4	21.6	21.8	22.5	22.7	23.0	23.1	\	27.5	27.7	27.9
	S/T	0.99	1.00	1.00	1.00	0.61	0.83	1.00	1.00	0.39	0.57	0.73	0.90	\	0.39	0.53	0.67
	PI	1.22	1.23	1.24	1.24	1.24	1.26	1.27	1.28	1.28	1.29	1.31	1.32	\	1.61	1.63	1.65
75	TC	20.5	20.7	21.1	21.4	21.1	21.4	21.6	21.8	22.6	22.8	23.0	23.2	\	27.2	27.4	27.6
	S/T	1.00	1.00	0.99	1.00	0.62	0.83	1.00	1.00	0.39	0.56	0.73	0.90	\	0.39	0.53	0.67
	PI	1.35	1.37	1.38	1.38	1.38	1.40	1.42	1.42	1.42	1.44	1.46	1.47	\	1.78	1.80	1.81
85	TC	20.2	20.4	20.8	21.1	20.8	21.1	21.3	21.5	22.3	22.5	22.7	22.8	\	26.7	26.9	27.1
	S/T	1.00	1.00	1.00	1.00	0.62	0.84	1.00	1.00	0.39	0.57	0.74	0.91	\	0.39	0.53	0.67
	PI	1.53	1.54	1.56	1.56	1.56	1.57	1.59	1.61	1.61	1.62	1.64	1.65	\	2.02	2.04	2.06
95	TC	19.8	20.0	20.5	20.7	20.5	20.7	20.9	21.1	21.9	22.1	22.3	22.5	\	26.1	26.3	26.4
	S/T	1.00	1.00	1.00	1.00	0.62	0.84	1.00	1.00	0.39	0.57	0.74	0.92	\	0.39	0.53	0.68
	PI	1.84	1.85	1.88	1.88	1.88	1.89	1.92	1.93	1.94	1.95	1.97	1.99	\	2.41	2.42	2.45
105	TC	19.4	19.7	20.1	20.3	20.1	20.3	20.5	20.7	21.5	21.7	21.8	22.0	\	25.2	25.3	25.4
	S/T	0.99	1.00	1.00	1.00	0.62	0.84	1.00	1.00	0.39	0.57	0.75	0.93	\	0.39	0.54	0.69
	PI	2.18	2.21	2.23	2.23	2.23	2.26	2.28	2.30	2.30	2.33	2.34	2.37	\	2.79	2.79	2.80
115	TC	17.4	17.6	18.0	18.2	18.0	18.2	18.4	18.6	19.3	19.5	19.5	19.7	\	20.9	21.1	21.1
	S/T	1.00	1.00	1.00	1.00	0.62	0.85	1.00	1.00	0.40	0.60	0.79	0.99	\	0.39	0.58	0.76
	PI	2.22	2.25	2.27	2.27	2.27	2.30	2.33	2.35	2.37	2.38	2.40	2.41	\	2.48	2.49	2.50

Performance data (Heating operation at rated frequency) 24K outdoor unit matches 24K indoor unit

ID °F	OD °F	72	67	62	57	52	47	42	37	32	27	22	17	12	7	2	-4
60	TC	28.3	28.3	28.2	28.2	28.1	27.1	24.9	23.0	21.4	21.4	20.1	19.2	18.0	16.7	15.6	14.6
	PI	1.64	1.75	1.90	2.06	2.23	2.24	2.16	2.08	2.02	2.23	2.17	2.11	2.00	1.99	1.93	1.89
70	TC	21.9	21.7	21.9	21.8	21.6	21.5	21.5	21.5	21.0	21.0	19.6	19.0	17.7	16.4	15.4	14.3
	PI	1.23	1.29	1.42	1.52	1.63	1.77	1.95	2.13	2.21	2.42	2.35	2.28	2.20	2.14	2.08	2.02
75	TC	18.4	18.3	18.3	18.3	18.3	18.3	18.1	18.1	18.1	18.1	18.1	18.0	16.7	15.4	14.1	13.0
	PI	1.02	1.10	1.19	1.28	1.40	1.51	1.61	1.76	1.88	2.06	2.22	2.38	2.30	2.23	2.17	2.11
80	TC	15.1	15.1	15.1	15.1	15.0	15.0	15.0	15.0	15.0	14.8	14.8	14.8	14.8	14.8	13.9	12.8
	PI	0.85	0.90	0.98	1.06	1.14	1.23	1.32	1.47	1.56	1.65	1.78	1.92	2.08	2.26	2.26	2.20

Remarks:

TC: Total Cooling Capacity (Gross) kBtu/h

S/T: Sensible Capacity Ratio

PI: Power Input (including the compressor, cond. fan motor) kW

DB: Dry Bulb Temperature

WB: Wet Bulb Temperature

5. CAPACITIES AND SELECTION DATA

**Performance data (Cooling operation at rated frequency)
36K outdoor unit matches 30K indoor unit**

Outdoor DB	IWB (°F)	59				63				67				71			
		70	75	80	85	70	75	80	85	70	75	80	85	70	75	80	85
65	TC	28.1	28.4	29.0	29.4	29.0	29.4	29.7	29.9	31.0	31.3	31.6	31.8	\	37.8	38.1	38.4
	S/T	0.99	1.00	1.00	1.00	0.61	0.83	1.00	1.00	0.39	0.57	0.73	0.90	\	0.39	0.53	0.67
	PI	2.11	2.13	2.15	2.15	2.15	2.17	2.19	2.21	2.21	2.23	2.26	2.28	\	2.79	2.82	2.86
75	TC	28.1	28.5	29.1	29.4	29.1	29.4	29.7	30.0	31.1	31.4	31.7	31.9	\	37.4	37.7	38.0
	S/T	1.00	1.00	0.99	1.00	0.62	0.83	1.00	1.00	0.39	0.56	0.73	0.90	\	0.39	0.53	0.67
	PI	2.34	2.36	2.39	2.39	2.39	2.42	2.45	2.46	2.45	2.49	2.52	2.54	\	3.08	3.10	3.13
85	TC	27.7	28.0	28.6	29.0	28.6	29.0	29.3	29.6	30.6	30.9	31.2	31.4	\	36.7	37.0	37.2
	S/T	1.00	1.00	1.00	1.00	0.62	0.84	1.00	1.00	0.39	0.57	0.74	0.91	\	0.39	0.53	0.67
	PI	2.64	2.67	2.69	2.69	2.69	2.72	2.75	2.77	2.77	2.80	2.83	2.86	\	3.49	3.53	3.55
95	TC	27.3	27.5	28.1	28.5	28.1	28.5	28.8	29.1	30.1	30.4	30.6	30.9	\	35.9	36.2	36.3
	S/T	1.00	1.00	1.00	1.00	0.62	0.84	1.00	1.00	0.39	0.57	0.74	0.92	\	0.39	0.53	0.68
	PI	3.17	3.20	3.24	3.24	3.24	3.27	3.31	3.34	3.35	3.38	3.40	3.44	\	4.16	4.18	4.22
105	TC	26.7	27.1	27.6	27.9	27.6	27.9	28.2	28.5	29.6	29.8	30.0	30.2	\	34.6	34.7	34.9
	S/T	0.99	1.00	1.00	1.00	0.62	0.84	1.00	1.00	0.39	0.57	0.75	0.93	\	0.39	0.54	0.69
	PI	3.77	3.81	3.85	3.85	3.85	3.90	3.94	3.98	3.98	4.02	4.05	4.09	\	4.81	4.83	4.84
115	TC	23.9	24.2	24.8	25.0	24.8	25.0	25.3	25.5	26.6	26.8	26.9	27.1	\	28.8	29.0	29.1
	S/T	1.00	1.00	1.00	1.00	0.62	0.85	1.00	1.00	0.40	0.60	0.79	0.99	\	0.39	0.58	0.76
	PI	3.84	3.88	3.92	3.92	3.92	3.98	4.02	4.06	4.09	4.11	4.14	4.16	\	4.28	4.31	4.32

**Performance data (Heating operation at rated frequency)
36K outdoor unit matches 30K indoor unit**

ID °F	OD °F	72	67	62	57	52	47	42	37	32	27	22	17	12	7	2	-4
60	TC	42.4	42.4	42.3	42.3	42.2	40.7	37.3	34.6	32.1	32.2	30.2	28.9	27.0	25.0	23.4	21.8
	PI	3.03	3.24	3.52	3.81	4.12	4.15	3.99	3.85	3.74	4.12	4.01	3.89	3.80	3.69	3.57	3.51
70	TC	32.8	32.6	32.8	32.7	32.4	32.3	32.3	32.3	31.6	31.6	29.4	28.4	26.5	24.6	23.1	21.4
	PI	2.27	2.39	2.63	2.81	3.02	3.28	3.62	3.94	4.09	4.48	4.34	4.21	4.08	3.96	3.84	3.74
75	TC	27.6	27.5	27.5	27.5	27.5	27.5	27.1	27.1	27.1	27.1	27.1	27.0	25.0	23.1	21.1	19.6
	PI	1.89	2.03	2.20	2.36	2.59	2.80	2.98	3.25	3.48	3.81	4.10	4.40	4.26	4.13	4.01	3.89
80	TC	22.7	22.7	22.7	22.7	22.6	22.6	22.4	22.4	22.6	22.2	22.2	22.2	22.2	22.2	20.8	19.2
	PI	1.57	1.67	1.81	1.96	2.10	2.28	2.45	2.71	2.88	3.06	3.30	3.56	3.84	4.19	4.17	4.06

Remarks:

TC: Total Cooling Capacity (Gross) kBtu/h

S/T: Sensible Capacity Ratio

PI: Power Input (including the compressor, cond. fan motor) kW

DB: Dry Bulb Temperature

WB: Wet Bulb Temperature

5. CAPACITIES AND SELECTION DATA

**Performance data (Cooling operation at rated frequency)
36K outdoor unit matches 36K indoor unit**

Outdoor DB	IWB (°F) IDB (°F)	59				63				67				71			
		70	75	80	85	70	75	80	85	70	75	80	85	70	75	80	85
65	TC	30.8	31.1	31.7	32.1	31.7	32.1	32.4	32.8	33.9	34.2	34.5	34.7	\	41.3	41.6	42.0
	S/T	0.99	1.00	1.00	1.00	0.61	0.83	1.00	1.00	0.39	0.57	0.73	0.90	\	0.39	0.53	0.67
	PI	2.16	2.19	2.20	2.20	2.20	2.23	2.24	2.27	2.27	2.29	2.31	2.34	\	2.86	2.89	2.93
75	TC	30.8	31.2	31.8	32.1	31.8	32.1	32.5	32.9	34.0	34.3	34.6	34.8	\	40.9	41.2	41.5
	S/T	1.00	1.00	0.99	1.00	0.62	0.83	1.00	1.00	0.39	0.56	0.73	0.90	\	0.39	0.53	0.67
	PI	2.40	2.43	2.46	2.46	2.46	2.48	2.51	2.53	2.51	2.55	2.58	2.61	\	3.16	3.18	3.21
85	TC	30.3	30.7	31.3	31.7	31.3	31.7	32.0	32.3	33.5	33.8	34.1	34.3	\	40.2	40.5	40.7
	S/T	1.00	1.00	1.00	1.00	0.62	0.84	1.00	1.00	0.39	0.57	0.74	0.91	\	0.39	0.53	0.67
	PI	2.71	2.74	2.76	2.76	2.76	2.79	2.82	2.85	2.85	2.88	2.90	2.93	\	3.58	3.62	3.65
95	TC	29.8	30.1	30.8	31.2	30.8	31.2	31.5	31.8	33.0	33.3	33.5	33.8	\	39.2	39.6	39.8
	S/T	1.00	1.00	1.00	1.00	0.62	0.84	1.00	1.00	0.39	0.57	0.74	0.92	\	0.39	0.53	0.68
	PI	3.25	3.28	3.32	3.32	3.32	3.35	3.39	3.42	3.44	3.47	3.49	3.54	\	4.26	4.29	4.33
105	TC	29.2	29.6	30.2	30.6	30.2	30.6	30.9	31.2	32.3	32.6	32.9	33.1	\	37.9	38.0	38.2
	S/T	0.99	1.00	1.00	1.00	0.62	0.84	1.00	1.00	0.39	0.57	0.75	0.93	\	0.39	0.54	0.69
	PI	3.87	3.91	3.96	3.96	3.96	4.00	4.04	4.08	4.08	4.12	4.15	4.19	\	4.94	4.95	4.97
115	TC	26.2	26.5	27.1	27.3	27.1	27.3	27.6	27.9	29.1	29.3	29.4	29.6	\	31.5	31.7	31.8
	S/T	1.00	1.00	1.00	1.00	0.62	0.85	1.00	1.00	0.40	0.60	0.79	0.99	\	0.39	0.58	0.76
	PI	3.94	3.98	4.03	4.03	4.03	4.08	4.12	4.17	4.19	4.22	4.25	4.26	\	4.39	4.42	4.43

**Performance data (Heating operation at rated frequency)
36K outdoor unit matches with 36K indoor unit**

ID °F	OD °F	72	67	62	57	52	47	42	37	32	27	22	17	12	7	2	-4
60	TC	44.2	44.2	44.1	44.1	44.0	42.3	38.9	36.0	33.4	33.5	31.5	30.1	28.1	26.1	24.4	22.7
	PI	2.98	3.19	3.46	3.75	4.05	4.08	3.93	3.79	3.68	4.05	3.94	3.83	3.70	3.63	3.52	3.45
70	TC	34.2	33.9	34.2	34.1	33.7	33.6	33.6	33.6	32.9	32.9	30.6	29.6	27.6	25.6	24.0	22.3
	PI	2.23	2.35	2.59	2.76	2.97	3.23	3.56	3.87	4.02	4.41	4.27	4.15	4.01	3.90	3.78	3.68
75	TC	28.8	28.7	28.7	28.7	28.7	28.7	28.2	28.2	28.2	28.2	28.2	28.1	26.1	24.0	22.0	20.4
	PI	1.86	2.00	2.16	2.33	2.55	2.75	2.93	3.20	3.42	3.75	4.04	4.32	4.19	4.06	3.94	3.83
80	TC	23.6	23.6	23.6	23.6	23.5	23.5	23.4	23.4	23.5	23.2	23.2	23.2	23.2	23.2	21.7	20.0
	PI	1.55	1.64	1.78	1.93	2.07	2.24	2.41	2.67	2.83	3.01	3.24	3.50	3.78	4.12	4.11	4.00

Remarks:

TC: Total Cooling Capacity (Gross) kBtu/h

S/T: Sensible Capacity Ratio

PI: Power Input (including the compressor, cond. fan motor) kW

DB: Dry Bulb Temperature

WB: Wet Bulb Temperature

5. CAPACITIES AND SELECTION DATA

**Performance data (Cooling operation at rated frequency)
60K outdoor unit matches 42K indoor unit**

Outdoor DB	IWB (°F)	59				63				67				71			
		70	75	80	85	70	75	80	85	70	75	80	85	70	75	80	85
65	TC	43.5	43.9	44.8	45.4	44.8	45.4	45.8	46.3	47.9	48.3	48.8	49.1	\	58.4	58.8	59.3
	S/T	0.99	1.00	1.00	1.00	0.61	0.83	1.00	1.00	0.39	0.57	0.73	0.90	\	0.39	0.53	0.67
	PI	3.52	3.56	3.59	3.59	3.59	3.63	3.65	3.70	3.70	3.72	3.77	3.81	\	4.66	4.71	4.77
75	TC	43.5	44.1	44.9	45.4	44.9	45.4	46.0	46.4	48.0	48.5	48.9	49.2	\	57.8	58.2	58.7
	S/T	1.00	1.00	0.99	1.00	0.62	0.83	1.00	1.00	0.39	0.56	0.73	0.90	\	0.39	0.53	0.67
	PI	3.91	3.95	4.00	4.00	4.00	4.04	4.09	4.11	4.09	4.16	4.20	4.25	\	5.14	5.19	5.23
85	TC	42.9	43.3	44.2	44.8	44.2	44.8	45.2	45.7	47.3	47.7	48.2	48.5	\	56.8	57.2	57.5
	S/T	1.00	1.00	1.00	1.00	0.62	0.84	1.00	1.00	0.39	0.57	0.74	0.91	\	0.39	0.53	0.67
	PI	4.41	4.45	4.50	4.50	4.50	4.55	4.59	4.64	4.64	4.68	4.73	4.77	\	5.82	5.89	5.94
95	TC	42.1	42.6	43.5	44.1	43.5	44.1	44.5	44.9	46.6	47.0	47.3	47.7	\	55.4	55.9	56.2
	S/T	1.00	1.00	1.00	1.00	0.62	0.84	1.00	1.00	0.39	0.57	0.74	0.92	\	0.39	0.53	0.68
	PI	5.30	5.34	5.41	5.41	5.41	5.46	5.53	5.57	5.60	5.64	5.69	5.76	\	6.94	6.99	7.06
105	TC	41.2	41.8	42.7	43.2	42.7	43.2	43.6	44.1	45.7	46.1	46.4	46.7	\	53.5	53.7	54.0
	S/T	0.99	1.00	1.00	1.00	0.62	0.84	1.00	1.00	0.39	0.57	0.75	0.93	\	0.39	0.54	0.69
	PI	6.30	6.37	6.44	6.44	6.44	6.51	6.58	6.65	6.65	6.72	6.76	6.83	\	8.04	8.06	8.09
115	TC	37.0	37.4	38.3	38.6	38.3	38.6	39.0	39.5	41.1	41.4	41.5	41.8	\	44.5	44.8	44.9
	S/T	1.00	1.00	1.00	1.00	0.62	0.85	1.00	1.00	0.40	0.60	0.79	0.99	\	0.39	0.58	0.76
	PI	6.42	6.49	6.56	6.56	6.56	6.65	6.72	6.78	6.83	6.88	6.92	6.94	\	7.15	7.20	7.22

**Performance data (Heating operation at rated frequency)
60K outdoor unit matches 42K indoor unit**

ID °F	OD °F	72	67	62	57	52	47	42	37	32	27	22	17	12	7	2	-4
60	TC	58.9	58.9	58.8	58.8	58.6	56.5	51.9	48.0	44.5	44.7	42.0	40.1	37.5	34.8	32.5	30.3
	PI	4.18	4.47	4.85	5.25	5.68	5.71	5.50	5.31	5.16	5.68	5.52	5.37	5.20	5.08	4.93	4.83
70	TC	45.5	45.3	45.5	45.4	45.0	44.8	44.8	44.8	43.8	43.8	40.8	39.5	36.8	34.2	32.0	29.7
	PI	3.13	3.30	3.62	3.87	4.16	4.52	4.98	5.43	5.64	6.17	5.98	5.81	5.62	5.46	5.29	5.16
75	TC	38.4	38.2	38.2	38.2	38.2	38.2	37.6	37.6	37.6	37.6	37.6	37.5	34.8	32.0	29.3	27.2
	PI	2.61	2.80	3.03	3.26	3.57	3.85	4.10	4.49	4.79	5.25	5.66	6.06	5.87	5.69	5.52	5.37
80	TC	31.5	31.5	31.5	31.5	31.3	31.3	31.2	31.2	31.3	30.9	30.9	30.9	30.9	30.9	28.9	26.7
	PI	2.17	2.30	2.49	2.70	2.90	3.14	3.37	3.74	3.97	4.22	4.54	4.91	5.29	5.77	5.75	5.60

Remarks:

TC: Total Cooling Capacity (Gross) kBtu/h

S/T: Sensible Capacity Ratio

PI: Power Input (including the compressor, cond. fan motor) kW

DB: Dry Bulb Temperature

WB: Wet Bulb Temperature

5. CAPACITIES AND SELECTION DATA

**Performance data (Cooling operation at rated frequency)
60K outdoor unit matches 48K indoor unit**

Outdoor DB	IWB (°F)	59				63				67				71			
		70	75	80	85	70	75	80	85	70	75	80	85	70	75	80	85
65	TC	43.9	44.3	45.2	45.8	45.2	45.8	46.3	46.7	48.4	48.8	49.3	49.6	\	59.0	59.4	59.9
	S/T	0.99	1.00	1.00	1.00	0.61	0.83	1.00	1.00	0.39	0.57	0.73	0.90	\	0.39	0.53	0.67
	PI	3.55	3.59	3.61	3.61	3.61	3.66	3.68	3.73	3.73	3.75	3.80	3.84	\	4.70	4.74	4.81
75	TC	43.9	44.5	45.4	45.8	45.4	45.8	46.4	46.9	48.5	49.0	49.4	49.7	\	58.4	58.8	59.3
	S/T	1.00	1.00	0.99	1.00	0.62	0.83	1.00	1.00	0.39	0.56	0.73	0.90	\	0.39	0.53	0.67
	PI	3.94	3.98	4.03	4.03	4.03	4.07	4.12	4.14	4.12	4.19	4.24	4.28	\	5.18	5.23	5.27
85	TC	43.3	43.7	44.6	45.2	44.6	45.2	45.7	46.1	47.8	48.2	48.7	49.0	\	57.3	57.8	58.1
	S/T	1.00	1.00	1.00	1.00	0.62	0.84	1.00	1.00	0.39	0.57	0.74	0.91	\	0.39	0.53	0.67
	PI	4.44	4.49	4.54	4.54	4.54	4.58	4.63	4.67	4.67	4.72	4.77	4.81	\	5.87	5.94	5.99
95	TC	42.5	43.0	43.9	44.5	43.9	44.5	44.9	45.4	47.0	47.5	47.8	48.2	\	56.0	56.4	56.7
	S/T	1.00	1.00	1.00	1.00	0.62	0.84	1.00	1.00	0.39	0.57	0.74	0.92	\	0.39	0.53	0.68
	PI	5.34	5.39	5.46	5.46	5.46	5.50	5.57	5.62	5.64	5.69	5.73	5.80	\	7.00	7.04	7.11
105	TC	41.6	42.2	43.1	43.6	43.1	43.6	44.0	44.5	46.1	46.6	46.9	47.2	\	54.0	54.2	54.5
	S/T	0.99	1.00	1.00	1.00	0.62	0.84	1.00	1.00	0.39	0.57	0.75	0.93	\	0.39	0.54	0.69
	PI	6.35	6.42	6.49	6.49	6.49	6.56	6.63	6.70	6.70	6.77	6.81	6.88	\	8.10	8.13	8.15
115	TC	37.3	37.8	38.7	39.0	38.7	39.0	39.4	39.9	41.5	41.8	41.9	42.2	\	44.9	45.2	45.4
	S/T	1.00	1.00	1.00	1.00	0.62	0.85	1.00	1.00	0.40	0.60	0.79	0.99	\	0.39	0.58	0.76
	PI	6.47	6.54	6.61	6.61	6.61	6.70	6.77	6.84	6.88	6.93	6.98	7.00	\	7.21	7.25	7.27

