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Air Conditioner Service Manual



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каталоги, инструкции, сервисные мануалы, схемы.

Model : AC-S24CG

Content

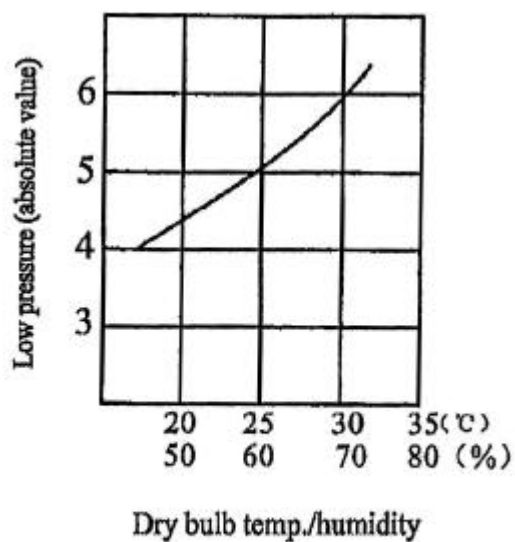
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TECHNICAL SPECIFICATION

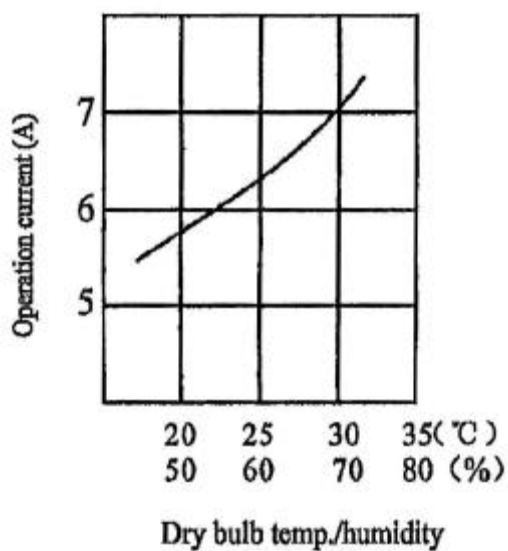
Content		AC-S25CG	
Function		Cooling	
Power supply		1Ph-220V-50Hz	
Capacity	W	6000	
Rated input	W	2600	
Rated current	A	11.3	
Air flow	M ³ /h	720	
Dehumidifying volume	L/h	2.4	
EER(W/W)		2.3	
Indoor unit	Motor fan speed(r/min)	1400/1200/1100	
	Output power(w)	20	
	Fan type/piece	Cross flow fan-1	
	Diameter-length(mm)	90 x 723	
	Evaporator	Aluminum fin-copper tube	
	Row-fin distance(mm)	3-1.5	
	Working area(mm ²)	733 x 330	
	Swing motor	MP24EA	
	Input/Power(W)	50	
	Fuse(A)	Controller 3.15A Transformer 0.2A	
	Working capacitor(F)	1	
	Noise(dB(A))	<48 / =48	
	Dimension(width-height-depth)(mm)	907 x 290 x 195	
	Net weight(Kg)	12	
Outdoor unit	Input power	W	2530
	Current	A	11.0
	L.R.A.	A	60
	Throttling method	Capillary	
	Compressor	SHV33YE6UU (revolving type)	
	Power	W	2335
	Protector	External overload protection	
	Starting method	By capacitor	
	Working temp.	Exhaust temperature <115/ =115	
	Condenser	Aluminum-copper	
	Pipe-diameter	9.52	
	Working area(m ²)	0.65	
	Fan motor speed(rpm)	815	
	Type-piece	Axial fan-1	
	Diameter(mm)	460	
	Defrosting method	Auto defrost	
	Noise(dB(A))	59	
	Dimension(mm)(width-height-depth)	950 x 710 x 410	
	Net weight(Kg)	59	
	Refrigerant charge(kg)	R22/1.6	
Connecting pipe	Outer diameter	Liquid pipe	3/8"
		Gas pipe	5/8"
	Max distance	Height(m)	5
		Length(m)	10

PERFORMANCE CURVE

The change relation between low pressure, operation current and temp.
Cooling operation condition: In testing, indoor and outdoor have same work condition.



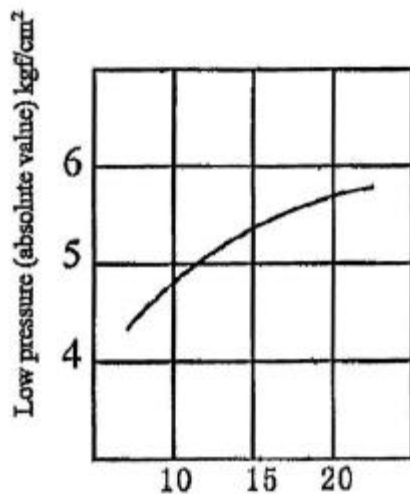
(a)



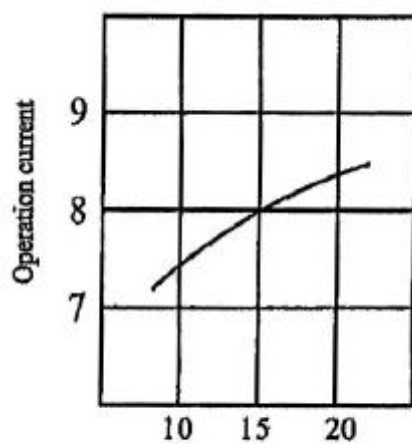
(b)

Heating operation

Indoor work condition: dry bulb temp. 21, wet bulb temp. 15.5 °C .



