HOKKAIDO

MULTI SPLIT TYPE, HEAT PUMP AIR CONDITIONERS

Technical service manual 2009

R410A R DC Inverter multi Series

Indoor Models

HKEU 261 XR

HKEU 351 XR

HKEU 531 XR

Outdoor Models

HCNU 401 X2R

HCNU 531 X2R

HCNU 601 X3R

CONTENT

Sommario

1. Product features

Indoor unit

- **Operation by remote controller**
- **Sensing by room temperature**

  Room temperature sensor.
  Pipe temperature sensor.
- **Room temperature control**

  Maintain the room temperature in accordance w
  ith the setting temperature.
- **Anti-freezing control in cooling**

  Prevent the water being frozen on evaporator by sensing the evaporator pipe temperature in cooling mode
- **Time Delay Safety control**

  Restarting is for approx. 3 minutes..
- **Indoor fan speed control**

  high, med, low, breeze.
- **Two-direction air vane**

  The unit will decide the louver direction according to operation mode.
- **Sleep mode auto control**

  The fan is turn to low speed (cooling/heating).
  The unit will be turn off at the seventh hour.
- **Independent dehumidification**

  The function is usually used in rainy days in springtime or damp areas.
- **Air flow Direction control**

  The louver can be set at the desired position or swing up and down automatically
- **Auto mode**

  The mode can be change by the room temperature.
- **Temp. Compensation**
- **Tele Remote control (Optional)**
- **Self-diag. function**
- **Anti-cold function**

  Prevent the cold wind at the beginning of unit start.
- **Auto defrost**
- **Auto-restart function**

  When the power supply is interrupted and then restore, the air conditioners automatically restore the previous function setting.
- **Flexible wiring connection**

Outdoor unit

Power relay control

The unit has 3 mins delay between continuously ON/OFF operations.

Low noise air flow system

Bird tail propeller fan makes the outdoor unit run more quietly.

Hydrophilic aluminum fin

The hydrophilic fin can improve the heating efficiency at operation mode.

4 way valve control

It is only operated in the heating operation mode except defrosting operation.

Anti-rust cabinet

Made from electrolytic zinc steel sheet and anti-rust coated components.

Valve protection cover

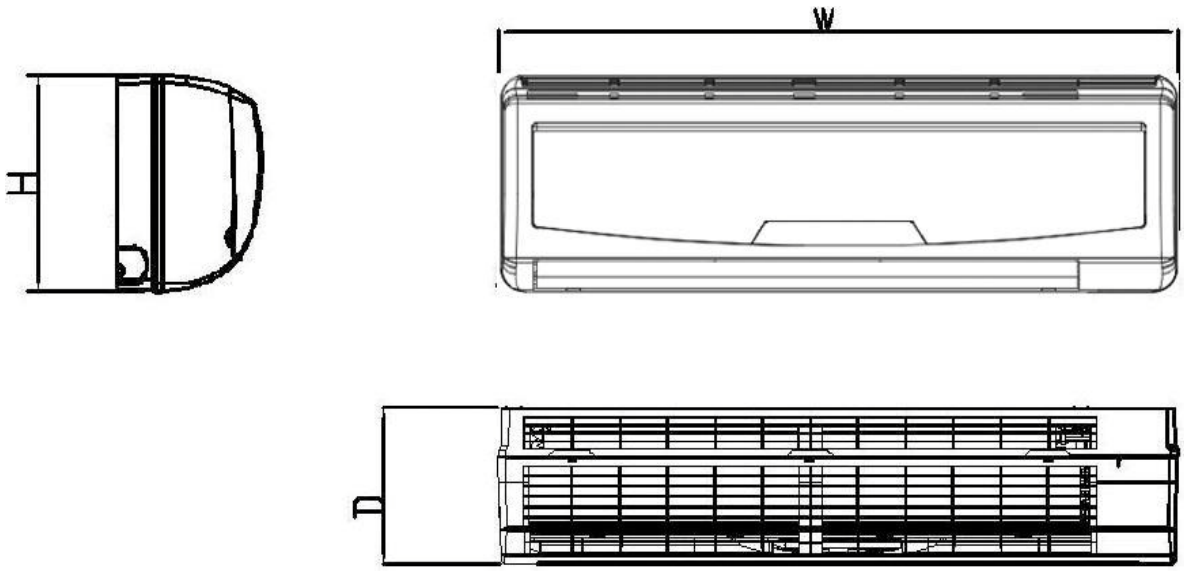
It protects the valves and prevents water from dripping.

Discharge pipe temperature protect

2 Dimensions

2.1 Indoor Units

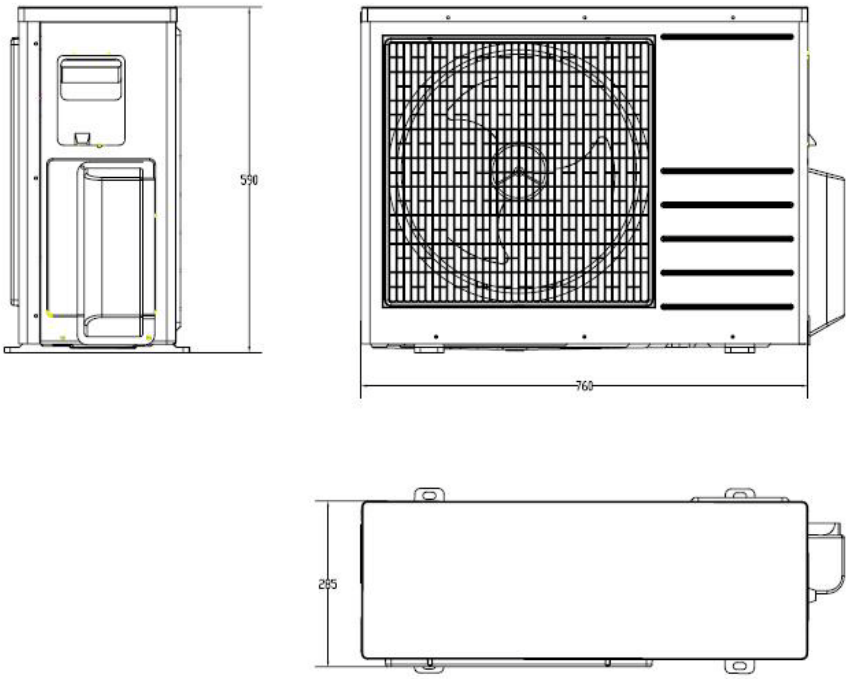
a) HKEU 261/HKEU351/HKEU531



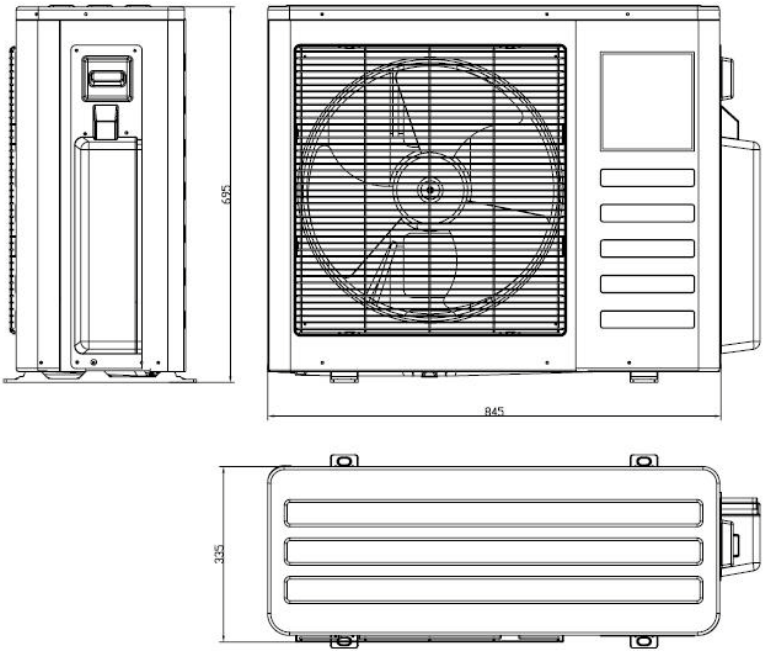
Dimension / Model	W	H	D
HKEU 261 HKEU 351	790	275	190
HKEU 531	940	275	198

2.2 Outdoor unit

a) HCNU 401 X2R



b) HCNU 531 X2R - HCNU 601 X3R



2.3 Specifications

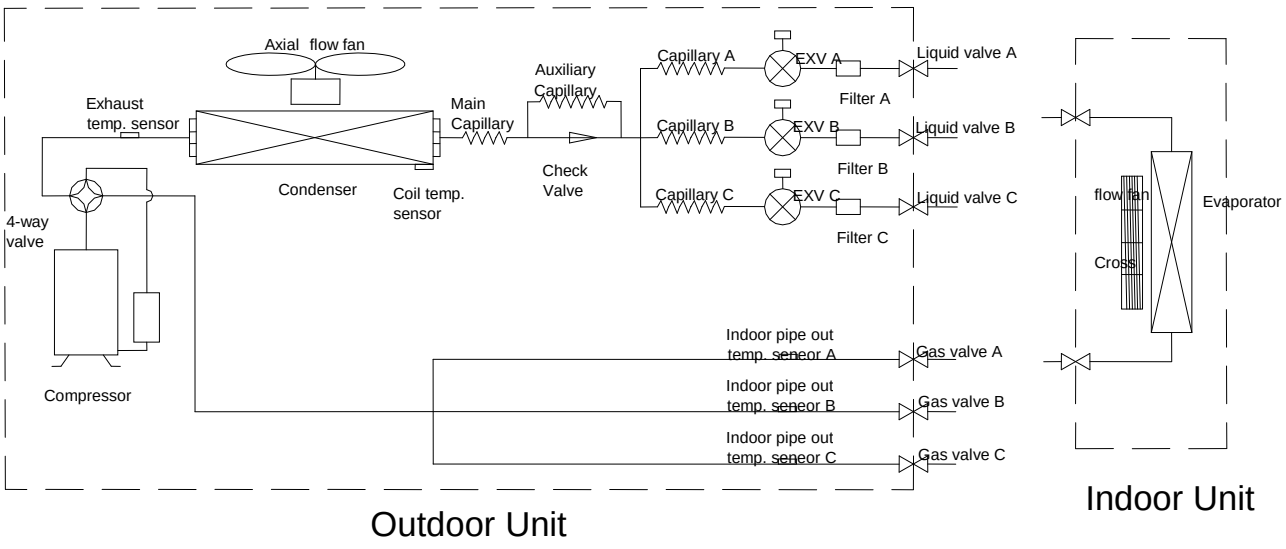
Outdoor Model			HCNU 401 X2R
Power supply		Ph-V-Hz	1Ph,220-240V~,50Hz
Cooling	Capacity	W	4.13 (1.94 - 6.03)
	Input	W	1.27 (0.74 - 2.09)
	Rated current	A	5.7
	EER	W/W	3.25
Heating	Capacity	W	4.57 (2.04 - 5.87)
	Input	W	1.26 (0.74 - 1.94)
	Rated current	A	6.2
	COP	W/W	3.62
Max. Input		W	1800
Max. current		A	8.5
Compressor	Model		DA108X1C-20FZ3
	Type		Rotary inverter
	Brand		Toshiba
	Capacity	W	3200
	Input	W	855
	Rated current(RLA)	A	5.3
	Locked rotor Amp(LRA)	A	8
	Thermal protector		INT01L-4619 or CS-74
	Refrigerant oil	ml	VG74/460
Outdoor fan motor	Model		YDK24-6G
	Brand		Welling
	Input	W	59/47
	Capacitor	uF	2.5uF/400~450V
	Speed	r/min	800/550
Outdoor coil	a.Number of rows		2
	b.Tube pitch(a)x row pitch(b)	mm	21×13.37
	c.Fin spacing	mm	1.4
	d.Fin type (code)		Hydrophilic aluminium
	e.Tube outside dia.and type	mm	φ7, innergroove tube
	f.Coil length x height x width	mm	655×546×26.74
	g.Number of circuits		2
Outdoor air flow		m3/h	2200
Outdoor noise level		dB(A)	56
Outdoor unit	Dimension(W*H*D)	mm	760×590×285
	Packing (W*H*D)	mm	887×655×355
	Net/Gross weight	Kg	40/43
Refrigerant type and charge		g	R410A,1350
Design pressure(Hi/Lo)		MPa	4.2/2.5
Refrigerant piping	Liquid side/ Gas side	mm(inch)	2 X Φ6.35(1/4")/Φ9.53(3/8")
	Transfer Connector (9.53 12.7)		2
	Max. refrigerant pipe length	m	15 (each indoor unit)
	Max. difference in level	m	10 (each indoor unit)

