Airwell

Service Manual

HGD 009/012 DCI Series

Indoor Units	Outdoor Units
AWSI-HGD009-N11	AWAU-YGD009-H11
AWSI-HGD012-N11	AWAU-YGD012-H11

gt

REFRIGERANT

R410A

HEAT PUMP

SM HGD-009/012 1-A.1 GB

APRIL- 2012

Version:1

LIST OF EFFECTIVE PAGES

Note: Changes in the pages are indicated by a “Revision#” in the footer of each effected page (when none indicates no changes in the relevant page). All pages in the following list represent effected/ non effected pages divided by chapters.

Dates of issue for original and changed pages are:

Original ..... 01 ..... April,2012

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Page No.	Revision No. #	Page No.	Revision No. #	Page No.	Revision No. #

* Zero in this column indicates an original page.

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1. INTRODUCTION

1.1 General

HGD series is a monosplit DCI inverter air conditioner designed for residential buildings.

The ODU YGD009/012 product is a DC inverter outdoor with high technology**.** By using DC compressor sine wave torque control technology, this product provides more comfort and economical operating.

The IDU HGD-009/012 is a high-wall mounted type indoor with modern apperance.

Product is available in two Capcities 9000 and 12000 Btu/h.

1.2 Main Features

The unit benefits from the most advanced technological innovations, namely:

- DC inverter technology.
- R410A models
- Microprocessor control and indoor LED display
- High COP,Energy efficiency class A in cooling/heating mode
- Torque control for compressor running in lower Freqency but with low vibration and little sound.
- Up to 10 m vertical high between indoor and outdoor units
- Cooling operation at outdoor temperature up to 48ºC.
- Heating operation at outdoor temperature down to -15ºC.
- Easy installation and service.
- Sleep mode from remote control to save energy
- ON/OFF timer and clock display
- Vertical auto swing with motorized flap (any position stop)
- Intelligent Deicing
- Memory from power failure
- Rapid cooling/heating
- I-Feel function
- Cold air prevention in heating
- Clean function (Blow dry)
- Multi speeds (7 speeds available for each mode)
- Self diagnosic (Error indications) for ease of maintenance

- Air sterilization- by Cold plasma that generating Active Hydrogen Oxygen and destory Bateria and Viruses.

1.3 Indoor Unit

The indoor unit is wall mounted, and can be easily fitted to many types of residential locations. It includes:

- LED display
- Variable speed with PG motor
- Motorized flap
- High efficiency filtration to ensure a best Air Quality : Advanced filtering combine mechanical, Photo-catalytic + Bi-anti bacterial and observe bad gaseous and smokes.
- Air sterilization- by Cold plasma that generating Active Hydrogen Oxygen and destory Bateria and Viruses.

1.4 Control

The microprocessor indoor controller, and an infrared remote control, supplied as standard, provide complete operating function and programming.

Remote control RC08A：
Compact and economically design, it offers excellent user comfort. Combining modern design with high technology, the RC8 remote control offers powerful functions of real considering of user comfort and energy saving of air-conditioner .

For detail of functions, please refer to Appendix 1

1.5 Outdoor Unit

The outdoor units can be installed as floor or wall mounted units by using a wall supporting bracket. The metal sheets are protected by anti- corrosion paint work allowing long life resistance. All outdoor units are pre-charged. For further information please refer to the Product Data Sheet, Chapter 2.
It includes :

- Compressor mounted in a soundproofed compartment :
- Axial fan.
- Outdoor coil with hydrophilic louver fins for RC units.
- Outlet air fan grill.
- Interconnecting wiring terminal block.

1.6 Tubing Connections

Flare type interconnecting tubing to be produced on site.
For further details please refer to the Installation Manual.

1.7 Inbox Documentation

Each unit is supplied with its own installation, operation and remote control manuals.

1.8 Matching Table

OUTDOOR UNITS	INDOOR UNITS	
	AWSI-HGD009-N11	AWSI-HGD012-N11
		
 AWAU-YGD009-H11	X	
 AWAU-YGD012-H11		X

2. PRODUCT DATA SHEET

2.1 HGD009 // YDD009

Model Indoor Unit					**HGD 009**	
Model Outdoor Unit					**YGD 009**	
Installation Method of Pipe					Flared	
Characteristics				**Units**	**Cooling**	**Heating**
Capacity (4)				kW	2.60(1.00-3.40)	2.87(0.60-3.80)
Power input (4)				kW	0.645(0.2-1.20)	0.695(0.16-1.25)
EER (Cooling) or COP(Heating) (4)				W/W	4.01	4.11
Energy efficiency class					A	A
Power supply				V	220-240	
				Ph	1	
				Hz	50	
Rated current				A	2.9	3.1
Power factor					0.97	0.97
Prated (IDU+ODU)				W	1450	
Circuit breaker rating				A	16A	
INDOOR	Fan type & quantity				Crossflow x 1	
	Fan speeds	Cooling	SH/H/M/L	RPM	1400/1200/1100/1000/900/800/700	
		Heating	SH/H/M/L	RPM	1380/1250/1170/1090/1020/950/900	
	Air flow (1)		SH/H/M/L	m3/hr	570/490/450/400/360/350/340	
	External static pressure		Min	Pa	0	
	Sound power level (2)		SH/H/M/L	dB(A)	48/44/42/39/37/35/32	
	Sound pressure level(3)		SH/H/M/L	dB(A)	38/34/32/29/27/25/22	
	Moisture removal			l/hr	0.8	
	Condensate drain tube I.D			mm	16	
	Dimensions		WxHxD	mm	896x320x159	
	Net Weight			kg	11.5	
	Package dimensions		WxHxD	mm	973x403x255	
	Packaged weight			kg	14.5	
OUTDOOR	Refrigerant control				Electrical Expansion Valve	
	Compressor type, model				Rotary –LANDA QXA-A086zC190	
	Fan type & quantity				Propeller(direct) x 1	
	Fan speeds		H	RPM	900	
	Air flow		H	m3/hr	1600	
	Sound power level		H	dB(A)	60	
	Sound pressure level(3)		H	dB(A)	50	
	Dimensions		WxHxD	mm	776X540X320	
	Net Weight			kg	29	
	Package dimensions		WxHxD	mm	823X595X358	
	Packaged weight			kg	33	
	Refrigerant type				R410A	
	Standard charge			kg(5m)	0.85	
	Additional charge				20g/m(5m<L<15m)	
	Connections between units	Liquid line		In.(mm)	1/4"(6.35)	
		Suction line		In.(mm)	3/8"(9.53)	
		Max.tubing length		m.	Max. 15	
		Max.height difference		m.	Max. 10	
Operation control type					Remote control	

(1)Airflow in ducted units; at nominal external static pressure.

(2)Sound power in ducted units is measured at air discharge.

(3)Sound pressure level measured at 1-meter distance from unit.

(4)Rating conditions in accordance to ISO 5151 and ISO 13253 (for ducted units).

2.2 HGD012 //YGD012

Model Indoor Unit					**HGD 012**	
Model Outdoor Unit					**YGD 012**	
Installation Method of Pipe					Flared	
Characteristics				**Units**	**Cooling**	**Heating**
Capacity (4)				kW	3.50(1.30-4.00)	3.81(0.90-4.30)
Power input (4)				kW	0.97(0.36-1.30)	1.055(0.34-1.36)
EER (Cooling) or COP(Heating) (4)				W/W	3.61	3.61
Energy efficiency class					A	A
Power supply				V	220-240	
				Ph	1	
				Hz	50	
Rated current				A	4.3	4.7
Power factor					0.97	0.97
Prated (IDU+ODU)				W	1600	
Circuit breaker rating				A	16 A	
INDOOR	Fan type & quantity				Crossflow x 1	
	Fan speeds	Cooling	SH/H/M/L	RPM	1400/1250/1150/1050/ 950/850/700	
		Heating	SH/H/M/L	RPM	1400/1270/1180/1100/1040/980/900	
	Air flow (1)		SH/H/M/L	m3/hr	570/490/450/400/360/350/340	
	External static pressure		Min	Pa	0	
	Sound power level (2)		SH/H/M/L	dB(A)	49/46/44/41/38/35/33	
	Sound pressure level(3)		SH/H/M/L	dB(A)	39/36/34/31/28/25/23	
	Moisture removal			l/hr	1.4	
	Condensate drain tube I.D			mm	16	
	Dimensions		WxHxD	mm	896×320×159	
	Net Weight			kg	11.5	
	Package dimensions		WxHxD	mm	973X403X255	
	Packaged weight			kg	14.5	
OUTDOOR	Refrigerant control				Capillary	
	Compressor type, model				Rotary –PANASONIC 5RS102ZJA21	
	Fan type & quantity				Propeller(direct) x 1	
	Fan speeds		H	RPM	900	
	Air flow		H	m3/hr	1600	
	Sound power level		H	dB(A)	62	
	Sound pressure level(3)		H	dB(A)	52	
	Dimensions		WxHxD	mm	848X540X320	
	Net Weight			kg	38	
	Package dimensions		WxHxD	mm	881X595X363	
	Packaged weight			kg	43	
	Refrigerant type				R410A	
	Standard charge			kg(5m)	1	
	Additional charge				20g/m(5m<L<20m)	
	Connections between units	Liquid line		In.(mm)	1/4"(6.35)	
		Suction line		In.(mm)	1/2"(12.7)	
		Max.tubing length		m.	Max. 20	
		Max.height difference		m.	Max. 10	
Operation control type					Remote control	

(1)Airflow in ducted units: at nominal external static pressure.
(2)Sound power in ducted units is measured at air discharge.
(3)Sound pressure level measured at 1-meter distance from unit.
(4)Rating conditions in accordance to ISO 5151 and ISO 13253 (for ducted units).

3. RATING CONDITIONS

Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units).