**Performance data (Heating operation at rated frequency)
60K outdoor unit matches 48K indoor unit**

ID °F	OD °F	72	67	62	57	52	47	42	37	32	27	22	17	12	7	2	-4
60	TC	60.1	60.1	59.9	59.9	59.8	57.6	52.9	48.9	45.4	45.6	42.8	40.9	38.3	35.5	33.1	30.9
	PI	4.26	4.55	4.95	5.36	5.79	5.83	5.61	5.42	5.26	5.79	5.63	5.47	5.30	5.18	5.02	4.93
70	TC	46.5	46.2	46.5	46.3	45.9	45.7	45.7	45.7	44.7	44.7	41.6	40.3	37.5	34.9	32.7	30.3
	PI	3.19	3.36	3.69	3.95	4.24	4.61	5.08	5.53	5.75	6.29	6.10	5.92	5.73	5.57	5.40	5.26
75	TC	39.1	39.0	39.0	39.0	39.0	39.0	38.4	38.4	38.4	38.4	38.4	38.3	35.5	32.7	29.9	27.7
	PI	2.66	2.85	3.09	3.32	3.64	3.93	4.18	4.57	4.89	5.36	5.77	6.18	5.98	5.81	5.63	5.47
80	TC	32.1	32.1	32.1	32.1	31.9	31.9	31.8	31.8	31.9	31.5	31.5	31.5	31.5	31.5	29.5	27.3
	PI	2.21	2.35	2.54	2.76	2.95	3.21	3.44	3.81	4.05	4.30	4.63	5.00	5.40	5.88	5.86	5.71

Remarks:

TC: Total Cooling Capacity (Gross) kBtu/h

S/T: Sensible Capacity Ratio

PI: Power Input (including the compressor, cond. fan motor) kW

DB: Dry Bulb Temperature

WB: Wet Bulb Temperature

5. CAPACITIES AND SELECTION DATA

**Performance data (Cooling operation at rated frequency)
60K outdoor unit matches 60K indoor unit**

Outdoor DB	IWB (°F)	59				63				67				71				
		IDB (°F)	70	75	80	85	70	75	80	85	70	75	80	85	70	75	80	85
65	TC	47.7	48.2	49.2	49.8	49.2	49.8	50.3	50.8	52.6	53.1	53.6	53.9	\	64.1	64.6	65.1	
	S/T	0.99	1.00	1.00	1.00	0.61	0.83	1.00	1.00	0.39	0.57	0.73	0.90	\	0.39	0.53	0.67	
	PI	3.63	3.68	3.70	3.70	3.70	3.75	3.78	3.82	3.82	3.85	3.89	3.94	\	4.81	4.86	4.93	
75	TC	47.7	48.4	49.3	49.8	49.3	49.8	50.5	51.0	52.8	53.2	53.7	54.1	\	63.5	64.0	64.4	
	S/T	1.00	1.00	0.99	1.00	0.62	0.83	1.00	1.00	0.39	0.56	0.73	0.90	\	0.39	0.53	0.67	
	PI	4.04	4.08	4.13	4.13	4.13	4.18	4.22	4.25	4.22	4.29	4.34	4.39	\	5.31	5.36	5.40	
85	TC	47.1	47.6	48.5	49.2	48.5	49.2	49.7	50.2	51.9	52.4	52.9	53.2	\	62.3	62.8	63.1	
	S/T	1.00	1.00	1.00	1.00	0.62	0.84	1.00	1.00	0.39	0.57	0.74	0.91	\	0.39	0.53	0.67	
	PI	4.55	4.60	4.65	4.65	4.65	4.70	4.74	4.79	4.79	4.84	4.88	4.93	\	6.02	6.09	6.14	
95	TC	46.3	46.7	47.7	48.4	47.7	48.4	48.9	49.3	51.1	51.6	51.9	52.4	\	60.9	61.4	61.7	
	S/T	1.00	1.00	1.00	1.00	0.62	0.84	1.00	1.00	0.39	0.57	0.74	0.92	\	0.39	0.53	0.68	
	PI	5.47	5.52	5.59	5.59	5.59	5.64	5.71	5.76	5.78	5.83	5.88	5.95	\	7.17	7.22	7.29	
105	TC	45.3	45.9	46.9	47.4	46.9	47.4	47.9	48.4	50.2	50.6	51.0	51.3	\	58.8	58.9	59.2	
	S/T	0.99	1.00	1.00	1.00	0.62	0.84	1.00	1.00	0.39	0.57	0.75	0.93	\	0.39	0.54	0.69	
	PI	6.51	6.58	6.65	6.65	6.65	6.73	6.80	6.87	6.87	6.94	6.98	7.06	\	8.31	8.33	8.35	
115	TC	40.6	41.1	42.0	42.4	42.0	42.4	42.9	43.3	45.1	45.4	45.6	45.9	\	48.9	49.2	49.3	
	S/T	1.00	1.00	1.00	1.00	0.62	0.85	1.00	1.00	0.40	0.60	0.79	0.99	\	0.39	0.58	0.76	
	PI	6.63	6.70	6.77	6.77	6.77	6.87	6.94	7.01	7.06	7.10	7.15	7.17	\	7.39	7.43	7.46	

**Performance data (Heating operation at rated frequency)
60K outdoor unit matches with 60K indoor unit**

ID °F	OD °F	72	67	62	57	52	47	42	37	32	27	22	17	12	7	2	-4
60	TC	66.0	66.0	65.8	65.8	65.7	63.2	58.1	53.7	49.9	50.0	47.0	44.9	42.0	38.9	36.4	34.0
	PI	4.34	4.63	5.03	5.45	5.89	5.93	5.71	5.51	5.35	5.89	5.73	5.57	5.40	5.27	5.11	5.01
70	TC	51.0	50.7	51.0	50.9	50.4	50.2	50.2	50.2	49.1	49.1	45.7	44.3	41.2	38.3	35.9	33.3
	PI	3.24	3.42	3.76	4.02	4.32	4.69	5.17	5.63	5.85	6.40	6.20	6.03	5.83	5.67	5.49	5.35
75	TC	43.0	42.8	42.8	42.8	42.8	42.2	42.2	42.2	42.2	42.2	42.2	42.0	38.9	35.9	32.8	30.4
	PI	2.70	2.90	3.14	3.38	3.70	4.00	4.26	4.65	4.97	5.45	5.87	6.28	6.09	5.91	5.73	5.57
80	TC	35.2	35.2	35.2	35.2	35.1	35.1	34.9	34.9	35.1	34.6	34.6	34.6	34.6	34.6	32.3	29.9
	PI	2.25	2.39	2.59	2.80	3.00	3.26	3.50	3.88	4.12	4.38	4.71	5.09	5.49	5.99	5.97	5.81

Remarks:

TC: Total Cooling Capacity (Gross) kBtu/h

S/T: Sensible Capacity Ratio

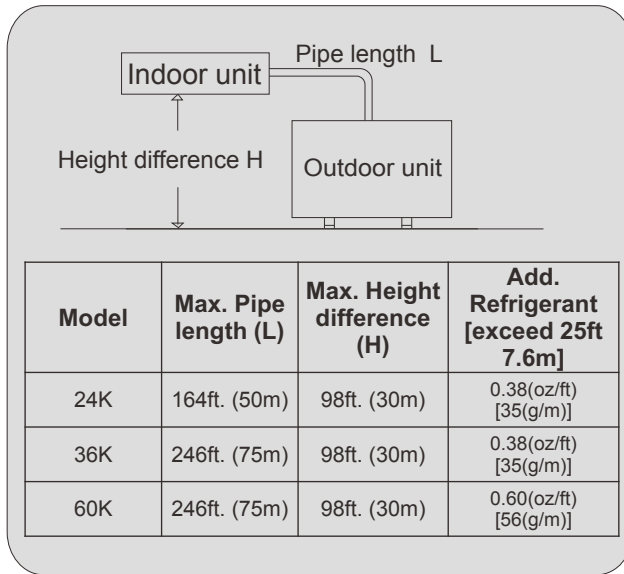
PI: Power Input (including the compressor, cond. fan motor) kW

DB: Dry Bulb Temperature

WB: Wet Bulb Temperature

5. CAPACITIES AND SELECTION DATA

5.2 Piping length correction factor



The correction factor is based on the equivalent piping length in meters (EL) and the height difference between outdoor and indoor units in meters (H).

H:

Height difference between indoor unit and outdoor unit (m).

- H>0: Position of outdoor unit is higher than position of indoor unit (m).

- H<0: Position of outdoor unit is lower than position of indoor unit (m).

L:

Actual one-way piping length between indoor unit and outdoor unit (m).

EL: Equivalent one-way piping length between indoor unit and outdoor unit (m).

Gas Diameter (mm/inch)	9.52 (3/8')	12.7 (1/2')	15.88 (5/8')	19.05 (3/4')	22.22 (7/8')
90° Elbow	0.15	0.2	0.25	0.35	0.40

Cooling

Model \ EL[ft(m)]	25(7.6)	38(10)	50(15)	75(23)	100(30)	125(38)	150(45)	164(50)	200(61)	246(75)
24K	1.0	0.95	0.93	0.89	0.85	0.81	0.78	0.75	--	--
36K/60K	1.0	0.98	0.97	0.93	0.89	0.86	0.82	0.81	0.75	0.69

Heating

Model \ EL[ft(m)]	25(7.6)	38(10)	50(15)	75(23)	100(30)	125(38)	150(45)	164(50)	200(61)	246(75)
24K	1.0	0.94	0.93	0.89	0.85	0.81	0.78	0.75	--	--
36K/60K	1.0	0.98	0.97	0.93	0.89	0.86	0.83	0.81	0.76	0.70

5. CAPACITIES AND SELECTION DATA

The correction factor of height between indoor unit and outdoor unit

Height difference	16ft (5m)	33ft (10m)	108ft (30m)
Factor	0.01	0.02	0.025

To ensure correct unit selection, consider the farthest indoor unit.

NOTE:

1. Above data is assuming that the height difference between indoor unit and outdoor unit is 0m.
2. Be sure to minimize length of connection pipes to optimize performance. If the outdoor unit is installed higher or lower than the indoor unit, it is necessary to apply height correction factor additionally to length correction factor to calculate cooling/heating.

If outdoor unit is higher, correction should be applied to cooling capacity, if outdoor unit is lower, correction should be applied to heating capacity.

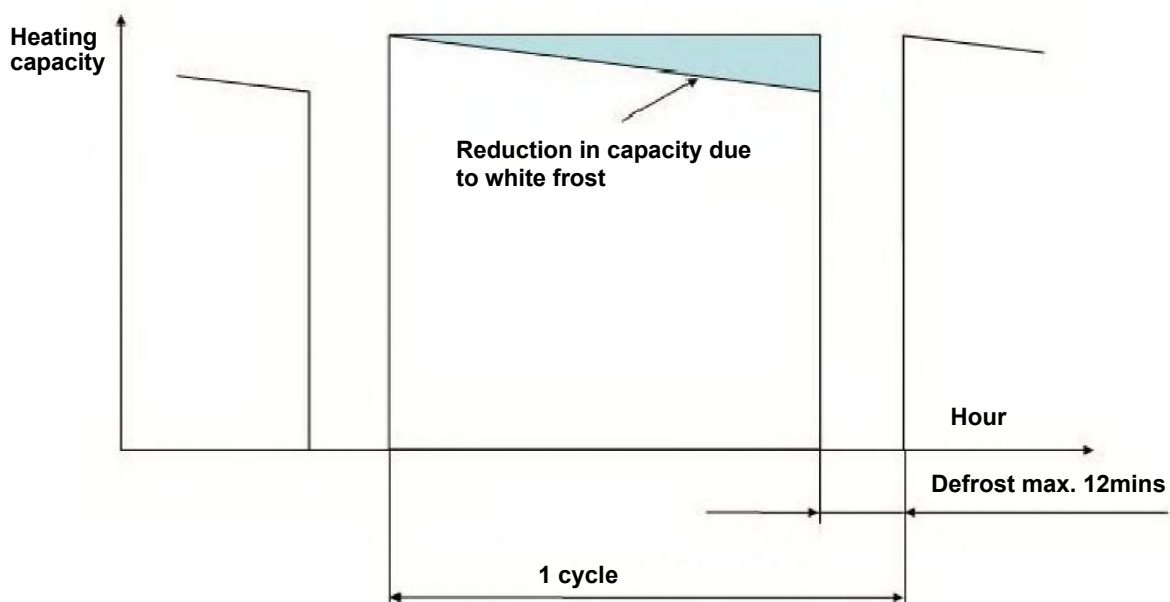
5.3 Correction factors according to defrosting operation

The heating capacity in the previous part, excludes the condition of defrosting operation period. In consideration of defrosting operation, the heating capacity is corrected by the equation below.

Corrected heating capacity = Defrost Correction factor x unit capacity

Outdoor temperature [°F(°C)DB]	5(-15)	14(-10)	23(-5)	32(0)	44.6(7)	50(10)	59(15)
Correction factor (humidity rate 85% RH)	0.95	0.95	0.93	0.85	1.0	1.0	1.0

Correction Factor



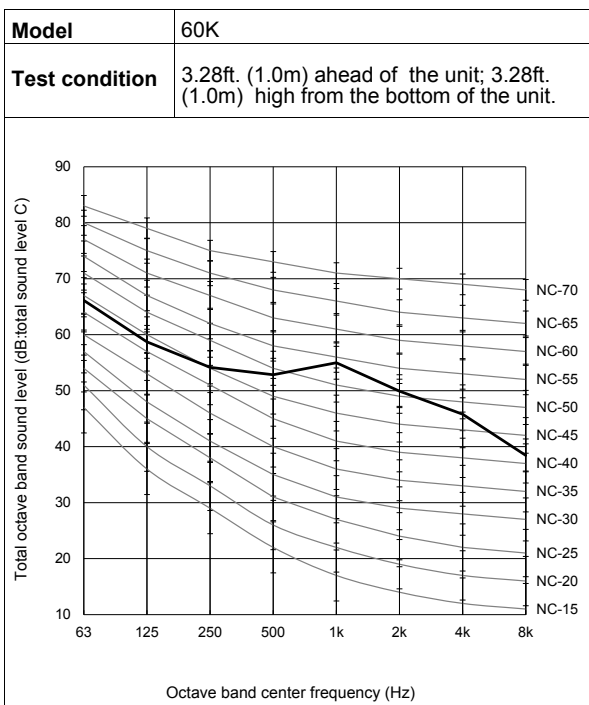
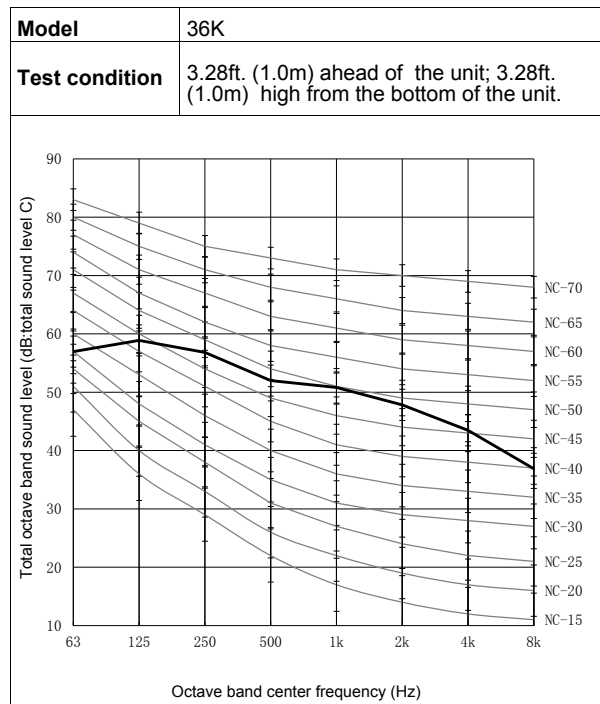
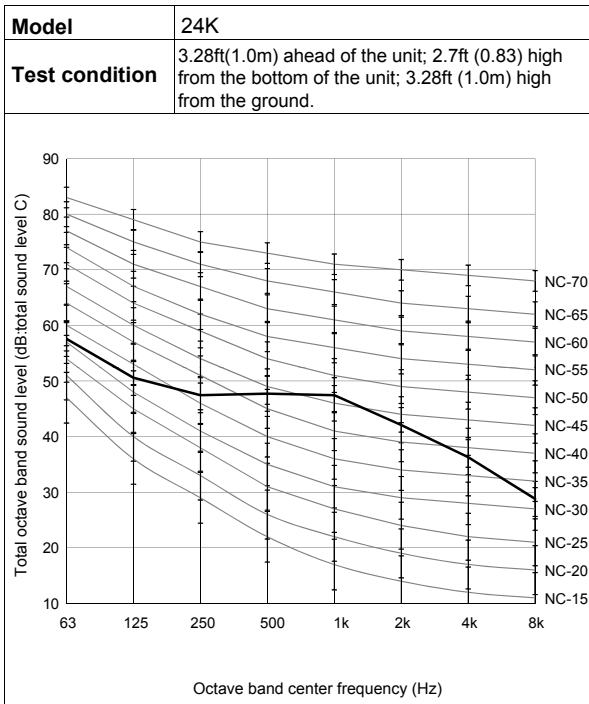
NOTE:

The correction factor is not valid for special conditions such as snowfall or operation in a transitional period.

6. SOUND PRESSURE DATA

6. Sound pressure data

Outdoor unit

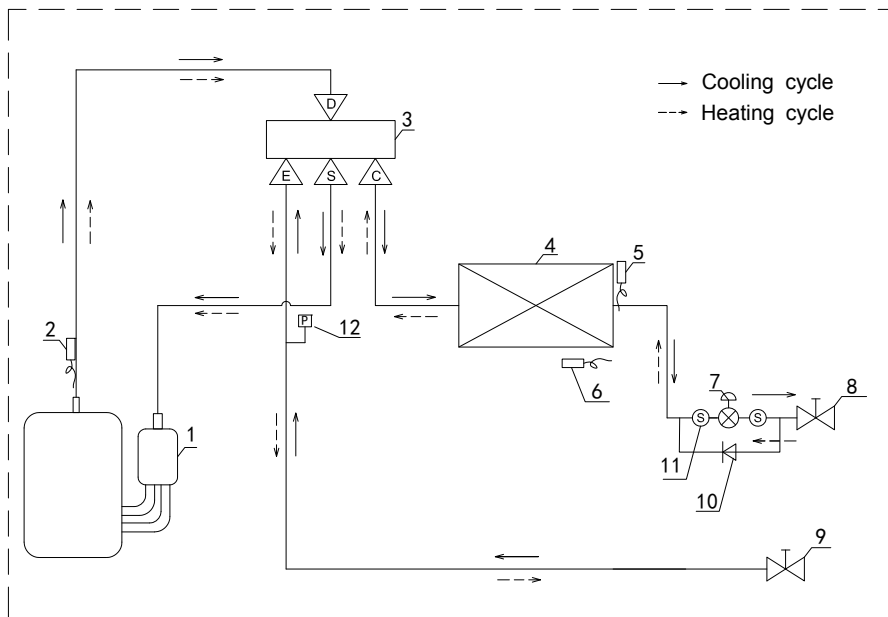


7. REFRIGERANT CYCLE

7. Refrigerant cycle

Outdoor unit

24K

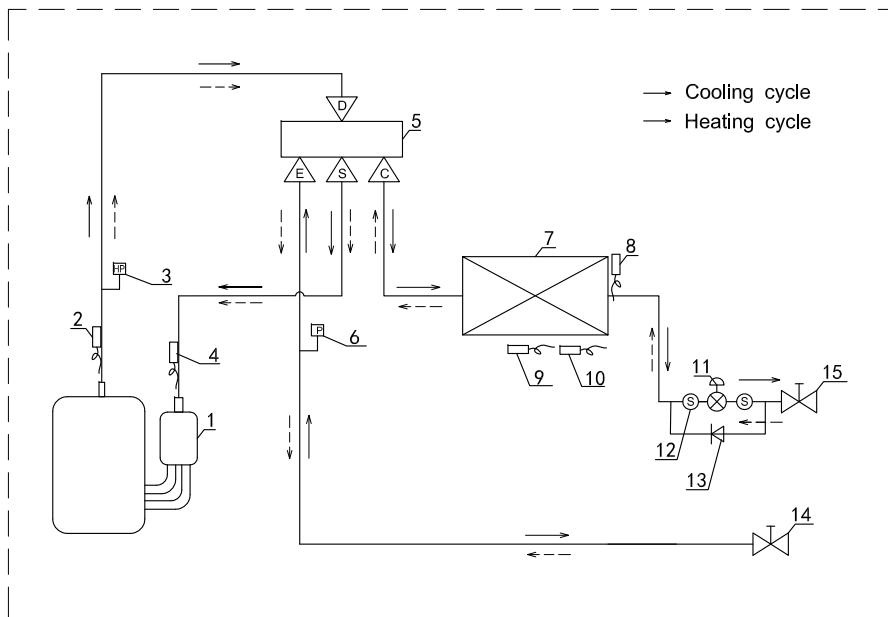


List of components

1	Compressor	7	Electronic expansion valve
2	Discharge temperature sensor	8	Stop valve (Liquid)
3	4-Way valve	9	Stopv valve (Gas)
4	Outdoor heat exchanger	10	One-way valve
5	Coil temperature sensor	11	Strainer
6	Ambient temperature sensor	12	Pressure sensor