Outdoor Model			HCNU 631 X2R
Power supply		Ph-V-Hz	1Ph,220-240V~,50Hz
Cooling	Capacity	W	5.30 (1.89 - 6.96)
	Input	W	1.64 (0.72 - 2.42)
	Rated current	A	7.3
	EER	W/W	3.23
Heating	Capacity	W	6.16 (2.04 - 8.35)
	Capacity		
	Input	W	1.70 (0.75 - 2.77)
	Rated current	A	8.5
	COP	W/W	3.62
Max. input		W	2150
Max. current		A	10.5
Compressor	Model		C-6RVN93H0V
	Type		Rotary Inverter
	Brand		Sanyo
	Capacity	Btu/h	19277
	Input	W	1610
	Rated current(RLA)	A	8.1
	Locked rotor Amp(LRA)	A	50
	Thermal protector		Internal
	Refrigerant oil	ml	FV50S/350CC
Outdoor fan motor	Model		YDK53-6F
	Brand		Welling
	Input	W	126/106
	Capacitor	uF	2.5
	Speed	r/min	760/600
Outdoor coil	a.Number of rows		1.5
	b.Tube pitch(a)x row pitch(b)	mm	22x19
	c.Fin spacing	mm	1.4
	d.Fin type (code)		Hydrophilic aluminium
	e.Tube outside dia.and type	mm	φ8 innergroove trube
	f.Coil length x height x width	mm	810X660X38
	g.Number of circuits		4
Outdoor air flow		m3/h	2500
Outdoor noise level		dB(A)	53
Outdoor unit	Dimension(W*H*D)	mm	845X695X335
	Packing (W*H*D)	mm	965X795X395
	Net/Gross weight	Kg	60/64
Refrigerant type and charge		g	R410A,1700
Design pressure(Hi/Lo)		MPa	4.2/2.5
Refrigerant piping	Liquid side/ Gas side	mm(inch)	2 X Φ6.35(1/4")/Φ9.53(3/8")
	Transfer Connector (9.53 12.7)		2
	Max. refrigerant pipe length	m	15 (each indoor unit)
	Max. difference in level	m	10 (each indoor unit)

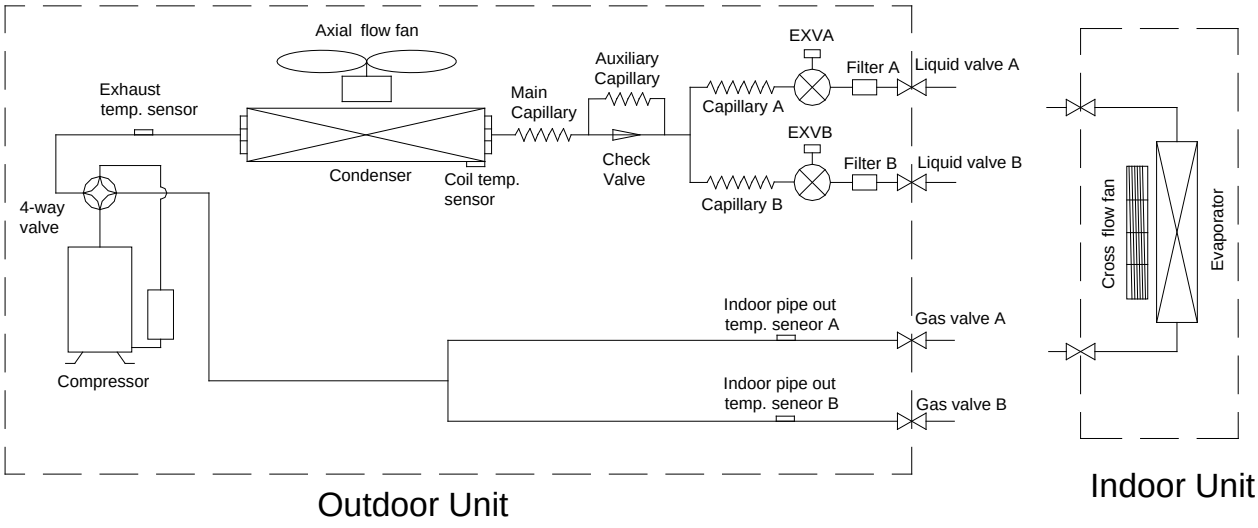
Outdoor Model			HCNU 801 X3R
Power supply		Ph-V-Hz	1Ph,220-240V~,50Hz
Cooling	Capacity	W	6.00 (1.89 - 9.45)
	Input	W	1.78 (0.74 - 3.30)
	Rated current	A	8.6
	EER	W/W	3.37
Heating	Capacity	W	6.80 (2.04 - 9.32)
	Input	W	1.86 (0.76 - 3.07)
	Rated current	A	8.7
	COP	W/W	3.65
Max. input		W	2700
Max. current		A	13.0
Compressor	Model		5RS132ZAD21
	Type		Rotary inverter
	Brand		Panasonic
	Capacity	W	3385
	Input	W	1250
	Rated current(RLA)	A	6.2
	Locked rotor Amp(LRA)	A	32
	Thermal protector		INT11L-5270 L115-15
	Refrigerant oil	cc	FV50S/370
Outdoor fan motor	Model		YDK53-6F
	Brand		Welling
	Input	W	126/106
	Capacitor	uF	2.5uF/450V
	Speed	r/min	760/600
Outdoor coil	a.Number of rows		1.5
	b.Tube pitch(a)x row pitch(b)	mm	21X13.37
	c.Fin spacing	mm	1.4
	d.Fin type (code)		Hydrophilic aluminium
	e.Tube outside dia.and type	mm	φ7, innergroove tube
	f.Coil length x height x width	mm	785X651X26.74
	g.Number of circuits		2
Outdoor air flow		m3/h	2500
Outdoor noise level		dB(A)	58
Outdoor unit	Dimension(W*H*D)	mm	845X695X335
	Packing (W*H*D)	mm	965X755X395
	Net/Gross weight	Kg	55/60
Refrigerant type and charge		g	R410A, 1450
Design pressure(Hi/Lo)		MPa	4.2/2.5
Refrigerant piping	Liquid side/ Gas side	mm(inch)	3 X Φ6.35(1/4")/Φ9.53(3/8")
	Transfer Connector (9.53)		2
	Max. refrigerant pipe length	m	15 (each indoor unit)
	Max. difference in level	m	10 (each indoor unit)

3 Refrigeration Cycle Diagram

3.1 Refrigeration circuit drawing of inverter Triple type



3.2 Refrigeration circuit drawing of inverter Dual type



4．Operation Temperature Limits

Cooling mode	Indoor temperature	≥17℃
	Outdoor temperature	0° ~ 50℃
Heating mode	Indoor temperature	<=30
	Outdoor temperature	-7℃ ~ 24℃
Dry mode	Indoor temperature	> 10℃
	Outdoor temperature	0° ~ 50℃

5. Indoor units combination

5.1 Indoor unit combination for HCNU 401 X2R

COOLING

Combinations		Rated Capacity(kW) (Nom. cooling)		Total Cooling Capacity(kW)			Total Power Input (kW)			Yearly Energy Consumption (kWh)	EER (W/W)	Energy Class
Unit A	Unit B	Unit A	Unit B	min. data	rated data	max. data	min. data	rated data	max. Data		rated capacity	
261	—	2,77	—	1,94	2,77	3,55	0,74	0,99	1,25	493	2,81	C
351	—	3,35	—	2,35	3,35	4,29	0,86	1,15	1,46	574	2,92	C
261	261	2,05	2,05	1,86	4,13	5,66	0,54	1,27	1,97	635	3,25	A
261	351	2,11	2,25	1,98	4,36	6,03	0,58	1,35	2,09	675	3,23	A

HEATING

Combinations		Rated Capacity(kW) (Nom. heating)		Total Heating Capacity(kW)			Total Power Input (kW)			Yearly Energy Consumption (kWh)	COP (W/W)	Energy Class
Unit A	Unit B	Unit A	Unit B	min. data	rated data	max. data	min. data	rated data	max. Data		rated capacity	
261	—	2,92	—	2,04	2,92	3,74	0,74	0,99	1,26	497	2,94	D
351	—	3,75	—	2,63	3,75	4,80	0,92	1,22	1,55	611	3,07	D
261	261	2,28	2,28	2,02	4,57	5,81	0,53	1,26	1,92	630	3,63	A
261	351	2,35	2,52	2,04	4,87	5,87	0,54	1,34	1,94	670	3,63	A

5.2 Indoor unit combination for HCNU 531 X2R

COOLING

Combinations		Rated Capacity(kW) (Nom. cooling)		Total Cooling Capacity(kW)			Total Power Input (kW)			Yearly Energy Consumption (kWh)	EER (W/W)	Energy Class
Unit A	Unit B	Unit A	Unit B	min. data	rated data	max. data	min. data	rated data	max. Data		rated capacity	
261	—	2,70	—	1,89	2,70	3,46	0,72	0,96	1,22	479	2,82	C
351	—	3,46	—	2,42	3,46	4,43	0,89	1,19	1,52	597	2,90	C
531	—	5,35	—	3,75	5,35	6,85	1,38	1,84	2,34	922	2,90	C
261	261	2,65	2,65	2,18	5,30	6,66	0,65	1,64	2,35	820	3,23	A
261	351	2,42	2,98	2,27	5,40	6,91	0,66	1,66	2,41	831	3,25	A
351	351	2,72	2,72	2,28	5,44	6,96	0,67	1,67	2,42	834	3,26	A

HEATING

Combinations		Rated Capacity(kW) (Nom. heating)		Total Heating Capacity(kW)			Total Power Input (kW)			Yearly Energy Consumption (kWh)	COP (W/W)	Energy Class
Unit A	Unit B	Unit A	Unit B	min. data	rated data	max. data	min. data	rated data	max. Data		rated capacity	
261	—	2,92	—	2,04	2,92	3,74	0,75	1,00	1,27	502	2,91	D
351	—	3,75	—	2,63	3,75	4,80	0,93	1,23	1,57	617	3,04	D
531	—	5,40	—	3,78	5,40	6,91	1,33	1,78	2,26	888	3,04	D
261	261	3,08	3,08	2,56	6,16	7,38	0,67	1,70	2,42	850	3,62	A
261	351	2,87	3,53	2,69	6,40	7,74	0,71	1,77	2,56	884	3,62	A
351	351	3,45	3,45	2,90	6,90	8,35	0,76	1,91	2,77	956	3,61	A