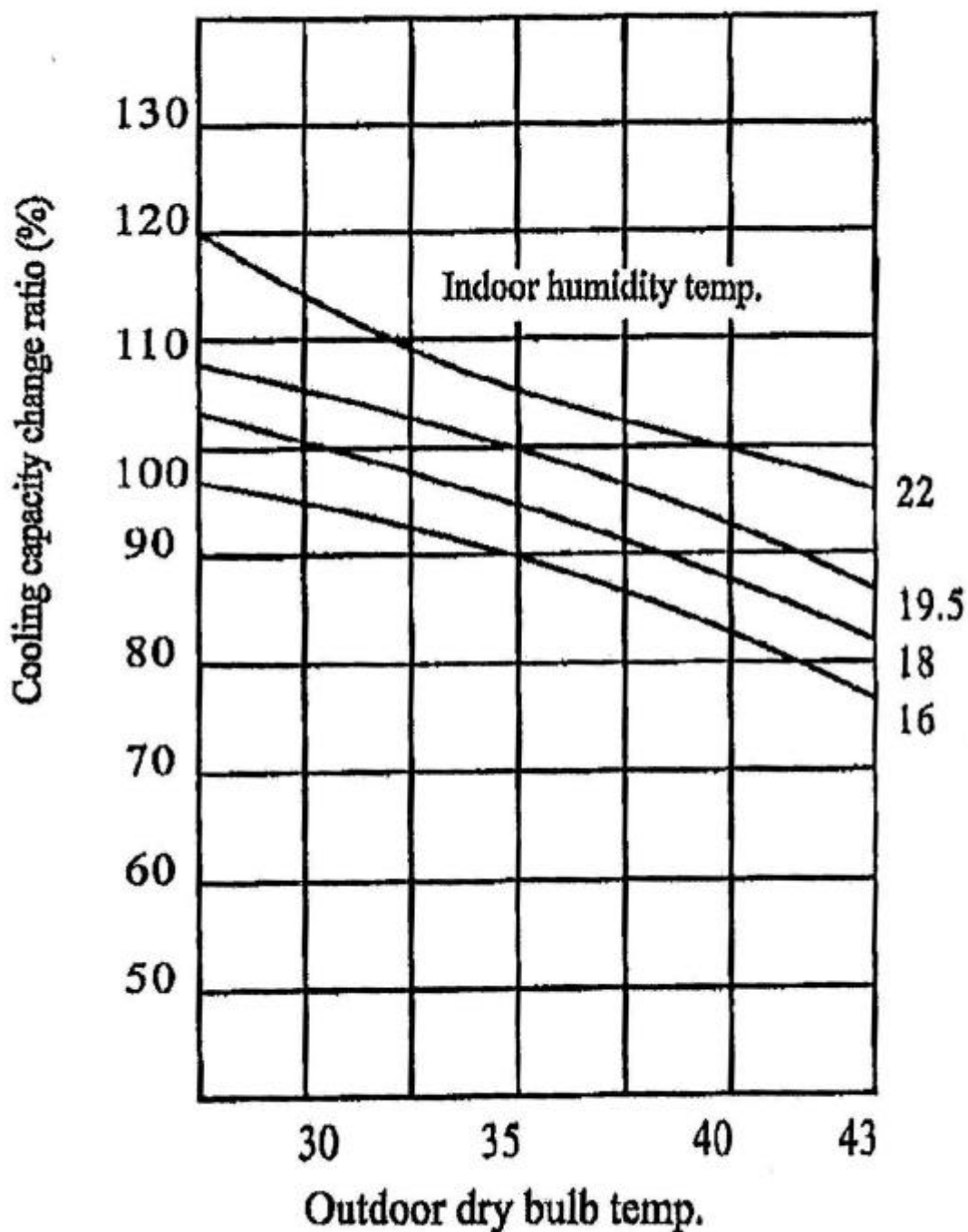
Outdoor dry bulb temp.
(c)



Outdoor dry bulb temp.
(d)

Cooling performance

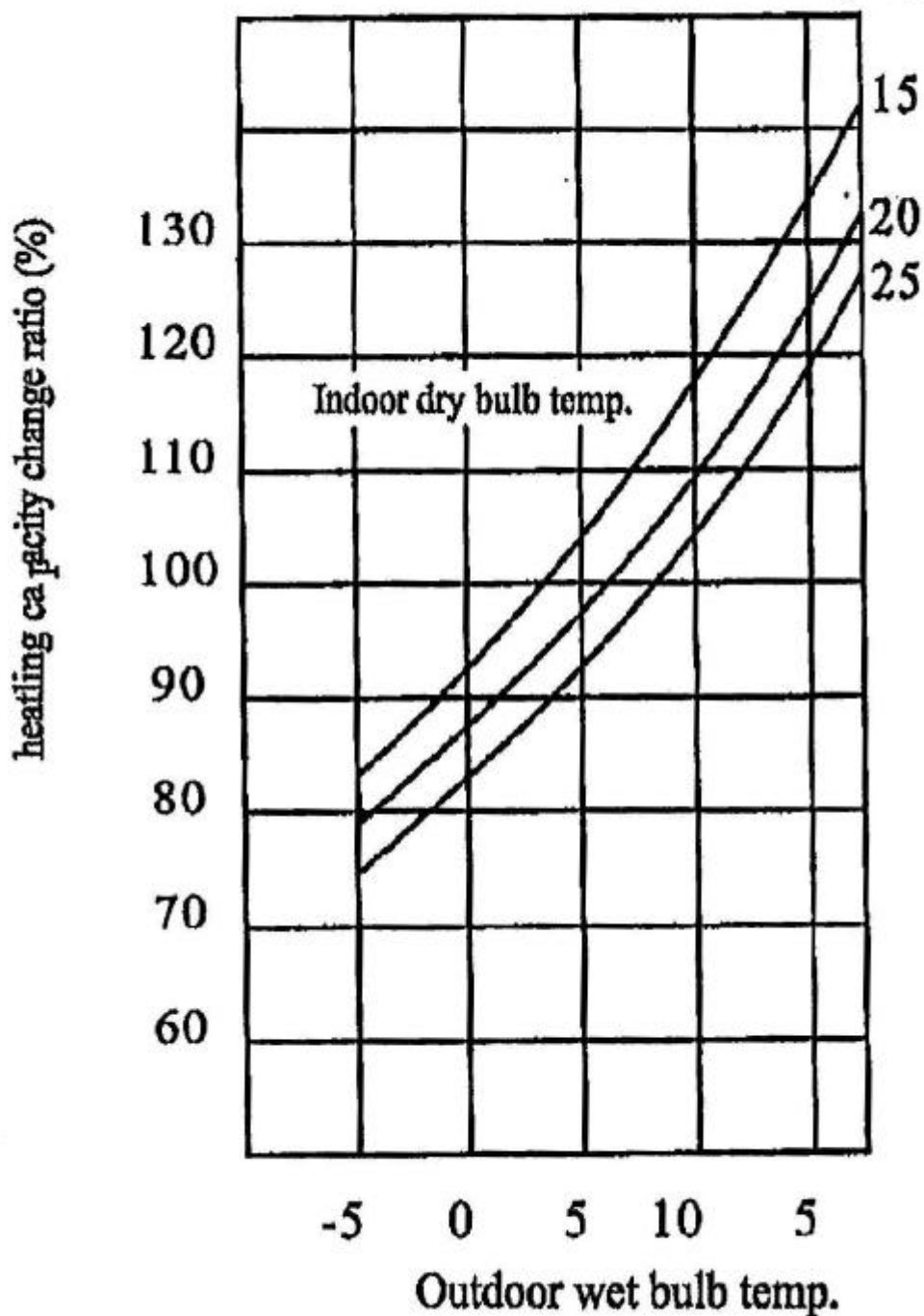
Indoor relative humidity 50%



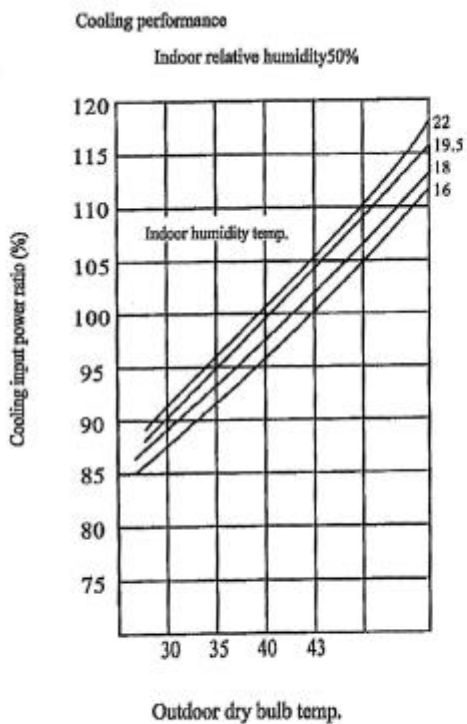
(a)