7. REFRIGERANT CYCLE

36K

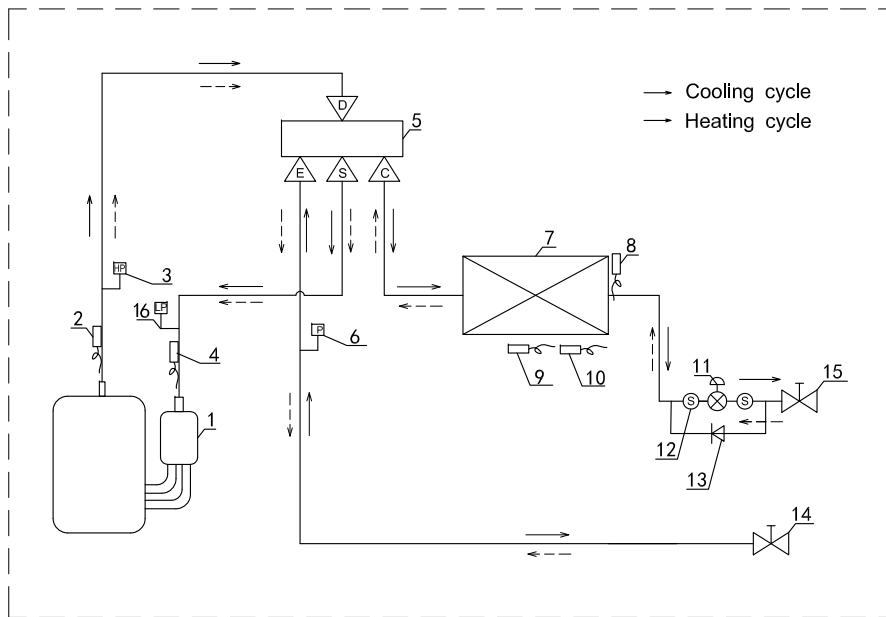


List of components

1	Compressor	9	Coil temperature sensor
2	Discharge temperature sensor	10	Defrost temperature sensor
3	High pressure switch	11	Electronic expansion valve
4	Suction temperature sensor	12	Strainer
5	4-Way valve	13	One-way valve
6	Pressure sensor	14	Stopv valve (Gas)
7	Outdoor heat exchanger	15	Stop valve (Liquid)
8	Ambient temperature sensor		

7. REFRIGERANT CYCLE

60K



List of components

1	Compressor	9	Coil temperature sensor
2	Discharge temperature sensor	10	Defrost temperature sensor
3	High pressure switch	11	Electronic expansion valve
4	Suction temperature sensor	12	Strainer
5	4-Way valve	13	One-way valve
6	Pressure sensor	14	Stopv valve (Gas)
7	Outdoor heat exchanger	15	Stop valve (Liquid)
8	Ambient temperature sensor	16	Low pressure switch

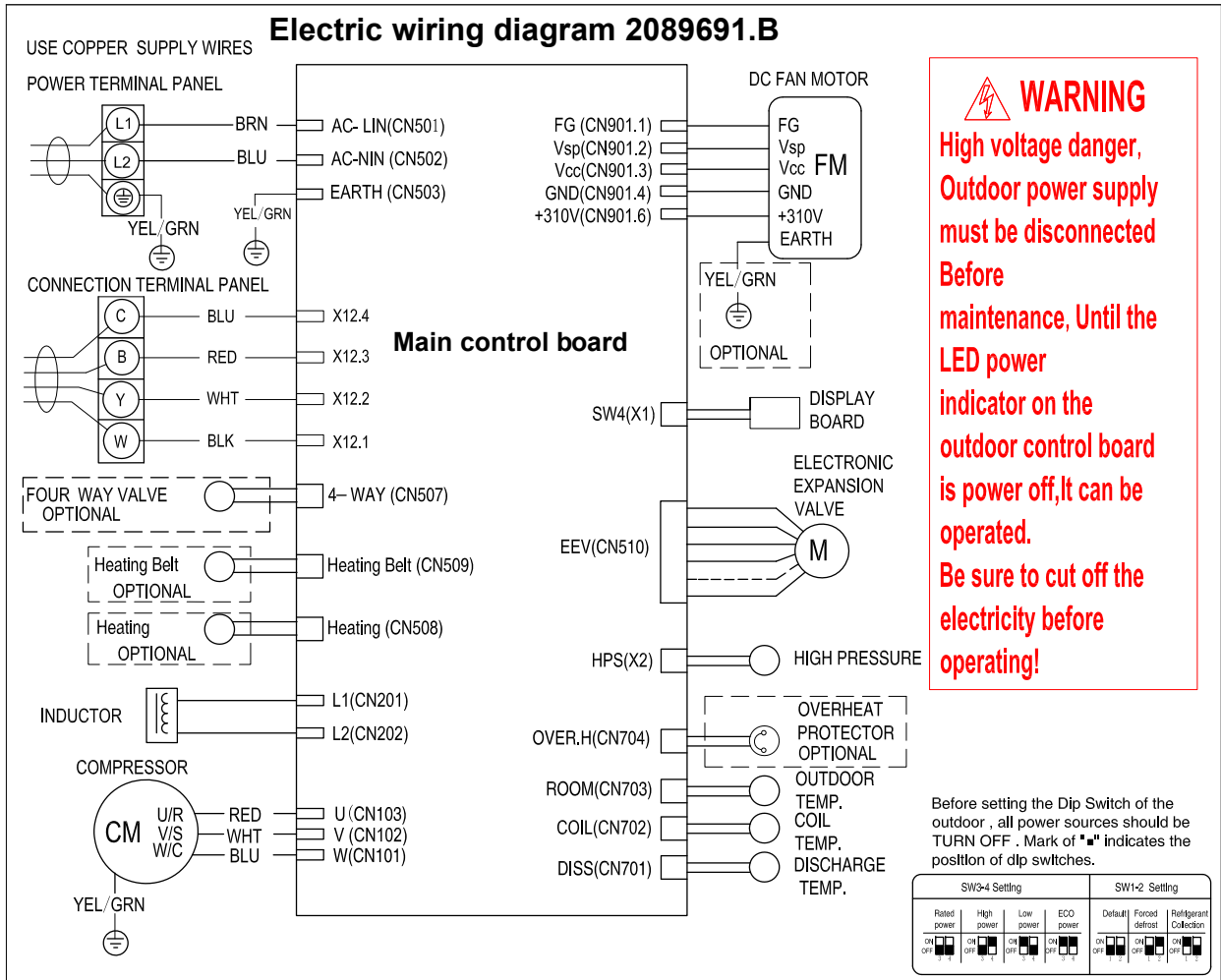
8. WIRING DIAGRAM

8. Wiring diagram

8.1 Electrical wiring diagram

Outdoor unit

24K



Remark:

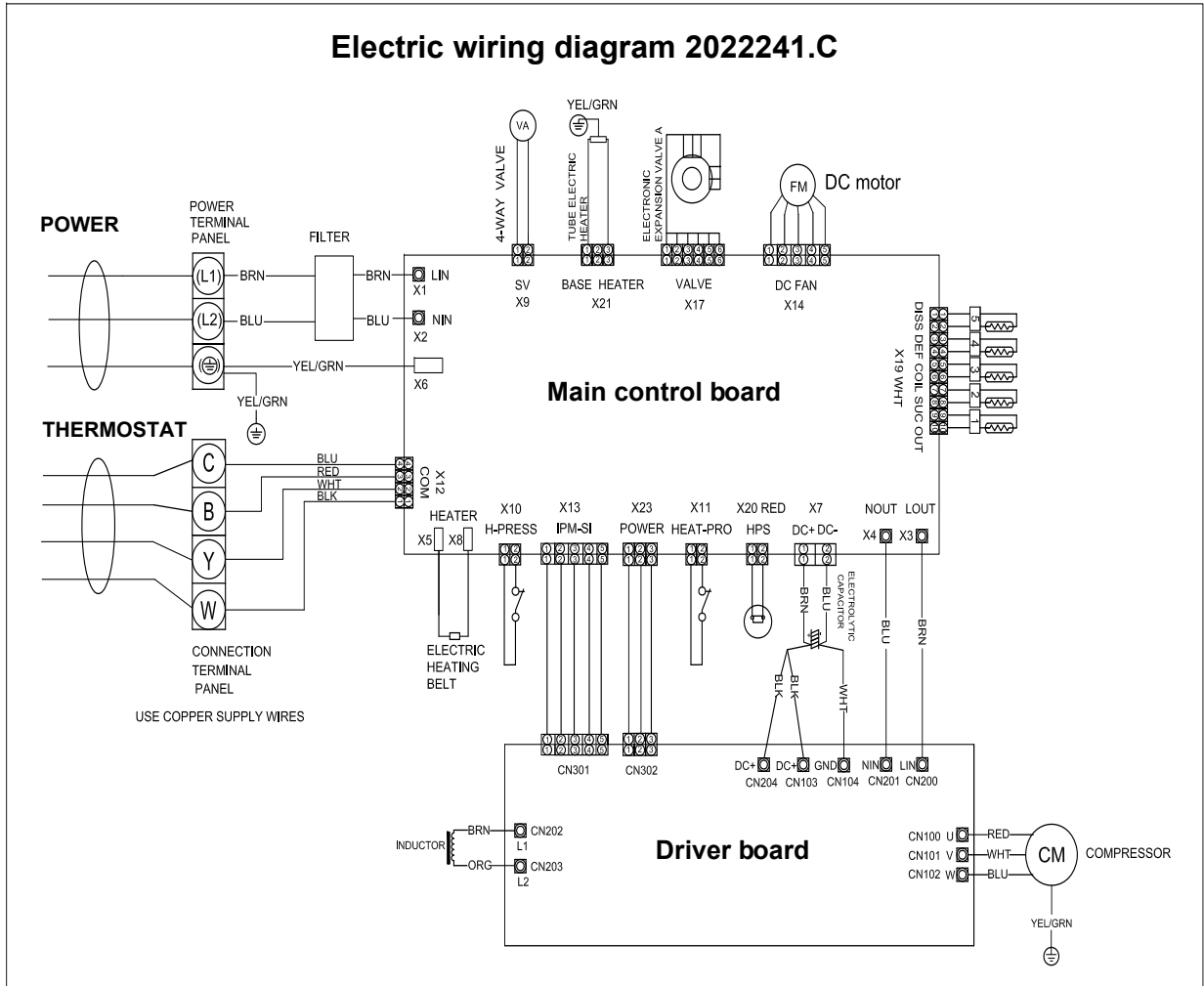
Dashed parts are not available in some models.
For details, see the table below.

Outdoor units model	Four way valve	Heating belt	Heating	YEL/GRN	Overheat protector
24K	●	●	●		●

●--available part

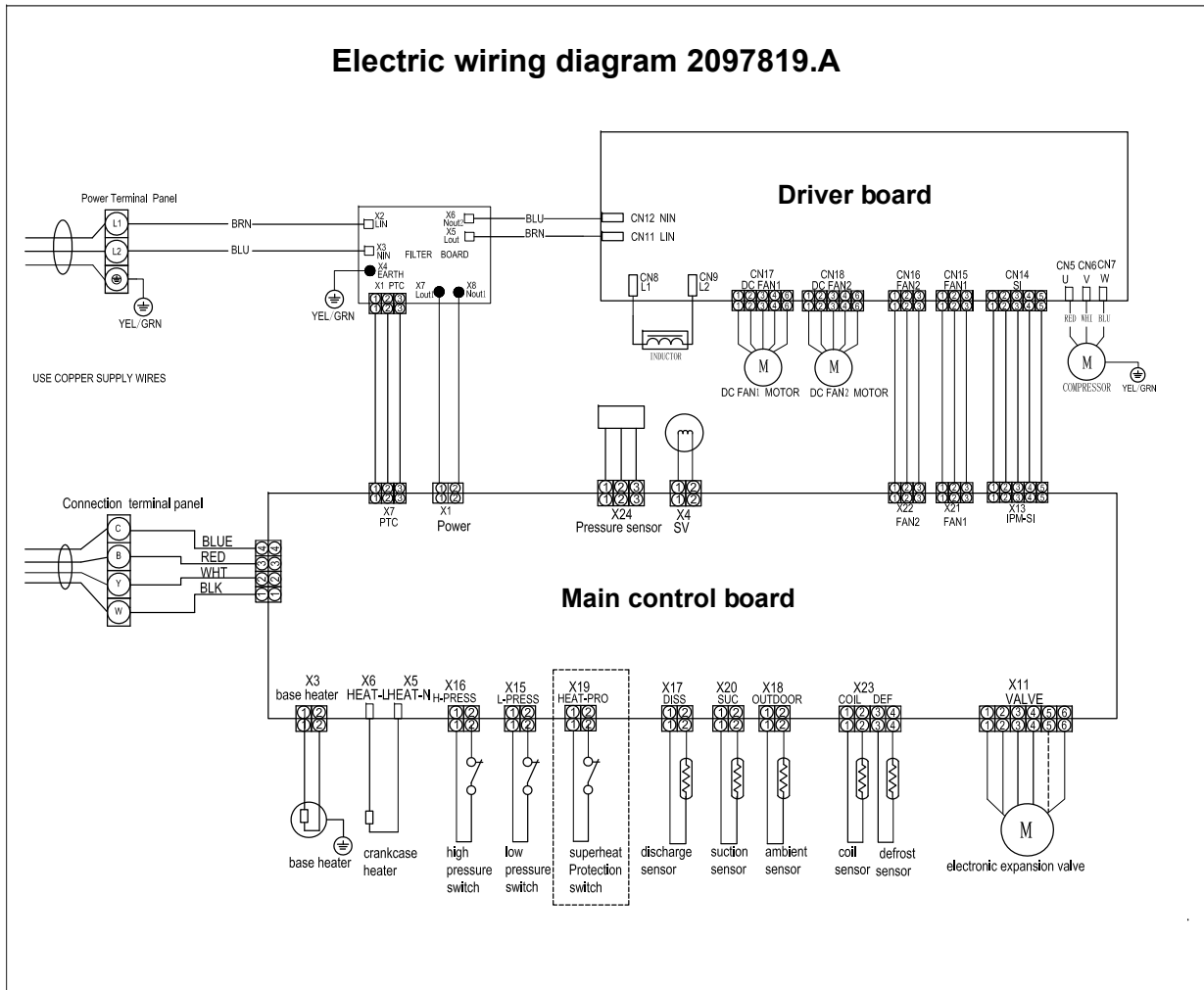
8. WIRING DIAGRAM

36K



8. WIRING DIAGRAM

60K



Remark:

Dashed parts are not available in some models.
For details, see the table below.

Outdoor units model	Superheat protection switch
60K	●

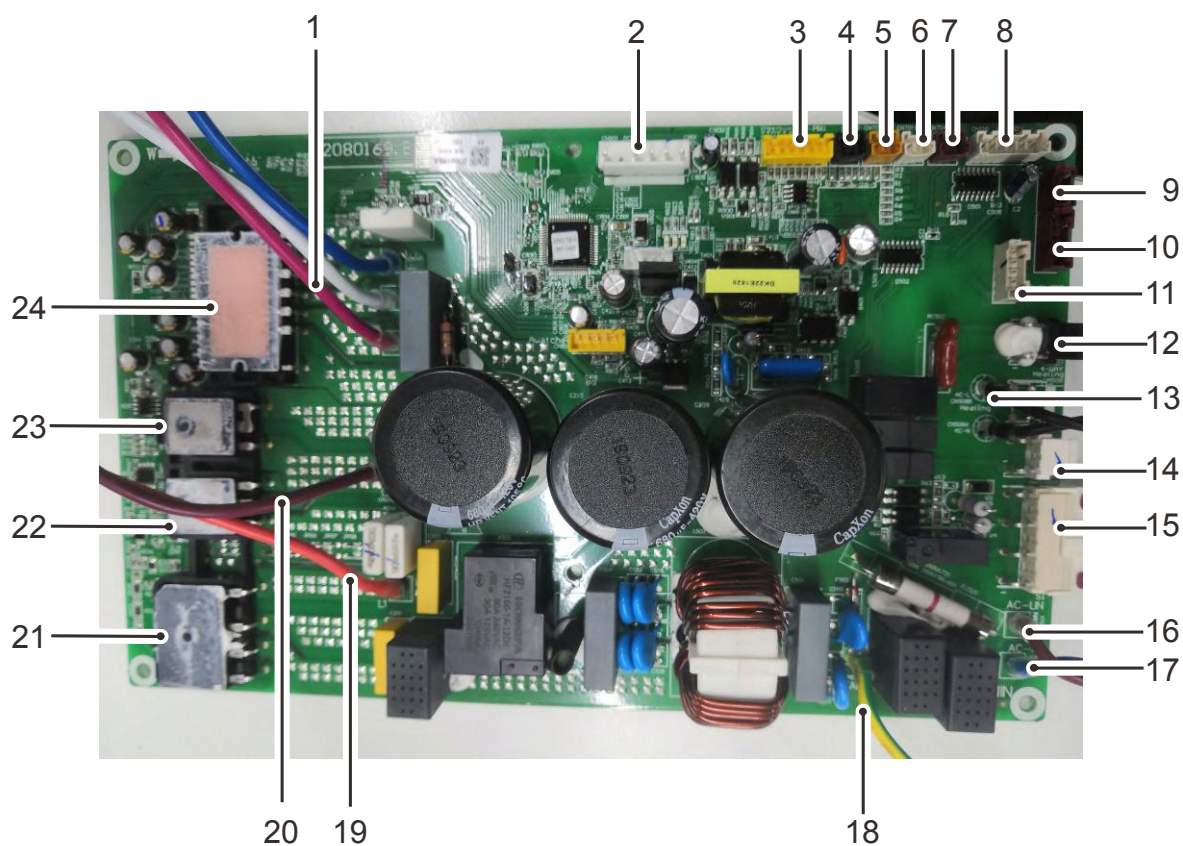
● --available part

8. WIRING DIAGRAM

8.2 Control board picture

24K

Main control board

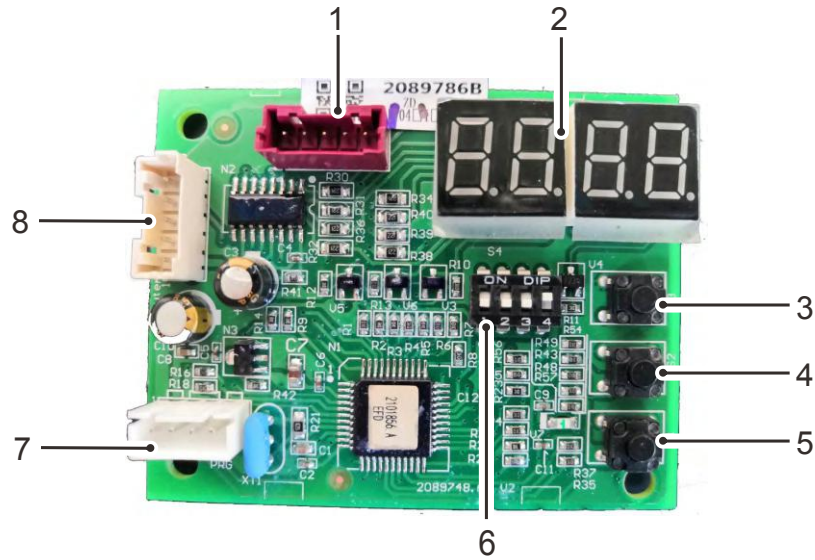


NO.	Description	NO.	Description
1	Compressor	13	Heater
2	DC fan	14	Electric heating belt
3	EE	15	SI
4	Coil temperature sensor	16	AC Power Lin
5	Ambient temperature sensor	17	AC Power Nin
6	Discharge temperature sensor	18	GND
7	Overheat protector	19	Reactor L1
8	Electronic expansion valve	20	Reactor L2
9	High pressure	21	Rectifier bridge
10	SW	22	IGBT
11	Computer/Checker	23	Diode
12	4-way valve	24	IPM

8. WIRING DIAGRAM

24K

7-Segment display board

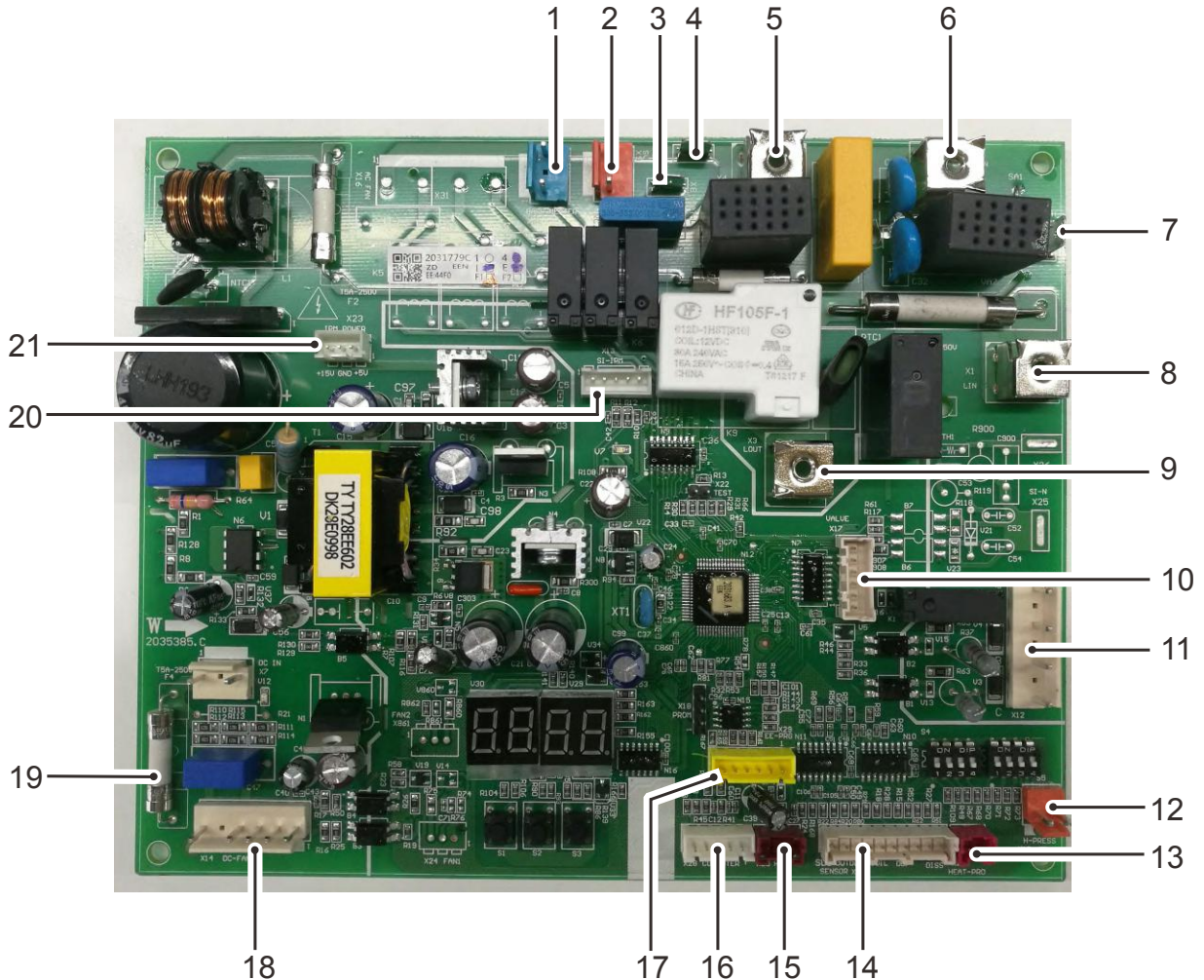


NO.	Description	NO.	Description
1	Switch to outdoor control board	5	S1-Select button
2	7-Segment display	6	DIP switch
3	S3-Decrease button	7	Program
4	S2-Increase button	8	Computer/Checker to outdoor control board