Cooling:
Indoor: 27°C DB 19°C WB
Outdoor: 35 °C DB

Heating:
Indoor: 20°C DB
Outdoor: 7°C DB 6°C WB

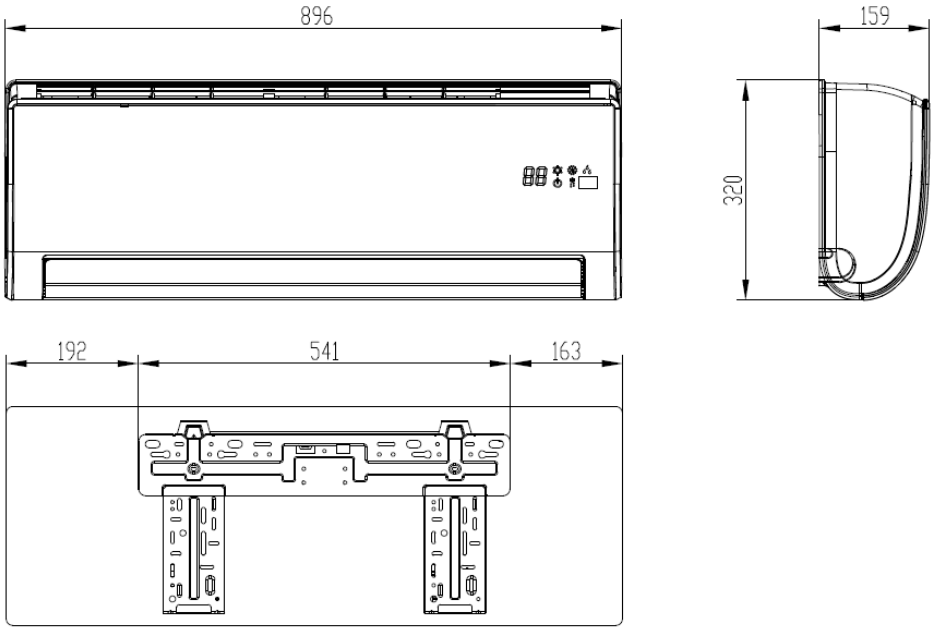
3.1 Operating Limits

R410A

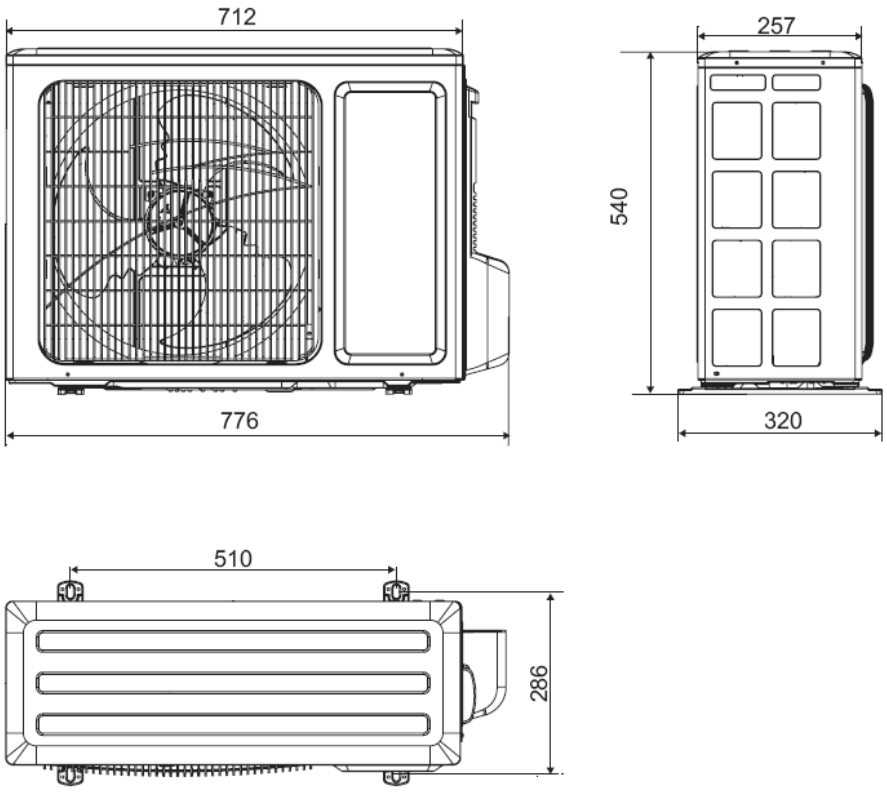
		Indoor	Outdoor
Cooling	Upper limit	32°C DB 23°C WB	48°C DB
	Lower limit	21°C DB 15°C WB	10°C DB
Heating	Upper limit	27°C DB	24°C DB 18°C WB
	Lower limit	10°C DB	-15°C DB -16°C WB
Voltage		1-PH 50Hz 198 – 264 V	

4. OUTLINE DIMENSION

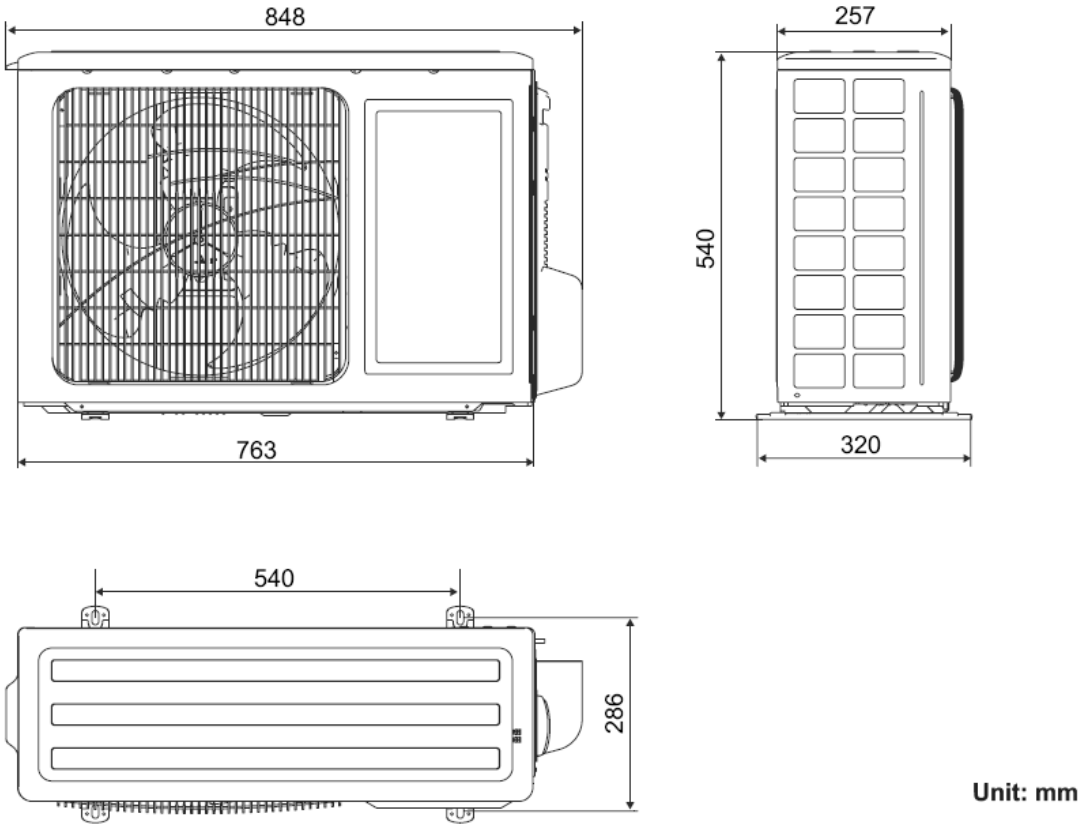
4.1 Indoor: HGD009/012



4.2 Outdoor: YGD009



4.3 Outdoor: YGD012



Unit: mm

5. PERFORMANCE DATA

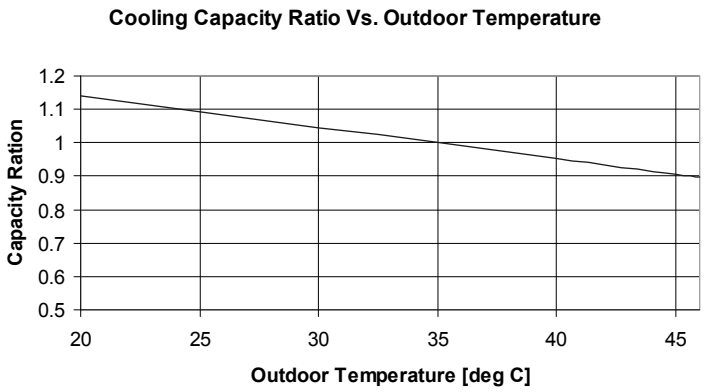
5.1 HGD009

5.1.1 Cooling Capacity (kW)

OD COIL ENTERING AIR DB TEMPERATURE [^{0}C]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [C^0] 22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	2.51	2.68	2.84	3.01	3.17
	SC	1.79	1.82	1.86	1.89	1.93
	PI	0.51	0.52	0.53	0.54	0.55
30	TC	2.39	2.56	2.72	2.89	3.05
	SC	1.74	1.78	1.81	1.85	1.89
	PI	0.57	0.58	0.59	0.60	0.61
35	TC	2.27	2.44	2.60	2.76	2.93
	SC	1.70	1.73	1.77	1.80	1.84
	PI	0.63	0.64	0.65	0.65	0.66
40	TC	2.15	2.31	2.48	2.64	2.81
	SC	1.65	1.69	1.72	1.76	1.80
	PI	0.68	0.69	0.70	0.71	0.72
46	TC	2.01	2.17	2.33	2.50	2.66
	SC	1.60	1.63	1.67	1.71	1.74
	PI	0.76	0.77	0.78	0.79	0.79

LEGEND
TC – Total Cooling Capacity, kW
SC – Sensible Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (^{o}C)
DB – Dry Bulb Temp., (^{o}C)
ID – Indoor
OU – Outdoor

5.1.2 Capacity Correction Factors



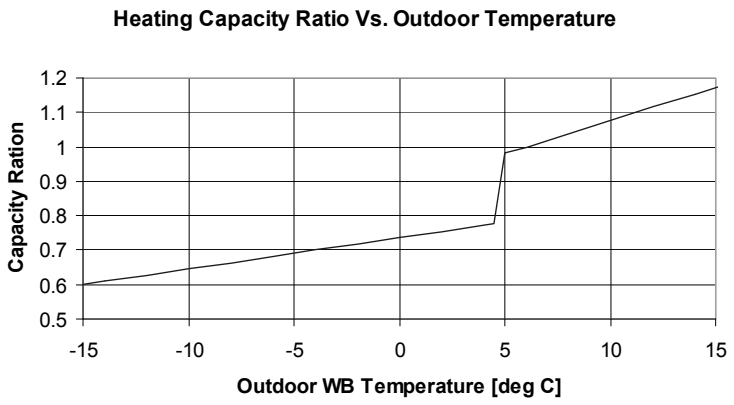
5.1.3 Heating Capacity (kW)

OD COIL ENTERING AIR DB/WB TEMPERATURE [^{0}C]	DATA	ID COIL ENTERING AIR DB TEMPERATURE [C^0]		
		15	20	25
-15/-16	TC	1.83	1.70	1.57
	PI	0.42	0.46	0.50
-10/-12	TC	2.03	1.91	1.78
	PI	0.50	0.55	0.59
-7/-8	TC	2.19	2.06	1.93
	PI	0.57	0.61	0.65
-1/-2	TC	2.27	2.14	2.01
	PI	0.60	0.64	0.68
2/1	TC	2.32	2.19	2.06
	PI	0.62	0.66	0.71
7/6	TC	3.00	2.87	2.74
	PI	0.65	0.70	0.74
10/9	TC	3.16	3.04	2.91
	PI	0.69	0.73	0.78
15/12	TC	3.33	3.20	3.07
	PI	0.73	0.77	0.82
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

LEGEND

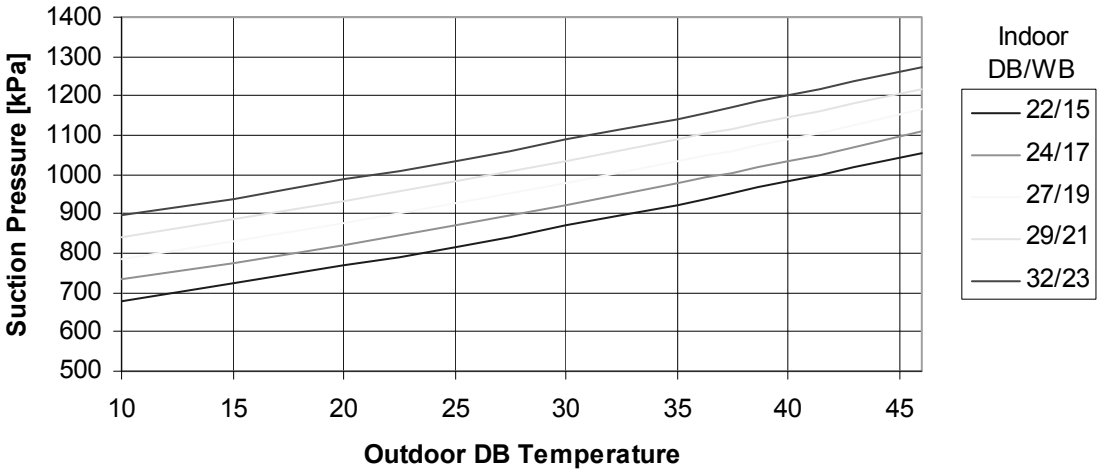
TH – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (^{o}C)
DB – Dry Bulb Temp., (^{o}C)
ID – Indoor
OU – Outdoor