Heating performance (not including electric heater)

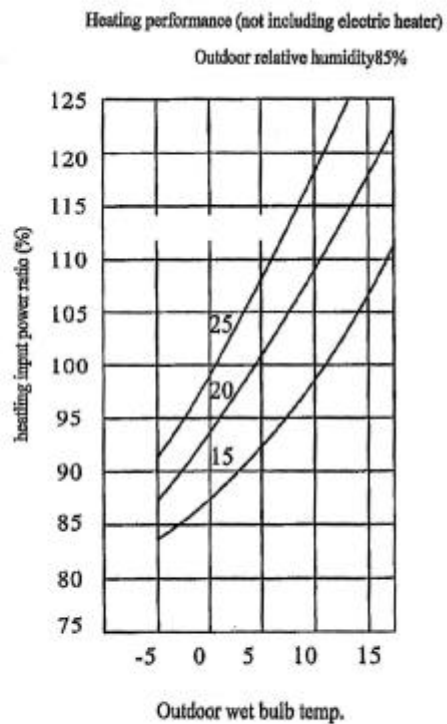
Outdoor relative humidity 85%



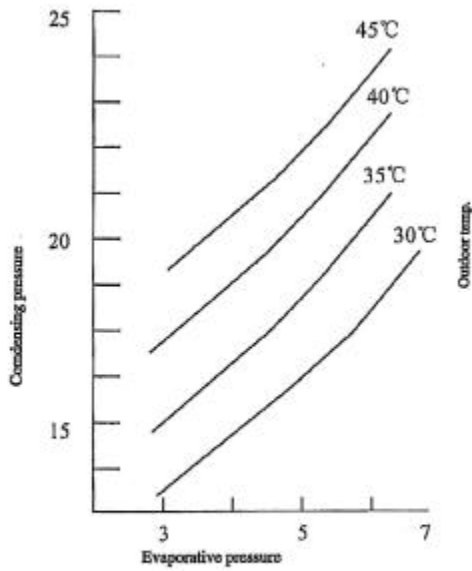
(b)



(e)

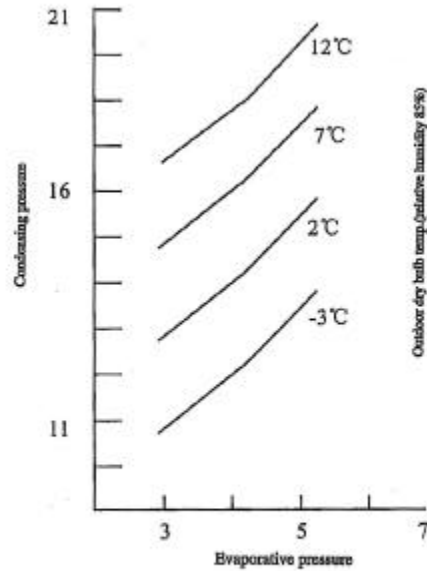


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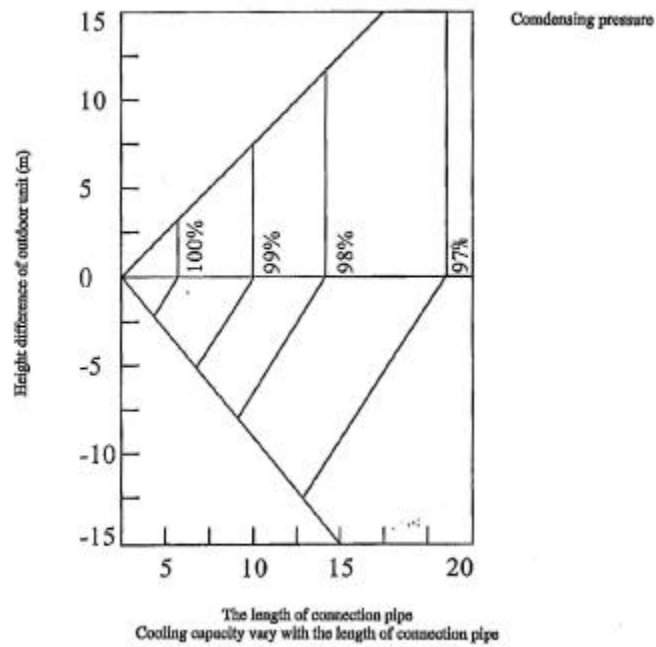


The affection to the charging quantity by pressure under cooling work condition.
The affection to the charging quantity by pressure under cooling work condition.
(Indoor work condition: dry bulb 27°C, wet bulb 19.5°C) (Indoor work condition: dry bulb 21°C)