8. WIRING DIAGRAM

36K

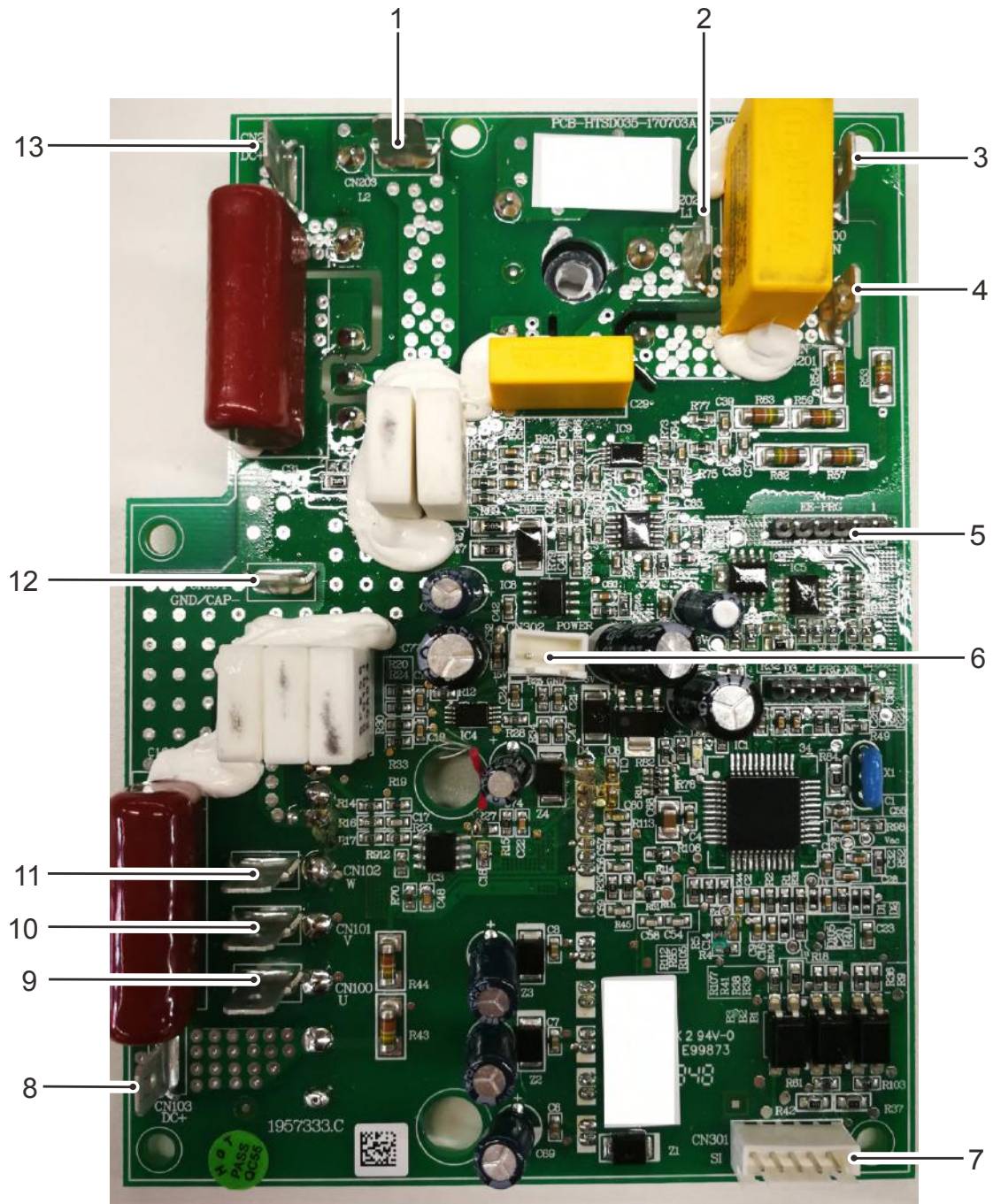
Main control board



NO.	Description	NO.	Description
1	Tube electric heater	12	Pressure switch
2	4-way valve	13	Compressor heating protector
3	Electric heating belt L	14	Sensor Signal Out Suc. Coil Def. Diss.
4	Electric heating belt N	15	Pressure sensor
5	N Out to driver board Nin	16	Computer socket
6	AC Power Nin	17	EE data socket
7	Earth	18	DC motor
8	AC Power Lin	19	DC310V from electrolytic capacitor
9	L Out to driver board Lin	20	Communication signal to driver board
10	Electronic expansion valve	21	Power to driver board
11	Communication signal to thermostat and indoor		

8. WIRING DIAGRAM

Driver board

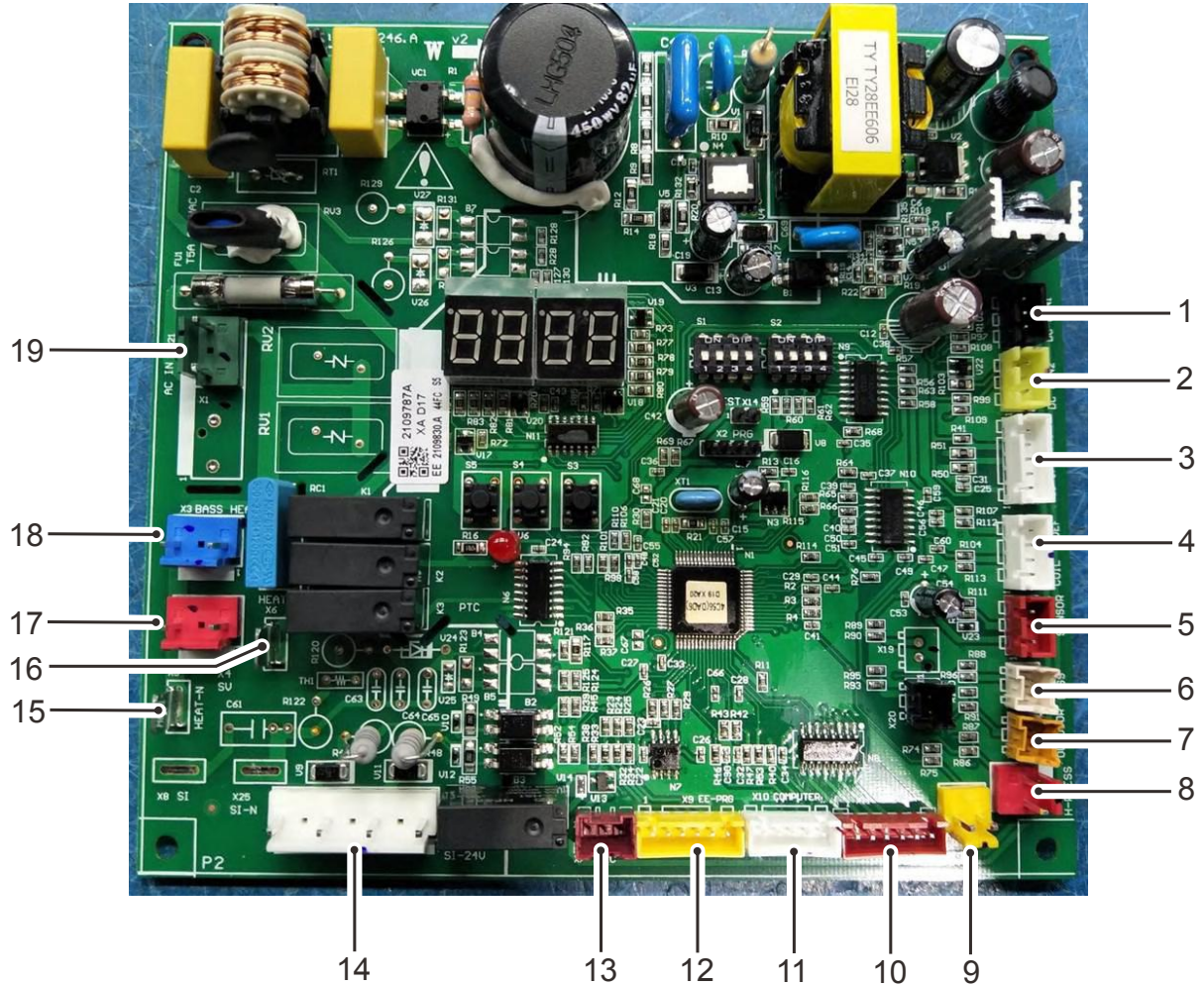


NO.	Description	NO.	Description
1	Reactor L2	8	DC+ to electrolytic capacitor +
2	Reactor L1	9	Compressor U
3	AC Power Lin	10	Compressor V
4	AC Power Nin	11	Compressor W
5	EE data socket	12	GND to electrolytic capacitor +
6	Power from main control board	13	DC+ to electrolytic capacitor +
7	Communication signal from main control board		

8. WIRING DIAGRAM

60K

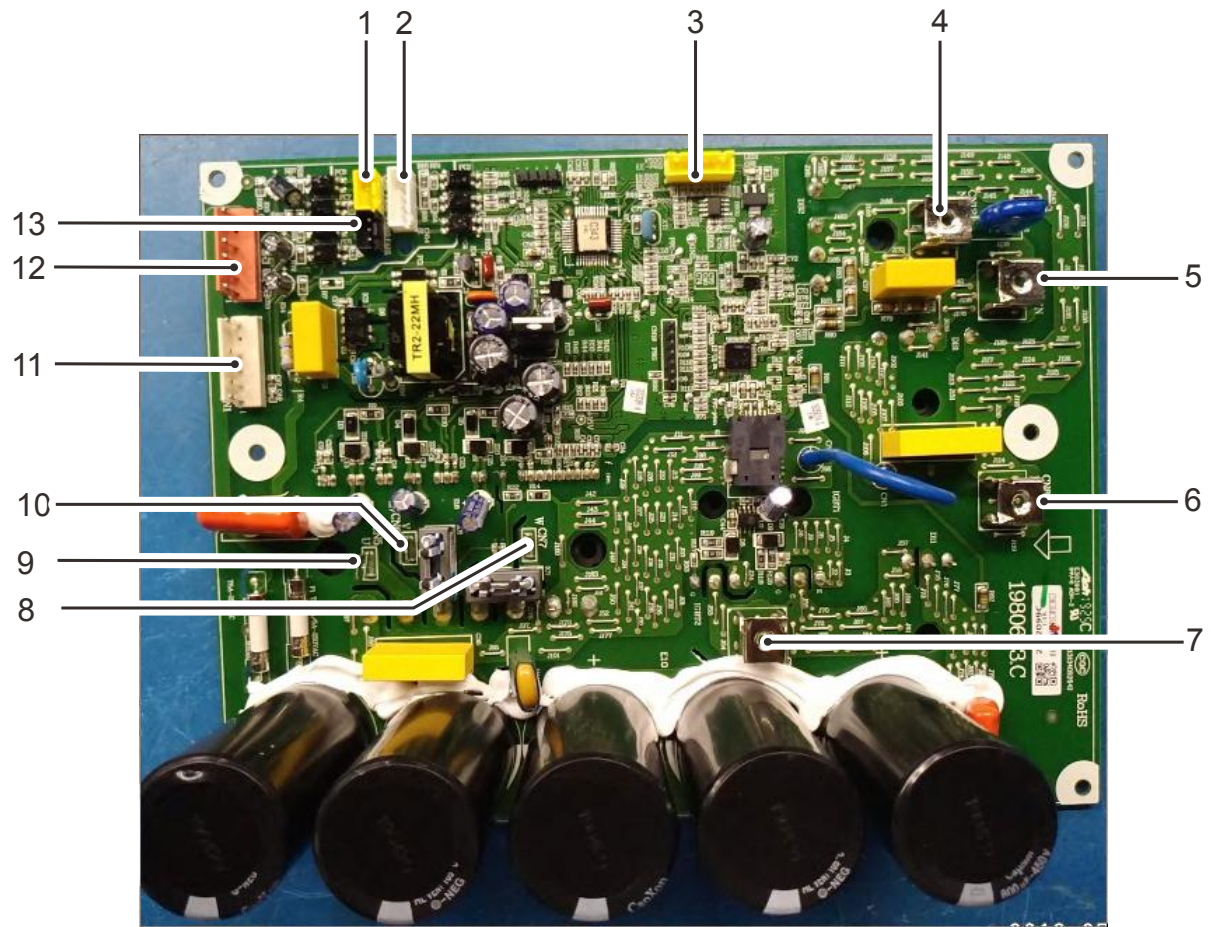
Main control board



NO.	Description	NO.	Description
1	DC Fan Driver1	11	Computer/Checker
2	DC Fan Driver2	12	EEPROM
3	IPM-SI	13	PTC Control Signal
4	Defrost /Coil Temperature Sensor	14	Communication signal
5	Pressure Sensor	15	Electric Heating Belt
6	Discharge Temperature Sensor	16	Electric Heating Belt
7	Ambient Temperature Sensor	17	4-Way Valve
8	High Pressure Switch	18	Base heater
9	Low Pressure Switch	19	AC Power
10	Electronic expansion valve		

8. WIRING DIAGRAM

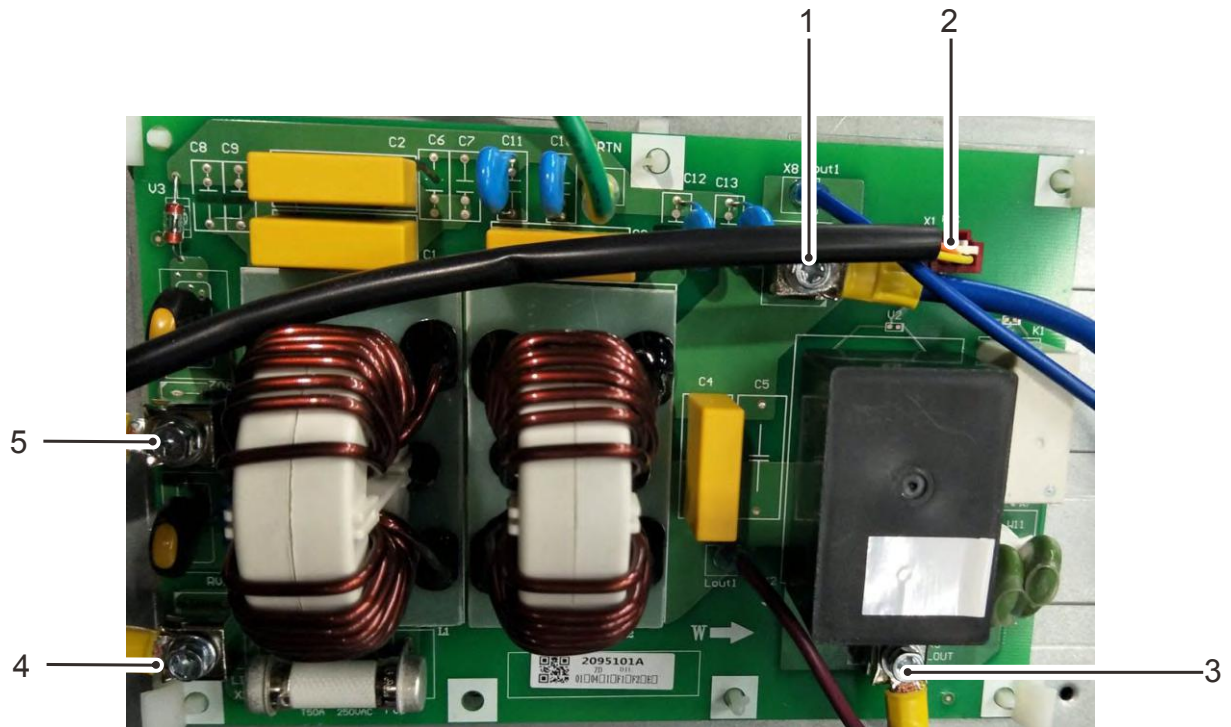
Driver board



NO.	Description	NO.	Description
1	DC Fan Signal	8	Compressor W
2	IPM-SI	9	Compressor U
3	EEPROM	10	Compressor V
4	Nin	11	DC FAN1
5	Lin	12	DC FAN2
6	Reactor L1	13	DC Fan Signal
7	Reactor L2		

8. WIRING DIAGRAM

Filter board



NO.	Description	NO.	Description
1	N Out	4	LIN
2	PTC Control Signal	5	NIN
3	L Out		

8. WIRING DIAGRAM

8.3 Common wiring

Recommended wire size

Model (Capacity)	Power Supply	ELB		Power Source Cable Size	Transmitting Cable Size
		Rated Current (A)	Nominal Sensitive Current (mA)		
24K	208/230V ~/60Hz	25	30	3×12AWG	4×16AWG
36K	208/230V ~/60Hz	35	30	3×10AWG	4×16AWG
60K	208/230V ~/60Hz	60	30	3×8AWG	4×16AWG

Max. Running Current (A): REFER TO NAMEPLATE

NOTE:

- Use copper power supply wires.
- Follow local codes and regulations when select field wires, and all the above are the minimum wire size.
- When transmitting cable length is longer than 262ft. (80m), a larger wire size should be selected.
- Install main switch and ELB for each system separately. Select the high response type ELB that acts within 0.1second.

9. FIELD SETTING

9. Field setting

9.1 Outdoor unit DIP switch

DIP Switch Setting of Outdoor Unit (Optional setting)

Turn off all power sources before setting. Without turning off, the switches settings are not refreshed and might be invalid. Mark of "■" indicates the position of DIP switches.

SW1, 2 Setting			Setting method 36K/60K			
Setting method 24K	Setting method 36K/60K		36K: SW4-3 60K: S1-3	Mandatory defrost mode	36K: SW5-4 60K: S2-4	Refrigerant collection
Default	Mandatory defrost mode	Refrigerant collection	Normal defrost mode		Mandatory defrost mode	
ON <input type="checkbox"/> <input type="checkbox"/> OFF <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 1 2	ON <input type="checkbox"/> <input checked="" type="checkbox"/> OFF <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 1 2	ON <input type="checkbox"/> <input checked="" type="checkbox"/> OFF <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 1 2	Setting before shipment	ON <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> OFF <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 1 2 3 4	ON <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> OFF <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 1 2 3 4	ON <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> OFF <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 1 2 3 4

Mandatory defrost mode

Operation:

Dial the switch from OFF to ON before turn on the appliance, and set it in heating mode, then it will run with manual defrosting mode at once.

Refrigerant collection mode

Actions:

The compressor runs with the target frequency, and without any protection when frequency rises; The EEV runs with setting opening; Outdoor unit fan will run with the set fan speed.

Operation procedures:

Step 1:

Press the ON/OFF button to power off the appliance.

Step 2:

Disconnect the machine power.

Step 3:

Close the shut-off valve of the liquid piping with an Allen wrench in a clockwise direction.



9. FIELD SETTING

Step 4:

Open the maintenance panel.

Step 5:

Switch the dial code (referring to outdoor wiring diagram) ON position on the main control board.

Step 6:

Switch on the machine power.

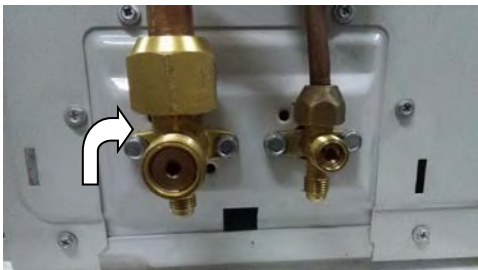
Step 7:

Check if "40" is displayed on the LED digital tube of the main control board.



Step 8:

When the numerals on the LED digital tube of outdoor unit count down to 0 (40 → 39 → 38 ... 0), and "0" begins to blink, close the shut-off valve of the gas piping with an Allen wrench in a clockwise direction.



Step 9:

Cut off machine power and the procedure for recovering refrigerant is finished.

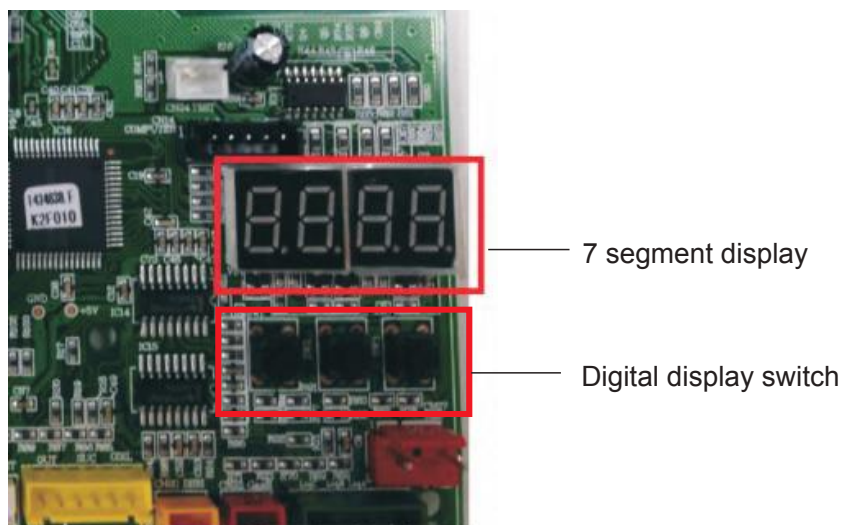
NOTE:

Be sure to switch back the dial after refrigerant recovery operation. If not, it will enter refrigerant recovery mode again after power ON. But if the power is not off, it will not enter refrigerant recovery mode and will run normally.