5.3 Indoor unit combination for HCNU 601 X3R

COOLING

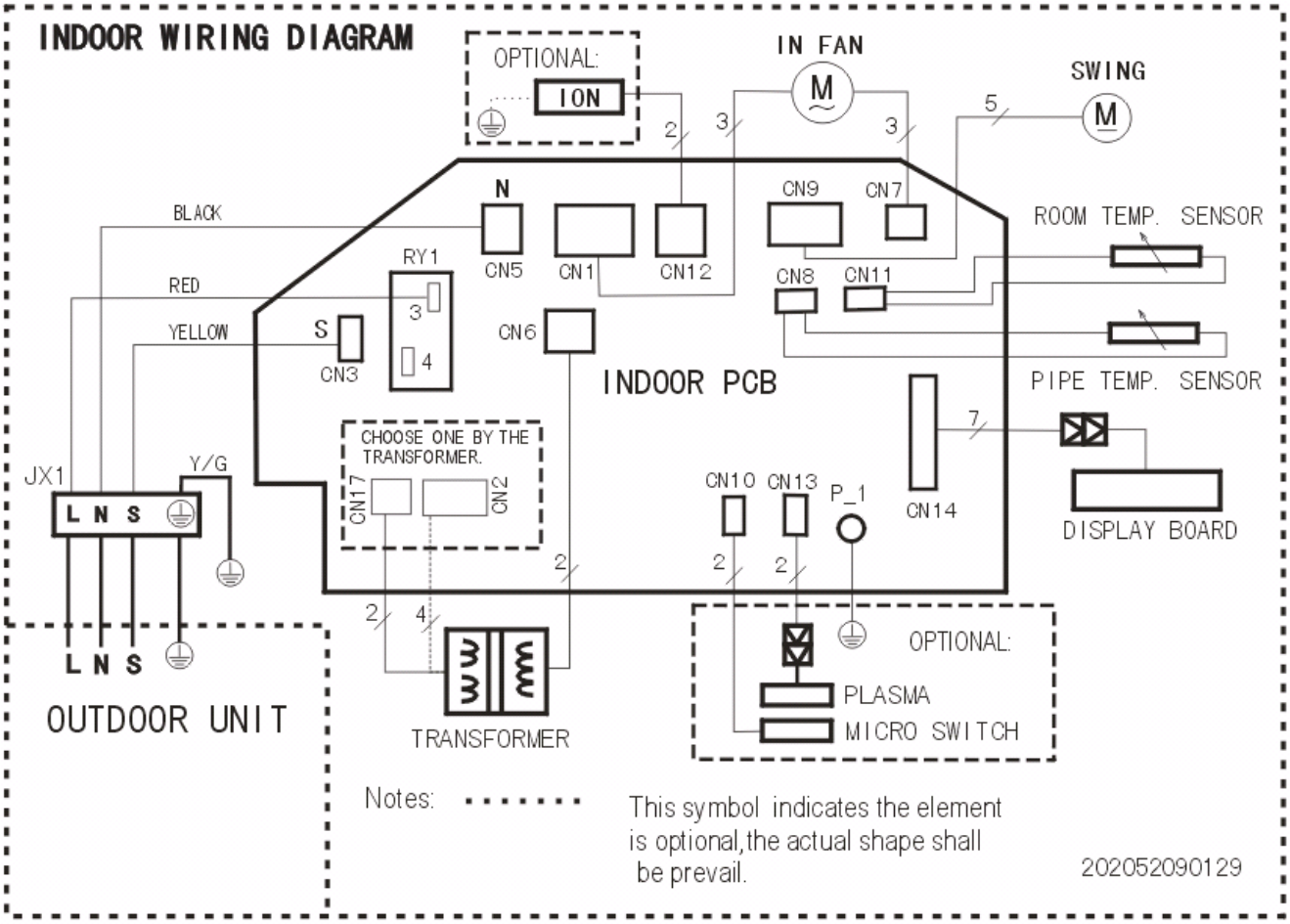
Combinations			Rated Capacity(kW) (Nom. cooling)			Total Cooling Capacity(kW)			Total Power Input (kW)			Yearly Energy Consumption (kWh)	EER (W/W)	Energy Class
Unit A	Unit B	Unit C	Unit A	Unit B	Unit C	min. data	rated data	max. data	min. data	rated data	max. Data		rated capacity	
261	—	—	2,70	—	—	1,89	2,70	3,46	0,74	0,99	1,26	495	2,73	D
351	—	—	3,46	—	—	2,42	3,46	4,43	0,92	1,20	1,56	600	2,88	C
531	—	—	5,35	—	—	3,75	5,35	6,85	1,02	1,50	2,42	750	3,57	A
261	261	—	2,60	2,60	—	2,18	5,20	6,66	0,73	1,50	2,65	750	3,47	A
261	351	—	2,20	3,20	—	2,52	5,40	7,68	0,84	1,58	3,05	790	3,42	A
261	531	—	2,40	3,20	—	2,92	5,60	8,90	0,91	1,60	3,30	800	3,50	A
351	351	—	2,90	2,90	—	2,68	5,80	8,17	0,83	1,65	3,02	825	3,52	A
261	261	261	2,00	2,00	2,00	2,92	6,00	8,90	0,86	1,70	3,12	850	3,53	A
261	261	351	2,00	2,00	2,20	3,10	6,20	9,45	0,91	1,78	3,30	890	3,48	A

HEATING

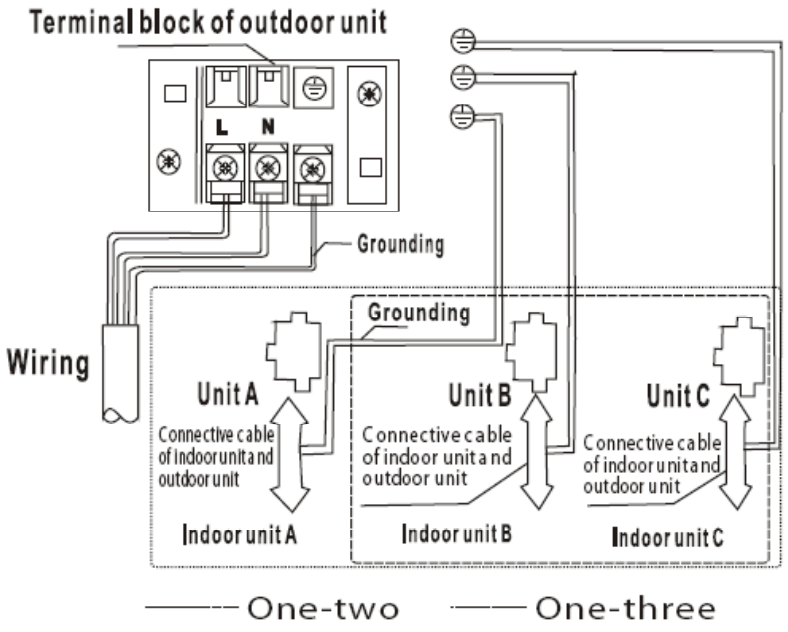
Combinations			Rated Capacity(kW) (Nom. heating)			Total Heating Capacity(kW)			Total Power Input (kW)			Yearly Energy Consumption (kWh)	COP (W/W)	Energy Class
Unit A	Unit B	Unit C	Unit A	Unit B	Unit C	min. data	rated data	max. data	min. data	rated data	max. Data		rated capacity	
261	—	—	2,92	—	—	2,04	2,92	3,74	0,76	1,01	1,29	507	2,88	D
351	—	—	3,75	—	—	2,63	3,75	4,80	0,94	1,26	1,60	629	2,98	D
531	—	—	5,40	—	—	3,78	5,40	6,91	1,36	1,50	2,30	750	3,60	B
261	261	—	3,00	3,00	—	2,52	6,00	7,26	0,76	1,55	2,77	775	3,87	A
261	351	—	2,89	3,56	—	2,71	6,45	7,80	0,80	1,68	2,91	840	3,84	A
261	531	—	2,30	4,20		3,09	6,50	8,91	0,86	1,70	3,12	850	3,82	A
351	351	—	3,30	3,30	—	2,90	6,60	8,35	0,81	1,80	2,93	900	3,67	A
261	261	261	2,26	2,26	2,26	3,09	6,80	8,91	0,81	1,86	2,94	930	3,66	A
261	261	351	2,26	2,26	2,68	3,23	7,20	9,32	0,85	1,95	3,07	975	3,69	A

6. Wiring Diagram

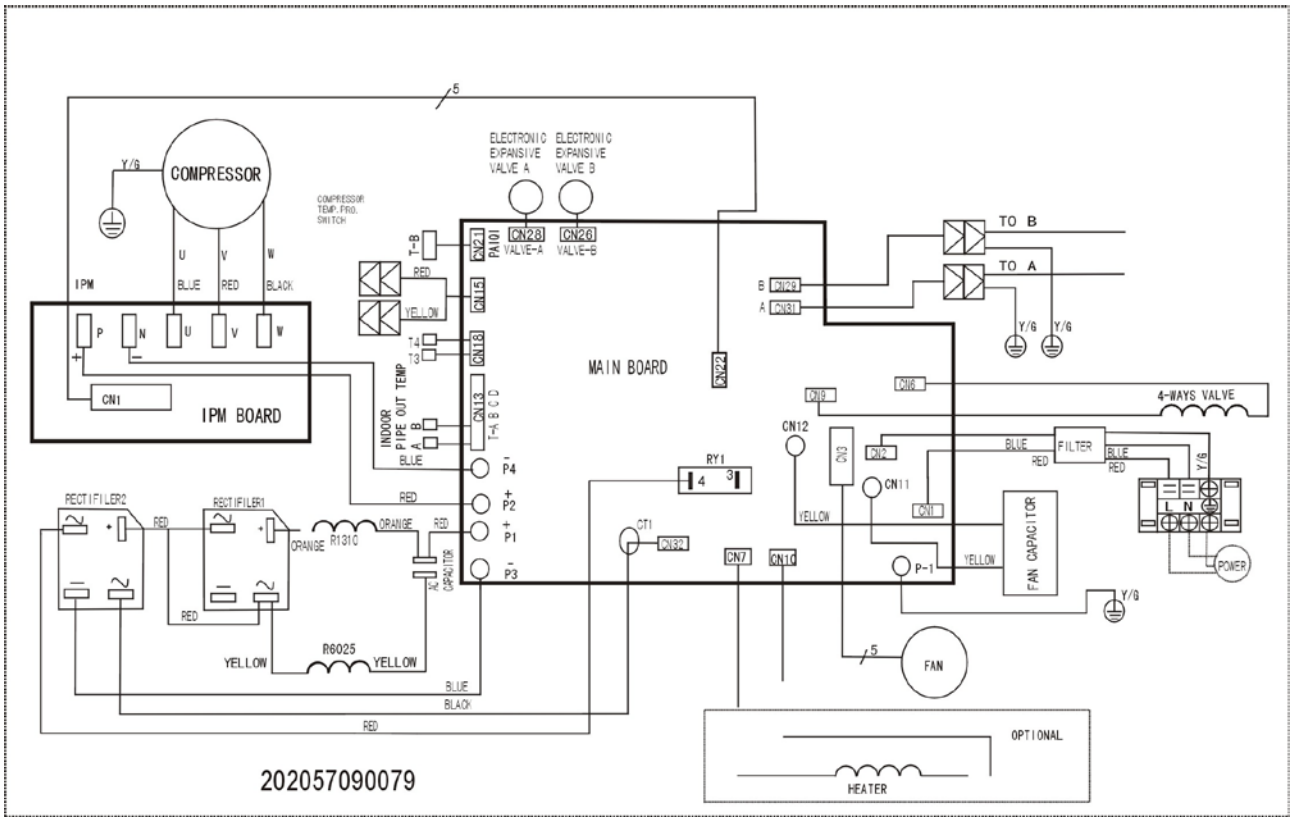
6.1 Indoor unit (HKEU 261/HKEU 351/HKEU 531)



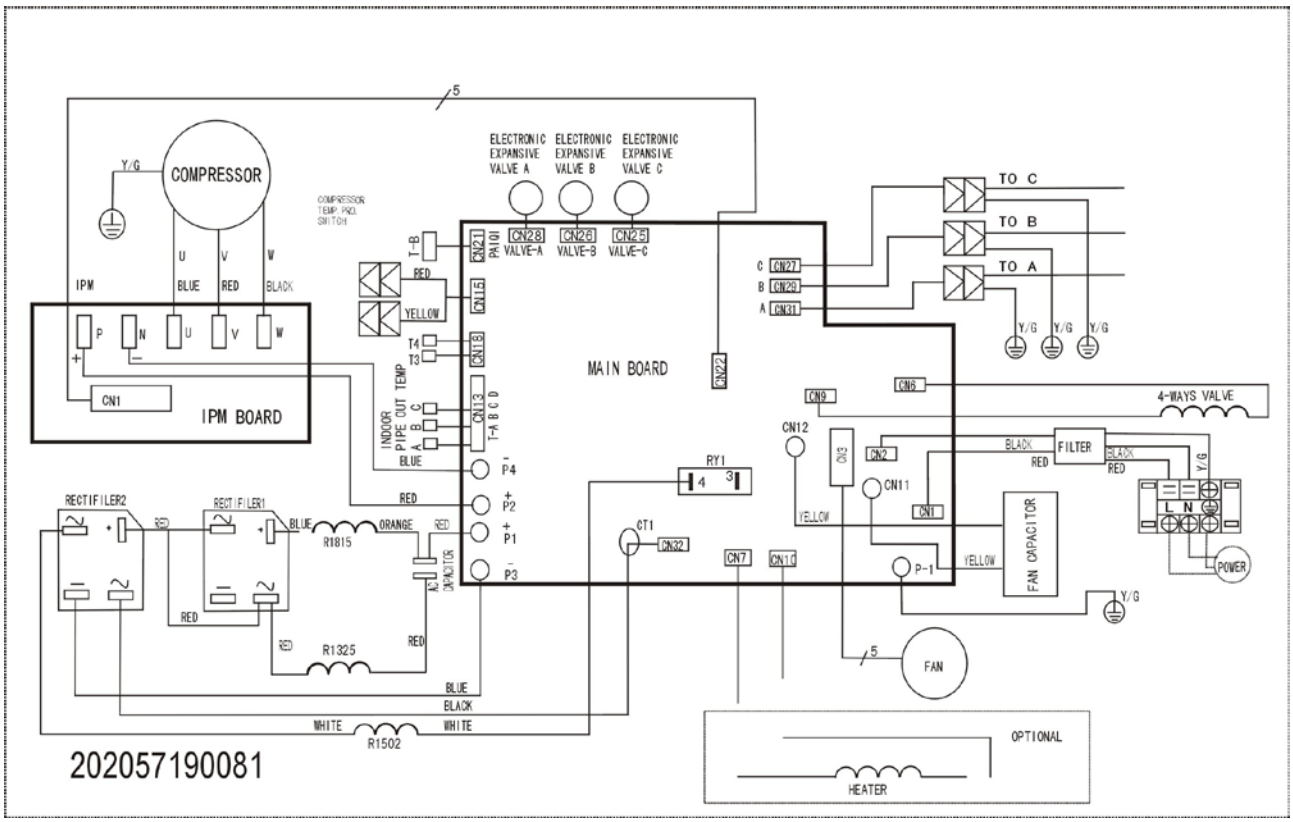
6.2 Special cable with plug from each Indoor Unit to Outdoor Unit



6.3 Outdoor unit (HCNU 401 X2R – HCNU 531 X2R)



6.4 Outdoor unit (HCNU 601 X3R)



7 Electronic control function

7.1 Electric Control working environment.

7.1.1 Input voltage: 175~253V.

7.1.2 Input power frequency:50Hz.

7.1.3 Indoor fan normal working amp. is less than 1A.

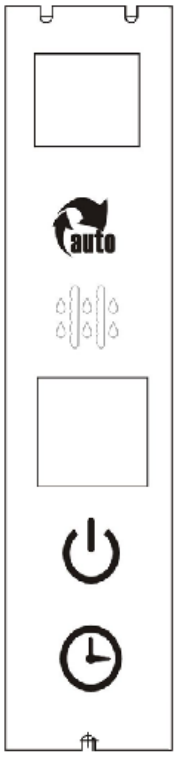
7.1.4 Outdoor fan. Normal working amp. is less than 1.5A.