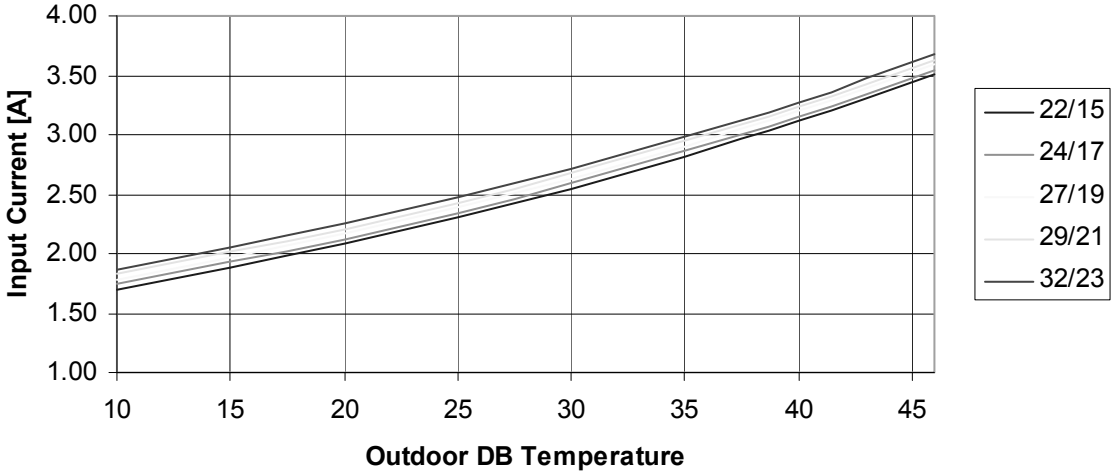
5.1.4 Capacity Correction Factors



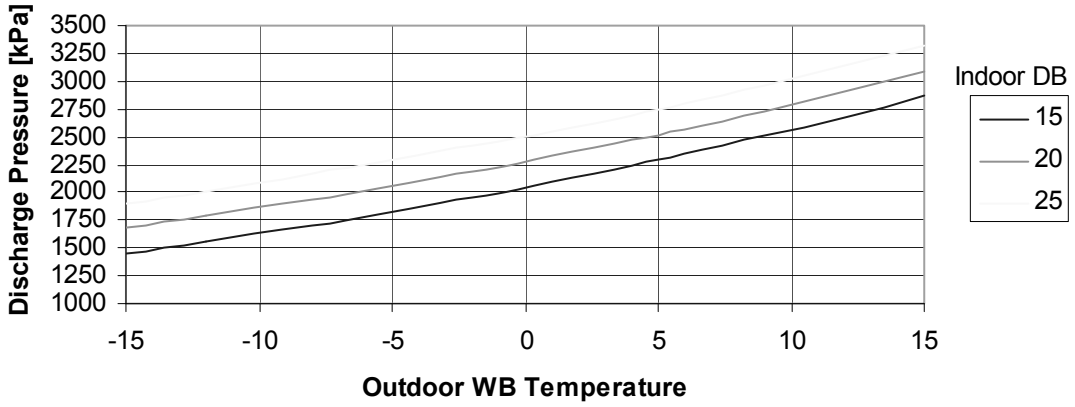
5.1.5 Pressure Curves

Cooling





Heating


Discharge Pressure [kPa]
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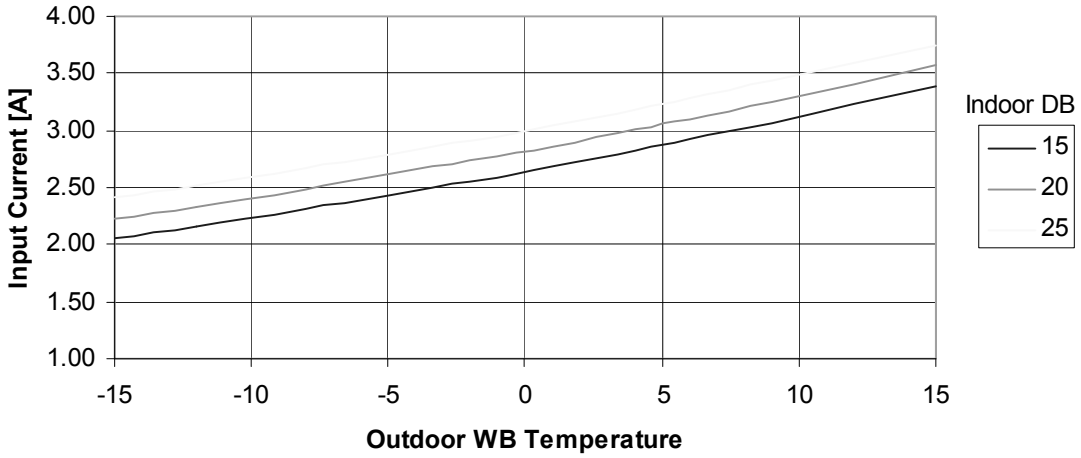
3250
3000
2750
2500
2250
2000
1750
1500
1250
1000
-15
-10
-5
0
5
10
15
Outdoor WB Temperature
Indoor DB
15
20
25


Input Current [A]
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3.50
3.00
2.50
2.00
1.50
1.00
-15
-10
-5
0
5
10
15
Outdoor WB Temperature
Indoor DB
15
20
25

5.2 HGD012

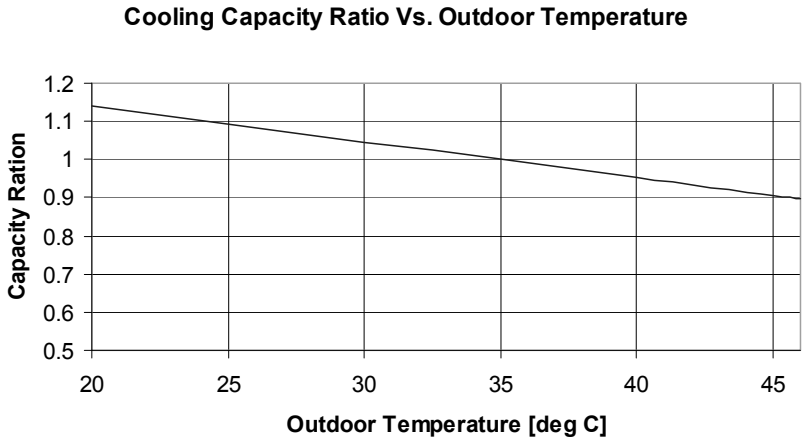
5.2.1 Cooling Capacity (kW)

OD COIL ENTERING AIR DB TEMPERATURE [^{0}C]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [C^0] 22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	3.38	3.60	3.83	4.05	4.27
	SC	2.40	2.45	2.50	2.55	2.60
	PI	0.76	0.78	0.79	0.81	0.82
30	TC	3.22	3.44	3.66	3.88	4.11
	SC	2.34	2.39	2.44	2.49	2.54
	PI	0.85	0.87	0.88	0.90	0.91
35	TC	3.06	3.28	3.50	3.72	3.94
	SC	2.28	2.33	2.38	2.43	2.48
	PI	0.94	0.96	0.97	0.98	1.00
40	TC	2.89	3.12	3.34	3.56	3.78
	SC	2.22	2.27	2.32	2.37	2.42
	PI	1.03	1.04	1.06	1.07	1.09
46	TC	2.70	2.92	3.14	3.36	3.58
	SC	2.15	2.20	2.25	2.30	2.34
	PI	1.14	1.15	1.17	1.18	1.20

LEGEND

TH – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (^{o}C)
DB – Dry Bulb Temp., (^{o}C)
ID – Indoor
OU – Outdoor

5.2.2 Capacity Correction Factors



5.2.3 Heating Capacity (kW)

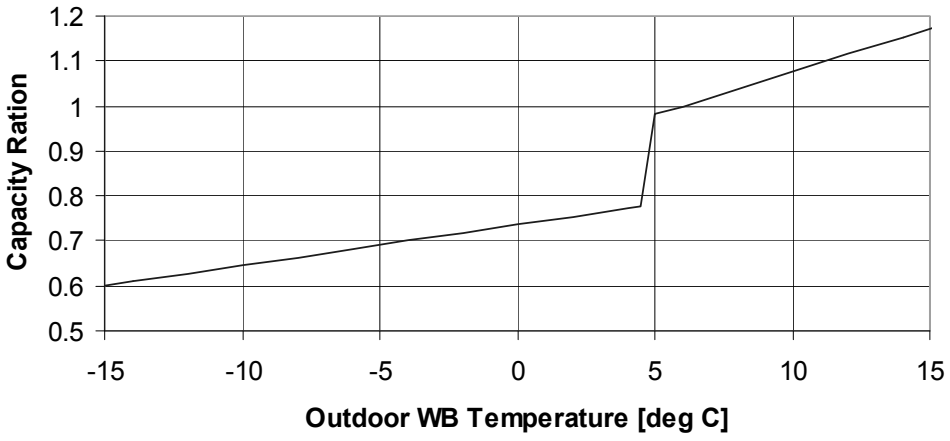
OD COIL ENTERING AIR DB/WB TEMPERATURE [^{0}C]	DATA	ID COIL ENTERING AIR DB TEMPERATURE [C^0]		
		15	20	25
-15/-16	TC	2.43	2.26	2.09
	PI	0.63	0.70	0.76
-10/-12	TC	2.70	2.53	2.36
	PI	0.76	0.83	0.89
-7/-8	TC	2.91	2.74	2.57
	PI	0.86	0.93	0.99
-1/-2	TC	3.01	2.84	2.67
	PI	0.91	0.97	1.04
2/1	TC	3.08	2.91	2.74
	PI	0.94	1.01	1.07
7/6	TC	3.98	3.81	3.64
	PI	0.99	1.06	1.12
10/9	TC	4.20	4.03	3.86
	PI	1.05	1.11	1.18
15/12	TC	4.42	4.25	4.08
	PI	1.11	1.17	1.24
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

LEGEND

TH – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (^{o}C)
DB – Dry Bulb Temp., (^{o}C)
ID – Indoor
OU – Outdoor