9. FIELD SETTING

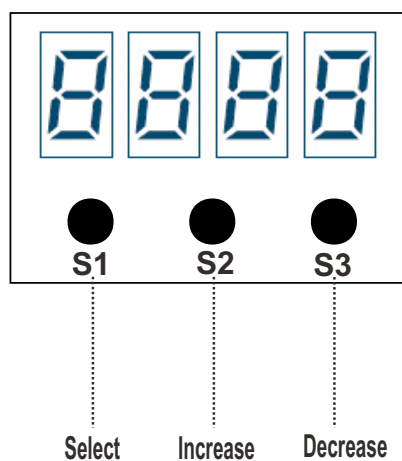
9.2 Running parameter query

Query by 7 segment display



7-segment display Introduction

24K



There are 3 buttons on the digital display board :

1) Select button: Select to display outdoor/indoor unit parameter.

"P." -- Parameter of outdoor unit

2) INCREASE button : Each time it is pressed, the number rises by 1.

3) DECREASE button : Each time it is pressed, the number lowers by 1.

The parameter content will be automatically displayed after the parameter code is selected for 3s.

9. FIELD SETTING

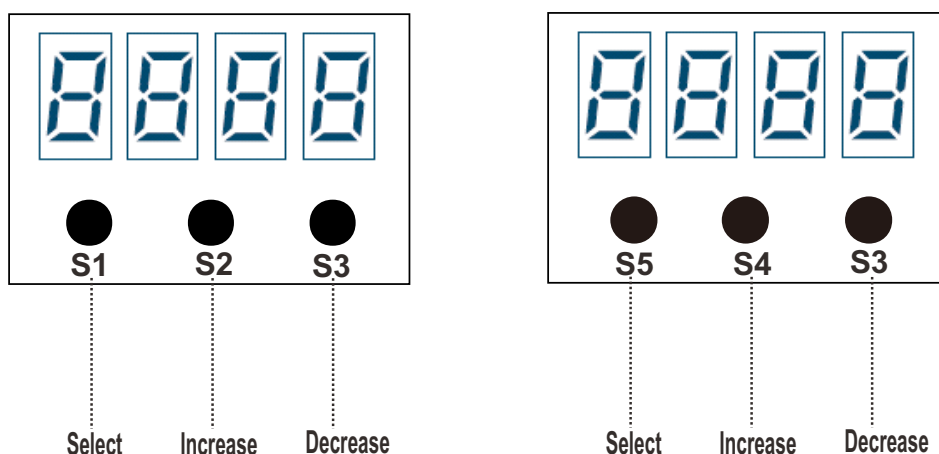
Parameters can be checked in the following table below.

Parameter code	Descriptions
P.0	Fault codes
P.1	Compressor actual frequency
P.2	Compressor driving frequency
P.4	Compressor target frequency
P.5	Compressor exhaust temperature
P.6	Outdoor suction Temperature
P.7	Outdoor ambient temperature
P.8	Outdoor coil temperature
P.9	Outdoor defrosting temperature
P.10	IPM module temperature
P.11	Outdoor capacity requirement
P.13	Outdoor DC Motor target speed
P.14	AC input current
P.15	AC input voltage
P.16	DC bus voltage
P.17	Compressor phase current
P.18	Frequency limit code
P.20	Target suction overheating
P.21	Target exhaust overheating
P.22	Actual suction overheating (heating)
P.23	Actual exhaust overheating (heating)

NOTE: The right is therefore reserved to EE changing without notice.

9. FIELD SETTING

36K/60K



There are 3 buttons on the digital display board :

1) SWITCH button:

Indoor parameters and outdoor parameters can be selected in turn by pressing it.

“P.”/“H.”-outdoor unit parameter

2) INCREASE button:

Each time it is pressed, the number rises by 1, hold down it, the number will be rapidly increased;

3) DECREASE button:

Each time it is pressed, the number lowers by 1, hold down it, the number will be rapidly decreased.

Parameters can be checked in the following table below.

Parameter code	Descriptions
0	Protection code or fault code
P.1	Target frequency
P.2	Driving frequency
P.4	Outdoor EEV opening
P.5	Outdoor EEV target opening
P.6	Upper DC motor revolving speed
P.8	AC Input voltage
P.9	Current
P.10	Modular temperature
P.11	Capacity needed
P.12	Modular fault
P.20	Outdoor ambient temperature
P.21	Outdoor coil temperature
P.22	Outdoor defrost temperature
P.23	Suction temperature
P.24	Discharge temperature
H.1	DSH actual value
H.2	DSH target value
H.3	Target pressure in cooling mode (Actual pressure= the displayed value/100)
H.4	Target pressure in heating mode (Actual pressure= the displayed value/100)
H.5	Actual pressure (Actual pressure=the displayed value/100)

10. PIPING WORK AND REFRIGERANT CHARGE

10. Piping work and refrigerant charge

10.1 MAX.length allowed

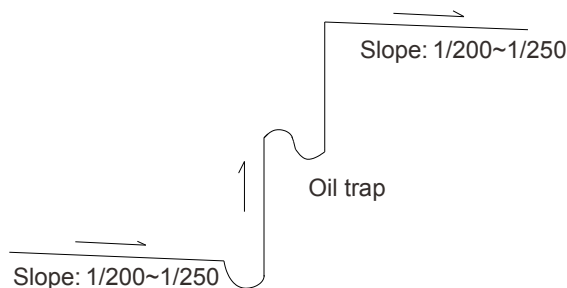
Model	Max. Pipe length (L)	Max. Height difference (H)	Add. Refrigerant [exceed 25ft 7.6m]
24K	164ft. (50m)	98ft. (30m)	0.38(oz/ft) [35(g/m)]
36K	246ft. (75m)	98ft. (30m)	0.38(oz/ft) [35(g/m)]
60K	246ft. (75m)	98ft. (30m)	0.60(oz/ft) [56(g/m)]

Additional refrigerant charge

24K/36K: Additional refrigerant charge= (L-25) ft×0.38 oz/ft
 60K: Additional refrigerant charge= (L-25) ft×0.60 oz/ft

10.2 Oil trap

When the indoor unit is lower than outdoor unit and height difference is larger than 5m, set an oil trap every 5m (height difference) on suction piping.



NOTE:

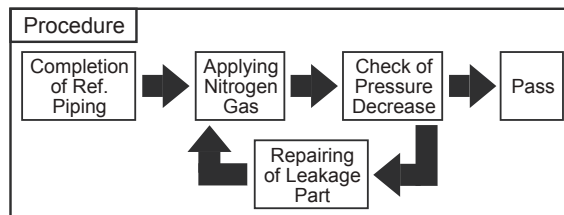
- 1) To avoid storing too much oil in the oil trap, the oil trap should be as short as possible.
- 2) The horizontal piping should slope down along the refrigerant flow direction, to bring the oil back to compressor, the slope is about 1/200 to 1/250.
- 3) In order to ensure cooling/heating performance better, the refrigerant piping should be as short and straight as possible.

10. PIPING WORK AND REFRIGERANT CHARGE

10.3 Air tight test

Do use nitrogen when performing air-tight test.

Connect the gauge manifold using charging hoses with a nitrogen cylinder to the check joints of the liquid line and the gas line stop valves. Perform the air-tight test. Don't open the gas line stop valves. Apply nitrogen gas pressure of 550 psig (3.8MPa). Check for any gas leakage at the flare nut connections, or brazed parts by gas leak detector or foaming agent. It is OK if gas pressure does not decrease. After the air tight test, release nitrogen gas.



Air tight procedure

10.4 Additional refrigerant charge

Although refrigerant has been charged into this unit, additional refrigerant charge is required according to the piping length.

- The additional refrigerant precharge quantity should be determined and charged into the system according to the following procedure.
- Record the additional refrigerant quantity in order to facilitate maintenance and servicing activities.

Refrigerant charge before shipment (W0 (oz.))

W0 is the outdoor unit refrigerant charge before shipment;

Xg is additional refrigerant outdoor unit needed to charge according to piping length during installation.

Model	Refrigerant precharged before shipment (oz.)	Total refrigerant pipe length	
		0ft.~25ft.	Long than 25ft.
24K	70.5	0	$Xg = 0.38oz/ft \times (Total\ pipe\ length(ft.) - 25)$
36K	98.7	0	$Xg = 0.38oz/ft \times (Total\ pipe\ length(ft.) - 25)$
60K	142.9	0	$Xg = 0.60oz/ft \times (Total\ pipe\ length(ft.) - 25)$

11. INSTALLATION TOOLS AND INSTALLATION FLOW CHART

11. Installation tools and installation flow chart

11.1 Necessary tools and instrument list for installation

No.	Tool	No.	Tool	No.	Tool	No.	Tool
1	Handsaw	6	Copper Pipe Bender	11	Spanner	16	Leveler
2	Phillips Screwdriver	7	Manual Water Pump	12	Charging Cylinder	17	Clamper for Solderless Terminals
3	Vacuum Pump	8	Pipe Cutter	13	Gauge Manifold	18	Hoist (for Indoor Unit)
4	Refrigerant Gas Hose	9	Brazing Kit	14	Cutter for Wires	19	Ammeter
5	Megohmmeter	10	Hexagon Wrench	15	Gas Leak Detector	20	Voltage Meter

Use specified tools and measuring instruments only for the new refrigerant.

◇: Interchangeability is available with R410A

●: Only for Refrigerant R32

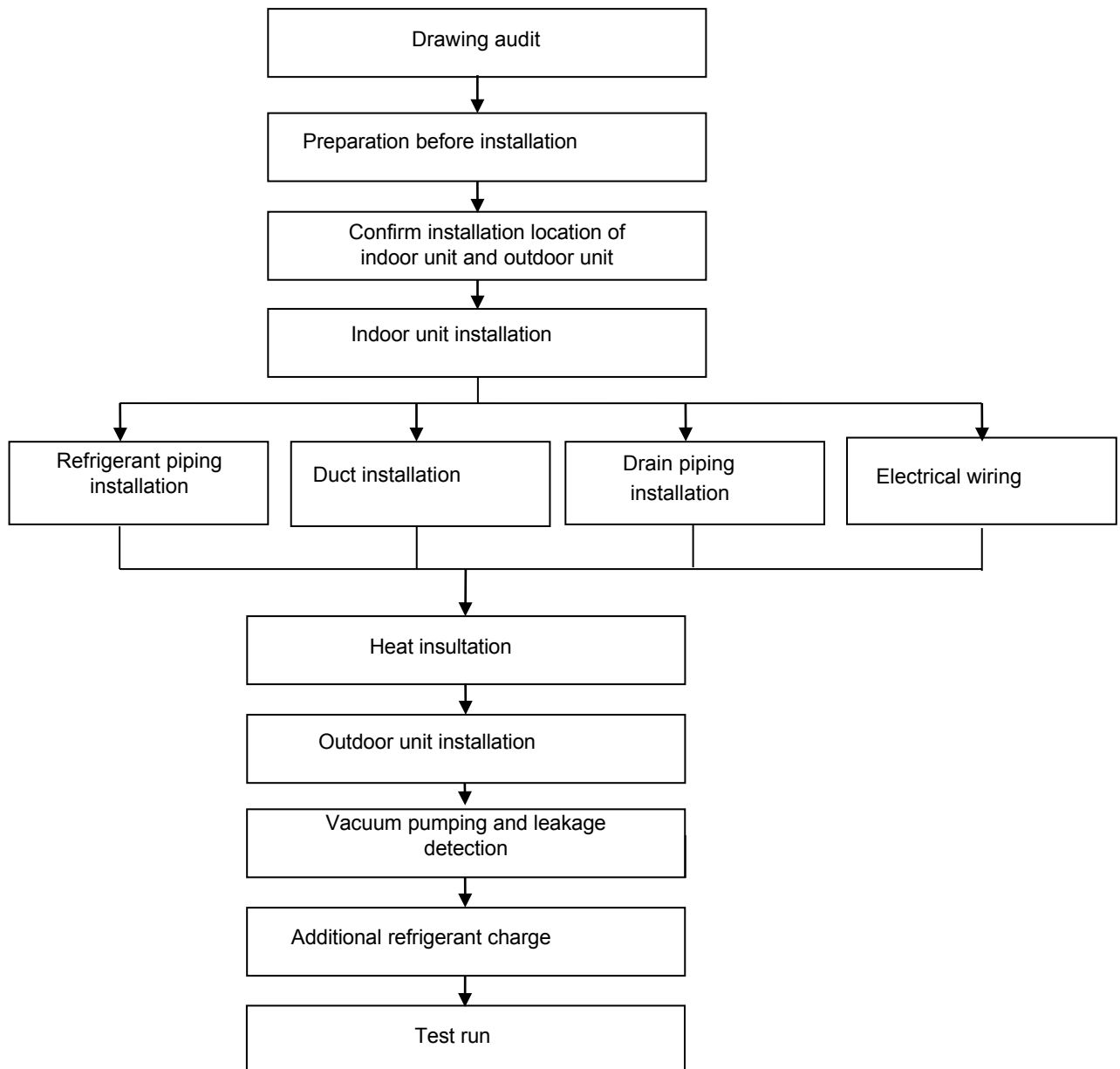
×: Prohibited

◆: Only for Refrigerant R22

Measuring Instrument and Tool for R410A		R32	R22	Reason of Non-Interchangeability and Attention (*: Strictly Required)	Use
Refrigerant Pipe	Pipe Cutter Chamfering Reamer	◇	◇	-	Cutting Pipe Removing Burrs
	Flaring Tool	◇	◇	* The flaring tools for R32 are applicable to R22/R410A. * If using flaring tube, make dimension of tube larger for R410A. * In case of material 1/2H, flaring is not available.	Flaring for Tubes
	Pipe Bender	◇	◇	* In case of material 1/2H, bending is not available. Use elbow for bend and braze.	Bending
	Expanding Tool	◇	◇	* In case of material 1/2H, expanding of tube is not available. Use socket for connecting tube.	Expanding Tubes
	Torque Wrench	◇	×	* For ϕ 1/2, ϕ 5/8, spanner size is up 2mm.	Connection of Flare Nut
		◇	◇	* For ϕ 1/4, ϕ 3/8, ϕ 3/4, spanner size is the same.	
	Brazing Tool	◇	◇	* Perform correct brazing work.	Brazing for Tubes
	Nitrogen Gas	◇	◇	* Strict Control against Contamin (Blow nitrogen during brazing.)	Prevention from Oxidation during
Lubrication Oil (for Flare Surface)	●	◆	* Use a synthetic oil which is equivalent to the oil used in the refrigeration cycle. * Synthetic oil absorbs moisture quickly.	Applying Oil to the Flared Surface	
Vacuum Drying & Refrigerant Charge	Refrigerant Cylinder	×	×	* Check refrigerant cylinder color. * Liquid refrigerant charging is required regarding zeotropic refrigerant. * Use the weight scale.	Refrigerant Charging
	Vacuum Pump	◇	◇	* The current ones are applicable. However, it is required to mount a vacuum pump adapter which can prevent from reverse flow when a vacuum pump stops, resulting in no reverse oil flow.	Vacuum Pumping
	Adapter for Vacuum Pump	◇	◆		
	Manifold Valve	◇	◆	* No interchangeability is available due to higher pressures when compared with R22. * Do not use current ones to the different refrigerant. If used, mineral oil will flow into the cycle and cause sludges, resulting in clogging or compressor failure.	Vacuum Pumping, Vacuum Holding, Refrigerant Charging and Check of Pressures
	Charging Hose	◇	×	* Connection diameter is different; R32/R410A: UNF1/2, R22: UNF7/16.	
	Weight Scale	◇	◇		Measuring Instrument for Refrigerant Charging
	Refrigerant Gas Leakage Detector	×	×	* The current gas leakage detector (R22) is not applicable due to different detecting method.	Gas Leakage Check

11. INSTALLATION TOOLS AND INSTALLATION FLOW CHART

11.2 Installation flow chart



NOTE: This flow is only for reference; for details please see installation manual section.

12. CONTROL MODE

12. Control mode

Control function

1. Cooling Anti-Freeze Protection

The outdoor pressure sensor functions as real time temperature detector of evaporator. It prevents the indoor unit evaporator temperature becoming too low. If the indoor coil temperature is too low, the compressor will automatically start protection mode.

2. Overload Protection

To prevent system overload caused by excessive pressure, the machine will implement real-time detection when outdoor coil temperature is too high during cooling mode or indoor coil temperature is too high during heating mode.

3. Exhaust temperature protection

To prevent deterioration due to high exhaust temperature of compressor, the machine will realize the real-time detection of the exhaust gas temperature. If the temperature is too high compressor provides automatic protection.

4. Oil-return Control

When the compressor runs at low frequencies for a long time, control system will start the oil-return mechanism. The oil in the system returns to the compressor.

5. Operation Mode

Air conditioning mode is the operation mode set by users through thermostat, two modes are available: cooling, heating.

6. Four-way Valve Control

Four-way valve of the outdoor unit shuts down when cooling and defrosting but starts when heating. During the heating process, the four-way valve stops working for a period of time after the compressor is disconnected.

7. Start-up Protection

To prevent compressor from restarting frequently when the system pressure has not been completely balanced, it cannot be restarted within 3 minutes.

8. Pressure Protection

When the pressure increases to a preset value, the pressure switch will automatically come to protection mode. The compressor will stop and report the fault code protection.

13. SENSOR PARAMETER

13. Sensor parameter

1. THE PARAMETER OF OUTDOOR COMPRESSOR DISCHARGE TEMPERATURE SENSOR:

($R_0=187.25K\pm 6.3\%$; $R_{100}=3.77K\pm 2.5K$; $B0/100=3979K\pm 1\%$)

T [°C]	Rmin [KΩ]	Rnom [KΩ]	Rmax [KΩ]	DR(MIN)%	DR(MAX)%
-30	908.2603	985.5274	1065.1210	-7.84	7.47
-29	855.3955	927.6043	1001.9150	-7.78	7.42
-28	805.9244	873.4324	924.8368	-7.73	5.56
-27	759.6097	822.7471	887.5944	-7.67	7.31
-26	716.2320	775.3041	835.9165	-7.62	7.25
-25	675.5881	730.8775	787.5529	-7.56	7.20
-24	637.4902	689.2583	742.2720	-7.51	7.14
-23	601.7645	650.2533	699.8601	-7.46	7.09
-22	568.2499	613.6835	660.1191	-7.40	7.03
-21	536.7970	579.3832	622.8658	-7.35	6.98
-20	507.2676	547.1989	587.9307	-7.30	6.93
-19	497.5332	516.9882	555.1565	-3.76	6.88
-18	453.4748	488.6192	524.3977	-7.19	6.82
-17	428.9819	461.9693	495.5191	-7.14	6.77
-16	405.9517	436.9251	486.3954	-7.09	10.17
-15	384.2888	413.3808	442.9105	-7.04	6.67
-14	363.9047	391.2386	418.9563	-6.99	6.62
-13	344.7169	370.4072	396.4325	-6.94	6.56
-12	326.6497	350.8019	375.2461	-6.88	6.51
-11	309.6286	332.3441	355.3104	-6.83	6.46
-10	293.5903	314.9620	336.5448	-6.79	6.41
-9	278.4719	298.5822	318.3744	-6.74	6.22
-8	264.2156	283.1464	302.2294	-6.69	6.31
-7	250.7678	268.5936	286.5448	-6.64	6.26
-6	238.0783	254.8686	271.7603	-6.59	6.22
-5	226.1003	241.9200	257.8193	-6.54	6.17
-4	214.7903	229.6997	244.6593	-6.49	6.11
-3	204.1073	218.1630	232.2612	-6.44	6.07
-2	194.0135	207.2681	220.5495	-6.39	6.02
-1	184.4732	196.9759	209.4913	-6.35	5.97
0	175.4533	187.2500	199.0468	-6.30	5.93
1	166.8952	178.0255	189.1529	-6.25	5.88
2	158.8023	169.3067	179.8058	-6.20	5.84
3	151.1467	161.0633	170.9724	-6.16	5.80
4	143.9026	153.2667	162.6216	-6.11	5.75
5	137.0455	145.8905	154.7246	-6.06	5.71
6	130.5528	138.9097	147.2544	-6.02	5.67
7	124.4033	132.3011	140.1856	-5.97	5.62
8	118.5769	126.0429	133.4946	-5.92	5.58
9	113.0550	120.1146	127.1591	-5.88	5.54
10	107.8202	114.4973	121.1586	-5.83	5.50
11	102.8560	109.1728	115.4734	-5.79	5.46
12	98.1470	104.1246	110.0855	-5.74	5.41
13	93.6787	99.3367	104.9778	-5.70	5.37
14	89.4378	94.7946	100.1342	-5.65	5.33
15	85.4114	90.4842	95.5398	-5.61	5.29
16	81.5875	86.3926	91.1805	-5.56	5.25
17	77.9551	82.5076	87.0430	-5.52	5.21
18	74.5034	78.8177	83.1150	-5.47	5.17