7.1.5 Four-way valve normal working amp. is less than 1A.

7.1.6 Swing motor: DC12V.

7.2 Display function

7.2.1 Icon explanation on indoor display board.



Auto indicator

This indicator illuminates when the air conditioner is in AUTO operation.

Timer indicator

This indicator illuminates when TIMER is set ON/OFF.

PRE.-DEF. Indicator (For Cooling & Heating models only)

This indicator illuminates when the air conditioner starts defrosting automatically or when the warm air control feature is activated in heating mode.

OPERATION indicator

This indicator illuminates when the air conditioner is running.

7.2.2 LED display control function.

Pressing “LED display” button on remote controller will turn off all displays on indoor unit, while pressing once again, all displays will resume.

7.3 Outdoor unit’s digital display tube

There is a digital display tube in outdoor PCB.

7.3.1 Digital display tube display function

- In standby , The LED displays the number of indoor units,
- In compressor operation, the LED display the frequency,
- In defrosting mode, The LED displays “dF”
- In compressor pre-heating, The LED displays “1 1”
- In protection or malfunction, the LEC displays error code or protection code.

7.4 Outdoor unit point check function

There is a check switch in outdoor PCB.
Push the switch SW1 to check the states of unit when the unit is running. The digital display tube will display the follow procedure when push SW1 each time:

	Display	**Remark**
1	Indoor unit capacity demand code	
2	Outdoor unit running mode code	Off:0, Cooling:1, Heating:2
3	Amendatory capacity demand code	
4	Outdoor unit fan motor state	Off:0, Low speed:1, High speed:2
5	Evaporator outlet temp. for 1# indoor unit	Actual data
6	Evaporator outlet temp. for 2# indoor unit	Actual data
7	Evaporator outlet temp. for 3# indoor unit	Actual data
8	Evaporator outlet temp. for 4# indoor unit	Actual data
9	Condenser pipe temp.	Actual data
10	Ambient temp.	Actual data
11	Compressor discharge temp.	Actual data
12	Inverter current	Actual data
13	EXV open angle for 1# indoor unit	Actual data×8
14	EXV open angle for 2# indoor unit	Actual data×8
15	EXV open angle for 3# indoor unit	Actual data×8
16	EXV open angle for 4# indoor unit	Actual data×8
17	Indoor unit number	The indoor unit can communicate with outdoor unit well.
18	The last error or protection code	00 means no malfunction
19	——	Check point over

7.4.1 Frequency of compressor:

Display	Frequency of compressor (Hz)
30	30
--	Stand by
60	60

7.4.2 Running mode:

Display	Corresponding mode
0	Off
1	Cooling mode
2	Heating mode

7.4.3 Capacity demand:

Cooling mode

Capacity	2000 2500	2000 2500	3000 3800	4500 5000	5000 5500	5500 6100	6100 7000	7000 7500	7500 8000	7500 8000
Corresponding Code	1	2	3	4	5	6	7	8	9	>=10

Heating mode

Capacity	2000 2500	2000 2500	3000 3800	4500 5000	5500 6100	6100 7000	6100 7000	7000 7500	7500 8000	8000 8900
Corresponding Code	1	2	3	4	5	6	7	8	9-10	>=11

Note:

The capacity is just for reference.

7.4.4 Number of indoor unit

Display	Number of indoor unit
1	1
2	2
3	3

7.4.5 Outdoor ambient temp:

Display	Corresponding temp.	Display	Corresponding temp.	Display	Corresponding temp.
15	-7.5	50	10	80	25
16	-7	51	10.5	81	25.5
17	-6.5	52	11	82	26
18	-6	53	11.5	83	26.5
19	-5.5	53	11.5	84	27
20	-5	54	12	85	27.5
21	-4.5	55	12.5	86	28
22	-4	56	13	87	28.5
23	-3.5	57	13.5	88	29
24	-3	58	14	89	29.5
26	-2	59	14.5	90	30
27	-1.5	60	15	91	30.5
28	-1	61	15.5	92	31
29	-0.5	62	16	93	31.5
30	0	63	16.5	93	31.5
31	0.5	63	16.5	94	32
32	1	64	17	95	32.5
33	1.5	65	17.5	96	33
34	2	65	17.5	97	33.5
35	2.5	66	18	98	34
36	3	67	18.5	99	34.5
37	3.5	68	19	10.	35~40
38	4	69	19.5	11.	40~45
39	4.5	70	20	12.	45~50
40	5	71	20.5	13.	50~55
41	5.5	72	21	14.	55~60
42	6	73	21.5	15.	60~65
43	6.5	74	22	16.	65~70
44	7	75	22.5		
45	7.5	75	22.5		
46	8	76	23		
47	8.5	77	23.5		
48	9	78	24		
49	9.5	79	24.5		

7.4.6 Current of outdoor unit

Display	Corresponding mode
44	6.0 A
46	6.2 A
54	7.4 A
55	7.6 A
58	7.6 A
62	8.0 A
66	8.6 A
67	8.8 A
68	9.0 A
70	9.2 A
72	9.5 A
76	10.0 A
78	10.2 A
80	10.4 A
82	10.6 A
84	11.0 A
88	11.6 A
92	12.0 A
94	12.2 A

7.4.7 No. 1 opening degree of electronic expansion valve:

Opening degree equals the display data times 8

7.4.8 No. 2 opening degree of electronic expansion valve:

Opening degree equals the display data times 8

7.4.9 No. 3 opening degree of electronic expansion valve:

Opening degree equals the display data times 8

7.5 Protection

7.5.1 3 minutes delay at restart for compressor.

7.5.2 Discharge temperature protection of compressor, compressor stops when the temp. of discharge is more than 115℃ and last out 10 s. compressor runs when the temp. of discharge is less than 90℃.

7.5.3 Temperature protection of compressor top, compressor stops when the temp. of top of compressor is more than 120℃, compressor runs when the temp. of top of compressor is less than 105℃.

7.5.4 When AC voltage ≥ 265V for 30 seconds, Outdoor Unit stops operation and alarms. When AC voltage ≤ 265V for 30 seconds, Outdoor Unit resumes operation.

7.5.5 Inverter module Protection , Inverter module Protection itself has a protection function against current, voltage and temperature.

7.5.6 Sensor protection at open circuit and breaking disconnection

7.5.7 Fan Speed is out of control. When Indoor Fan Speed is too high(higher than High Fan+300RPM)or too low(lower than 400RPM), the unit stops and LED displays failure information and can't return to normal operation automatically.

7.5.8 Cross Zero signal error warning. If there is no Cross Zero signals in 4 minutes, the unit stops and LED displays failure information and can't return to normal operation automatically.

7.5.9 Current protection: When the current is more than 'X' A, the compressor stops.

(X is 7A for 14K 1x2 unit, is 14A for 18K 1x2 unit, is 13.5A for 21 1x3 unit, is 15A for 27K 1x3 unit, is 16A for 27K 1x4 unit and is 21.5A for 36K 1x4 unit.)

7.5.10 Outdoor condenser high temperature protection: Under cooling mode, if T3>65℃ for 3 minutes, the compressor will stop. When T3<52℃, the protection is not valid.

7.5.11 Pressure protection (just be available for 27K and 36K 1x4 unit): If low pressure is lower 0.03MPa, the compressor will stop and when low pressure is higher than 0.10MPa, the compressor will restart. If high pressure is higher than 3.3MPa, the compressor will stop and when high pressure is lower than 2.4MPa, the compressor will restart.

7.5.12 Compressor pre-heating function: When the outdoor temperature is lower than 3℃ and the compressor stops operation for more than 3 hours, or the outdoor temperature is lower than 3℃ and the power is just put on, the compressor enters into pre-heating condition. When outdoor temp. is more than 5℃ or user operate it, pre-heating condition will finish.

7. 6 Fan-only mode

Fan speed is high/mid/low/ Auto

7.7 Cooling mode

7.7.1 Indoor fan keeps running, fan speed can be set in high/mid/low/ Auto:

7.7.2 Auto fan at cooling mode: (T=Indoor Temp.-Setting Temp.)

	Condition	Indoor fan speed
Room temp. up	T<1.5□	Low
	1.5□<T<4□	Mid.
	T>4□	High
Room temp. down	T> 3□	High
	1□<T<3□	Mid.
	T<1□	Low

7.7.3 Anti-freezing control to indoor evaporator at cooling mode (T: evaporator temp.)

	Evaporator Temp.	Compressor
	T< 4□	Off
	T > 8□	On

7.8 Dehumidifying mode

7.8.1 the indoor fan is fixed in low speed

7.8.2 Low room temperature protection:

When room temperature decreases to below 10℃, indoor fan stop, when room temperature restores to over 12℃, indoor fan start.

7.8.3 At dehumidifying mode, the anti-freezing function of the indoor heat exchanger is the same as that of cooling mode.

7.9Heating mode

7.9.1 Indoor Fan actions at heating mode

Indoor Fan can be set at HIGH/MID/LOW/AUTO by using a remote controller, but Anti-cold wind function prevails.

Anti-cold wind control function at heating mode

	Condition T= Indoor exchanger temp.	Indoor fan speed
Indoor exchanger temp. up	T<34°	Off
	34°<T<37°	Breeze
	37°<T<44°	Low speed
	T> 44°	Setting fan speed
Indoor exchanger temp. down	T> 38°	Setting fan speed
	33°<T<38°	Low speed
	24°<T<33°	Breeze
	T<24°	Off

7.9.2 Auto wind at heating mode

	Condition T=Indoor Temp.-Setting Temp.	Indoor fan speed
Room temp. up	T<1.5°	High
	1.5°<T<2.5°	Mid.
	T>2.5°	Low
Room temp. down	T<1.0°	High
	1.0°<T<2.0°	Mid.
	T>2.0°	Low

7.9.3 Indoor evaporator high-temperature protection at heating mode

Condition T= Indoor exchanger temp.	Compressor
T<48°	On
53°<T<63°	Decrease frequency of compressor
T>63°	Off

Defrosting operation (Available for heating only).

7.10 Defrost

7.10.1 Defrosting condition:

The temperature of outdoor heat exchanger remains consecutively lower than -2°c for more than 40 minutes,

7.10.2 Ending condition of defrosting

If one of following conditions is satisfied, end the defrost and turn into heating mode:

a. The defrost time has reached to 10 minutes.

b. When the temperature of outdoor heat exchanger rises up to 15°C

7.10.3 Defrosting Actions:

a. Compressor runs.

b. 4 way valve switches off,

c. Outdoor fan switches off

d. Indoor fan running according to anti-cold wind function in heating mode.

7.11Automatic operation mode

The air conditioner automatically selects one of the following operation modes: cooling, heating or fan only according to the temp. difference between room temp. (TA) and set temp. (TS).

TA—TS	Operation mode
TA—TS>2°	Cooling
-1°≤TA-TS≤+2°	Fan-only
TA-TS<-1°	Heating (air-only for cooling only type)

7.12Manual switch

7.12.1 Mode changes when push this button .

Cooing mode→ Auto mode→Unit off→ Cooing mode

7.12.2 At Cooing mode, after 30 minutes cooling operation whose fan speed is set as low, the A/C operates with a setting temp. of 24℃.

7.12.3 At auto mode, the A/C operates with a set temp. of 24℃

7.13Timer Function

7.13.1 The maximum length of timer is 24 hours and the minimum resolving power is 15 minutes.

7.13.2 Timer on: first turn off the A/C, the A/C will be automatically on at the set time.

7.13.3 Timer off: first turn on the A/C, the A/C will be automatically off at the set time

7.13.4 Timer on/off function(on time is earlier than off time): first turn off the A/C, it will be automatically on at set time, and later be off at the set time, then unit turns on at set time.