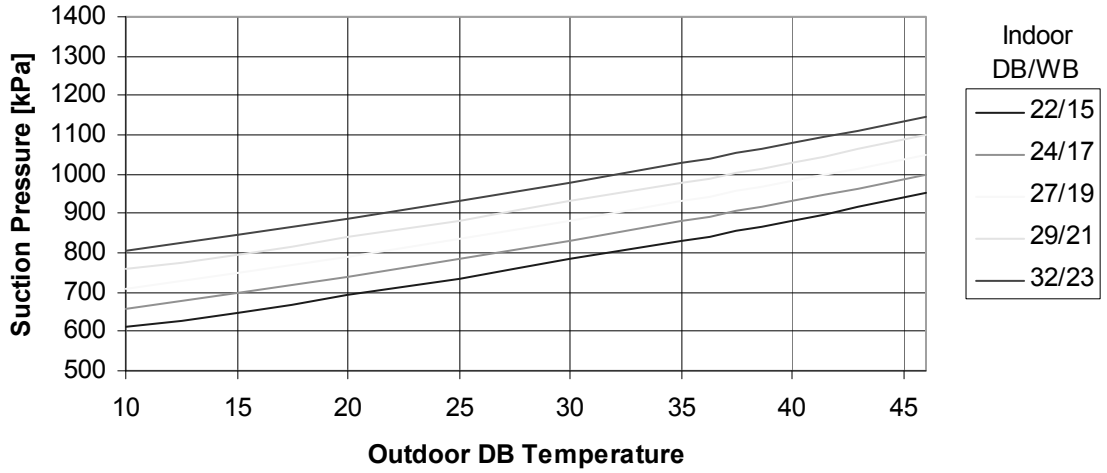
5.2.4 Capacity Correction Factors

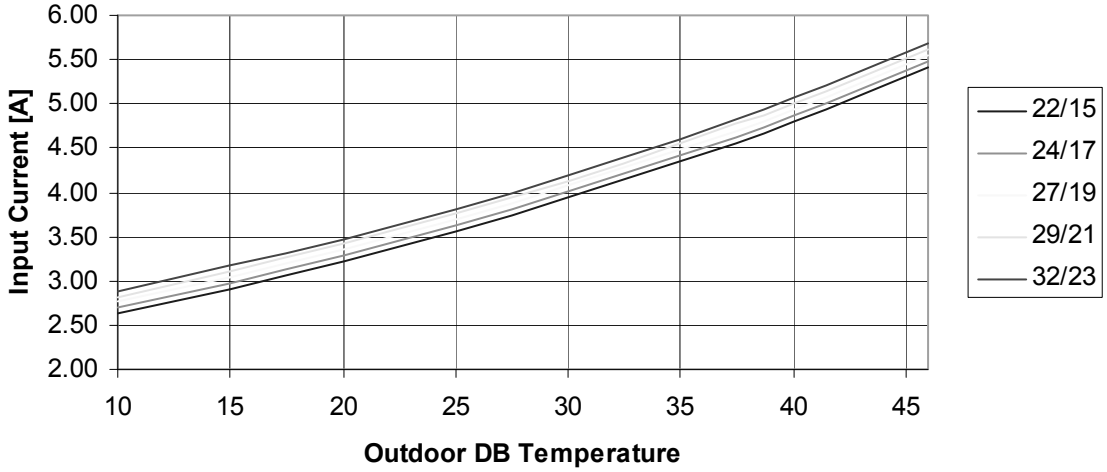
Heating Capacity Ratio Vs. Outdoor Temperature



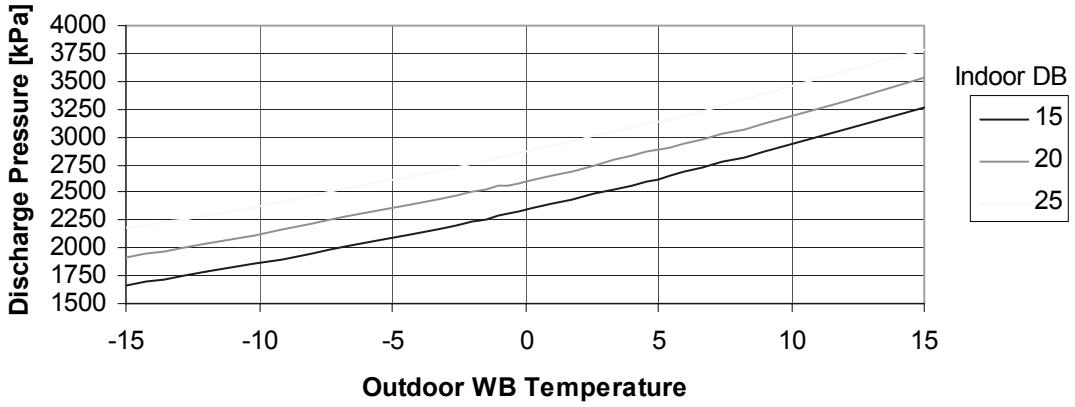
5.2.5 Pressure Curves

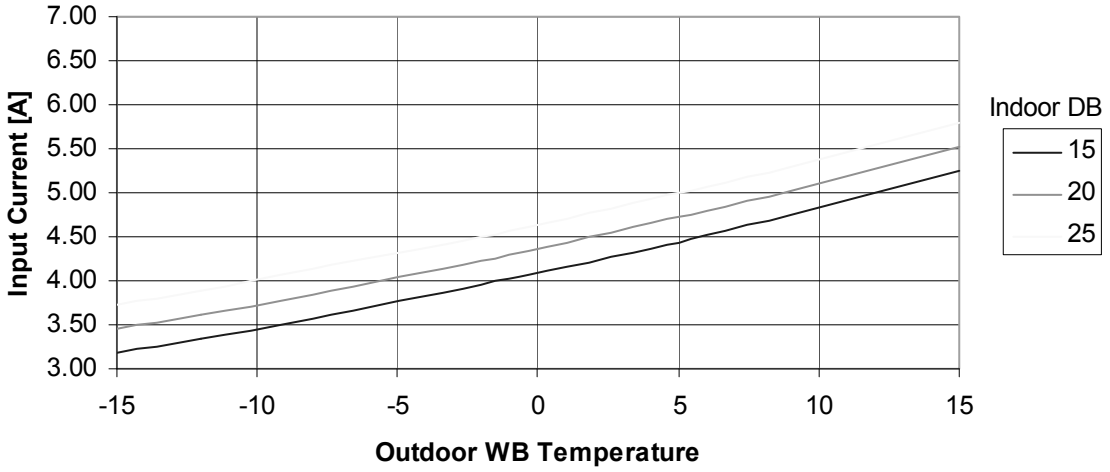
Cooling





Heating


Discharge Pressure [kPa]
4000
3750
3500
3250
3000
2750
2500
2250
2000
1750
1500
-15
-10
-5
0
5
10
15
Outdoor WB Temperature
Indoor DB
15
20
25


Input Current [A]
7.00
6.50
6.00
5.50
5.00
4.50
4.00
3.50
3.00
-15
-10
-5
0
5
10
15
Outdoor WB Temperature
Indoor DB
15
20
25

6. SOUND LEVEL CHARACTERISTICS

6.1 Sound Pressure Level

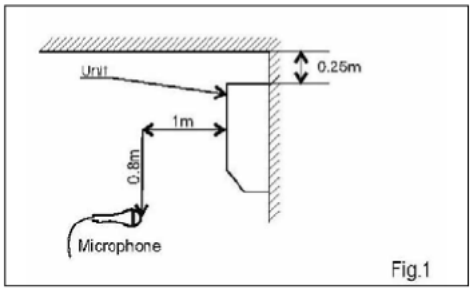


Figure 1. Wall Mounted

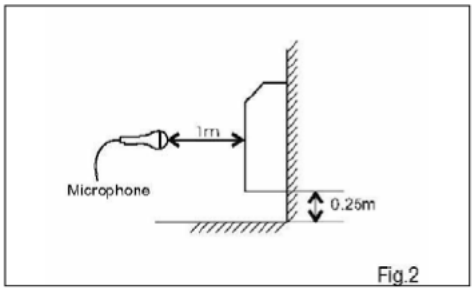


Figure 2. Floor Mounted

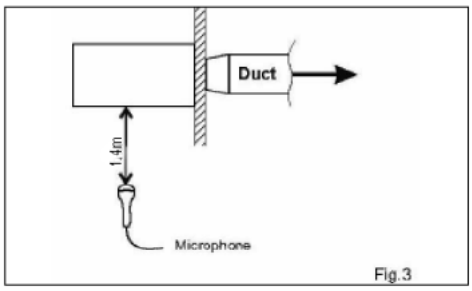


Figure 3. Ducted

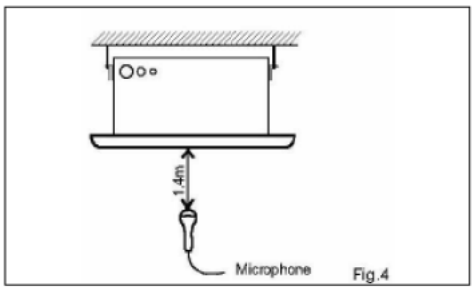
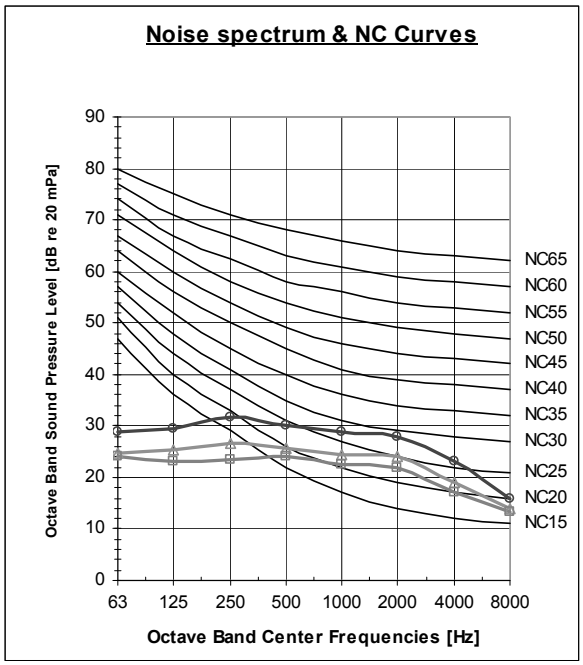


Figure 4. Cassette

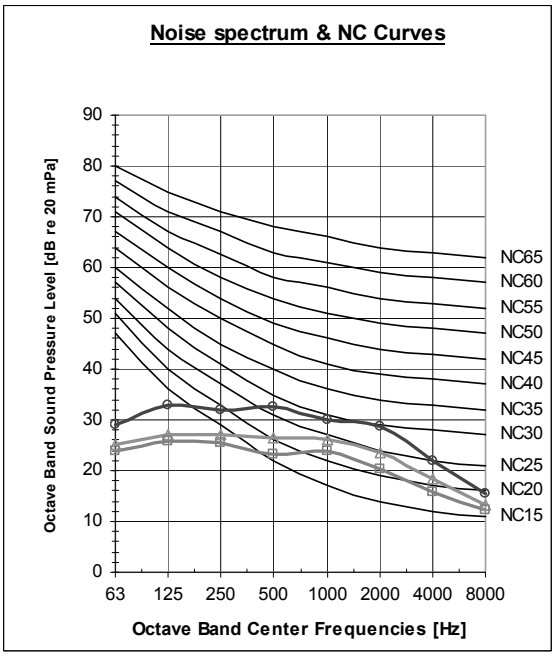
6.2 Soud Pressure Level Spectrum (Measured as Figure 1)