13. SENSOR PARAMETER

T [°C]	Rmin [KΩ]	Rnom [KΩ]	Rmax [KΩ]	DR(MIN)%	DR(MAX)%
19	71.2227	75.3122	79.3848	-5.43	5.13
20	68.1036	71.9808	75.8414	-5.39	5.09
21	65.1373	68.8141	72.4746	-5.34	5.05
22	62.3155	65.8032	69.2746	-5.30	5.01
23	59.6306	62.9395	66.2324	-5.26	4.97
24	57.0752	60.2152	63.3395	-5.21	4.93
25	54.6424	57.6227	60.5877	-5.17	4.89
26	52.3258	55.1551	57.9695	-5.13	4.85
27	50.1192	52.8058	55.4778	-5.09	4.82
28	48.0168	50.5684	53.1058	-5.05	4.78
29	46.0133	48.4371	50.8472	-5.00	4.74
30	44.1034	46.4046	48.6960	-4.96	4.71
31	42.2825	44.4711	46.6466	-4.92	4.66
32	40.5458	42.6261	44.6937	-4.88	4.63
33	38.8891	40.8668	42.8323	-4.84	4.59
34	37.3084	39.1890	41.0576	-4.80	4.55
35	35.7998	37.5883	39.3653	-4.76	4.51
36	34.3596	36.0609	37.7511	-4.72	4.48
37	32.9844	34.6030	36.2109	-4.68	4.44
38	31.6710	33.2113	34.7412	-4.64	4.40
39	30.4164	31.8823	33.3383	-4.60	4.37
40	29.2176	30.6130	31.9988	-4.56	4.33
41	28.0718	29.4004	30.7197	-4.52	4.29
42	26.9765	28.2417	29.4979	-4.48	4.26
43	25.9293	27.1342	28.3306	-4.44	4.22
44	24.9277	26.0755	27.2150	-4.40	4.19
45	23.9697	25.0632	26.1488	-4.36	4.15
46	23.0530	24.0950	25.1293	-4.32	4.12
47	22.1757	23.1688	24.1545	-4.29	4.08
48	21.3360	22.2826	23.2221	-4.25	4.05
49	20.5321	21.4345	22.3301	-4.21	4.01
50	19.7623	20.6226	21.4766	-4.17	3.98
51	19.0261	19.8468	20.6612	-4.14	3.94
52	18.3211	19.1040	19.8808	-4.10	3.91
53	17.6458	18.3926	19.1338	-4.06	3.87
54	16.9986	17.7113	18.4185	-4.02	3.84
55	16.3784	17.0537	17.7335	-3.96	3.83
56	15.7839	16.4332	17.0774	-3.95	3.77
57	15.2139	15.8338	16.4488	-3.92	3.74
58	14.6673	15.2592	15.8464	-3.88	3.71
59	14.1430	14.7083	15.2690	-3.84	3.67
60	13.6400	14.1799	14.7154	-3.81	3.64
61	13.1573	13.6730	14.1846	-3.77	3.61
62	12.6941	13.1868	13.6756	-3.74	3.57
63	12.2494	12.7202	13.1872	-3.70	3.54
64	11.8224	12.2723	12.7186	-3.67	3.51
65	11.4124	11.8424	12.2690	-3.63	3.48
66	11.0185	11.4295	11.8373	-3.60	3.45
67	10.6401	11.0331	11.4230	-3.56	3.41
68	10.2765	10.6522	11.0251	-3.53	3.38
69	9.9271	10.2863	10.6429	-3.49	3.35
70	9.5912	9.9348	10.2756	-3.46	3.32
71	9.2682	9.5968	9.9231	-3.42	3.29
72	8.9576	9.2720	9.5841	-3.39	3.26
73	8.6589	8.9597	9.2583	-3.36	3.23
74	8.3716	8.6594	8.9451	-3.32	3.19

13. SENSOR PARAMETER

T [°C]	Rmin [KΩ]	Rnom [KΩ]	Rmax [KΩ]	DR(MIN)%	DR(MAX)%
75	8.0951	8.3705	8.6440	-3.29	3.16
76	7.8290	8.0926	8.3544	-3.26	3.13
77	7.5730	7.8252	8.0758	-3.22	3.10
78	7.3264	7.5679	7.8078	-3.19	3.07
79	7.0891	7.3202	7.5499	-3.16	3.04
80	6.8605	7.0818	7.3018	-3.12	3.01
81	6.6403	6.8522	7.0629	-3.09	2.98
82	6.4282	6.6311	6.8329	-3.06	2.95
83	6.2239	6.4182	6.6115	-3.03	2.92
84	6.0269	6.2131	6.3982	-3.00	2.89
85	5.8371	6.0154	6.1928	-2.96	2.86
86	5.6542	5.8249	5.9949	-2.93	2.84
87	5.4777	5.6413	5.8042	-2.90	2.81
88	5.3076	5.4644	5.6205	-2.87	2.78
89	5.1435	5.2937	5.4433	-2.84	2.75
90	4.9853	5.1292	5.2726	-2.81	2.72
91	4.8326	4.9705	5.1079	-2.77	2.69
92	4.6852	4.8174	4.9492	-2.74	2.66
93	4.5430	4.6697	4.7960	-2.71	2.63
94	4.4058	4.5272	4.6483	-2.68	2.61
95	4.2733	4.3896	4.5058	-2.65	2.58
96	4.1453	4.2568	4.3683	-2.62	2.55
97	4.0218	4.1287	4.2355	-2.59	2.52
98	3.9024	4.0049	4.1074	-2.56	2.50
99	3.7872	3.8854	3.9837	-2.53	2.47
100	3.6758	3.7700	3.8643	-2.50	2.44
101	3.5661	3.6585	3.7512	-2.53	2.47
102	3.4601	3.5509	3.6419	-2.56	2.50
103	3.3577	3.4468	3.5362	-2.59	2.53
104	3.2588	3.3463	3.4341	-2.61	2.56
105	3.1632	3.2491	3.3353	-2.64	2.58
106	3.0708	3.1551	3.2398	-2.67	2.61
107	2.9816	3.0643	3.1475	-2.70	2.64
108	2.8953	2.9765	3.0582	-2.73	2.67
109	2.8118	2.8915	2.9717	-2.76	2.70
110	2.7311	2.8093	2.8881	-2.78	2.73
111	2.6531	2.7299	2.8072	-2.81	2.75
112	2.5776	2.6530	2.7289	-2.84	2.78
113	2.5046	2.5785	2.6531	-2.87	2.81
114	2.4340	2.5065	2.5798	-2.89	2.84
115	2.3656	2.4368	2.5087	-2.92	2.87
116	2.2995	2.3693	2.4400	-2.95	2.90
117	2.2354	2.3040	2.3733	-2.98	2.92
118	2.1734	2.2407	2.3088	-3.00	2.95
119	2.1134	2.1795	2.2463	-3.03	2.97
120	2.0553	2.1201	2.1858	-3.06	3.01
121	1.9991	2.0626	2.1271	-3.08	3.03
122	1.9446	2.0070	2.0702	-3.11	3.05
123	1.8918	1.9530	2.0151	-3.13	3.08
124	1.8406	1.9007	1.9617	-3.16	3.11
125	1.7911	1.8500	1.9099	-3.18	3.14
126	1.7430	1.8009	1.8597	-3.22	3.16
127	1.6965	1.7533	1.8110	-3.24	3.19
128	1.6514	1.7071	1.7638	-3.26	3.21
129	1.6076	1.6623	1.7180	-3.29	3.24
130	1.5652	1.6189	1.6736	-3.32	3.27

13. SENSOR PARAMETER

2. THE PARAMETER OF THE OTHER SENSOR:

($R_0=15K\pm 2\%$; $B0/100=3450K\pm 2\%$)

T [°C]	Rmin [KΩ]	Rnom [KΩ]	Rmax [KΩ]	DR(MIN)%	DR(MAX)%
-30	60.78	64.77	68.99	-6.16	6.12
-29	57.75	61.36	65.16	-5.88	5.83
-28	54.89	58.15	61.58	-5.61	5.57
-27	52.19	55.14	58.23	-5.35	5.31
-26	49.63	52.30	55.08	-5.11	5.05
-25	47.21	49.62	52.13	-4.86	4.81
-24	44.92	47.10	49.37	-4.63	4.60
-23	42.76	44.73	46.78	-4.40	4.38
-22	40.71	42.49	44.34	-4.19	4.17
-21	38.77	40.38	42.05	-3.99	3.97
-20	36.93	38.39	39.90	-3.80	3.78
-19	35.18	36.51	37.87	-3.64	3.59
-18	33.53	34.74	35.97	-3.48	3.42
-17	31.96	33.06	34.17	-3.33	3.25
-16	30.48	31.47	32.49	-3.15	3.14
-15	29.07	29.97	30.89	-3.00	2.98
-14	27.73	28.56	29.39	-2.91	2.82
-13	26.46	27.22	27.98	-2.79	2.72
-12	25.26	25.95	26.64	-2.66	2.59
-11	24.11	24.75	25.38	-2.59	2.48
-10	23.03	23.61	24.19	-2.46	2.40
-9	21.99	22.53	23.06	-2.40	2.30
-8	21.01	21.51	22.00	-2.32	2.23
-7	20.08	20.54	20.99	-2.24	2.14
-6	19.19	19.62	20.04	-2.19	2.10
-5	18.35	18.74	19.14	-2.08	2.09
-4	17.55	17.92	18.29	-2.06	2.02
-3	16.78	17.13	17.48	-2.04	2.00
-2	16.06	16.38	16.71	-1.95	1.97
-1	15.36	15.67	15.98	-1.98	1.94
0	14.70	15.00	15.29	-2.00	1.90
1	14.08	14.36	14.64	-1.95	1.91
2	13.48	13.75	14.02	-1.96	1.93
3	12.91	13.17	13.43	-1.97	1.94
4	12.36	12.62	12.87	-2.06	1.94
5	11.85	12.09	12.34	-1.99	2.03
6	11.35	11.59	11.83	-2.07	2.03
7	10.88	11.11	11.35	-2.07	2.11
8	10.43	10.66	10.89	-2.16	2.11
9	9.999	10.230	10.450	-2.26	2.11
10	9.590	9.816	10.040	-2.30	2.23
11	9.199	9.422	9.647	-2.37	2.33
12	8.826	9.047	9.269	-2.44	2.40
13	8.470	8.689	8.910	-2.52	2.48
14	8.129	8.347	8.567	-2.61	2.57
15	7.804	8.021	8.240	-2.71	2.66
16	7.493	7.709	7.928	-2.80	2.76
17	7.196	7.412	7.630	-2.91	2.86
18	6.912	7.127	7.346	-3.02	2.98
19	6.640	6.855	7.074	-3.14	3.10
20	6.381	6.595	6.815	-3.24	3.23
21	6.132	6.347	6.567	-3.39	3.35
22	5.894	6.109	6.330	-3.52	3.49

13. SENSOR PARAMETER

T [°C]	Rmin [KΩ]	Rnom [KΩ]	Rmax [KΩ]	DR(MIN)%	DR(MAX)%
23	5.667	5.882	6.103	-3.66	3.62
24	5.449	5.664	5.886	-3.80	3.77
25	5.240	5.456	5.678	-3.96	3.91
26	5.048	5.260	5.478	-4.03	3.98
27	4.864	5.072	5.286	-4.10	4.05
28	4.687	4.891	5.101	-4.17	4.12
29	4.517	4.717	4.924	-4.24	4.20
30	4.355	4.550	4.753	-4.29	4.27
31	4.198	4.390	4.589	-4.37	4.34
32	4.048	4.236	4.431	-4.44	4.40
33	3.904	4.089	4.280	-4.52	4.46
34	3.766	3.946	4.134	-4.56	4.55
35	3.663	3.810	3.994	-3.86	4.61
36	3.506	3.679	3.859	-4.70	4.66
37	3.383	3.552	3.729	-4.76	4.75
38	3.265	3.431	3.604	-4.84	4.80
39	3.152	3.314	3.484	-4.89	4.88
40	3.043	3.202	3.368	-4.97	4.93
41	2.938	3.094	3.257	-5.04	5.00
42	2.838	2.990	3.149	-5.08	5.05
43	2.741	2.890	3.046	-5.16	5.12
44	2.648	2.793	2.946	-5.19	5.19
45	2.558	2.701	2.850	-5.29	5.23
46	2.472	2.611	2.758	-5.32	5.33
47	2.389	2.525	2.669	-5.39	5.40
48	2.309	2.443	2.583	-5.49	5.42
49	2.232	2.363	2.500	-5.54	5.48
50	2.158	2.286	2.421	-5.60	5.58
51	2.087	2.212	2.344	-5.65	5.63
52	2.018	2.140	2.269	-5.70	5.69
53	1.952	2.072	2.198	-5.79	5.73
54	1.888	2.005	2.129	-5.84	5.82
55	1.827	1.941	2.062	-5.87	5.87
56	1.767	1.880	1.998	-6.01	5.91
57	1.710	1.820	1.936	-6.04	5.99
58	1.655	1.763	1.876	-6.13	6.02
59	1.602	1.707	1.818	-6.15	6.11
60	1.551	1.654	1.762	-6.23	6.13
61	1.502	1.602	1.709	-6.24	6.26
62	1.452	1.553	1.657	-6.50	6.28
63	1.409	1.505	1.606	-6.38	6.29
64	1.364	1.458	1.558	-6.45	6.42
65	1.322	1.413	1.511	-6.44	6.49
66	1.280	1.370	1.466	-6.57	6.55
67	1.241	1.328	1.422	-6.55	6.61
68	1.202	1.288	1.379	-6.68	6.60
69	1.165	1.249	1.339	-6.73	6.72
70	1.129	1.211	1.299	-6.77	6.77
71	1.095	1.175	1.261	-6.81	6.82
72	1.061	1.140	1.224	-6.93	6.86
73	1.029	1.106	1.188	-6.96	6.90
74	0.9977	1.073	1.153	-7.02	6.94
75	0.9676	1.041	1.120	-7.05	7.05
76	0.9385	1.011	1.088	-7.17	7.08
77	0.9104	0.9810	1.056	-7.20	7.10
78	0.8833	0.9523	1.026	-7.25	7.18

13. SENSOR PARAMETER

T [°C]	Rmin [KΩ]	Rnom [KΩ]	Rmax [KΩ]	DR(MIN)%	DR(MAX)%
79	0.8570	0.9246	0.9971	-7.31	7.27
80	0.8316	0.8977	0.9687	-7.36	7.33
81	0.8071	0.8717	0.9412	-7.41	7.38
82	0.7834	0.8466	0.9146	-7.47	7.43
83	0.7604	0.8223	0.8888	-7.53	7.48
84	0.7382	0.7987	0.8639	-7.57	7.55
85	0.7167	0.7759	0.8397	-7.63	7.60
86	0.6958	0.7537	0.8161	-7.68	7.65
87	0.6755	0.7322	0.7933	-7.74	7.70
88	0.6560	0.7114	0.7712	-7.79	7.75
89	0.6371	0.6913	0.7498	-7.84	7.80
90	0.6188	0.6718	0.7291	-7.89	7.86
91	0.6011	0.6530	0.7051	-7.95	7.39
92	0.5840	0.6348	0.6897	-8.00	7.96
93	0.5674	0.6171	0.6709	-8.05	8.02
94	0.5514	0.6000	0.6527	-8.10	8.07
95	0.5359	0.5835	0.6350	-8.16	8.11
96	0.5209	0.5675	0.6179	-8.21	8.16
97	0.5064	0.5519	0.6014	-8.24	8.23
98	0.4923	0.5369	0.5853	-8.31	8.27
99	0.4787	0.5224	0.5698	-8.37	8.32
100	0.4655	0.5083	0.5547	-8.42	8.36
101	0.4528	0.4946	0.5401	-8.45	8.42
102	0.4404	0.4814	0.5259	-8.52	8.46
103	0.4284	0.4685	0.5121	-8.56	8.51
104	0.4168	0.4561	0.4988	-8.62	8.56
105	0.4056	0.4440	0.4859	-8.65	8.62
106	0.3947	0.4323	0.4733	-8.70	8.66
107	0.3841	0.4210	0.4611	-8.76	8.70
108	0.3739	0.4100	0.4493	-8.80	8.75
109	0.3640	0.3993	0.4379	-8.84	8.81
110	0.3544	0.3890	0.4267	-8.89	8.84
111	0.3450	0.3789	0.4159	-8.95	8.90
112	0.3360	0.3692	0.4055	-8.99	8.95
113	0.3272	0.3597	0.3953	-9.04	9.01
114	0.3187	0.3505	0.3854	-9.07	9.06
115	0.3104	0.3416	0.3758	-9.13	9.10
116	0.3024	0.3330	0.3665	-9.19	9.14
117	0.2947	0.3246	0.3574	-9.21	9.18
118	0.2871	0.3164	0.3468	-9.26	8.77
119	0.2798	0.3085	0.3401	-9.30	9.29
120	0.2727	0.3008	0.33	-9.34	9.34

14. TROUBLESHOOTING

14. Troubleshooting

14.1 Trouble guide

Troubleshooting for normal malfunction

Troubleshooting	Possible Reasons of Abnormality	How to Deal With
Air conditioner can not start up	<ol style="list-style-type: none"> 1. Power supply failure; 2. Trip of breaker or blow of fuse; 3. Power voltage is too low; 4. Improper setting of remote controller ; 5. Remote controller is short of power. 	<ol style="list-style-type: none"> 1. Check power supply circuit; 2. Measure insulation resistance to ground to see if there is any leakage; 3. Check if there is a defective contact or leak current in the power supply circuit; 4. Check and set remote controller again; 5. Change batteries.
The compressor starts or stops frequently	The air inlet and outlet has been blocked.	Remove block obstacles.
Poor cooling/heating	<ol style="list-style-type: none"> 1. The outdoor heat exchanger is dirty, such as condenser; 2. There are heating devices indoors; 3. The air tightness is not enough, and people come in and out too frequently; 4. Block of outdoor heat exchanger; 5. Improper setting of temperature. 	<ol style="list-style-type: none"> 1. Clean the heat exchanger of the outdoor unit, such as condenser ; 2. Remove heating devices; 3. Keep certain air tightness indoors; 4. Remove block obstacles; 5. Check and try to set temperature again.
Sound from deforming parts	During system starting or stopping, a sound might be heard. However, this is due to thermal deformation of plastic parts.	It is not abnormal, and the sound will disappear soon.
Water leakage	<ol style="list-style-type: none"> 1. Drainage pipe is blocked or broken; 2. Wrap of refrigerant pipe joint is not closed completely. 	<ol style="list-style-type: none"> 1. Change drainage pipe; 2. Re-wrap and make it tight.

Troubleshooting according to fault codes

When the air conditioner failure occurs, the fault code will display on the control board.

How to check fault codes

17.TROUBLESHOOTING

Outdoor unit

24K

DC-Inverter unitary (Main control board upside-down)

Fault code displayed by LED lamps on outdoor main control board.

There are 3 LED lamps on control board, LED1, LED2 and LED3.

LED1 indicates fault code represented by 2-digit number, LED2 indicates fault code represented by single digit number and LED3 indicates outdoor drive control fault.

When LED3 is off, LED1 and LED 2 indicate main control fault code.

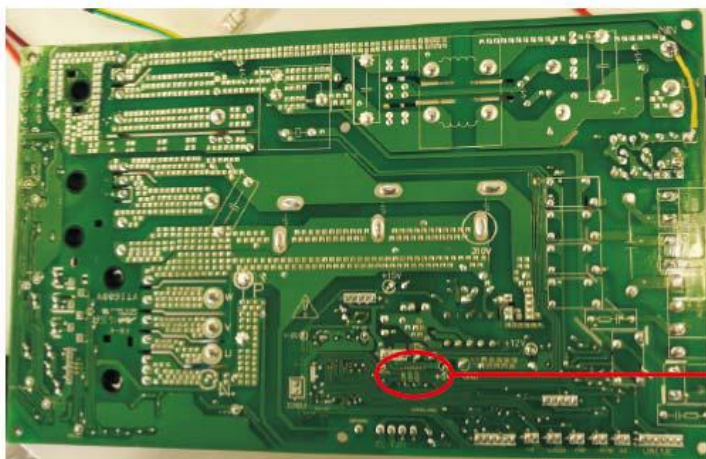
When LED3 is on, LED1 and LED 2 indicate drive control fault code.

When LED3 is flickering and LED1, LED 2 are all off, it indicates the compressor is preheating.

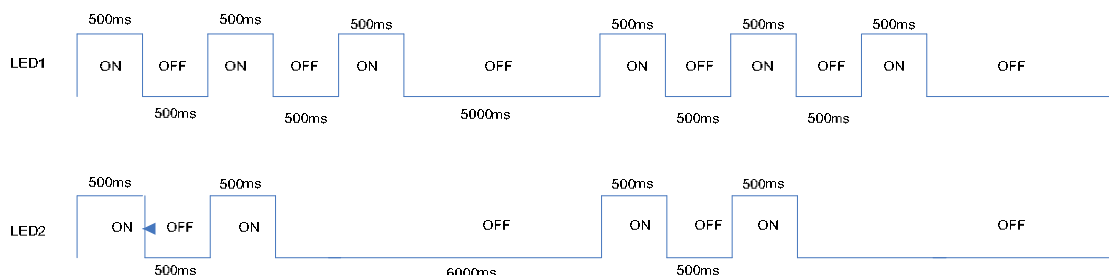
Failures display with 5s interval. It means LED will be off for 5s to report the next fault code.

System protection codes display method is the same with main control fault code.

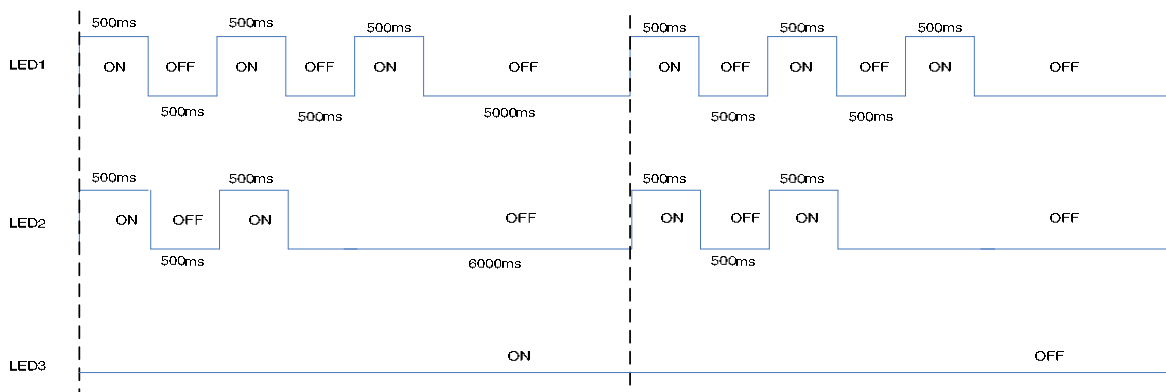
LED lamps will be off when there is no failure, protection or preheating.