7.13.5 Timer off/on function(off time is earlier than on time): first turn on the A/C, it will be automatically off at set time, and later be on at the set time, then unit turns off at set time.

7.14Sleep mode

7.14.1 It is available at cooling, heating or auto mode.

7.14.2 Cooling:

The set temperature rise 1℃ per hour. Two hours later, the set temperature will maintain as a constant and the fan speed is kept at low speed.

7.14.3 Heating:

The set temperature decrease 1℃ per hour. Two hours later, the set temperature will maintain as a constant and the air circulation is kept at low speed (Cold air proof function takes precedence over all).

7.14.4 Auto:

The Sleep Mode running function operates in accordance with selected running mode by auto mode.

7.14.5 After 7 hours, unit cancels this mode automatically.

J2	On	On	Off	Off
J3	On	Off	On	Off
Stop time	7 hours	8 hours	6 hours	7 hours

7.14.6 Auto restart function

In case of a sudden power failure, this function automatically sets the unit to previous settings before the power failure when power returns.

7.15 Mode conflict

The indoor units can not work cooling mode and heating at same time.

Heating mode has a priority.

7.15.1 Definition

	Cooling mode	Heating Mode	Fan	Off
Cooling mode	No	Yes	No	No
Heating Mode	Yes	No	Yes	No
Fan	No	Yes	No	No
Off	No	No	No	No

No: No mode conflict;

Yes: Mode conflict

7.15.2 Unit action

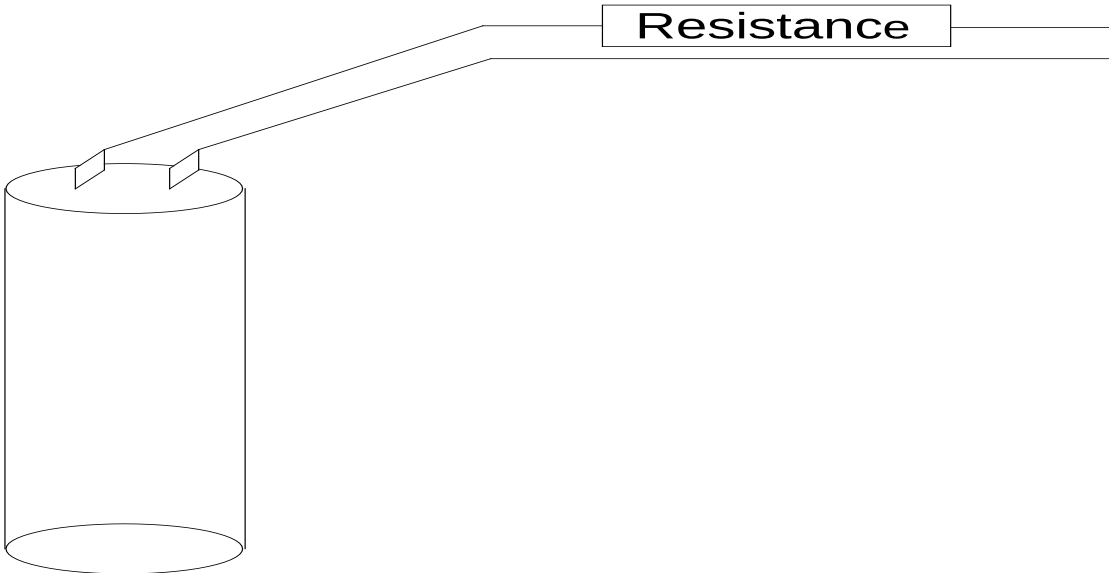
- In case of one Indoor unit working in cooling mode or fan mode, and another indoor unit is set to heating mode, the indoor unit working in cooling mode or fan mode will change to stand by. The outdoor unit will work in heating mode.
- In case of one Indoor unit working in heating mode, and another indoor unit is set to cooling mode or fan mode, the indoor unit setting to cooling mode or fan mode will change to stand by.

8.Troubleshooting

8.1 Safety

Because of there are capacitors in PCB and relative circuit in outdoor unit, even shut down the power supply, electricity power still are kept in capacitors, do not forget to discharge the electricity power in capacitor.

The value of resistance is about 1500 ohms to 2000 ohms



The voltage in P3 and P4 in outdoor PCB is high voltage about 310V

The voltage in P6 in outdoor PCB is high voltage about 310V

8.2 Troubleshooting for indoor unit

Display	LED STATUS
E0	EEPROM error
E1	Communication error between indoor and outdoor unit
E2	Zero-crossing examination error
E3	Fan speed beyond control
E5	Outdoor units temp. sensor or connector of temp. sensor is defective
E6	Indoor units temp. sensor or connector of temp. sensor is defective
P0	Inverter module protection
P1	Outdoor voltage protection
P2	Compressor temp. protection
P3	Compressor current protection

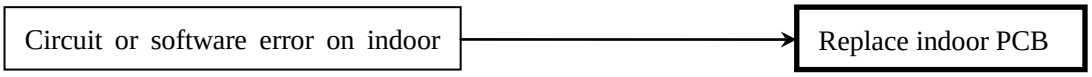
8.3 LED error code display for outdoor unit

Display	LED STATUS
E0	EEPROM error
E1	No 1 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective
E2	No 2 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective
E3	No 3 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective
E6	No 4 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective
E4	Outdoor temp. sensor or connector of temp. sensor is defective
E5	Compressor volt protection
E7	Communication error between outdoor IC and DSP
P0	Compressor temp. protection
P1	High pressure protection (just for 27K and 36K 1x4 units.)
P2	Low pressure protection (just for 27K and 36K 1x4 units.)
P3	Compressor current protection
P4	Inverter module protection
P6	Condenser high-temperature protection
P7	Compressor driving protection

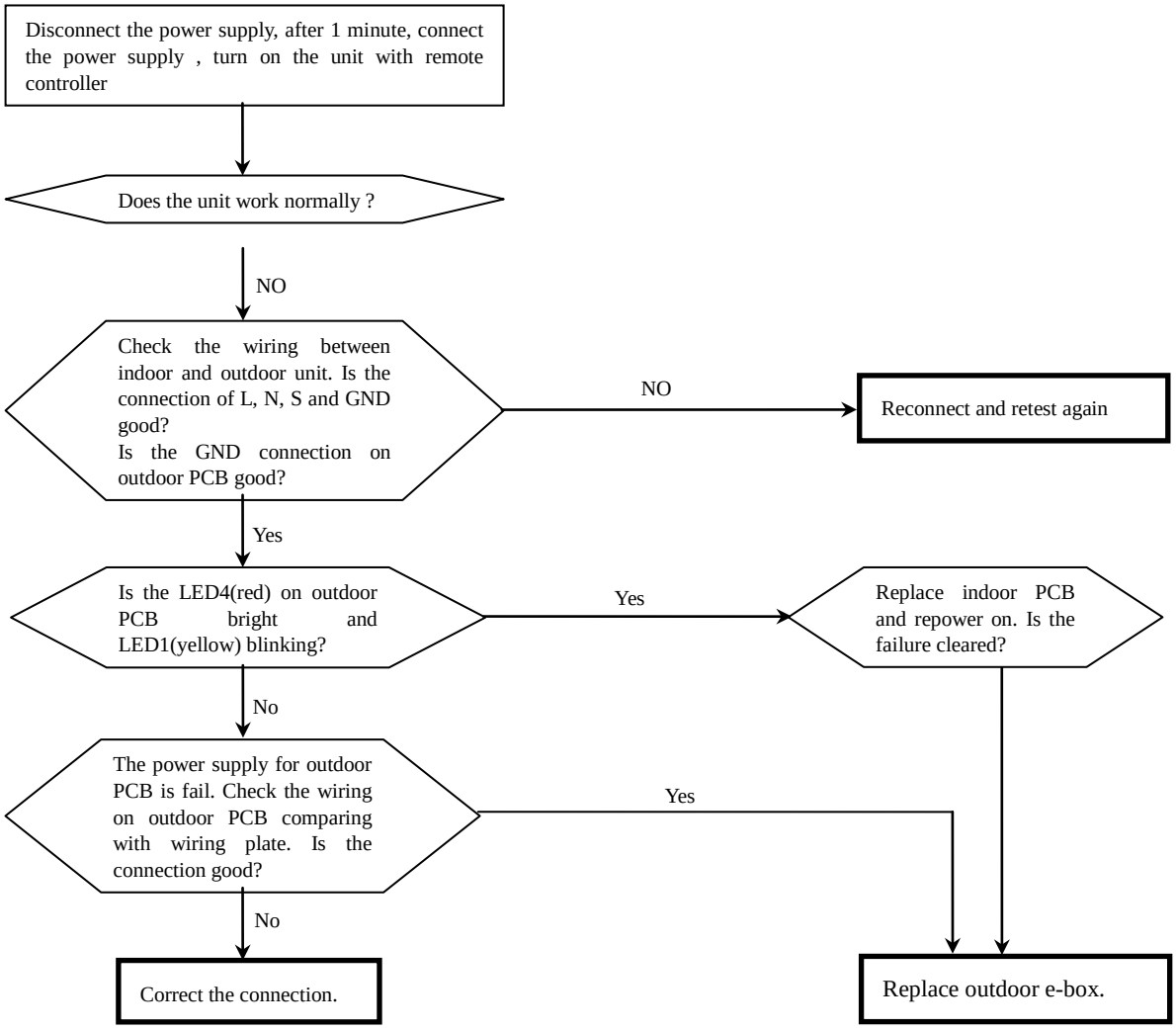
8.4 Troubleshooting

8.4.1 Indoor unit trouble shooting

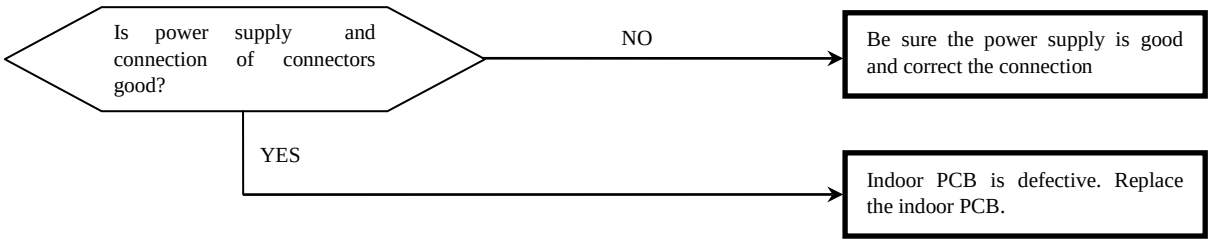
Indoor unit display	LED STATUS
E0	EEPROM error



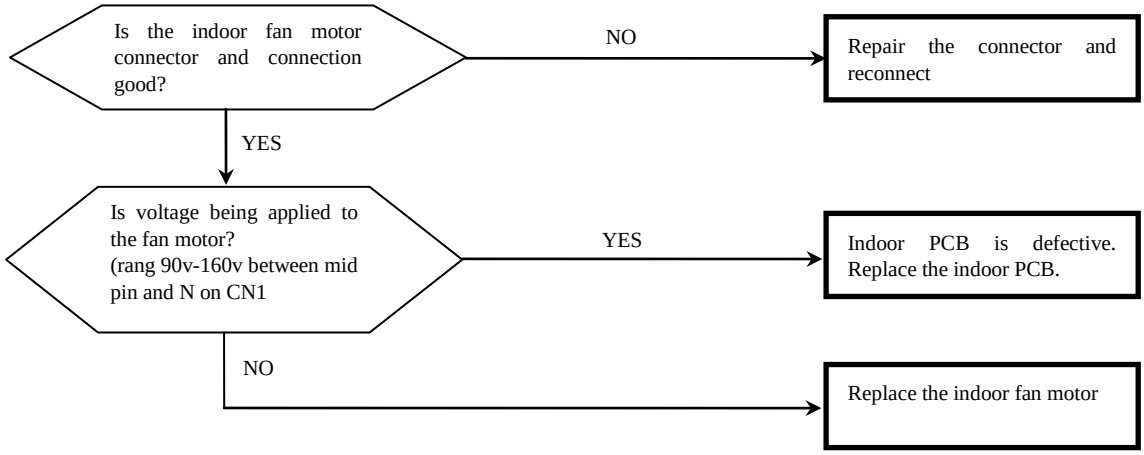
Indoor unit display	LED STATUS
E1	outdoor communication error