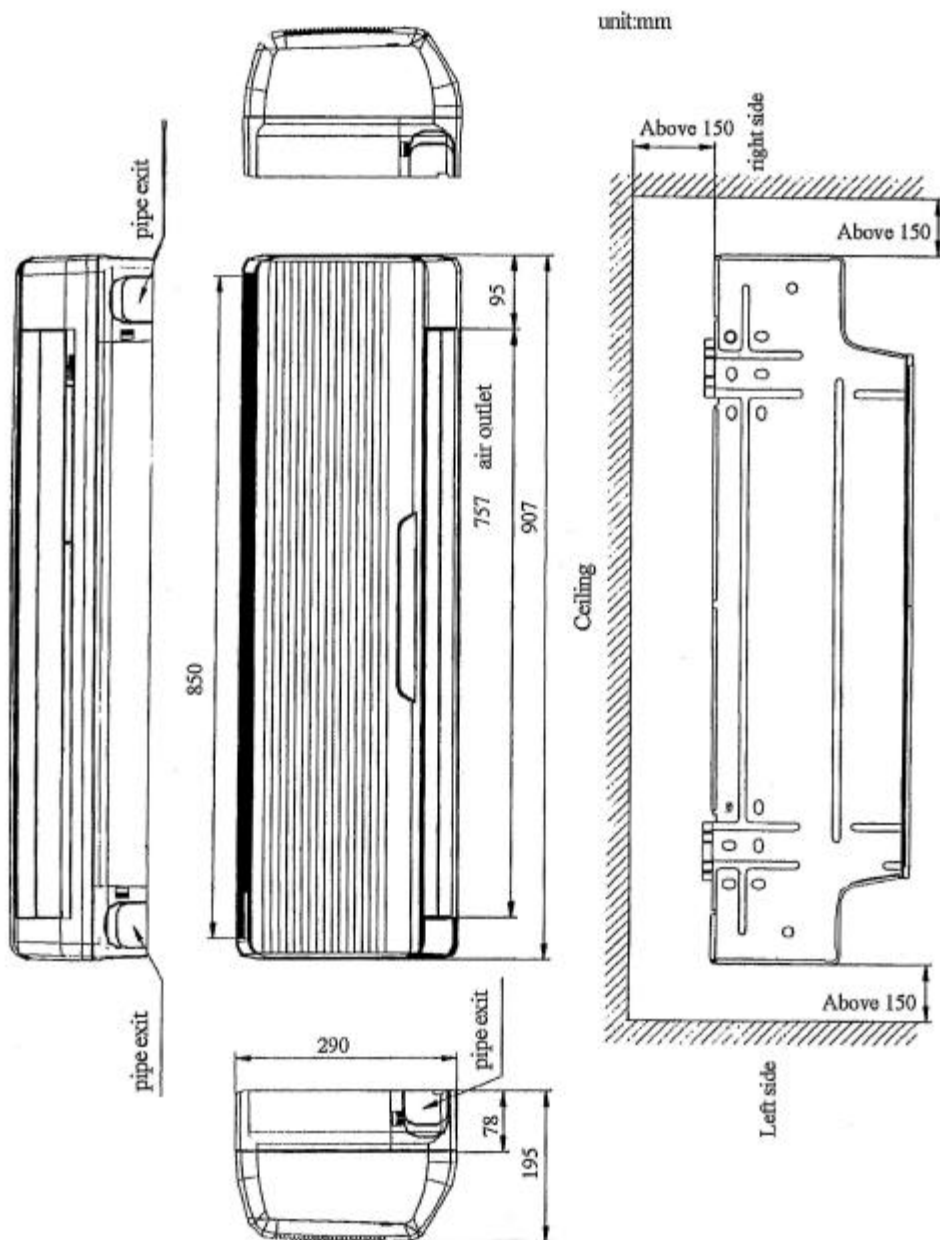
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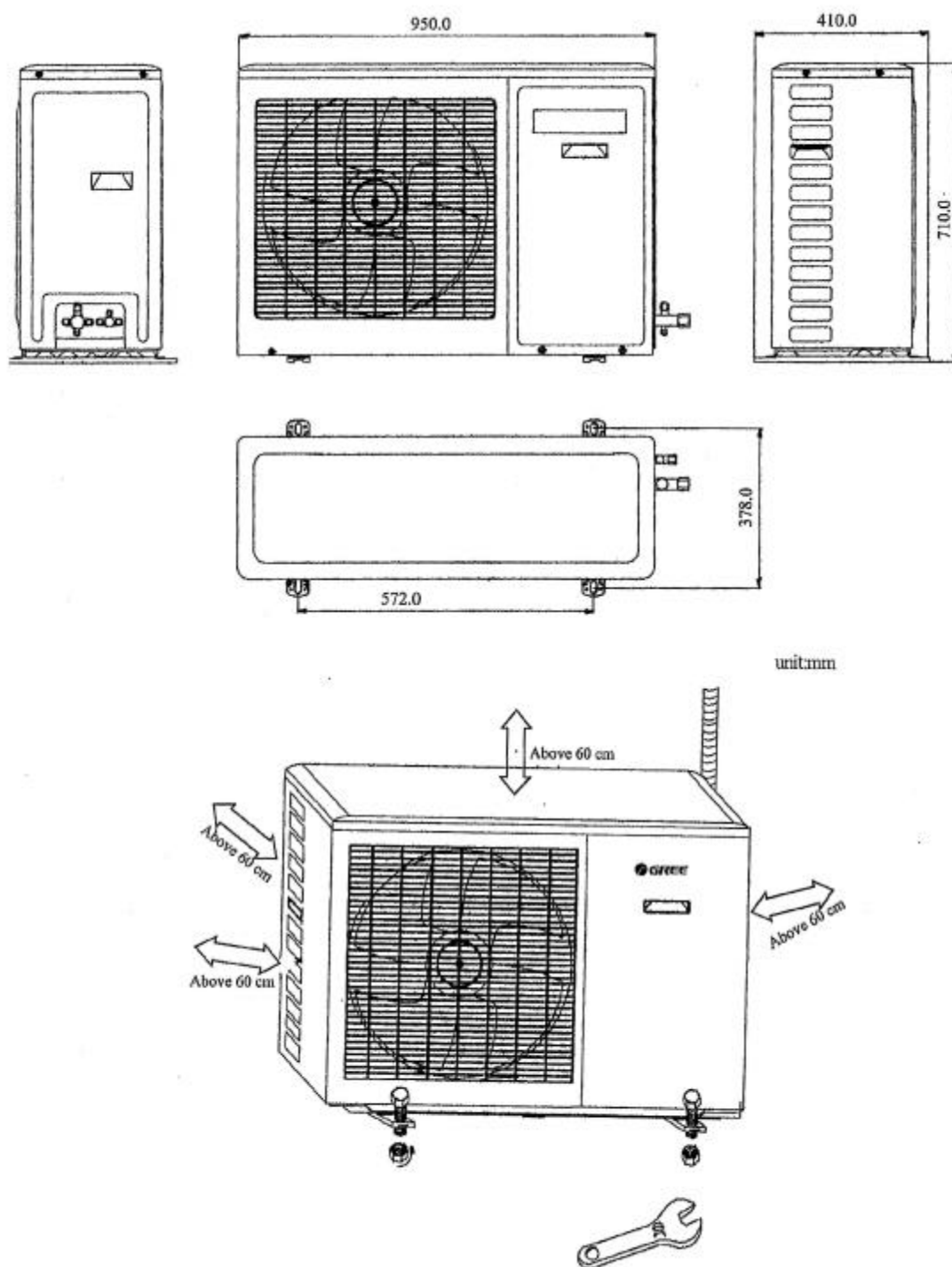