For example, outdoor main control fault 32:



For example, outdoor drive fault 32:

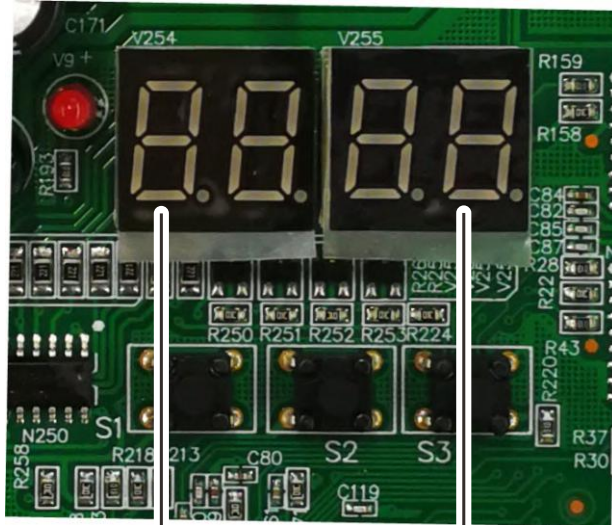


14.TROUBLESHOOTING

36K/60K

Main control fault display

Fault code will be displayed by 7 segment display on main control board.



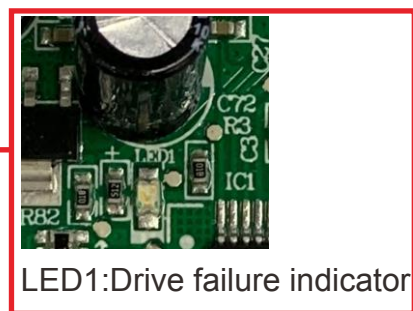
⏏ : Show failure occur.

Display ERROR code.

Drive fault code display

The lamp of drive board flashing shows failure occurs.

How many times the drive failure lamp flick will show the failure code.



LED1: Drive failure indicator

14. TROUBLESHOOTING

14.2 Fault codes

The following is the fault code table of outdoor units.

Table 1 Outdoor fault code

Fault code	Fault description	Possible reasons for abnormality	How to deal with	Remarks
1	Outdoor ambient temperature sensor fault	<ol style="list-style-type: none"> 1.The outdoor ambient temperature sensor is connected loosely; 2.The outdoor ambient temperature sensor fails to work; 3.The sampling circuit fails. 	<ol style="list-style-type: none"> 1.Reconnect the outdoor ambient temperature sensor; 2.Replace the outdoor ambient temperature sensor components; 3.Replace the outdoor control board components. 	
2	Outdoor coil temperature sensor fault	<ol style="list-style-type: none"> 1.The outdoor coil temperature sensor is connected loosely; 2.The outdoor coil temperature sensor fails to work; 3.The sampling circuit fails. 	<ol style="list-style-type: none"> 1.Reconnect the outdoor coil temperature sensor; 2.Replace the outdoor coil temperature sensor components; 3.Replace the outdoor control board components. 	
3	The unit over-current turn off fault	<ol style="list-style-type: none"> 1. Control board current sampling circuit fails; 2. The current is over high because the supply voltage is too low; 3. The compressor is blocked; 4. Overload in cooling mode; 5. Overload in heating mode. 	<ol style="list-style-type: none"> 1. Replace the electrical control board components; 2. Normal protection; 3. Replace the compressor; 4. Please see NOTE 3; 5. Please see NOTE 4. 	
4	EEProm Data error	<ol style="list-style-type: none"> 1.EE components fails; 2.EE components control circuit fails; 3.EE components are inserted incorrectly. 	<ol style="list-style-type: none"> 1.Replace the EE components; 2.Replace the outdoor control board components; 3.Reassemble the EE components. 	
5	Cooling freezing protection (the indoor coil temperature is too low) or heating overload (indoor coil temperature is too high)	<ol style="list-style-type: none"> 1.The indoor unit can not blow air normally; 2.The room temperature is too low in cooling mode or the room temperature is too high in heating; 3.The filter is dirty; 4.The duct resistance is too high to result in low air flow; 5.The setting fan speed is too low; 6.The indoor unit is not installed in accordance with the installation standards, and the air inlet is too close to the air outlet . 	<ol style="list-style-type: none"> 1.Check whether the indoor fan, indoor fan motor and evaporator work normally; 2.Normal protection; 3.Clean the filter; 4.Check the volume control valve, duct length etc.; 5.Set the speed with high speed; 6.Reinstall the indoor unit referring to the user manual to change the distance between the indoor unit and the wall or ceiling. 	
7	The communication fault between the indoor unit and outdoor unit	<ol style="list-style-type: none"> 1.The connection cable is connected improperly between the indoor unit and outdoor unit; 2.The communication cable is connected loosely; 3.The communication cable fails; 4.The indoor control board fails; 5.The outdoor control board fails; 6.Communication circuit fuse open; 7.The specification of communication cable is incorrect. 	<ol style="list-style-type: none"> 1.Reconnect the connection cable referring to the wiring diagram; 2.Reconnect the communication cable; 3.Replace the communication cable; 4.Replace the indoor control board; 5.Replace the outdoor control board; 6.Check the communication circuit, adjust the DIP switch and the short-circuit fuse; 7.Choose suitable communication cable referring to the user manual. 	

14. TROUBLESHOOTING

Fault code	Fault description	Possible reasons for abnormality	How to deal with	Remarks
13	Compressor overheat protector device	<ol style="list-style-type: none"> 1. The wiring of the overload protector is connected loosely. 2. The overload protector fails . 3. The refrigerant is not enough; 4. The installation pipe is much longer than the normal one, but extra refrigerant is not added ; 5. The expansion valve fails; 6. The outdoor control board fails. 	<ol style="list-style-type: none"> 1. Reconnect the wiring of the overload protector; 2. Replace the overload protector; 3. Check the welding point of the unit to confirm whether it is leakage, and then recharge the refrigerant; 4. Add the refrigerant; 5. Replace expansion valve; 6. Replace the outdoor control board. 	
14	The high pressure switch operation or the unit is turned off for high pressure protection	<ol style="list-style-type: none"> 1.The wiring of the high pressure protector is connected loosely; 2.The high pressure protector fails; 3.The outdoor control board is abnormal; 4. Overload in cooling; 5. Overload in heating. 	<ol style="list-style-type: none"> 1. Reconnect the wiring of the high pressure protector; 2. Replace the high pressure protector; 3. Replace the outdoor control board; 4. Please refer to NOTE 3; 5. Please refer to NOTE 4. 	Applied to models with high pressure switch or pressure sensor
15	The low pressure switch protection or the unit is turned off for low pressure protection	<ol style="list-style-type: none"> 1. The wiring of the low pressure switch is connected loosely; 2. The low pressure switch fails; 3. The refrigerant is not enough; 4. The expansion valve fails in heating mode; 5. The outdoor control board is abnormal. 	<ol style="list-style-type: none"> 1. Reconnect the wiring of the low pressure switch; 2. Replace the low pressure switch; 3. Check the welding point to confirm whether the unit leaks, and add some refrigerant; 4. Replace the expansion valve; 5. Replace the outdoor control board. 	Applied to models with low pressure switch or pressure sensor
16	Overload protection in cooling mode	System overload	Please refer to NOTE 3.	
17	Discharge temperature sensor fault	<ol style="list-style-type: none"> 1.The wiring of the discharge temperature sensor is connected loosely; 2. The discharge temperature sensor fails; 3.The sampling circuit is abnormal. 	<ol style="list-style-type: none"> 1. Reconnect the wiring of the discharge temperature sensor; 2. Replace the discharge temperature sensor; 3. Replace the outdoor control board. 	
18	AC voltage is abnormal	<ol style="list-style-type: none"> 1.The AC voltage>275V or <160V; 2.The AC voltage of sampling circuit on the driver board is abnormal. 	<ol style="list-style-type: none"> 1. Normal protection, please check the supply power; 2. Replace the driver board. 	
19	Suction temperature sensor fault	<ol style="list-style-type: none"> 1.The wiring of the suction temperature sensor is connected loosely; 2.The suction temperature sensor fails; 3.The sampling circuit is abnormal. 	<ol style="list-style-type: none"> 1.Reconnect the wiring of the suction temperature sensor; 2.Replace the suction temperature sensor; 3.Replace the outdoor control board. 	
22	The defrosting sensor fault	<ol style="list-style-type: none"> 1.The wiring of the defrosting sensor is connected loosely; 2.The defrosting sensor fails; 3.The sampling circuit is abnormal. 	<ol style="list-style-type: none"> 1. Reconnect the wiring of the defrosting sensor; 2. Replace the defrosting sensor; 3. Replace the outdoor control board. 	
43	High Pressure sensor fault	<ol style="list-style-type: none"> 1. The wiring of the high-pressure pressure sensor connect is loose; 2. The high-pressure pressure sensor fails; 3. The sampling circuit of the high-pressure pressure sensor fails. 	<ol style="list-style-type: none"> 1. Reconnect the wiring of the high-pressure pressure sensor; 2. Replace the high-pressure pressure sensor; 3. Replace the outdoor control board. 	

14. TROUBLESHOOTING

Fault code	Fault description	Possible reasons for abnormality	How to deal with	Remarks
45	IPM fault	There are many reasons for this failure. You can check the driver board fault LED to further analyze the fault code of the drive board and to learn about what leads to the fault and how to operate it. Specific information can be seen in table 5, table 6.	See attached "analysis of the driving board fault".	
46	IPM and control board communication fault	<ol style="list-style-type: none"> 1.The cable between the control board and the driver board is connected loosely; 2.The cable between the control board and the driver board fails; 3.The driver board fails ; 4.The control board fails. 	<ol style="list-style-type: none"> 1.Reconnect the cable between the control board and the driver board; 2.Replace the communication cable between the control board and the driver board; 3.Replace the driver board; 4.Replace the control board. 	
47	Too high discharge temperature fault	<ol style="list-style-type: none"> 1. The refrigerant of the unit is not enough; 2.The refrigerant of the unit is not enough due to that the installation pipe is longer; 3.Throttling service fails; 4.The outdoor ambient temperature is too high. 	<ol style="list-style-type: none"> 1.Check the welding point to confirm whether the unit has leakage point, and then add some refrigerant; 2.Add some refrigerant referring to the installation user manual; 3.Replace the throttling service (such as capillary, expansion valve); 4.Normal protection. 	
48	The outdoor DC fan motor fault (upper fan motor)	<ol style="list-style-type: none"> 1.The connecting wiring of the up DC fan motor is loose; 2.The cord of the upper DC fan motor fails; 3.The upper DC fan motor fails; 4.The drive circuit of the upper DC fan motor fails; 5.The outdoor fan has been blocked. 	<ol style="list-style-type: none"> 1.Reconnect the wiring of the up DC fan motor; 2.Replace the upper DC fan motor; 3.Replace the upper DC fan motor; 4.Replace the driver board of the fan motor; 5.Check the outdoor fan and ensure the outdoor fan can run normally. 	
49	The outdoor DC fan motor fault (down fan motor)	<ol style="list-style-type: none"> 1.The connecting wiring of the down DC fan motor is loose; 2.The cord of the down DC fan motor fails; 3. The down DC fan motor fails; 4. The drive circuit of the down DC fan motor fails; 5. The outdoor fan has been blocked. 	<ol style="list-style-type: none"> 1. Reconnect the wiring of the down DC fan motor; 2. Replace the down DC fan motor; 3. Replace the down DC fan motor; 4. Replace the driver board of the fan motor; 5. Check the outdoor fan and ensure the outdoor fan can run normally. 	
91	The unit turn off due to the IPM board over heating fault	<ol style="list-style-type: none"> 1. The outdoor ambient temp. is too high; 2. The speed of the out fan motor is too low if the fan motor is AC fan motor; 3. The outdoor unit is not installed in accordance with the standard; 4.The supply power is too low. 	<ol style="list-style-type: none"> 1. Normal protection; 2. Check the fan capacitor, and replace the fan capacitor if it is a failure; 3. Reinstalled the outdoor unit referring to the installation user manual; 4. Normal protection. 	
96	Lacking of refrigerant	The refrigerant of the unit is not enough.	Discharge the refrigerant and charge the refrigerant referring to the rating label.	
97	4-way valve commutation failure fault	<ol style="list-style-type: none"> 1.The connecting wiring of the 4-way valve coil is loose; 2.The 4-way valve coil fails; 3.The 4-way valve fails; 4.The driver board of the 4-way valve fails. 	<ol style="list-style-type: none"> 1. Reconnect the wiring of the 4-way valve; 2. Replace the 4-way valve coil; 3. Replace the 4-way valve; 4. Replace the driver board of the way valve. 	

14. TROUBLESHOOTING

NOTE 1:

If the indoor unit can not start or the indoor unit stops itself after 30s, at the same time the unit does not display the fault code, please check the fire and the socket of the control board.

NOTE 2:

If the indoor unit displays the 75,76,77,78 fault code after you turn on the unit, please check the TEST seat of the indoor control board or the TEST detection circuit to see whether short circuit occurs.

NOTE 3: Overload in cooling mode

Overload in cooling mode		
sr.	The root cause	Corrective measure
1	The refrigerant is excessive.	Discharge the refrigerant, and recharge the refrigerant referring to the rating label.
2	The outdoor ambient temperature is too high.	Please use within allowable temperature range
3	Short-circuit occurs in the air outlet and air inlet of the outdoor unit.	Adjust the installation of the outdoor unit referring to the user manual.
4	The outdoor heat exchanger is dirty, such as condenser.	Clean the heat exchanger of the outdoor unit, such as condenser.
5	The speed of the outdoor fan motor is too low.	Check the outdoor fan motor and fan capacitor.
6	The outdoor fan is broken or the outdoor fan is blocked.	Check the outdoor fan.
7	The air inlet and outlet has been blocked.	Remove the obstructions.
8	The expansion valve or the capillary fails.	Replace the expansion valve or the capillary.

NOTE 4: Over load in heating mode

Overload in heating mode		
sr.	The root cause	Corrective measures
1	The refrigerant is excessive.	Discharge the refrigerant, and recharge the refrigerant referring to the rating label.
2	The indoor ambient temperature is too high.	Please use it within allowable temperature range.
3	Short-circuit occurs in the air outlet and air inlet of the indoor unit.	Adjust the installation of the indoor unit referring to the user manual.
4	The indoor filter is dirty.	Clean the indoor filter.
5	The speed of the indoor fan motor is too low.	Check the indoor fan motor and fan capacitor.
6	The indoor fan is broken or the outdoor fan is blocked.	Check the indoor fan.
7	The air inlet and outlet has been blocked.	Remove the obstructions.
8	The expansion valve or the capillary fails.	Replace the expansion valve or the capillary.

17. TROUBLESHOOTING

Table 2 Drive fault code (24K)

Fault code	Fault description	Possible reasons for abnormality	How to deal with
1	Inverter DC voltage overload fault	1. Power supply input is too high or too low; 2. Driver board fault.	1. Check power supply; 2. Change driver board.
2	Inverter DC low voltage fault		
3	Inverter AC current overload fault		
4	Out-of-step detection	1. Compressor phase lost ; 2. Bad driver board components ; 3. The compressor insulation fault.	1. Check compressor wire connection; 2. Change the driver board; 3. Change compressor.
5	Loss phase detection fault (speed pulsation)		
6	Loss phase detection fault (current imbalance)		
7	Inverter IPM fault (edge)	1. System overload or current overload; 2. Driver board fault; 3. Compressor oil shortage, serious wear of crankshaft ; 4. The compressor insulation fault.	1. Check the system. 2. Change the driver board; 3. Change the compressor; 4. Change the compressor.
8	Inverter IPM fault (level)		
9	PFC_IPM IPM fault (edge)		
10	PFC_IPM IPM fault (level)		
11	PFC power detection of failure	1. The power supply is not stable; 2. Instantaneous power off; 3. Driver board failure.	1. Check the power supply. 2. No need to deal with. 3. Change the driver board.
12	PFC overload current detection of failure.	1. System overload, current is too high; 2. Driver board fails; 3. PFC fails.	1. Check the system; 2. Change the driver board; 3. Change the PFC.
13	DC voltage detected abnormal .	1. Input voltage is too high or too low; 2. Driver board fails.	1. Check the power supply; 2. Change the driver board.
14	PFC LOW voltage detected failure.		
15	AD offset abnormal detected failure.	Driver board fails.	Change the driver board.
16	Inverter PWM logic set fault.		
17	Inverter PWM initialization failure		
18	PFC_PWM logic set fault.		
19	PFC_PWM initialization fault.		
20	Temperature abnormal.		
21	Shunt resistance unbalance adjustment fault		
22	Communication failure.	1. Communication wire connection is not proper; 2. Driver board fails; 3. Control board fails.	1. Check the wiring; 2. Change the driver board; 3. Change the control board.
23	Motor parameters setting of failure	Initialization is abnormal.	Reset the power supply.
26	DC voltage mutation error	1. Power input changes suddenly 2. Driver board fails.	1. Check power supply, to provide stable power supply; 2. Change driver board.
27	D axis current control error	1. System overload, phase current is too high; 2. Driver board fails.	1. Check system to see if it works normally. 2. Check stop valve to see if it is open; 3. Change the driver board.
28	Q axis current control error	1. System overloads, phase current is too high ; 2. Driver board fails.	1. Check system to see if it works normally. 2. Check stop valve to see if it is open; 3. Change the driver board.
29	Saturation error of d axis current control integral	1. System overload suddenly; 2. Compressor parameter is not suitable; 3. Driver board fails.	1. Check system to see if it works normally. 2. Check stop valve to see if it is open; 3. Change the driver board.
30	Saturation error of q axis current control integral	1. System overload suddenly; 2. Compressor parameter is not suitable; 3. Driver board fails.	1. Check system to see if it works normally. 2. Check stop valve to see if it is open; 3. Change the driver board.
35	EE data abnormal	Driver board EEPROM is abnormal	1. Change EEPROM ; 2. Change the driver board.

14. TROUBLESHOOTING

Table 3 Drive fault code (36K/60K)

Fault code	Fault description	Possible reasons for abnormality	How to deal with
1	Q axis current detection, failure in drive control	1. Compressor wire is not connected properly; 2. Bad driver board components; 3. Compressor start load is too large; 4. Compressor demagnetization; 5. Compress or oil shortage serious wear of crankshaft; 6. The compressor insulation fails.	1. Check the wire of the compressor; 2. Change the driver board ; 3. Turn on the machine after the pressure is balanced again; 4. Change the compressor; 5. Change the compressor; 6. Change the compressor.
2	Phase current detection, failure in drive control	1.Compressor voltage default phase; 2.Bad driver board components; 3.The compressor insulation fault.	1.Check compressor wire connection; 2.Change the driver board; 3.Change the compressor.
3	Initialization, phase current imbalance	Bad driver board components.	Change the driver board .
4	Speed estimation, failure in drive control	1.Bad driver board components; 2.Compressor shaft clamping; 3.The compressor insulation fails.	1.Change the driver board ; 2.Change the compressor ; 3.Change the compressor .
5	IPM FO output fault	1. System overload or current overload. 2. Driver board fails; 3. Compressor oil shortage,serious wear of crankshaft; 4. The compressor insulation fault.	1.Check the air conditioner system; 2.Change the driver board; 3.Change the compressor; 4. Change the compressor.
6	Communication between driver board and control board fault	1.Communication wire is not connected well; 2. Driver board fault; 3. Control board fault;	1. Check compressor wire connection. 2. Change the driver board; 3. Change the control board ;
7	AC voltage,overload voltage	1. Supply voltage input is too high or too low; 2. Driver board fails;	1.Check power supply; 2.Change the driver board;
8	DC voltage,overload voltage	1. Supply voltage input is too high ; 2. Driver board fault;	1. Check power supply; 2. Change the driver board;
9	AC voltage imbalance	Driver board fails;	Change the driver board;
10	The PFC current detection circuit fault before compressor is ON	Bad driver board components;	Change the driver board
11	AC voltage supply in outrange	1.Power supply abnormal, power frequency out of range; 2.Driver board fails;	1. Check the system; 2. Change the driver board;
12	Products of single-phase PFC over-current, FO output low level	1. System overload, current is too large; 2. Driver board fault; 3. PFC fault.	1. Check the system; 2. Change the driver board; 3. Change PFC.
	Inverter over current (3-phase power supply air conditioners)	1. System overload, current is too large; 2. Driver board fault; 3. Compressor oil shortage, serious wear of crankshaft; 4. The compressor insulation fault.	1. Check the system; 2. Change the driver board; 3. Change the compressor; 4. Change the compressor.
13	Inverter over current	1. System overload, current is too large; 2. Driver board fault; 3. Compressor oil shortage,serious wear of crankshaft; 4. The compressor insulation fault.	1. Check the system; 2. Change the driver board; 3. Change the compressor; 4. Change the compressor.
14	PFC over current(single-phase air-conditioner)	1. System overload, current is too large; 2. Driver board fault; 3. PFC fault.	1. Check the system; 2. Change the driver board; 3. Change PFC.
	Phase imbalance or phase lacks or the instantaneous power failure (only for 3-phase power supply air conditioners)	1.3-Phase voltage imbalance; 2.The 3-phase power supply phase lost; 3. Power supply wiring is wrong; 4. Driver board fault.	1, Check the power supply; 2. Check the power supply; 3. Check the power supply wiring connection; 4. Change the driver board.
15	The instantaneous power off detection	1.The power supply is not stable ; 2.The instantaneous power failure ; 3.Driver board fault;	1. Check the power supply; 2. Not fault; 3. Change the driver board.

14. TROUBLESHOOTING

Fault code	Fault description	Possible reasons for abnormality	How to deal with
16	Low DC voltage 200V	1. Voltage input is too low; 2. Drive board fault.	1. Check the power supply. 2. Change the driver board.
18	Driver board read EE data error	1. EEPROM has no data or data error; 2. EEPROM circuit fault.	1. Change EEPROM component; 2. Change the driver board.
19	PFC chip receives data fault	Abnormal communication loop.	Change the drive board.
20	PFC soft start abnormally	Abnormal PFC drive loop.	Change the drive board.
21	The compressor drive chip could not receive data from PFC chip.	Communication loop fault.	Change the drive board.

15. CHECKING COMPONENTS

15. Checking components

15.1 Check refrigerant system

TEST SYSTEM FLOW

Conditions: ① Compressor is running.

② The air condition should be installed in good ventilation.