HGD009 Cooling

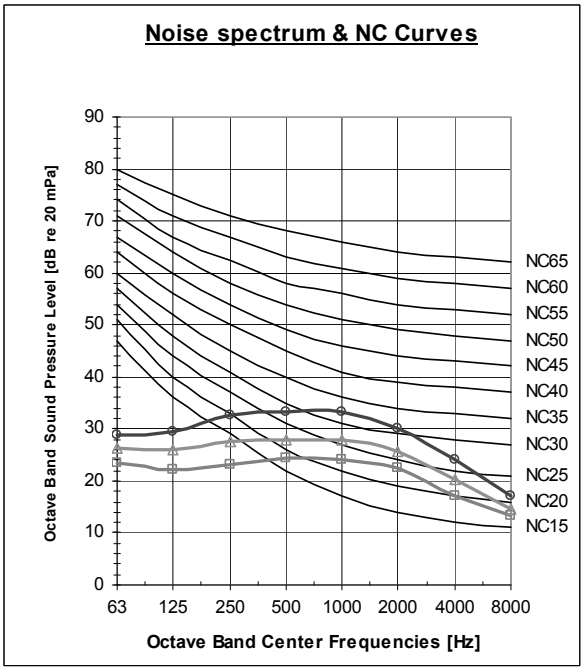


FAN SPEED	LINE
HI	
ME	
LO	

HGD009 Heating

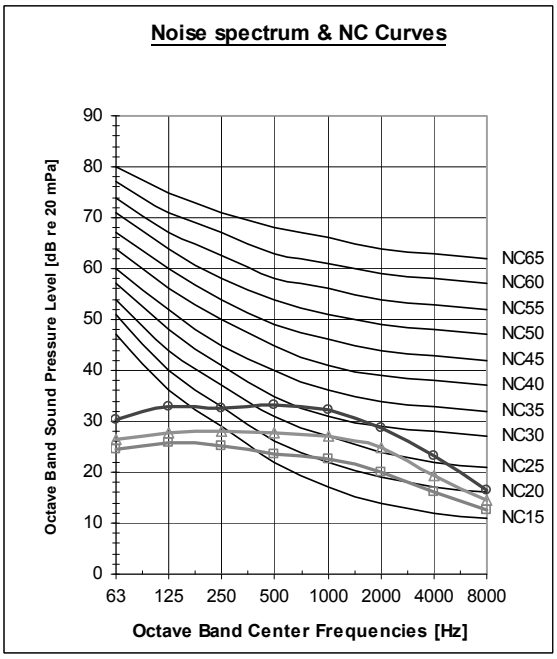


HGD012 Cooling



FAN SPEED	LINE
HI	
ME	
LO	

HGD012 Heating



7. ELECTRICAL DATA

MODEL	YGD009	YGD012
Power Supply	To indoor	
	1PH-220-240V-50Hz	
Max Current, A	6.5A	7.2A
Circuit Breaker,A	16A	16A
Power Supply Wiring No. X Cross Section mm^2	3x1.5 mm^2	3x1.5 mm^2
Interconnecting Cable Model No. X Cross Section mm^2	4x1.5 mm^2	4x1.5 mm^2

NOTE

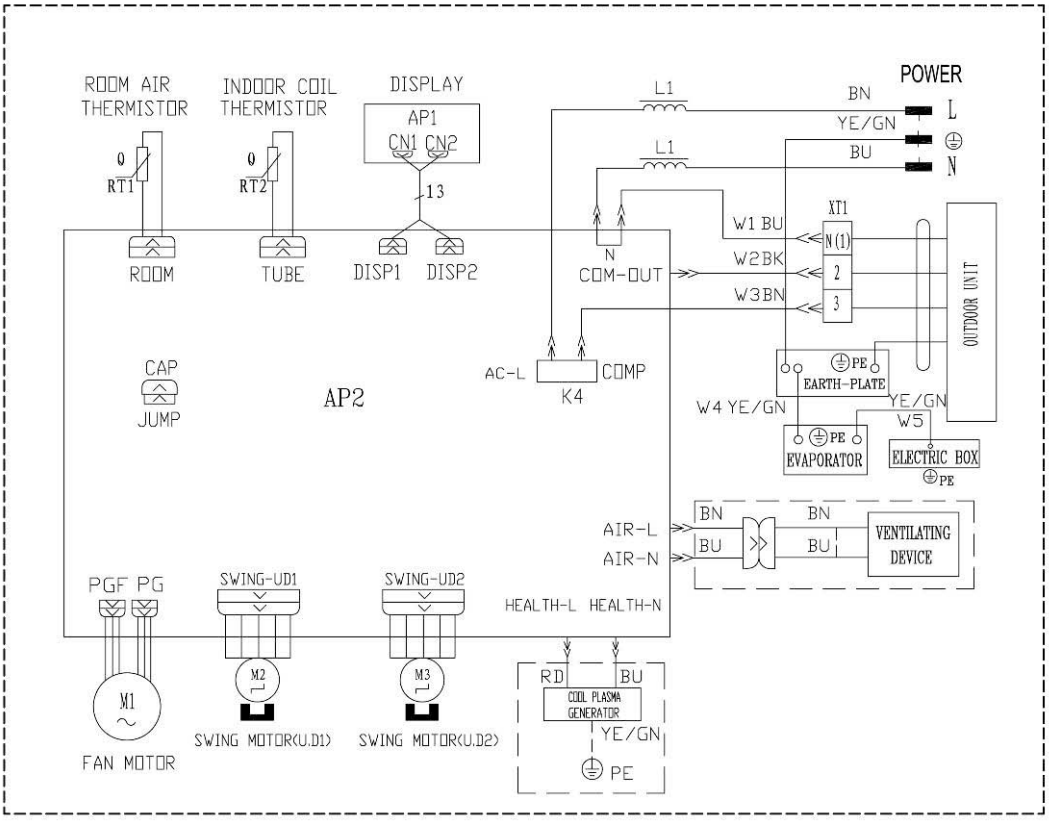
Power wiring cord should comply with local laws and electrical regulations requirements.

8. WIRING DIAGRAM

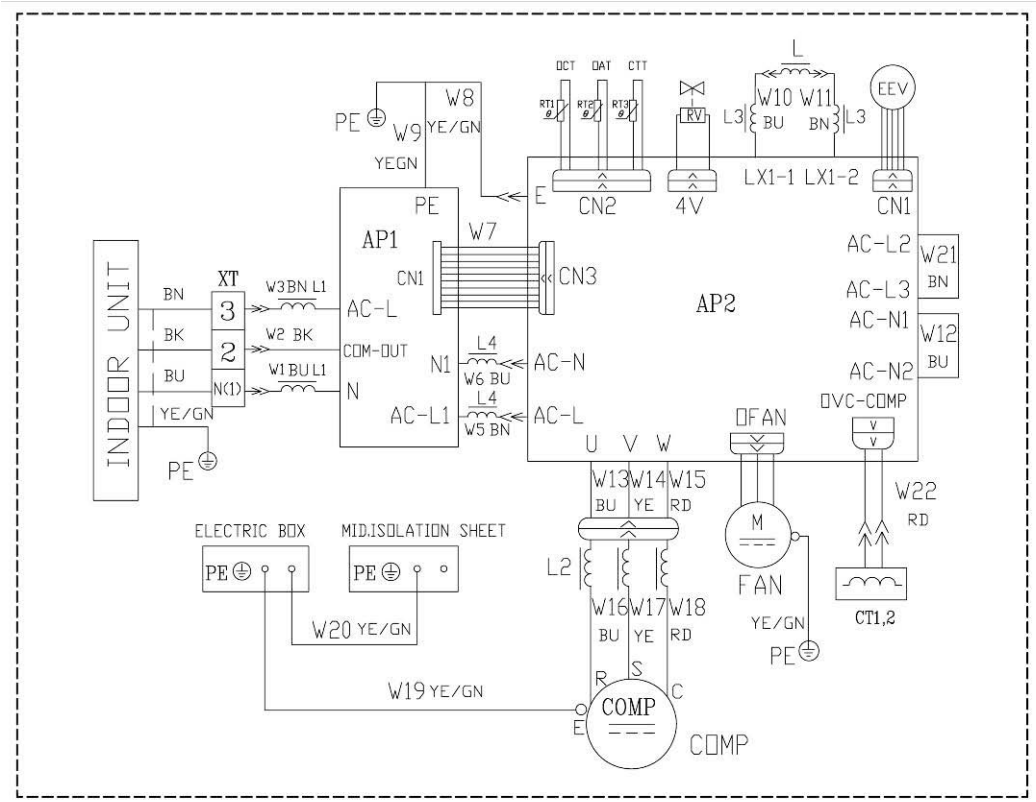
8.1 LEGEND

BN-BROWN
WH-WHITE
BU-BLUE
YE-YELLOW
BK-BLACK
RD-RED
OG-ORANGE
YE/GN-YELLOW/GREEN
OCT-OUTDOOR COIL THERMISTOR
OAT-OUTDOOR AIR THERMISTOR
CTT-COMP. DISCHARGE THERMISTOR