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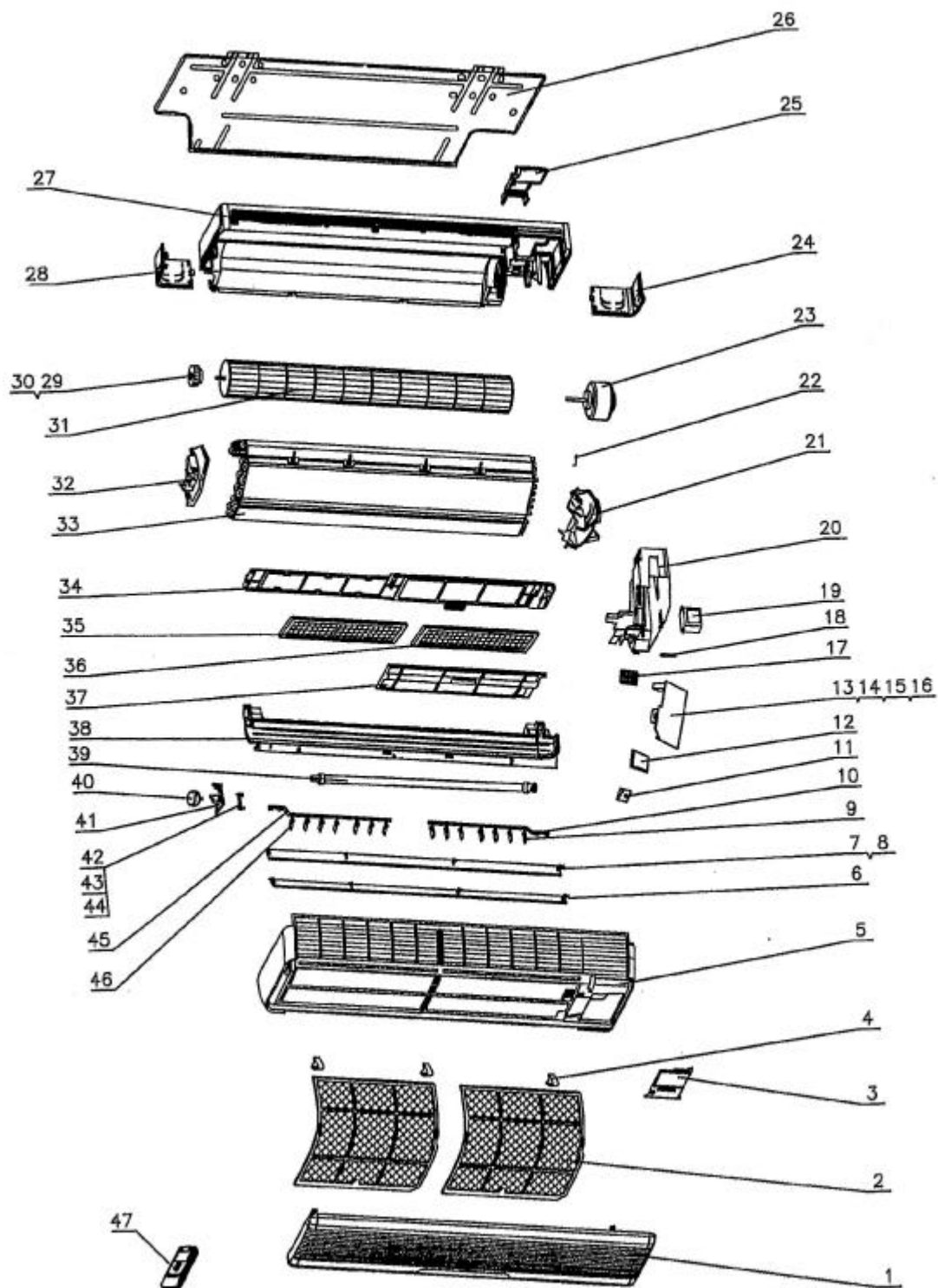
OUTLINES AND DIMENSIONS OF INDOOR UNIT