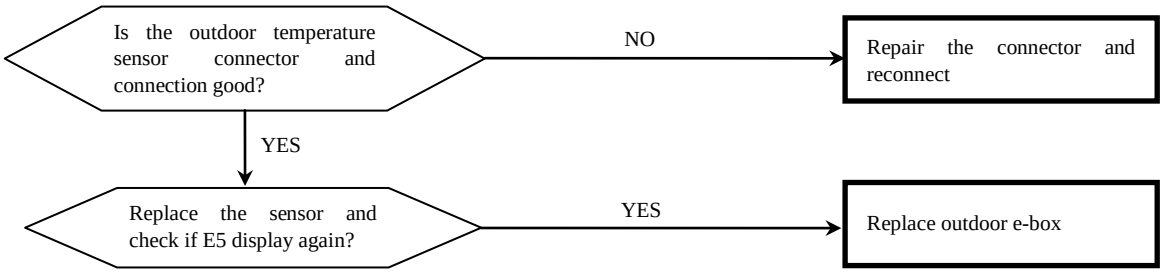
Indoor unit display	LED STATUS
E2	Zero-crossing examination error



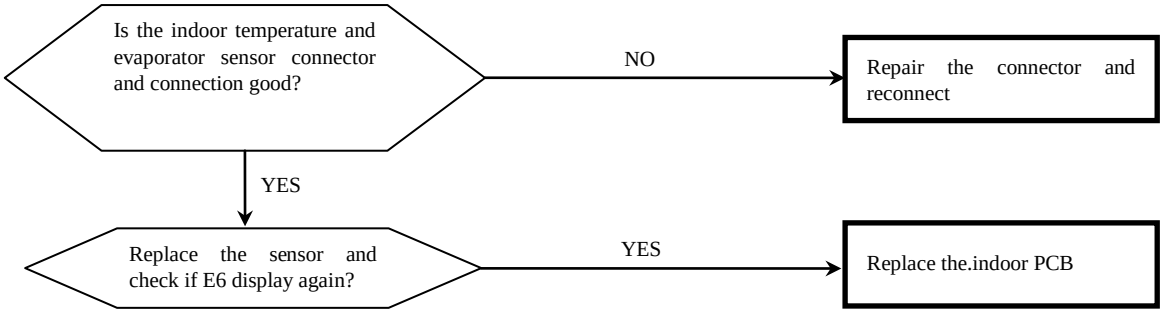
Indoor unit display	LED STATUS
E3	Fan speed beyond control



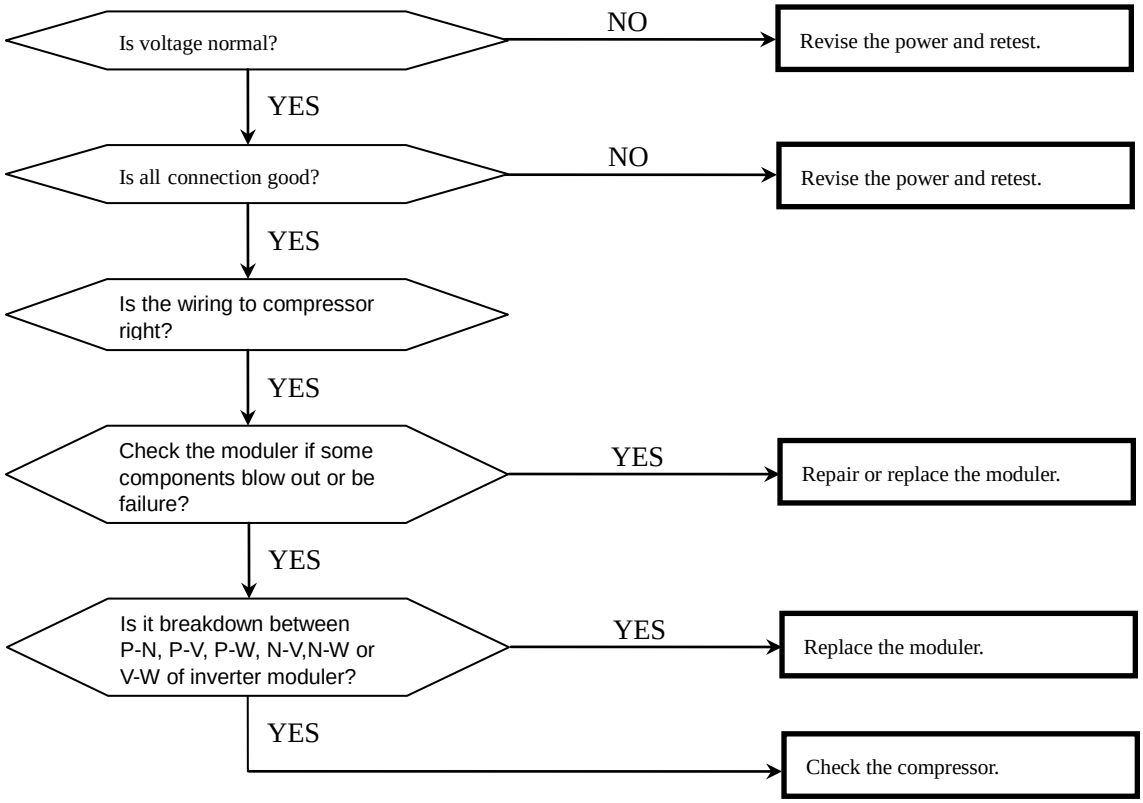
Indoor unit display	LED STATUS
E5	Outdoor units temp. sensor or connector of temp. sensor is defective



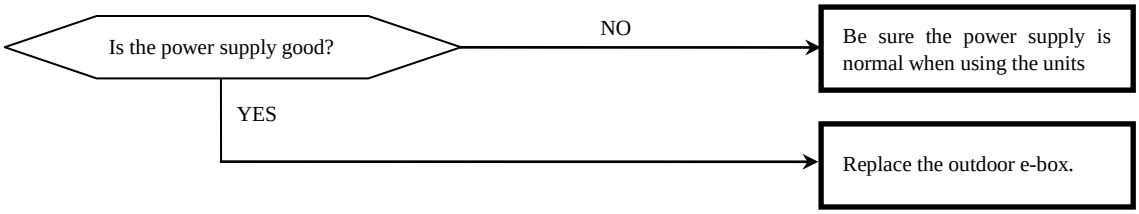
Indoor unit display	LED STATUS
E6	Indoor units temp. sensor or connector of temp. sensor is defective



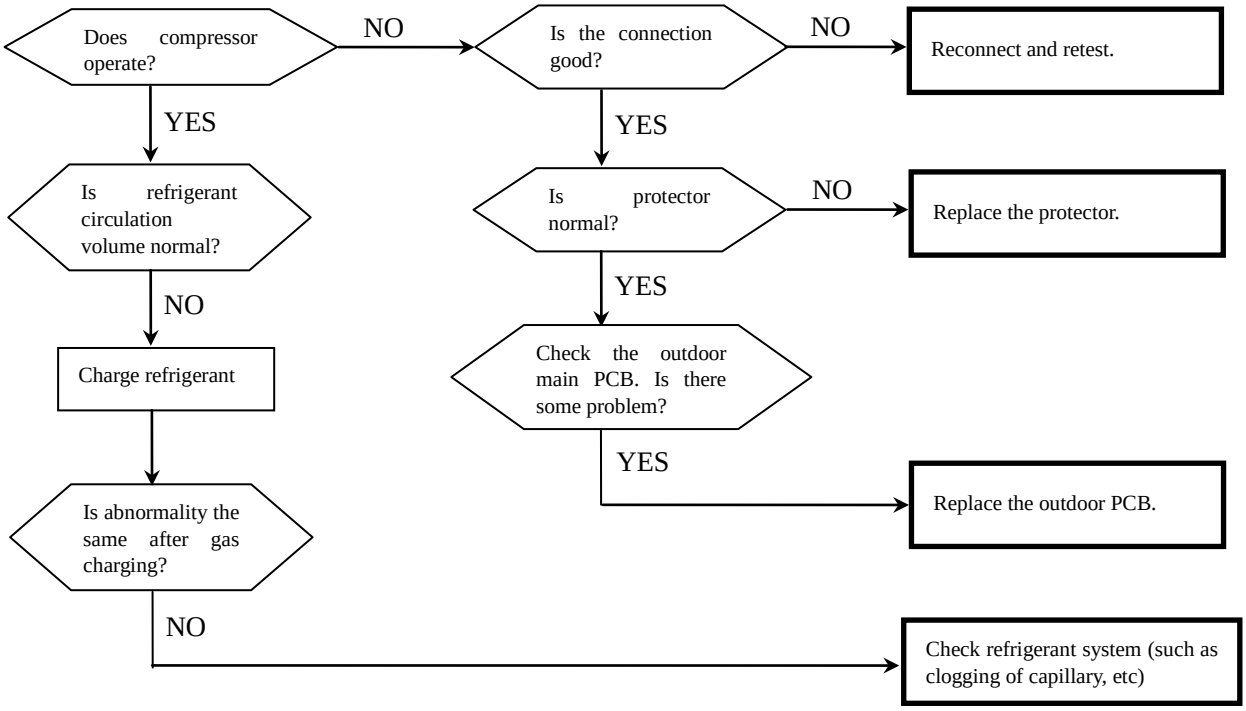
Indoor unit display	LED STATUS
P0	Inverter module protection



Indoor unit display	LED STATUS
P1	Outdoor voltage protection



Indoor unit display	LED STATUS
P2	Compressor top protection against temperature

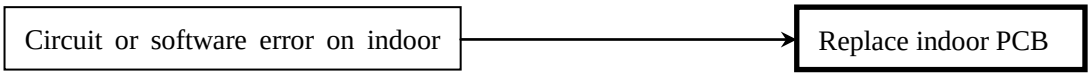


Indoor unit display	LED STATUS
P3	Compressor current protection

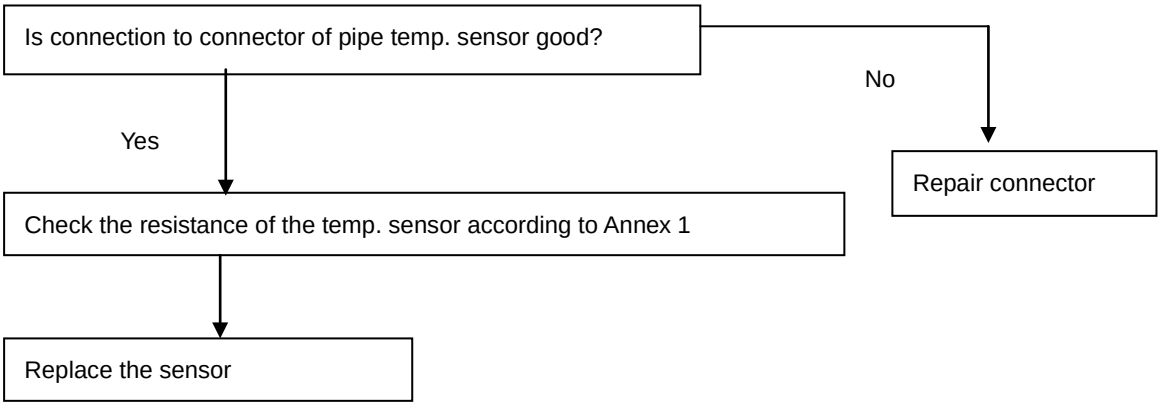
The trouble shooting is same with one of outdoor unit P3 protection.