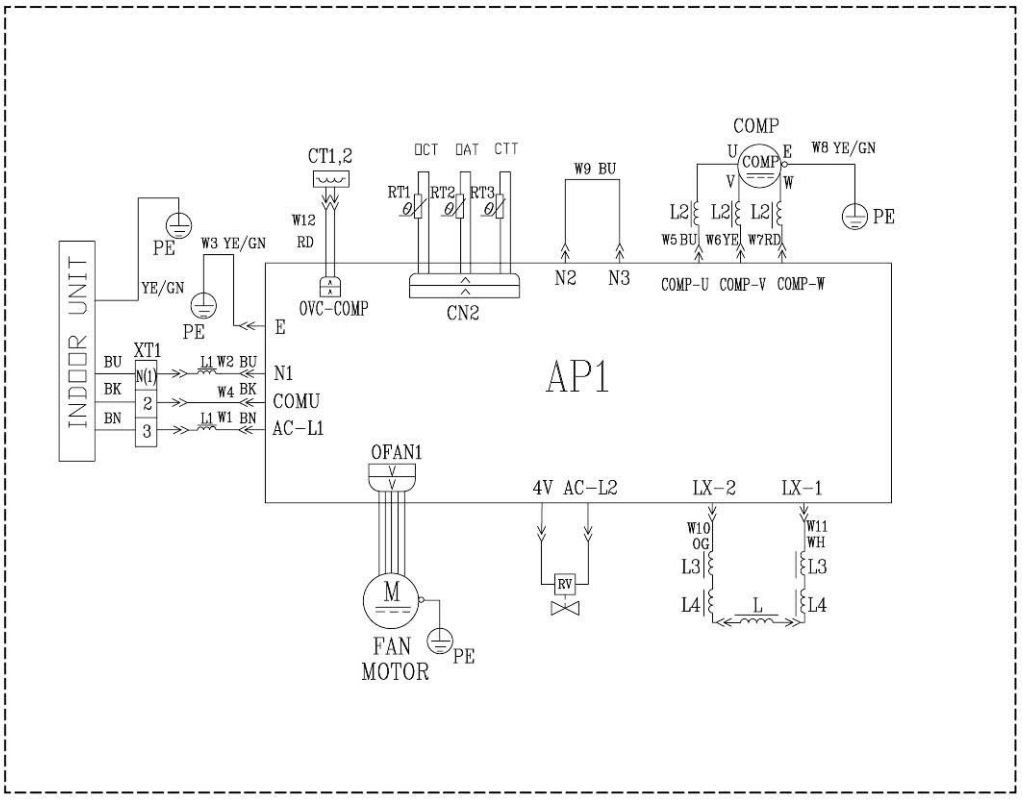
8.2 HGD009/012



8.3 YGD009

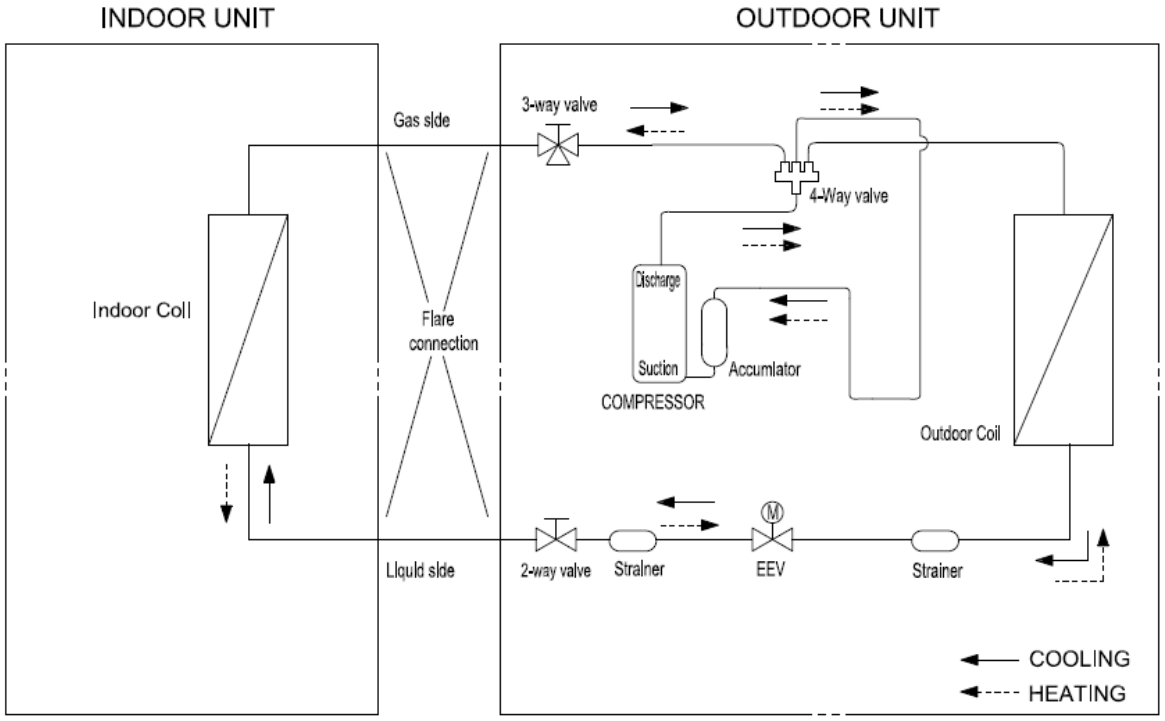


8.4 YGD012

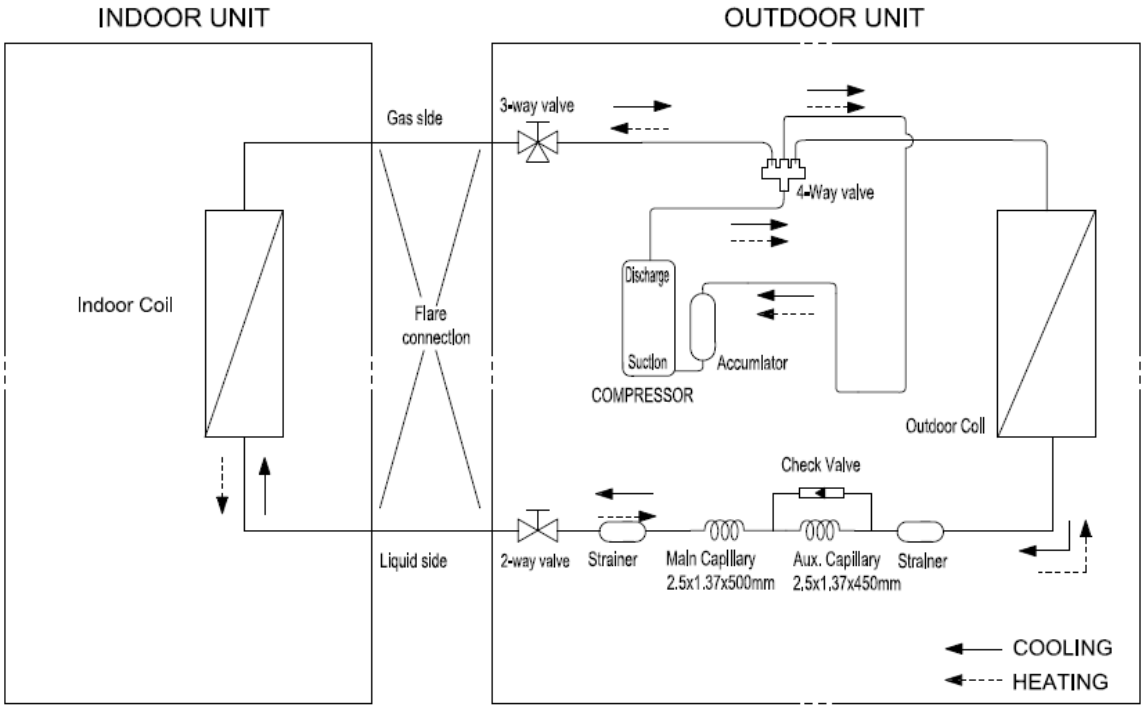


9. REFRIGERATION DIAGRAMS

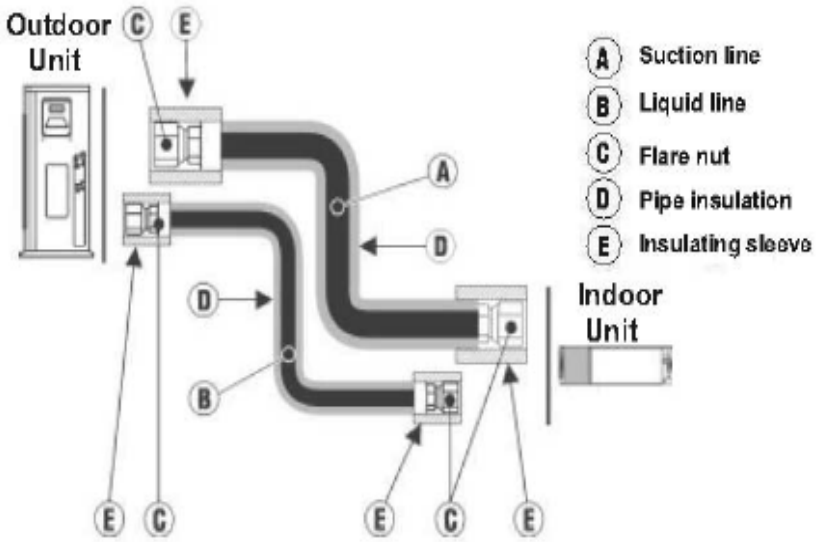
9.1 HGD009 + YGD009

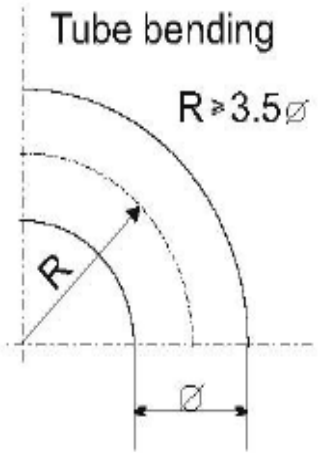


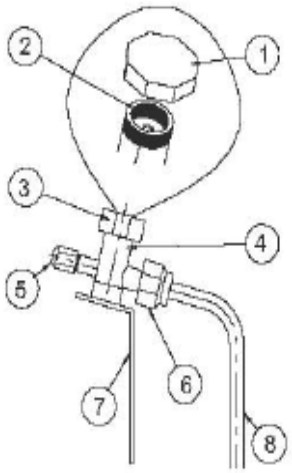
9.2 HGD012 + YGD012



10. TUBING CONNECTIONS







TUBE (Inch) / TORQUE (Nm)	1/4"	3/8"	1/2"	5/8"	3/4"
Flare Nuts	15-18	40-45	60-65	70-75	80-85
Valve Cap	13-20	13-20	18-25	18-25	40-50
Service Port Cap	11-13	11-13	11-13	11-13	11-13

1. Valve Protection Cap-end
2. Refrigerant Valve Port (use Allen wrench to open/close)
3. Valve Protection Cap
4. Refrigerant Valve
5. Service Port Cap
6. Flare Nut
7. Unit Back Side
8. Copper Tube

When the outdoor unit is installed above the indoor unit an oil trap is required every 5m along the suction line at the lowest point of the riser. In case the indoor unit is installed above the outdoor, no trap is required.

11. CONTROL SYSTEM

11.1 Electronic Control

11.1.1 Abbreviations

Abbreviation	Definition
A/C	Air Condition
BMS	Building Management System
PWR	System Power
CTT	Compressor Top Temperature sensor
DCI	DC Inverter
EEV	Electronic Expansion Valve
HE	Heating Element
HMI	Human Machine Interface
HST	Heat Sink Temperature sensor
Hz	Hertz (1/sec) – electrical frequency
ICT	Indoor Coil Temperature (RT2) sensor
IDU	Indoor Unit
MCU	Micro Controller Unit
OAT	Outdoor Air Temperature sensor
OCT	ODU Coil Temperature sensor
ODU	Outdoor Unit
OFAN	Outdoor Fan
PFC	Power Factor Corrector
RAC	Residential A/C
RAT	Room Air Temperature sensor
RC	Reverse Cycle (Heat Pump)
RCT	Remote Control Temperature sensor
RGT	Return Gas Temperature sensor
RPS	Rounds per second (mechanical speed)
RV	Reverse Valve
SB,STBY	Stand By
SUCT	Compressor Suction Temperature sensor
S/W	Software
TBD	To Be Defined
TMR	Timer

11.1.2 System Operation Concept

The control function is divided between indoor and outdoor unit controllers. Outdoor unit is the system ‘Master’, requesting the indoor unit for cooling/heating capacity supply. The indoor unit is the system ‘Slave’ and it must supply the required capacity unless it enters into a protection mode avoiding it from supplying the requested capacity.
Target frequency is transferred via indoor to outdoor communication, and the caculation is based on room temperature and set point temperature.

11.1.3 Compressor Frequency Control

The Compressor Frequency Control is based on the PI scheme.

When starting the compressor, or when conditions are varied due to the change of the room condition, the frequency must be initialized according to the **ΔD** value of the indoor unit and the **Q** value of the indoor unit.

Q value: Indoor unit output determined from indoor unit capacity, air flow rate and other factors.

1. P control

Calculate **ΔD** value in each sampling time (20 seconds), and adjust the frequency according to its difference from the frequency previously calculated.

2. I control

If the operating frequency is not change more than a certain fixed time, adjust the frequency up and down according to the **ΔD** value.

Obtaining the fixed **ΔD** value

When the **ΔD** value is small- decrease the frequency

When the **ΔD** value is large- increase the frequency

3. Frequency management when other controls are functioning

When frequency is drooping;

Frequency management is carried out only when the frequency droops.

For limiting lower limit

Frequency management is carried out only when the frequency rises.

4. Maximum and minimum limits of frequency by PI control

The frequency upper and lower limits are set depending on indoor unit.