OUTLINES AND DIMENSIONS OF OUTDOOR UNIT



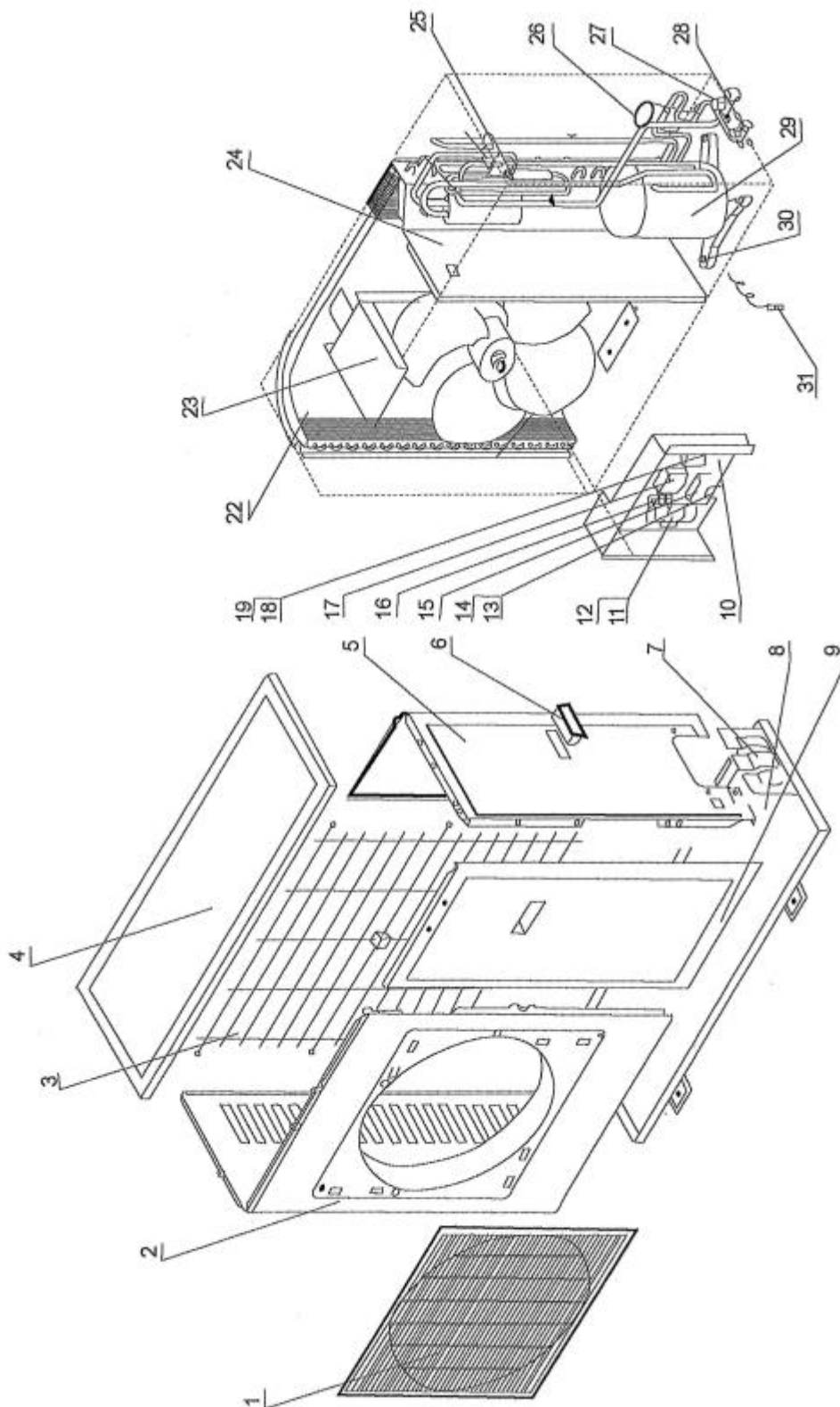
EXPLODED VIEW OF INDOOR UNIT



SPARE PARTS LIST OF INDOOR UNIT

No.	Description	Part No.	Qty
1	Front Panel	20002010	1
2	Filter	11122021	2
3	Electric Box Cover	20102011	1
4	Screw Cover	24252011	3
5	Front Case Assy	20002013	1
6	Lower Guide Louver	10512012	1
7	Upper Guide Louver	10512011	1
8	Guide Louver Bearing	10542011	6
9	Right Swing Louver	10512014	7
10	Right Connecting Lever	10582015	1
11	LED Board	30046005	1
12	LED Holder	24212007	1
	PCB 5D51-2		1
13	PCB 5D52-2		
	PCB 5D51H2	30025524	1
	PCB 5D52H2		1
14	Tube Sensor	39000057	1
15	Room Sensor	39000042	1
16	Fuse 3.15A 250VAC	46010014	1
17	Terminal Board	42011039	1
18	Wire Clip	70482401	2
19	Transformer	43110176	1
20	Electric Box	20102012	1
21	Right Evaporator Supporter	01072012	1
22	Sensor Insert	42020064	1
23	Motor FN20D-PG	15012102	1
24	Right gate	26112012	1
25	Pipe Clamp	24242014	1
26	Wall-Mounting Frame	01252200	1
27	Rear Case	22202011	1
28	Left Gate	26112011	1
29	Ring of Bearing	76512205	1
30	Fan Bearing	76512210	1
31	Cross Flow Fan	10352021	1
32	Left Evaporator Supporter	01072011	1
33	Evaporator Assy	1002009	1
34	Air Cleaner holder	24222014	1
35	Air Cleaner A	11012021	1
36	Air Cleaner B	11012022	1
37	Air Cleaner Frame	26112013	1
38	Water Tray Assy	20182010	1
39	Drainage Pipe	05232004	1
40	Stepping Motor MP24EA	15212101	1
41	Stepping Motor Backseat	26152011	1
42	Upper Swing Lever	10582011	1
43	Lower Swing Lever	10582012	1
44	Connecting Lever	10582013	1
45	Left Connecting Lever	10582014	1
46	Left Swing Louver	10512013	7
47	Remote Controller	30512505	1

EXPLODED VIEW OF OUTDOOR UNIT

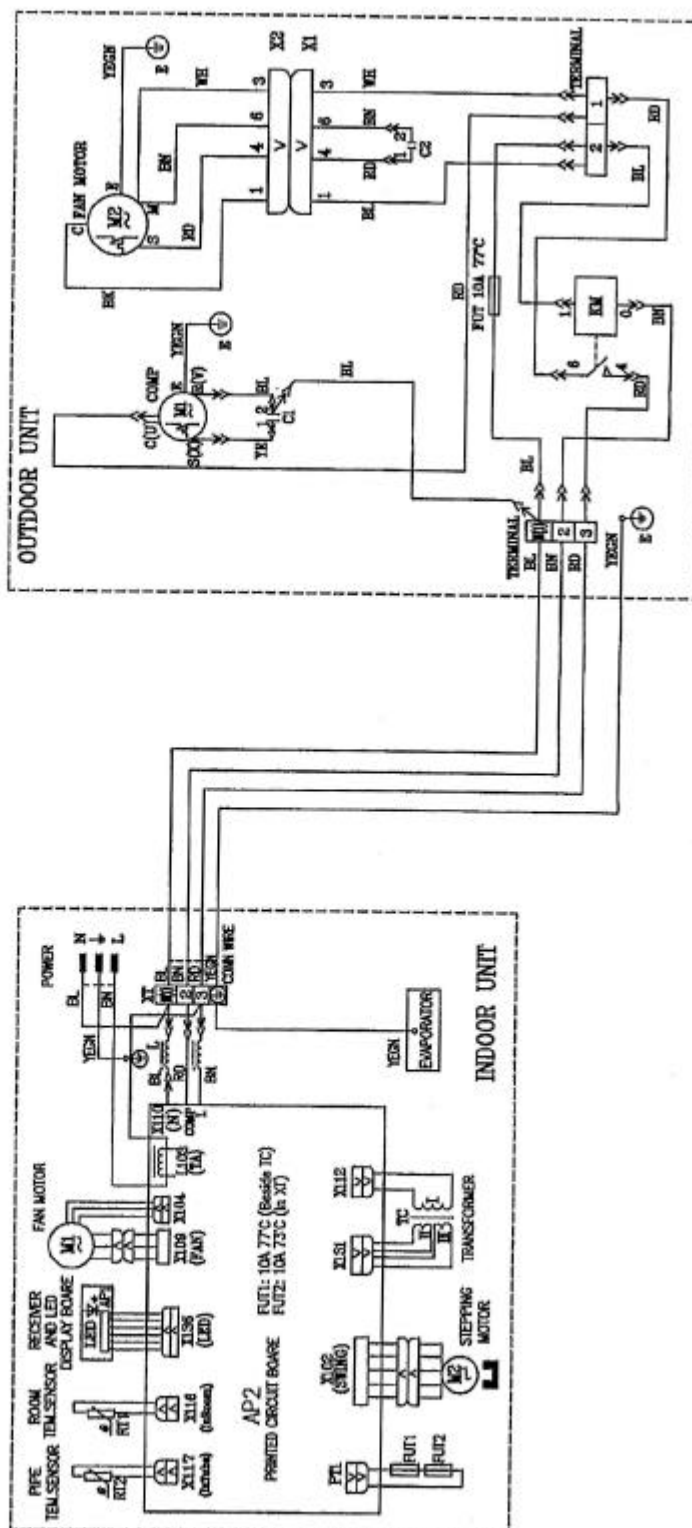


SPARE PARTS LIST OF OUTDOOR UNIT

No.	Description	Part no.	Qty
1	Front Grill	22265250	1
2	Front Plate	01433030	1
3	Rear grill Assy	01473024	1
4	Top cover Assy	01255260	1
5	Rear Side Plate	01305001	1
6	Handle	26235253	2
7	Valve Support	01715256	1
8	Metal Base	01205032	1
9	Front Side Support	01303019	1
10	Electric Plate	20102007	1
11	Capacitor clamp	02143442	1
12	Comp Capacitor 50uF	33010710	1
13	Wire Clamp	71010102	2
14	Insulation Gasket D	70410525	1
15	Terminal Board	42011073	1
	Fan Capacitor 2.5uF		1
16	Fan Capacitor 3uF	33010027	1
17	Relay	44020311	1
18	Terminal Board 2-8	42011103	1
19	Filter Capacitor		1
20	Axial Flow Fan	10335253	1
	Motor LW80D		1
21	Motor LW80B	15015053	1
	Condenser Assy		1
			1
22	Condenser Assy		
	Condenser Assy	01105132	1
	Condenser Assy		1
23	Motor Support	01703027	1
24	Isolation Sheet Assy	01233022	1
25	4-way Valve	43000313	18
26	Capillary Assy	03003137	1
	Valve		1
27	Valve	07105252	1
	Valve		1
		07105256	1
28	Valve		
	Valve		1
			1
29	Compressor SHW33T4C-U		
	Compressor SHV33YE6UU	00100144	1
30	Nut with Washer M8	70310015	3
31	Tube Sensor		1

CIRCUIT DIAGRAM

These circuit diagrams are subject to change without notice.
Please refer to the ones stuck on the machines.