8.4.1 Outdoor unit trouble shooting

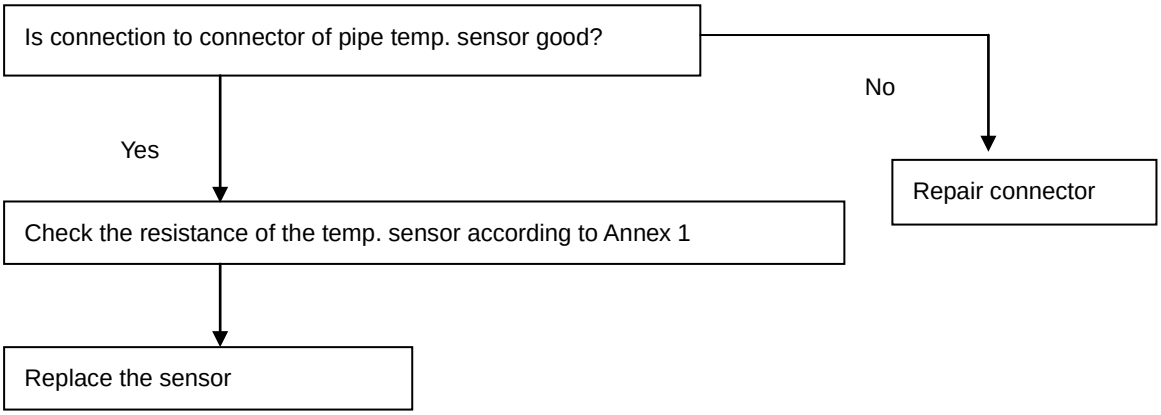
Outdoor unit display	LED STATUS
E0	EEPROM error



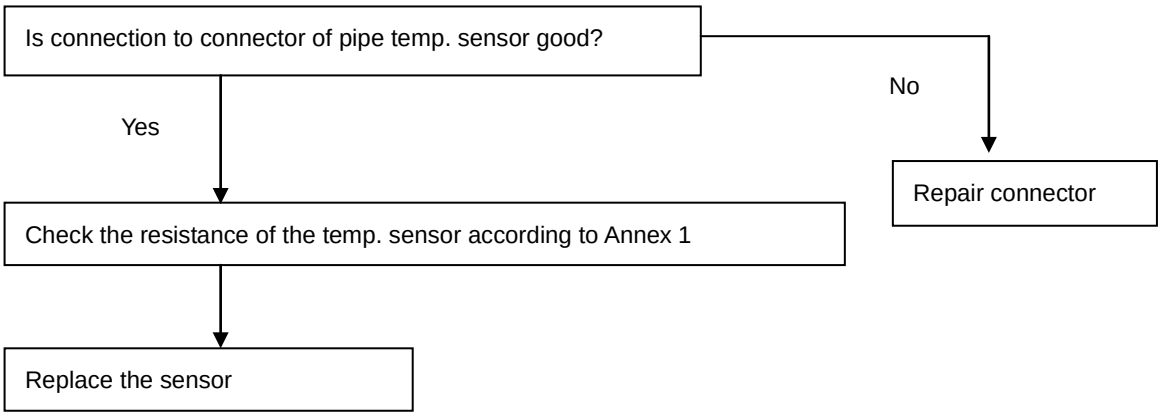
Outdoor unit display	LED STATUS
E1	No 1 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective



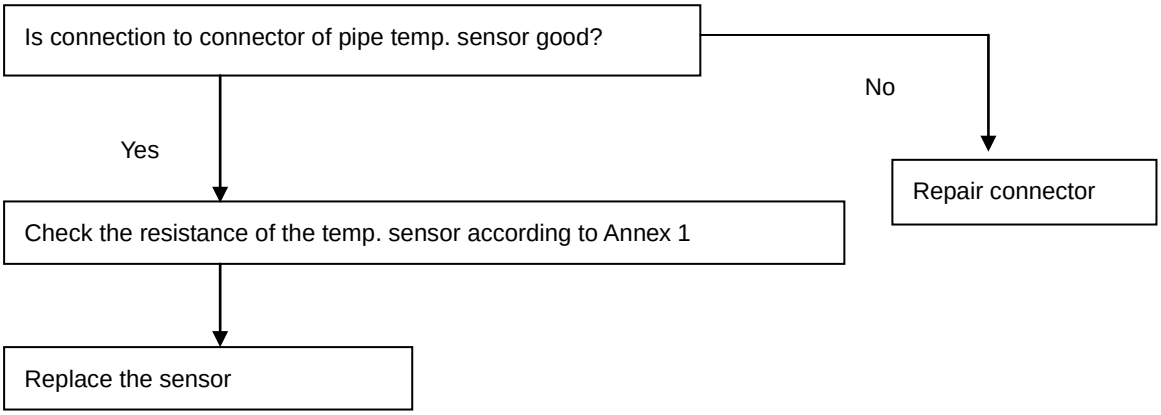
Outdoor unit display	LED STATUS
E2	No 2 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective



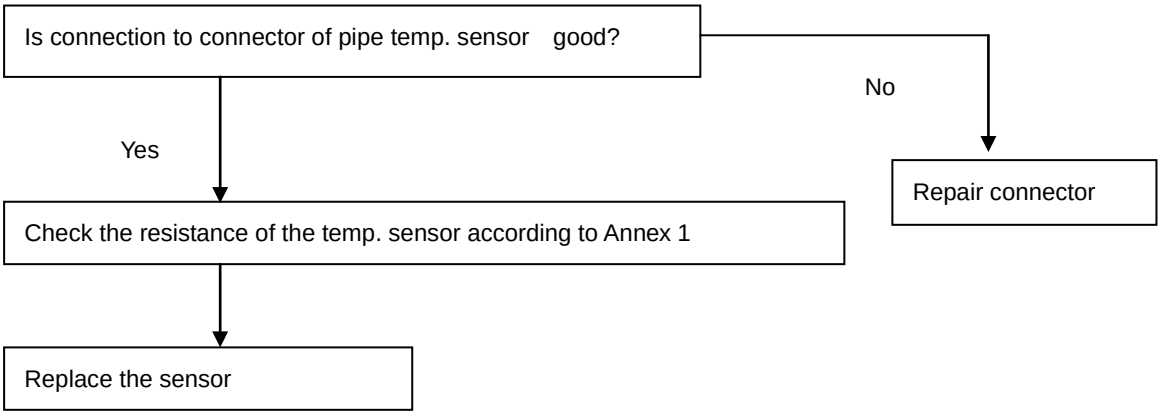
Outdoor unit display	LED STATUS
E3	No 3 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective



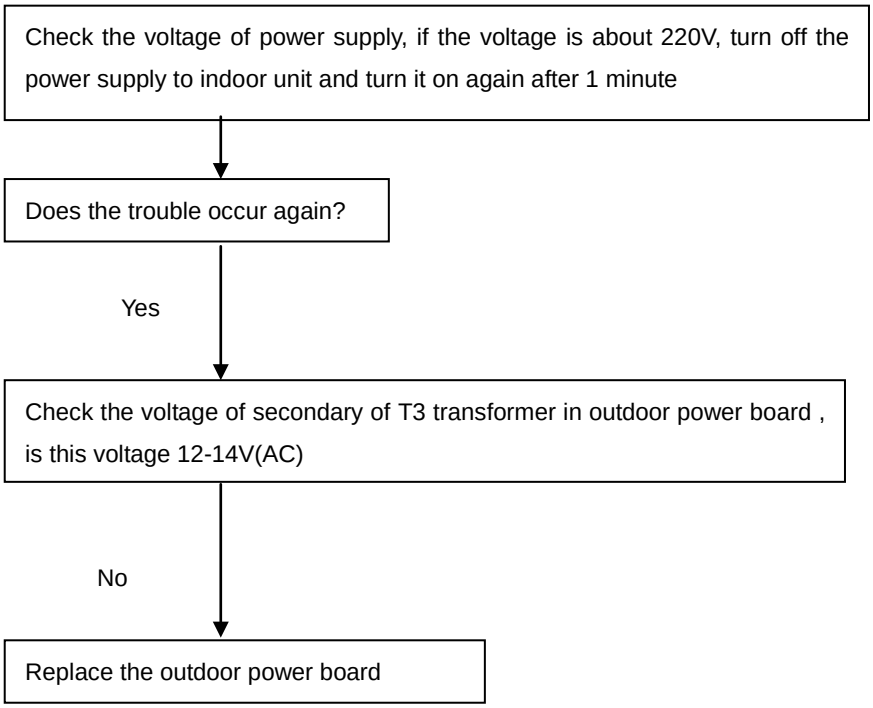
Outdoor unit display	LED STATUS
E6	No 4 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective



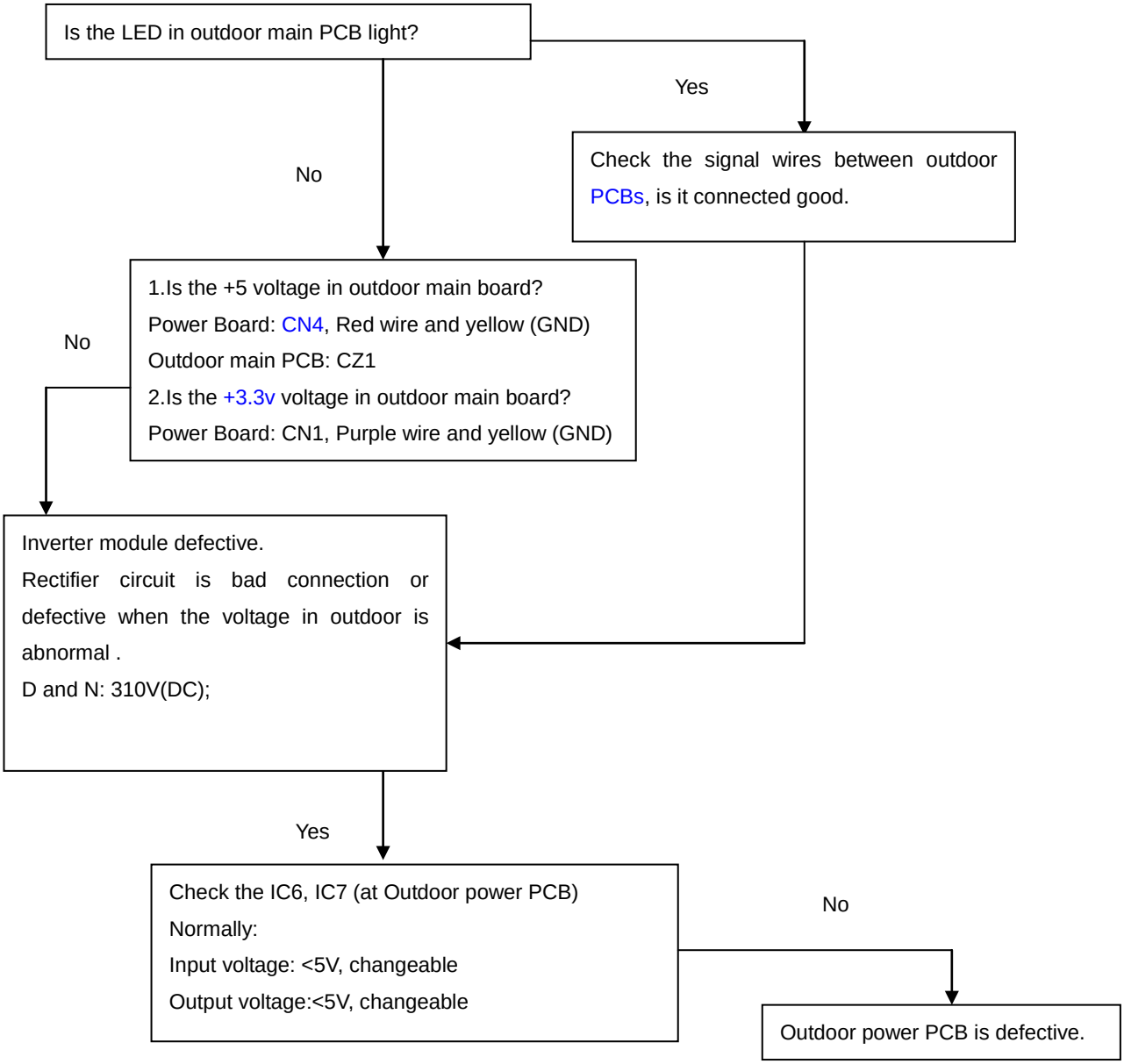
Outdoor unit display	LED STATUS
E4	Outdoor units temp. sensor or connector of temp. sensor is defective



Outdoor unit display	LED STATUS
E5	Compressor volt protection


Check the voltage of power supply, if the voltage is about 220V, turn off the power supply to indoor unit and turn it on again after 1 minute
Does the trouble occur again?
Yes
Check the voltage of secondary of T3 transformer in outdoor power board , is this voltage 12-14V(AC)
No
Replace the outdoor power board