When low noise commands come from the indoor unit or when outdoor unit low noise or quiet commands come from indoor unit, the upper limit frequency must be lowered than the usual setting. (see 11.1.3.1)

11.1.3.1 Frequancy range

The compressor frequency limitation is set by the following table

Mode	Minimum Frequency(MinFreq)		**Maximum Frequency(MaxFreq)**
	09	12	**See following table**
Cooling	*15HZ*	*26HZ*	
Heating	*15HZ*	*26HZ*	

The maximum allowed frequency is extracted from the following:

Mode	Night Mode	Maximum Frequency(MaxFreq)	
		09	12
Cooling	ON	*88HZ*	*75HZ*
	OFF	*88HZ*	*75HZ*
Heating	ON	*92HZ*	*80HZ*
	OFF	*92HZ*	*80HZ*

11.1.3.2 Frequency Changes Control

Frequency change rate is 1 Hz/sec.

11.1.3.3 Minimum On and Off Time

Prohibit to turn ON the compressor for 3 minutes after turning it off.(except during deicing protection)
The compressor will not stop within 6 minutes regardless of room temperature changes (except during protection)

11.1.4 Indoor Fan Control

7 Indoor fan speeds are determined for each operating modes

Unit Model	Mode	Turbo	F5	F4	F3	F2	F1	Silent
09	Cooling	1400	1200	1100	1000	900	800	700
	Heating	1380	1250	1170	1090	1020	950	900
12	Cooling	1400	1250	1150	1050	950	850	700
	Heating	1400	1270	1180	1100	1040	980	900

By short pressing FAN button to select each manual fan speed or AutoFan speed

Symbol					
Fan speed	F1,2	F3,4	F5	Turbo	Auto

By long pressing FAN button to select Silent or Auto Silent (Silent or Auto Silent can be swiched by another long pressing)

Symbol	No Icon displayed	AUTO
Fan speed	Silent	Auto Silent

In Silent setting, fan speed will be silent speed. And in Auto Silent setting, fan speed will be adjusted to silent fan speed or F1 according to conditions

In AutoFan user setting, fan speed will be adjusted automatically according to the difference between actual room temperature(RAT) and user set point temperature(SPT).

Indoor Fan speed		F5	F3	F1
RAT-SPT	Cooling	>= 2	(-2,2)	<= -2
	Fan	> 4	[4,2]	< 2
	Heating	<=1	(1,3)	>=3

In DRY mode, the automatic fan speed is forced to be low.

11.1.4.1 Turbo Speed

In COOL and HEAT mode (not available in AUTO, DRY, FAN mode), press the Turbo button, the super high fan speed is selected on Remote control and the indoor fan rotates at super high speed.

11.1.5 Outdoor Fan Control

11.1.5.1 OFAN Speed Type

The outdoor fan motor is a 2-speed DC motor.

Unit Model	Mode	High	Low
09	Cooling	900	600
	Heating	900	600
12	Cooling	900	600
	Heating	900	600

11.1.5.2 General rules

1. The outdoor fan is ON when compressor ON during cooling, dring and heating mode.
2. Outdoor fan OFF will delay 30sec when compressor is OFF during cooling and heating mode.
3. In normal operating, the OFAN speed depends on actual compressor frequency.
4. Outdoor fan control under outdoor deicing please refer to 11.12.6

11.1.6 Refrigerant control

Electrical expansion valve is used in model 09 and capiliary is usued in model 12

11.1.7 Reversing Valve (RV) Control

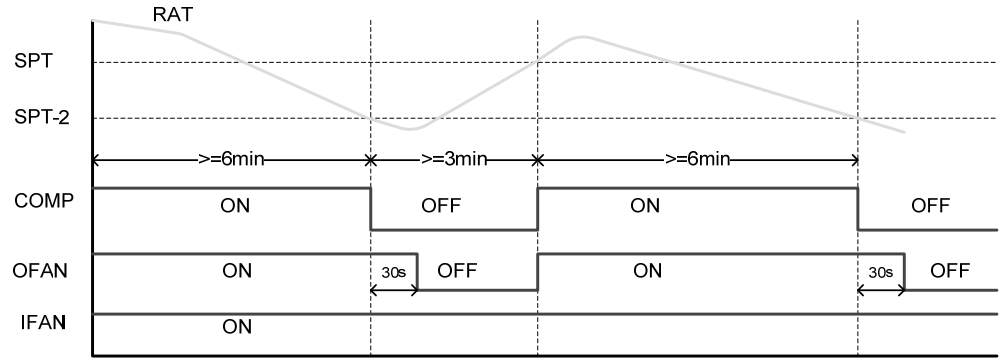
Reversing valve is on in heat mode.
Switching of RV state is done only after compressor is off for over 2 minutes.

11.2 Fan Mode

In this mode, the indoor fan may run at high,medium,low and automatic speed. The compressor, outdoor fan and 4-way valve will be OFF.
In this mode, the range of setting temperature is 16~30 ^{o}C

11.3 Cool Mode

If RAT≥SPT, the unit starts cooling operation. In this case, the compressor and outdoor fan will operate and the indoor fan will run at the setting speed.
If RAT≤SPT-2, the compressor will stop operation and the outdoor fan will delay 30 seconds to stop. While the indoor fan will run at the setting speed.
If SPT-2＜RAT＜SPT, the unit will maintain the previous status.



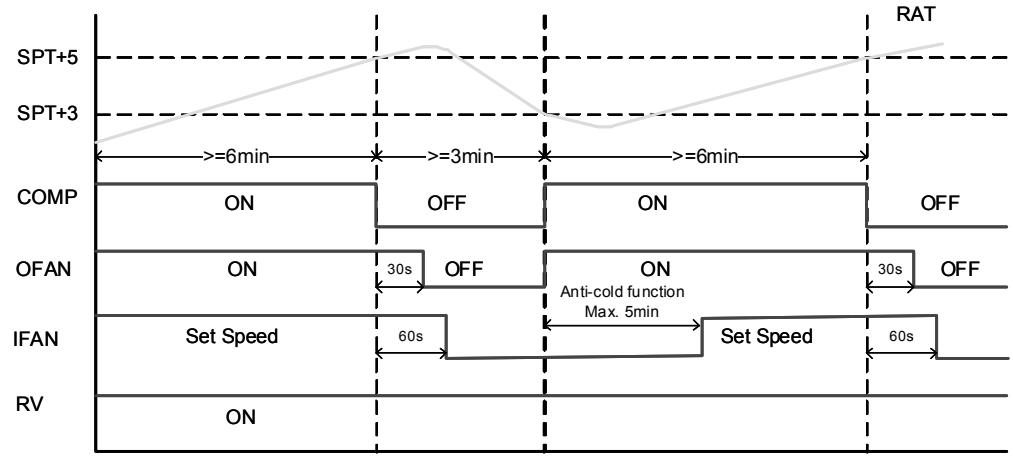
11.3.1 Indoor Fan operation under Cool Mode

Under cooling mode, the fan will operate at each manual setting fan speed.

In AutoFan user setting, fan speed will be adjusted automatically according to the SPT and RAT, rerfer to 11.1.4

11.4 Heat Mode

If RAT≤SPT+2, the unit will operate in heating mode. The compressor, outdoor fan and 4-way valve will operate and the indoor fan will delay 3min to start at the latest
If SPT+2<RAT<SPT+5,the unit will maintain the previous status.
If RAT≥SPT+5, the compressor will stop, the outdoor fan will delay 30s to stop and the indoor fan will blow for 60s at the low speed. During this period, the fan speed can't be switched.



11.4.1 Indoor Fan Control in Heat Mode

Indoor fan speed depends on the indoor coil temperature

Anti-cold air function

When starting the heating mode, anti-cold air function will be activated and indoor fan can run at low speed or stop running. This function will terminate after the unit runs for 5min or the ICT reaches 40 degree.

Residual heat blowing function

During heating, when the stopping condition for the compressor is reached, the compressor and the outdoor fan motor stop running while the louver moves to P2. The indoor fan will stop after running for 60s at low speed.

11.5 Auto Cool/Heat Mode

In AUTO mode, the system selects the running mode (COOL/HEAT/FAN) automatically according to the room temperature. The display shows the actual running mode and setting temperature. There will be 30s delay for mode conversion.

1. When RAT≥26°C, the cooling mode is selected.
2. When RAT≤22 °C, the unit runs in heating mode
3. When 23 °C ≤RAT≤ 25 °C, upon initial startup, the unit will enter auto mode and run in automatic fan mode. If the other mode changes into auto mode, the previous running mode will remain.

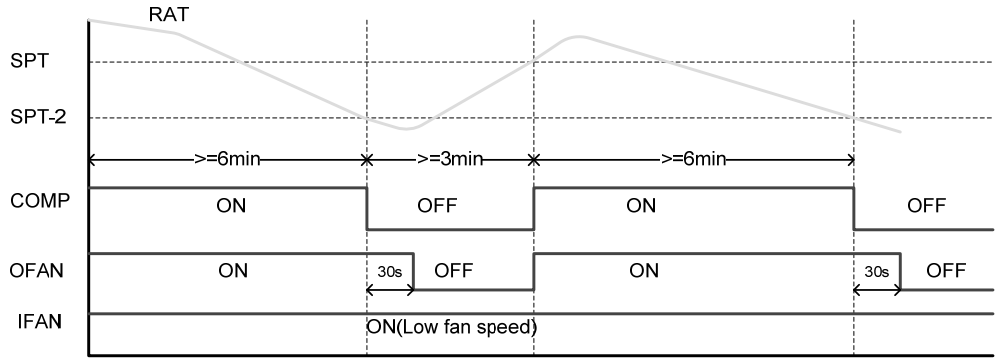
11.6 Dry Mode

If RAT>SPT, the unit starts drying operation. Indoor fan, outdoor fan and compressor will operate and the indoor fan will run at low speed.

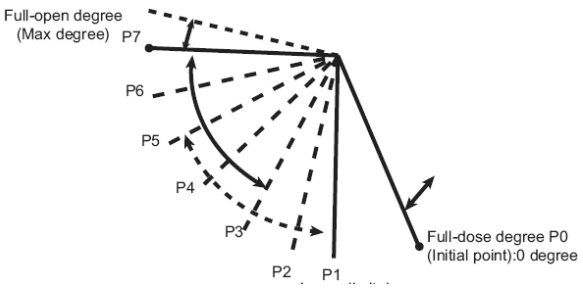
If SPT-2≤RAT≤SPT, the unit will keep running in the original mode.

If RAT<SPT-2, the compressor will stop running and the outdoor fan will delay 30 seconds to stop. While the indoor fan will run at low speed.

In this mode, the Reverse Valve will be OFF and the temperature setting range is 16~30.



11.7 Louver Control



After power on, the upper and lower swing louver will automatically open and then close completely.

If swing function has not been set after unit stating up:
Under heating mode, the upper and lower louver will rotate to position P4.
Under other modes, the upper and lower louver will rotate to position P7.

If swing function has been set after unit stating up:
Under heating mode, the up and down louver can be set to position: P2-P3-P4-P5-P6
Under other modes, the upper and lower louver can be set to position: P7-P6-P5-P4-P3
Auto swing setting
Under heating mode, the up and down louver will rotate from P2 to P6
Under other modes, the upper and lower louver will rotate from P7 to P3

Anti-moisture protection:
In Cooling, Auto Cooling and dry modes, the rotation range of louver will be from P6 to P4 if the silent speed is selected.

11.8 Clean function

Clean function enables dring the indoor coil after Cool or Dry mode to avoid mould.