PCB FUNCTION MANUAL

5 In 1 PCB Function manual

A. Running mode

1. Cooling
2. Dehumidifying
3. Heating
4. Fan
5. Auto

B. Input parameters

1. Indoor ambient temp. T in
2. Evaporator tube temp. T eva
3. Setting temp. T set
4. Condenser tube temp. T con
5. Outdoor ambient temp. T out

C. Targets

1. Indoor motor (PG motor)
2. Swing motor
3. Outdoor motor (two speeds motor)
4. Compressor
5. Four-way reversing valve
6. Electric heater
7. Fresh motor
8. Air cleaner

D. Fundamental functions

Cooling mode

- 1 The running conditions and control measures
 - a. if $T_{in} > T_{set} + 1^{\circ}\text{C}$, the machine runs at the cooling mode. Compressor runs, outdoor motor runs at low speed , indoor fan runs at the set fan speed.
 - b. if $T_{in} < T_{set} - 1^{\circ}\text{C}$, the machine stops. Compressor stops first , outdoor motor stops after 15 seconds , indoor motor runs at the set fan speed.
 - c. if $T_{set} - 1^{\circ}\text{C} < T_{in} < T_{set} + 1^{\circ}\text{C}$,keep the previous state.
- 2 In this mode, the reversing valve is inactive, the temp. setting range is from 16~30°C .
- 3 Protect function
 - a. anti-freezing function.
 - i. if compressor have run 6 minutes , and detect $T_{eva} < 0^{\circ}\text{C}$ for continuous 3 minutes, then the compressor, outdoor fan stopped , indoor fan run at the set fan speed. After 3 minutes later, it will run at the original state if $T_{eva} > 10^{\circ}\text{C}$ or $= 10^{\circ}\text{C}$.
 - b. compressor protection
 - i. Compressor's starting interval should be more than 3 minutes no matter in whatever modes and conditions. If it's plugged in first time, the compressor does not have 3 minutes delay. When compressor is started, it will not stop within 5 minutes unless it is plugged out.

- c. overload protection
 - i. If it detect the system current surpass the designed 13 A for continuous 3 minutes, the machine go into fan mode, when 3 minutes passed and it detect the current no more than 13 A, it will back to original state. If it detects overloading states for 3 consecutive times within 30 minutes, the machine stops, and must be restarted by remote controller.
- d. locked motor protection
 - i. if it detects no feedback from the PG motor for continuous 15 seconds , the machine stops, after 3 minutes delay, the machine backs to original state. If the motor be detected locked for 3 consecutive times, the whole machine stops and can not run again automatically.

Dehumidifying mode

- 1 The working conditions and control measures
 - a. If $T_{in} > T_{set} + 2^{\circ}\text{C}$, it is in cooling running, the indoor motor speed can be selected ,and outdoor motor run at low speed.
 - b. If $T_{set} - 2^{\circ}\text{C} < \text{or} = T_{in} < \text{or} = T_{set} + 2^{\circ}\text{C}$, it goes into dehumidifying running ,the indoor motor run at the low speed, 6 minutes later the compressor stops, another 15 seconds later the outdoor fan stops and another 30 seconds later, the indoor motor stops, 3 and a half minutes later, compressor and outdoor fan run again ,indoor motor runs at the low speed, then the machine cycle the above procedures repeatedly. outdoor motor runs at the low speed.
 - c. If $T_{in} < T_{set} - 2^{\circ}\text{C}$, compressor, outdoor motor and indoor motor stop.
- 2 In this mode, the reversing valve is inactive , the temp. setting range is 16~30 .
- 3 Anti-freezing protection.
 - a. If $T_{indoor} > T_{set} + 2^{\circ}\text{C}$, it goes into cooling running , anti-freezing function is same with cooling mode, but the compressor must stops for 4 minutes. when it goes into dehumidifying mode, compressor runs 6 minutes , if it detects $T_{eva} < 0^{\circ}\text{C}$ compressor and outdoor motor stop, indoor motor runs at low speed ,after 3 minutes delay, and $T_{eva} > \text{or} = 10^{\circ}\text{C}$, it will be back to its original state.
- 4 Overload is same as the one in cooling mode.

Heating mode

- 1 The working conditions and control measures
 - a. If $T_{in} < \text{or} = T_{set} + 2^{\circ}\text{C}$, it goes into heating mode, reversing valve, compressor and outdoor motor all work in the same time, indoor fan will run at the same procedures with anti cool air function.
 - b. If $T_{in} > \text{or} = T_{set} + 4^{\circ}\text{C}$, compressor stops first, 15 seconds late, outdoor motor stops ,but re versing valve keeps working, indoor motor run at the procedures of blowing surplus heat.
 - c. if $T_{set} + 2^{\circ}\text{C} < T_{indoor} < T_{set} + 4^{\circ}\text{C}$, keep the previous running state.
 - d. If $T_{outdoor} < \text{or} = 3^{\circ}\text{C}$, outdoor runs at high speed, if $T_{outdoor} 5^{\circ}\text{C}$,outdoor motor runs at low speed .if $3^{\circ}\text{C} < \text{or} = T_{outdoor} 5^{\circ}\text{C}$,keep the previous running state.
- 2 In this mode, the temperature setting range is from 16~30°C .
- 3 The working conditions of auxiliary electric heater.
 - a. In heating mode, when compressor is working, indoor motor runs at high speed and middle speed. if it detect $T_{eva} < 50^{\circ}\text{C}$ for continuous 8 seconds and $T_{indoor} 25^{\circ}\text{C}$, electric heater will work ,if compressor stop or indoor motor runs at low speed or $T_{eva} > \text{or} = 54^{\circ}\text{C}$ or $T_{indoor} 28^{\circ}\text{C}$ or 10 seconds before defrosting , the electric heater will stop.