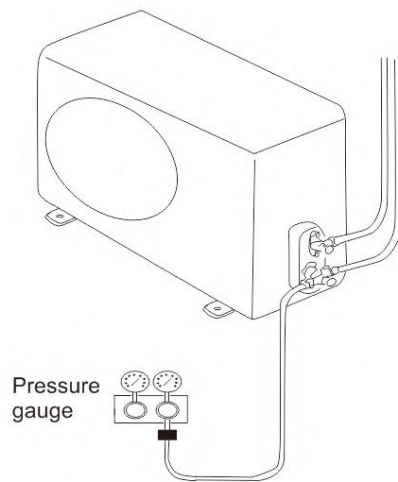
Tool: Pressure Gauge

Technique: ① see ② feel ③ test

See ----- Tube defrost.

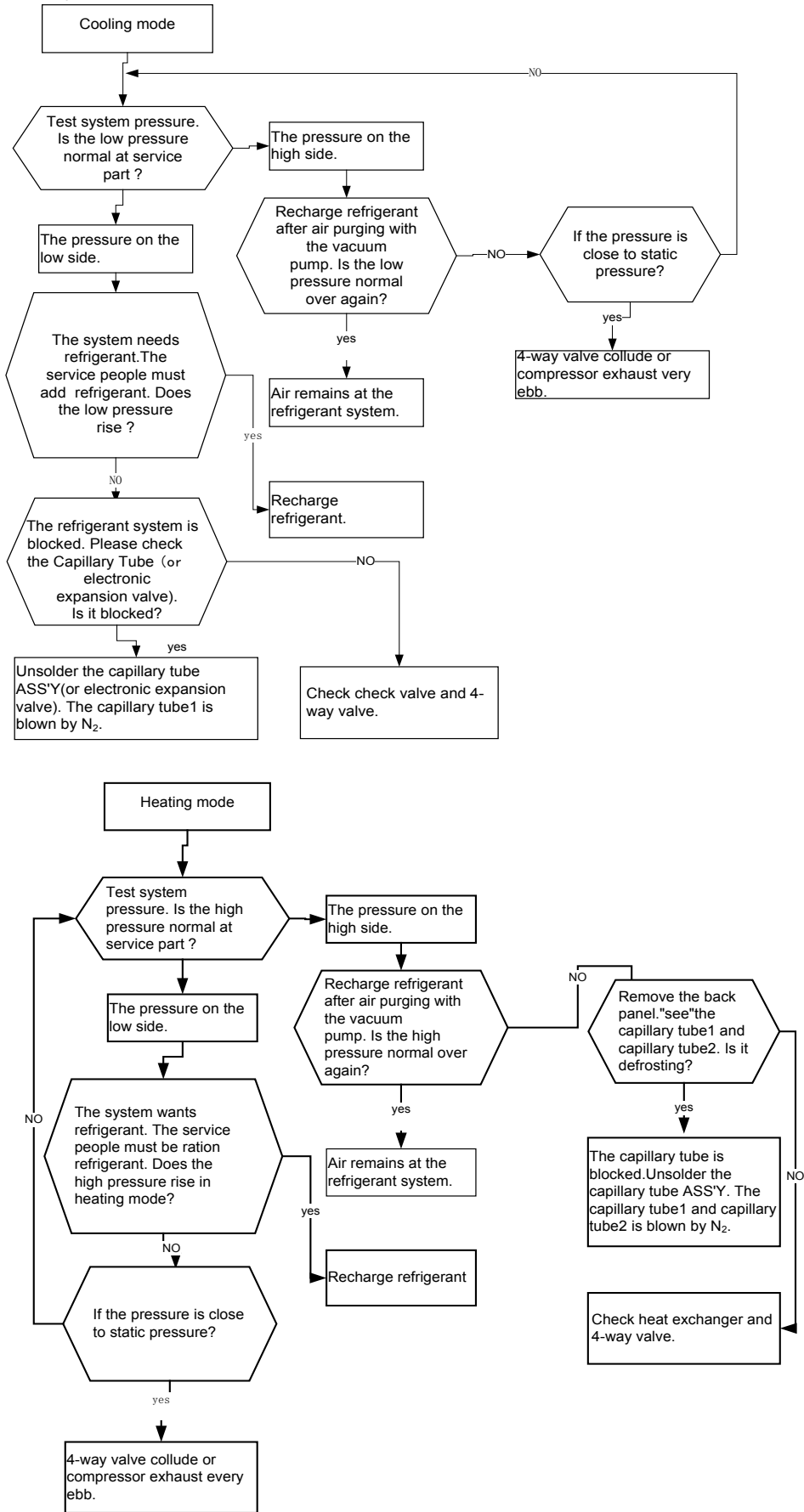
Feel ----- The difference between the temperature of tubes.

Test ----- Test pressure.



15. CHECKING COMPONENTS

Test system flow



15. CHECKING COMPONENTS

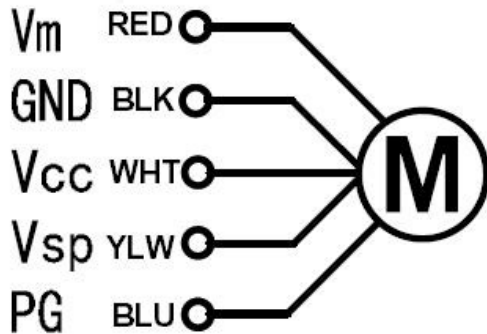
15.2 Check parts unit

1. Outdoor unit fan motor

DC motor

24K: ZWK511A805001

36K/60K: SIC-71FW-F8121-1

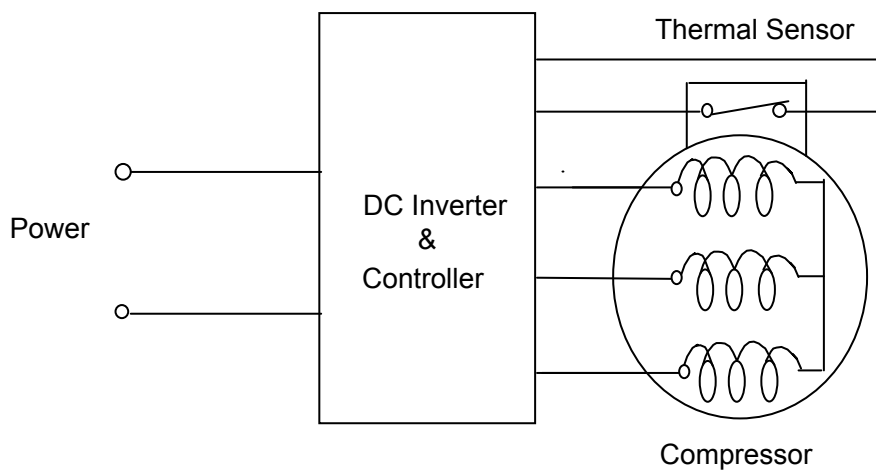


2. Compressor

Compressor examination and repairing

24K/36K: EATF250D22UMT

60K: EATF400D64UMTA



Test in resistance.

TOOL: Multi-meter.

Test the resistance of the winding. The compressor fails if the resistance of winding is 0 (short circuit) or ∞ (open circuit).

Familiar error:

- 1) Compressor motor lock.
- 2) Discharge pressure value approaches static pressure value.
- 3) Compressor motor winding abnormality.

15. CHECKING COMPONENTS

NOTES:

- 1) Don't put a compressor on its side or turn over.
- 2) Please assemble the compressor in your air conditioner rapidly after removing the plugs.
Don't place the comp. in air for a long time.
- 3) Avoid compressor running in reverse caused by connecting electrical wire incorrectly.
- 4) Warning! In case AC voltage is impressed to compressor, the compressor performance will decrease because of its rotor magnetic force decreasing.

3. Inductance

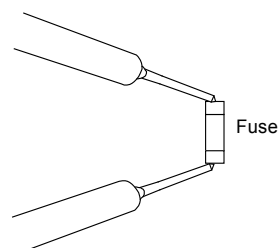
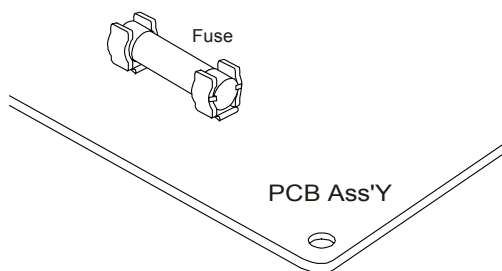
Familiar error:

- 1) Sound abnormality
- 2) Insulation resistance disqualification.

4. Fuse

Check for continuity of fuse on PCB ASS'Y.



Remove the PCB ASS'Y from the electrical component box. Then pull out the fuse from the PCB ASS'Y. Check for continuity by a multimeter as shown below.



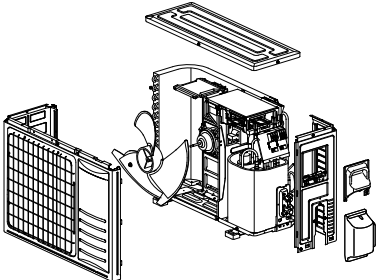
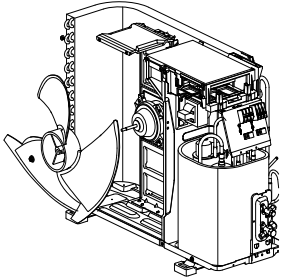
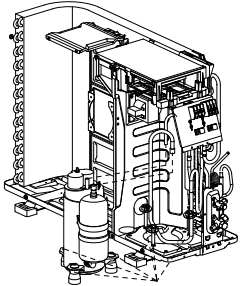
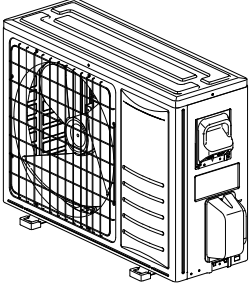
16. DISASSEMBLY AND ASSEMBLY FOR COMPRESSOR AND MOTOR

16. Disassembly and assembly for compressor and motor

The special tools for compressor & motor disassembly and assembly:

	Tool
1	Hexagon Screwdriver 
2	Hexagon Socket 

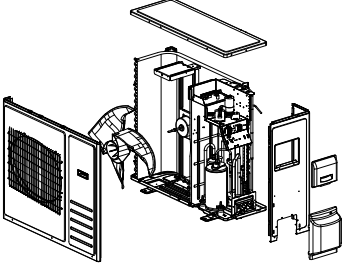
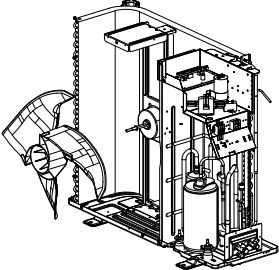
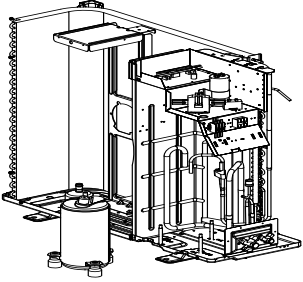
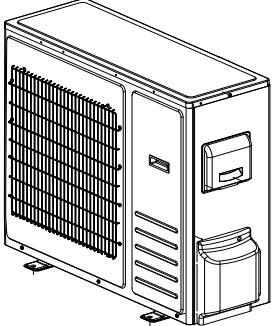
Outdoor unit 24K

Important: Before disassembly and assembly, make sure that the power to the system has been disconnected and verified as voltage free.		
Step	Illustration	Handling Instruction
1. Remove external casing		<ol style="list-style-type: none"> 1. Remove the top cover, handle and valve cover; 2. Remove the outer case and right side plate.
2. Remove motor		<ol style="list-style-type: none"> 1. Remove the blade nut and then remove the blade; 2. Remove the motor from motor supporter.
3. Remove compressor		<ol style="list-style-type: none"> 1. Reclaim the refrigerant from the entire system; 2. Unsolder the 4-way valve piping assy from compressor; 3. Remove the compressor mounting bolts; 4. Carefully remove the compressor from chassis.
4. Assemble unit		Assemble the unit in the reverse order of disassembly.

16. DISASSEMBLY AND ASSEMBLY FOR COMPRESSOR AND MOTOR

Outdoor unit 36K

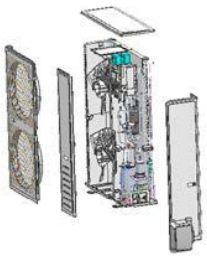
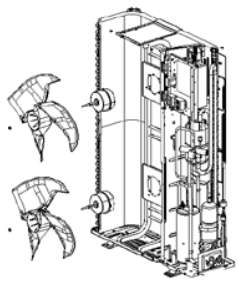
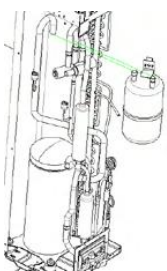
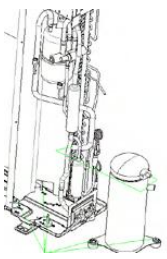
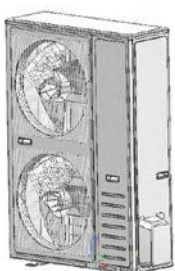
Important: Before disassembly and assembly, make sure that the power to the system has been disconnected and verified as voltage free.

Step	Illustration	Handling Instruction
1. Remove external casing		<ol style="list-style-type: none"> 1. Remove the top cover, handle and valve cover; 2. Remove the outer case and right side plate.
2. Remove motor		<ol style="list-style-type: none"> 1. Remove the blade nut and then remove the blade; 2. Remove the motor from motor supporter.
3. Remove compressor		<ol style="list-style-type: none"> 1. Reclaim the refrigerant from the entire system; 2. Unsolder the 4-way valve piping assy from compressor; 3. Remove the compressor mounting bolts; 4. Carefully remove the compressor from chassis.
4. Assemble unit		<p>Assemble the unit in the reverse order of disassembly.</p>

16. DISASSEMBLY AND ASSEMBLY FOR COMPRESSOR AND MOTOR

Outdoor unit 60K

Important: Before disassembly and assembly, make sure that the power to the system has been disconnected and verified as voltage free.

Step	Illustration	Handling Instruction
1. Remove external casing		<ol style="list-style-type: none"> 1. Remove the top cover, handle and valve cover. 2. Remove the outer case and Right side plate.
2. Remove motor		<ol style="list-style-type: none"> 1. Remove the blade nut and then remove the blade. 2. Remove the motor from motor supporter.
3. Remove gas liquid separator		<ol style="list-style-type: none"> 1. Reclaim the refrigerant from the entire system. 2. Unsolder the 4-way valve piping assy from gas liquid separator. 3. Remove the gas liquid separator.
4. Remove compressor		<ol style="list-style-type: none"> 1. Reclaim the refrigerant from the entire system. 2. Unsolder the 4-way valve piping assy from compressor. 3. Remove the compressor mounting bolts. 4. Carefully remove the
5. Assemble unit		<p>Assemble the unit in the reverse order of disassembly.</p>

17. CONTORL LOGIC DESCRIPTION

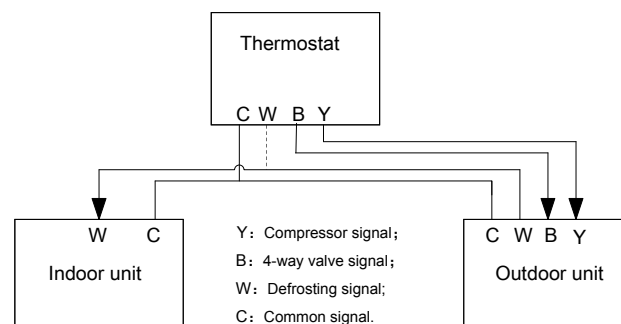
17. Control logic description

17.1 An illustration to outdoor unit signal

(1) Communication between indoor and outdoor units:

The communication between the outdoor unit, thermostat and the indoor unit is achieved through 24V alternating current, as shown in figure below.

The thermostat controls the signal output of Y and B, and the outdoor unit identifies its operation mode according to these two signals. If Y-C is high level, the outdoor unit starts in cooling mode; if both Y-C and B-C are high level, the outdoor unit starts in heating mode. When the outdoor unit meets its defrosting conditions in heating mode, W-C is high level, and when it exits from defrosting function, W-C is low level.



17.2 Cooling Mode

(1) Start conditions:

When high level compressor signal and low level 4-way valve signal are received from the thermostat, that is Y-C is high level and B-C is low level.

(2) Stopping operating :

① Stopping conditions:

When low level compressor signal is received from the thermostat, that is Y-C is low level.

② Actions:

The compressor keeps operating with its current frequency, and detects its system pressure at the same time.

(a) If the pressure changes more than 0.04MPa **【e2】** in 10 seconds, the compressor stops operating.

(b) If the pressure changes less than 0.04MPa **【e2】** in 10 seconds, the compressor keeps operating and the target pressure is set to increase by 0.2MPa **【e2】** based on the current system pressure. The motor and electronic expansion valve are controlled as usual, the protection function and oil-return control are valid.

③ Stopping conditions:

When the compressor signal received from the thermostat is high level and 4-way valve signal is low level, that is Y-C is high level and B-C is low level, the unit restores the normal target pressure to operate or when the compressor has operated for 30min **【e2】** with the increased target pressure, it is taken as it has stopped operating.

17. CONTORL LOGIC DESCRIPTION

Compressor running rules:

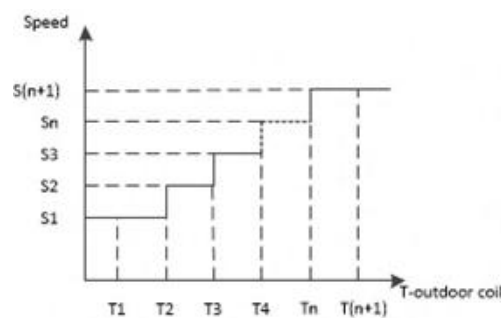
When the unit starts up in cooling mode, the compressor starts to work, and adjust its operating frequency according to the system target pressure and the actual pressure. If the actual pressure is higher than the target pressure, the compressor frequency will rise; if the actual pressure is lower than the target pressure, the compressor frequency decreases; when the target pressure is reached, the compressor frequency will keep stable.

Outdoor fan running rules:

Once the outdoor fan starts up, it will follow the rules below:

Single outdoor fan: First, it will run in an invariable speed for a short time; Then it will regulate the speed by the outdoor-coil temperature.

Double outdoor fan: If it has two outdoor fans, the upper fan regulates the speed by the rules, and the downer fan speed is lower than the upper fan speed for 30rpm~60rpm.



17.3 Heating Mode

(1) Start conditions:

When high level compressor signal and high level 4-way valve signal are received from the thermostat, that is both Y-C and B-C are low level.

(2) Stopping operating in heating mode:

① Stopping conditions:

When low level compressor signal and low level 4-way valve signal are received from the thermostat, that is both Y-C and B-C are low level.

② Stopping actions:

The compressor keeps operating with its current frequency, and detects its system pressure at the same time.

(a) If the pressure keeps 3.6 MPa **【e2】** or more for 10 seconds, or it changes more than 0.1 MPa **【e2】** in 10 seconds, the compressor stops operating

(b) If the pressure changes less than 0.1MPa **【e2】** in 10 seconds, the compressor keeps operating and the target pressure is set to decrease by 0.3MPa **【e2】** based on the current system pressure. The motor and electronic expansion valve are controlled as usual, the protection function and oil-return control are valid.

17. CONTORL LOGIC DESCRIPTION

③ When the compressor signal and 4-way valve signal received from the thermostat are high level, that is Y-C and B-C are high level, the unit restores the normal target pressure to operate or when the compressor has operated for 30min 【e2】 with the decreased target pressure, it is taken as it has stopped operating.

Compressor running rules:

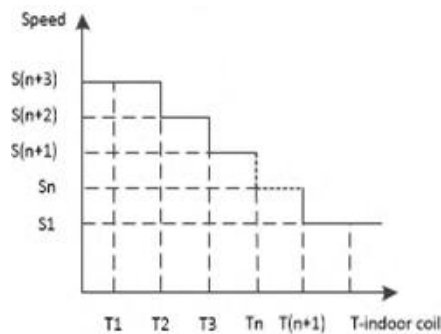
When the unit starts up in heating mode, the compressor starts to work, and adjust its operating frequency according to the system target pressure and the actual pressure. If the actual pressure is higher than the target pressure, the compressor frequency will decrease; if the actual pressure is lower than the target pressure, the compressor frequency increases; when the target pressure is reached, the compressor frequency will keep stable.

Outdoor fan running rules:

Once the outdoor fan starts up, it will follow the rules below:

Single outdoor fan: First, it will run in an invariable speed for a short time; Then it will regulate the speed by the saturation temperature (which is got from high pressure cycling)

Double outdoor fan: If it has two outdoor fans, the upper fan regulates the speed by the rules, and the downer fan speed is lower than the upper fan speed for 30rpm~60rpm.

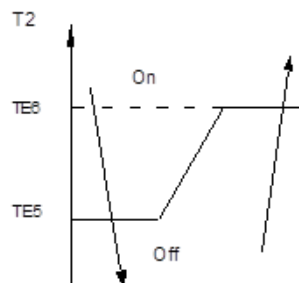


17.4 Evaporator Low-temperature Protection

DC-Inverter

AC will enter T2 protection if any of the following condition is satisfied.

Condition:



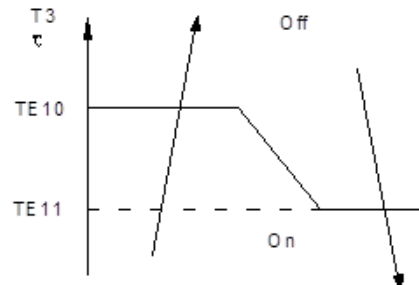
Cooling mode: When the saturation temperature (which is got from low pressure cycling) T2 keeps lower than TE5 for 120 seconds, the compressor and outdoor fan will shut off. When T2 is higher than TE6, the compressor and outdoor fan will restart up.

17. CONTORL LOGIC DESCRIPTION

17.5 Condenser High-temperature Protection

DC-Inverter outdoor unit

AC will enter T3 protection if any of the following conditions is satisfied.



Condition1:

Cooling mode: When the outdoor coil temp. T3 keeps higher than T2 for 10 seconds, the compressor and outdoor fan will shut off. When T3 is lower than T1, the compressor and outdoor fan will restart up.

Condition2:

Heating mode: When the saturation temperature (which is got from high pressure cycling) T3 keeps higher than T2 for 10 seconds, the compressor and outdoor fan will shut off. When T3 is lower than T1, the compressor and outdoor fan will restart up.

Product improvement, specifications and appearance in this manual are subject to change without prior notice.