Outdoor unit display	LED STATUS
E7	outdoor units communication protection

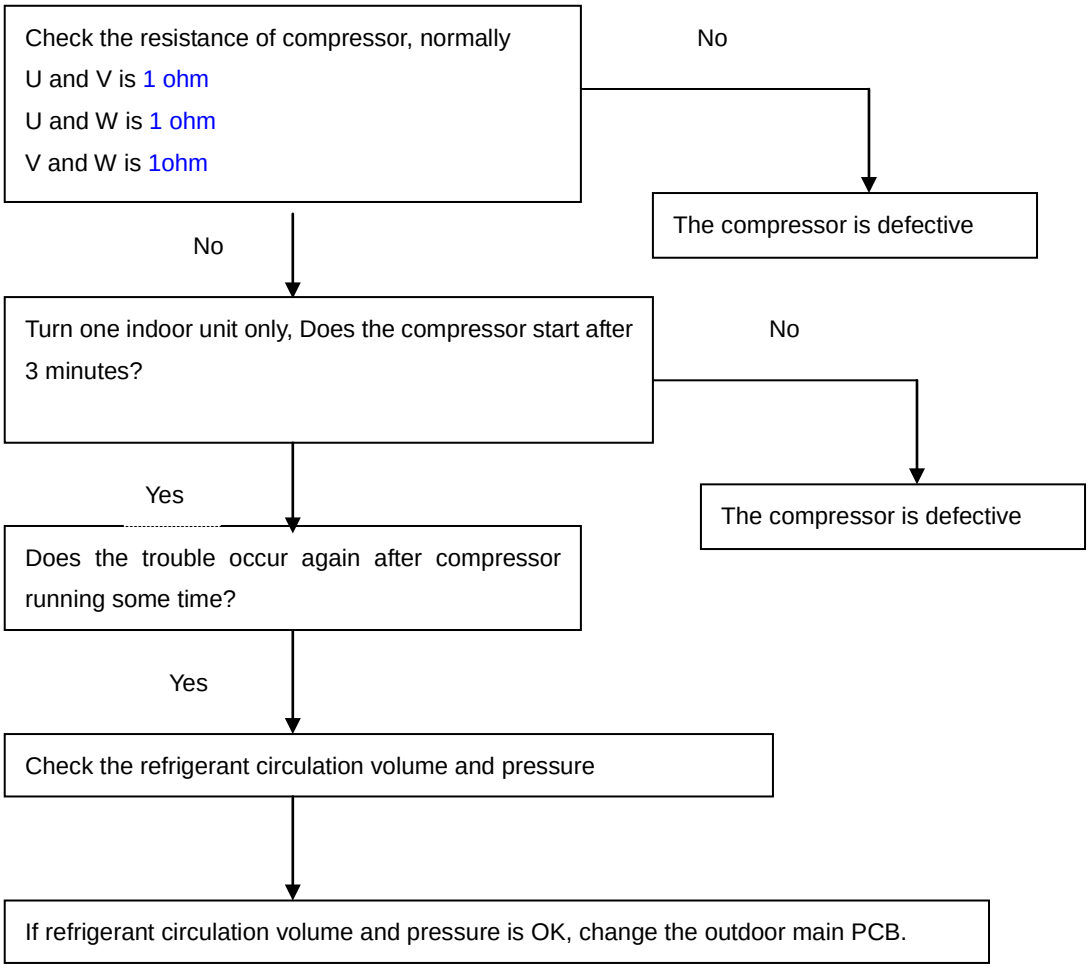


Outdoor unit display	LED STATUS
P0	Compressor top protection against temperature

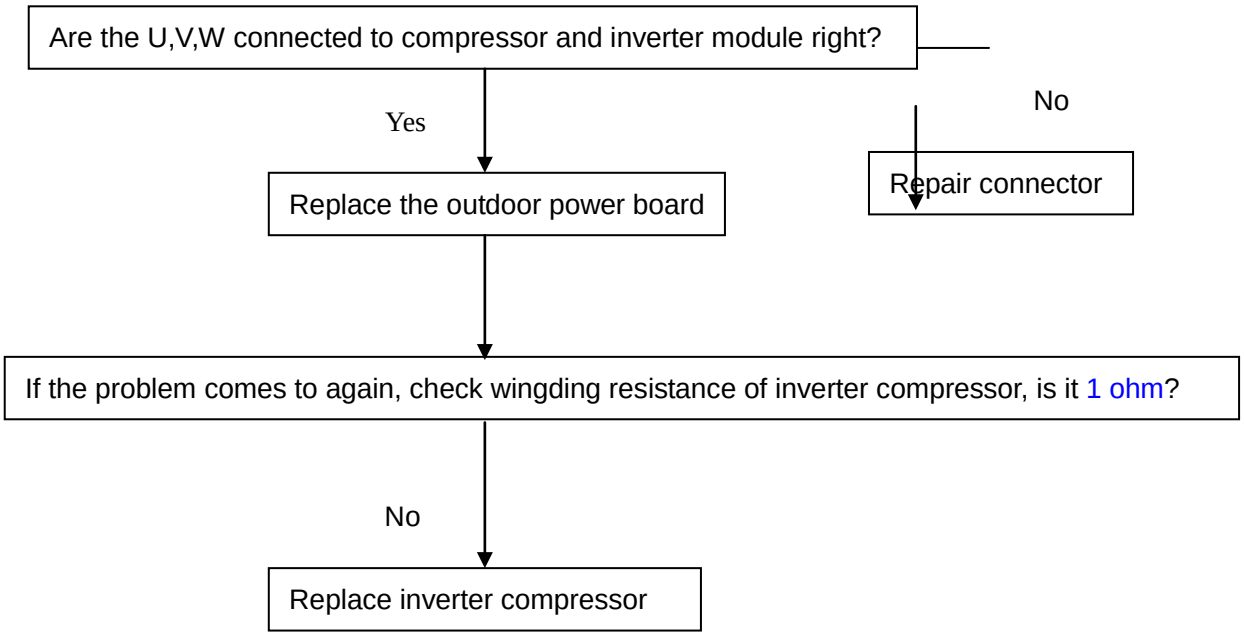
Off: 105c; On: 90c

The trouble shooting is same with the one of indoor unit P2 protection.

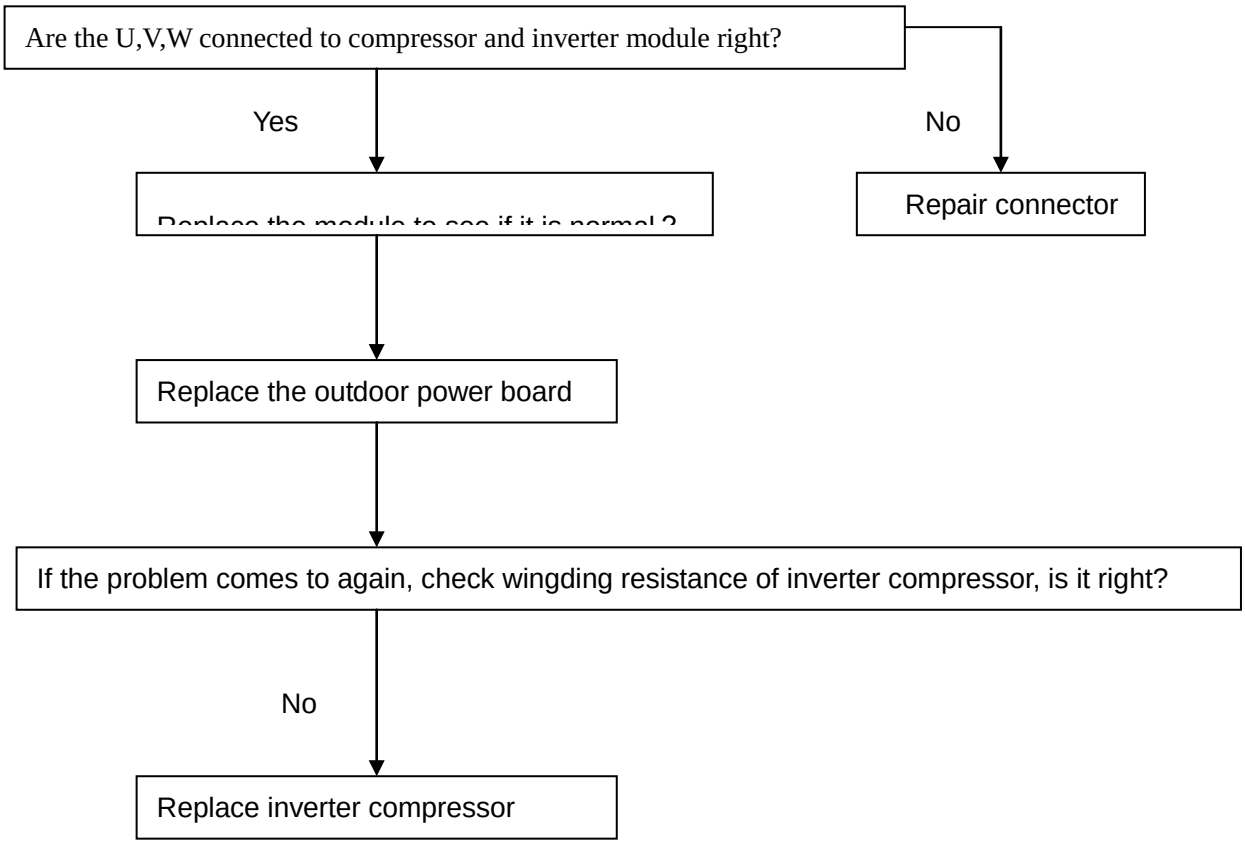
Outdoor unit display	LED STATUS
P3	Compressor current protection



Outdoor unit display	LED STATUS
P4	Compressor drive malfunction (drive protection arose)

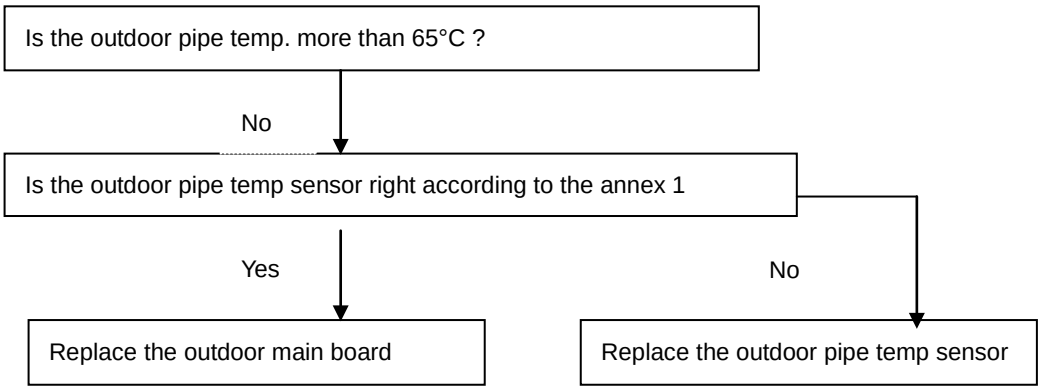


Outdoor unit display	LED STATUS
P4(LED flashes for nine times)	Compressor drive malfunction (module protection arose)



Outdoor unit display	LED STATUS
P6	Condenser high-temperature protection

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



Annex 1

Characteristic of temp. sensor

Temp.□	Resistance KΩ		Temp.□	Resistance KΩ		Temp.□	Resistance KΩ
-10	62.2756		17	14.6181		44	4.3874
-9	58.7079		18	13.918		45	4.2126
-8	56.3694		19	13.2631		46	4.0459
-7	52.2438		20	12.6431		47	3.8867
-6	49.3161		21	12.0561		48	3.7348
-5	46.5725		22	11.5		49	3.5896
-4	44		23	10.9731		50	3.451
-3	41.5878		24	10.4736		51	3.3185
-2	39.8239		25	10		52	3.1918
-1	37.1988		26	9.5507		53	3.0707
0	35.2024		27	9.1245		54	2.959
1	33.3269		28	8.7198		55	2.8442
2	31.5635		29	8.3357		56	2.7382
3	29.9058		30	7.9708		57	2.6368
4	28.3459		31	7.6241		58	2.5397
5	26.8778		32	7.2946		59	2.4468
6	25.4954		33	6.9814		60	2.3577
7	24.1932		34	6.6835		61	2.2725
8	22.5662		35	6.4002		62	2.1907
9	21.8094		36	6.1306		63	2.1124
10	20.7184		37	5.8736		64	2.0373
11	19.6891		38	5.6296		65	1.9653
12	18.7177		39	5.3969		66	1.8963
13	17.8005		40	5.1752		67	1.830
14	16.9341		41	4.9639		68	1.7665
15	16.1156		42	4.7625		69	1.7055
16	15.3418		43	4.5705		70	1.6469

Annex 2

1. Reference voltage data:

   a) Rectifier : Input :220-230V(AC), output :310V(DC)

   b) Inverter module: U,V, W 3ph.

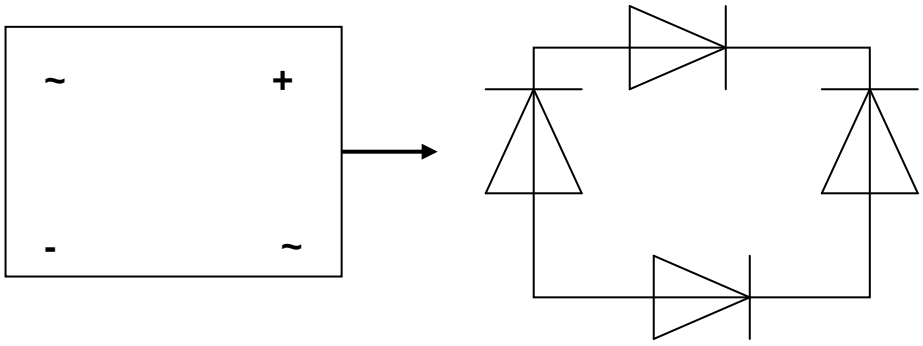
	Result
U-V	60-150V(AC)
U-W	60-150V(AC)
V-W	60-150V(AC)
P-N	DC 310V

   c) Photo-couple PC817, PC851: Control side <+5V, AC side :< 24V(AC)

   d) S terminal and N: changeable from 0-24V

2. Check the Diode Bridge component (In wiring diagram, rectifier)

Remark: If this part is abnormal, the LED will not light.



Multi-meter		Result	
		Forward Resistance	Backward Resistance
+	—	Infinite	Infinite
~	+	~500 ohm	Infinite
~			
-	~	~500 ohm	Infinite
	~		