4 Protections

- a. Anti cool air
 - i. When the machine starts heating and $T_{eva} \geq 22^{\circ}\text{C}$, indoor motor runs at low speed, and swing motor makes the louver at the horizontal position (in Bird line, it will swing to the maximum air volume position), if $T_{eva} 40^{\circ}\text{C}$ or compressor have run 2 minutes, indoor motor and swing motor will run at the set speed.
- b. Anti high temp.
 - i. In heating mode, if it detect $T_{eva} \geq 56^{\circ}\text{C}$ (58°C can be selected), outdoor motor will stop (in this period it will not detect the defrosting temp.). if $T_{eva} 52^{\circ}\text{C}$, outdoor motor will be back running (it will not detect defrosting temp. in the first 5 seconds).
- c. Blowing surplus heat
 - i. In heating mode, when set temp is reached, comp. stops first, 15 seconds later outdoor fan stops, Indoor motor blows 90 seconds (60 seconds can be selected) at low speed, swing motor makes the louver at the horizontal position (in Bird line, it will swing to the maximum air volume position).
- d. Compressor's protection is same with the one in cooling mode.
- e. Overload protection
 - i. If it detects that the system current surpassed the designed 13 A for continuous 3 seconds, compressor, electric heater and outdoor motor stop, indoor motor runs the same procedures as the blowing surplus heat condition. After 3 minutes and current no more than 13 A, the machine will be back to its original state, indoor motor runs as the anti cool air condition. If it detects overloading state for 3 consecutive times within 30 minutes, the machine stops, and it must be restarted by remote controller.
- f. Locked motor protection
 - i. if it detects no feedback from the PG motor for continuous 15 seconds, compressor, outdoor motor, indoor motor and electric heater will stop, 3 minutes later, the machine will be back to its original state, indoor motor runs as the anti cool air condition. If the motor was locked for 3 consecutive times, the whole machine stops and can not run again automatically.
- g. Defrosting conditions and procedures
 - i. In heating mode, if compressor has run 44 minutes (in its first 6 minutes it will not detect defrosting temp.), and it has detected $T_{con} \leq -4^{\circ}\text{C}$ for continuous 1 minutes, it begins to defrost, electric heater will stop for 10 seconds (even if electric heater is not working), then indoor motor stops, reversing valve becomes inactive in another 2 seconds, another 2 seconds later, outdoor motor stops, when $T_{con} \geq 10^{\circ}\text{C}$ or defrosting lasts for 10 minutes, outdoor motor and reversing valve becomes active, indoor motor will run as the anti cool air condition, then it cycles again, recalculates the compressor's running time again. (In this period, if any protection works, and after the machine is back to work, it will re-start defrosting state. it will not detect outdoor tube temp when compressor's in its first 6 minutes running)
- h. Noise lowering protection
 - i. When you use RUN/STOP button to switch off the machine, reversing valve will become inactive in 2 minutes.

AUTO mode

- 1 In AUTO mode, standard cooling $T_{set} = 25^{\circ}\text{C}$, standard heating $T_{set} = 20^{\circ}\text{C}$.
- 2 Working procedures
 - a. If $T_{indoor} \geq T_{set} + 1^{\circ}\text{C}$, select cooling mode, from this time, the set temp. is 25°C . If $T_{indoor} \geq T_{set} - 1^{\circ}\text{C}$, compressor and outdoor motor stop, indoor motor runs at the set speed, if $T_{set} - 1^{\circ}\text{C} < T_{indoor} < T_{set} + 1^{\circ}\text{C}$, keep the original state.

- b. If $T_{\text{indoor}} \geq T_{\text{set}} + 2^{\circ}\text{C}$, select heating mode, from this time, the set temp. is 20°C , if $T_{\text{indoor}} \geq T_{\text{set}} + 4^{\circ}\text{C}$, compressor stops first, outdoor motor stops 15 seconds later , reversing valve is always active, indoor motor runs as the blowing surplus heat condition. If $T_{\text{set}} + 2^{\circ}\text{C} < T_{\text{indoor}} < T_{\text{set}} + 4^{\circ}\text{C}$, keeps the original state. Cooling & heating AUTO mode: in AUTO mode, when the machine is switched from heating mode to the other modes, reversing valve becomes inactive in 90 seconds. Cooling only AUTO mode: there is no heating function in this mode.

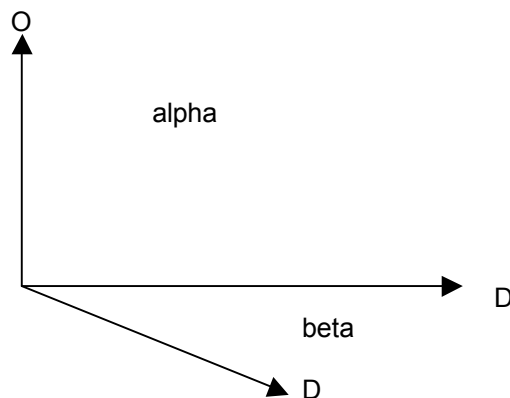
3 Protections

- a. It is same as the one in cooling or heating mode, there is only one exception , the compressor doesn't have at least 5 minutes protection.

E. Other controls

1 SWING mode

- a. When it is active, the louver returns to position O, close the air outlet.
b. When machine works, it turns to the max. Air output position D, then returns back to position L to stand by (position L is the horizontal place mentioned before).
c. In swing state, the louver swings between position L and position D.
d. When the machine is switched off, it is back to position O.



2 Beeper

- a. When PCB becomes active or receives the signal from the remote controller , the beeper will beep.
b. If thermostat is open-circuited or short-circuited, when you press the TEST button, the beeper will alarm at the frequency 2HZ.
c. Indication lamps it flashes when defrosting begin.

- d. multi-step switch.
 - i. If the switch is in AUTO position, the machine will run at the AUTO mode, if there is a signal from remote controller, it will run according to the signal .
 - ii. If the switch is in TEST position, the machine will run at the COOL mode, indoor motor will run at high speed , swing motor will run according to SWING mode. If there is a signal from remote controller, it will run according to the signal .if the thermostat is open-circuited or short-circuited, the beeper will alarm at the frequency 2 HZ .
 - iii. If the switch is in RUN position , the machine will run according to the remote signal.
 - iv. If the switch is in STOP position, the machine will stop.
- e. SLEEP mode.
 - i. In cooling or dehumidifying mode, 1 hour after you set the sleep timer ,T set will add 1 automatically, another 1 hour, another 1 will be added.
 - ii. In heating mode, 1 hour after you set the sleep timer, T set will lower 1 automatically, another 1 hour, another 1 will be lowered .
- f. Automatic fan speed .
 - i. In cooling mode, if $T_{\text{indoor}} > T_{\text{set}} + 4^{\circ}\text{C}$ high speed
 $T_{\text{set}} + 2^{\circ}\text{C} < \text{or} = T_{\text{indoor}} < \text{or} = T_{\text{set}} + 4^{\circ}\text{C}$ middle speed
 $T_{\text{indoor}} < T_{\text{set}} + 2^{\circ}\text{C}$ low speed

F. Fresh air function.

- 1 there are two fresh air modes .
 - a. fresh air 2
 - i. fresh air motor will work 1 hour, then rest 1 hour, then cycle again.
 - b. fresh air 1
 - i. press the button AIR on the remote controller to select fresh air 1 function, the swing motor keeps running till you give a signal to change it.

G. Air cleaning

- 1 In air cleaning mode, air cleaner works while indoor fan runs and air cleaner stops while indoor fan stops.
 - a. The speeds of the wind of all types of the air-conditioner are as below:
 - 000: 900,850, 800, 700 (RPM);
 - 001: 1000, 900, 850, 700(RPM);
 - 010: 1050, 950, 900, 700(RPM);
 - 011: 1100, 1000, 950, 700(RPM);
 - 100: 1200, 1100, 1000, 700(RPM);
 - 101: 1250, 1100, 1050, 700(RPM);
 - 111: 1400, 1200, 1100, 700(RPM);



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