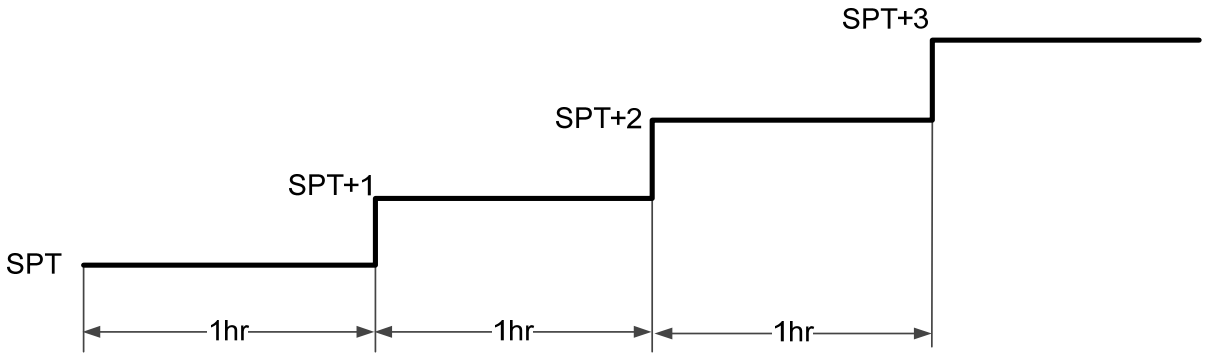
Press CLEAN button in Cool or Dry mode, and the  will be shown on remote control.
Under clean function, the indoor fan will continue operation for 10 min at low speed after the unit is turned OFF.

Clean function is defaulted as OFF after unit is Power ON.
Clean function is not available in Auto, Fan or Heat mode.

11.9 Sleep function

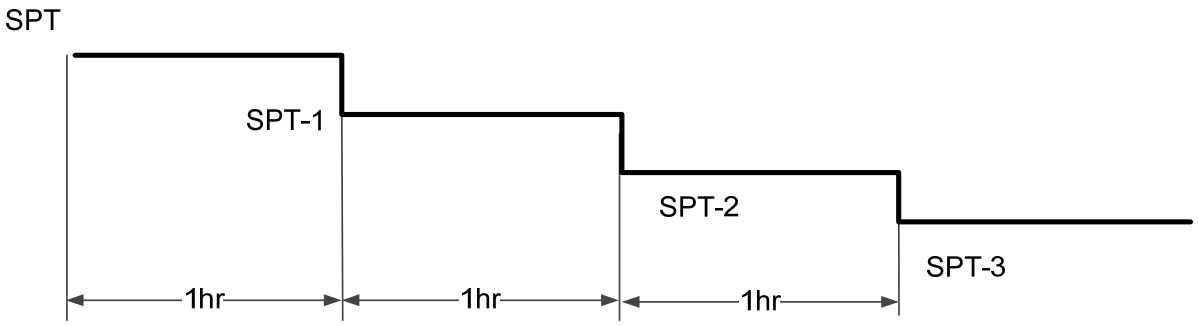
Pressing SLEEP button will enable the Sleep function.  will be shown on remote control.

Sleep function in Cool and Dry mode:
The SPT will be adjusted according to following chart.



Sleep function in Heat mode:

The SPT will be adjusted according to following chart.



Press either Sleep button or ON/OFF button can cancel the Sleep function.
Sleep function will not be available in Auto mode or Fan mode.

11.10 I-Feel function

I-Feel function maintains the room temperature by comparing the RCT on remote control.

Pressing IFEEL button will enable the I-Feel function. I FEEL will be shown on remote control.
Under I-Feel funtion, remote control sends I-Feel data every 10 min to IDU controller. If the IDU controller does not received I-Feel data after 11 min. I-Feel function will be interrupted and then the AC will work according to RAT on the IDU.

I-Feel function can not be remembered after power failure.

11.11 8-degree heating mode

Under heat mode, press “Eco” button, the system will enter into 8 Degree Heat Mode.

1. 8 Degree Heat Mode can not exist together with Sleep mode. If Sleep Mode is selected, 8 degree Heat Mode will be canceled.
2. The SPT will be 8 degree and display will show the SPT,
3. Under this mode, IFAN can not be changed manually (Including Turbo speed)
4. Under this mode, IFAN will operate as following table when compressor is ON. When compressor stops, IFAN will operate as “**Residual heat blowing function” (refer to 11.4.1)**

Indoor Fan speed	High	Medium	Low
RAT	<=9	(9,11)	>=11

One speed should keep at least 210sec operating before switching to other speeds.

11.12 Protections

There are 4 protection codes.
Normal (Norm) – unit operate normally.
Stop Rise (SR) – compressor frequency can not be raised but does not have to be decreased.
HzDown – Compressor frequency is reduced by 2Hz/s
Stop Compressor (SC) – Compressor is stopped.

11.12.1 Indoor Coil Defrost Protection

Conditions for Start Controlling
Judge the controlling start with the ICT (Indoor Coil Temperature) after 6min from operation start.

During cooling operation, the signals being sent from the indoor unit allow the operating frequency limitation and then prevent freezing of the indoor heat exchanger.

Compressor will operate at reduced frequency when ICT≤ 2 °C
Compressor will stop when ICT ≤-1 °C for continuous 3 mins. And the indoor fan and louver will remain at the original state.

Compressor will resume its original operation state when ICT≥10 °C AND Comp OFF time≥3min

If the unit stops as such protection for 6 times, it can not resume running automatically and display malfunction, it can resume by pressing ON/OFF.

11.12.2 Indoor Coil over Heating Protection

Conditions for Start Controlling
Judge the controlling start with the ICT after 2 sec from operation start.

During heating operation, the signals being sent from the indoor unit allow the operating frequency limitation and prevent abnormal high pressure.

Compressor frequency is prohibited going up when ICT≥ 53 °C
Compressor will operate at reduced frequency when ICT≥ 56 °C
Compressor will stop when ICT≥ 60 °C. And the indoor fan will stop after residual heating blowing function finished.

Compressor will resume its original operation state when ICT≤50 °C AND Comp OFF time≥3min

If the unit stops as such protection for 6 times, it can not resume running automatically and display malfunction, it can resume by pressing ON/OFF.

11.12.3 Outdoor Coil over Heating Protection

Conditions for Start Controlling
Judge the controlling start with the OCT after 2 sec from operation start.

During heating operation, the signals being sent from the outdoor unit allow the operating frequency limitation and prevent abnormal high pressure.

Compressor frequency is prohibited going up when OCT≥ 55 °C
Compressor will operate at reduced frequency when OCT≥ 58 °C
Compressor will stop when OCT≥ 62 °C. And the indoor fan will run at preset speed.

Compressor will resume its original operation state when OCT≤53 °C AND Comp OFF time≥3min

If the unit stops as such protection for 6 times, it can not resume running automatically and display malfunction, it can resume by pressing ON/OFF.

11.12.4 Compressor over Heating Protection

The Discharging temperature is used as the compressor's internal temperature. If the discharge temperature rises above a certain level, the operating frequency upper limit is set to keep this temperature from going up further.

Compressor frequency is prohibited going up when CTT≥ 98 °C
Compressor will operate at reduced frequency when CTT≥ 103 °C
Compressor will stop when CTT≥ 110 °C. And the indoor fan will run at preset speed.

Compressor will resume its original operation state when CTT≤90 °C AND Comp OFF time≥3min

If the unit stops as such protection for 6 times, it can not resume running automatically and display malfunction, it can resume by pressing ON/OFF.

11.12.5 Compressor over Current Protection

Detect an input current by the CT during the compressor is running, and set the frequency upper limit from such input current. In case of heat pump model, this control is the upper limit control function of the frequency which takes priority of the lower limit of four way valve activating compensation.
Detail
Compressor frequency is prohibited going up when AC current ≥ 7A
Compressor will operate at reduced frequency when AC current ≥ 8A
Compressor will stop when AC current ≥ 9A.

Compressor frequency is allowed to increase when AC current≤6A.

If the unit stops as such protection for 6 times, it can not resume running automatically and display malfunction, it can resume by pressing ON/OFF.

11.12.6 Outdoor Coil Deicing Protection

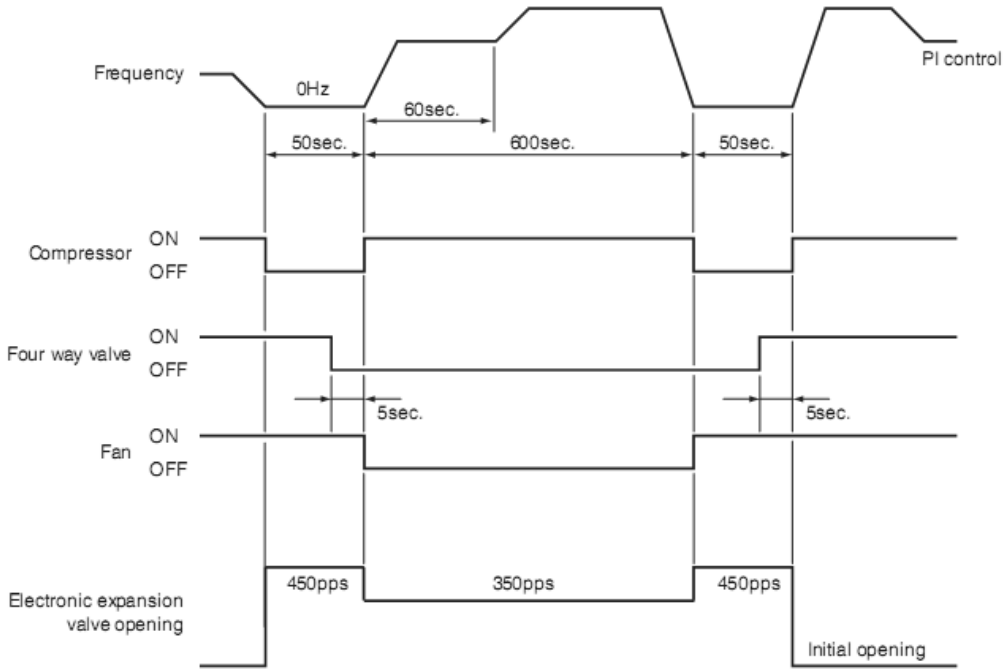
This protection is for Heat Pump Only
This protection is carried out by the cooling cycle (reverse cycle). The defrosting time or outdoor heat exchanger temperature must be more than its setting values when finishing the deicing protection.
In the deicing protection, IFAN is forced OFF.

11.12.6.1 Deicing Starting Conditions

The starting conditions must be made with the outdoor air temperature (OAT) and outdoor coil temperature (OCT). Under the conditions that the system is in heating operation, duration of successive heating operation is more than 45min, or accumulated heating time more than 90 min, the unit will enter the deicing mode after 3 min with either of following condition:

OAT	OCT
OAT>5°C	OCT≤-2°C
-2 °C<OAT≤5 °C	OCT≤-6°C
-5 °C<OAT≤-2 °C	OCT≤-8°C
OAT<-5 °C	OCT≤OAT-3°C

11.12.6.2 Deicing Protection Procedure



11.12.6.3 Exiting Deicing

The deicing operation can exit when any of the conditions below is satisfied:

1. OCT ≥10°C
2. The continuous running time of deicing reaches to maximum deicing time(9K-9min, 12K-7.5min).

11.12.7 Communication malfunction

If the unit does not receive correct signal from indoor unit for 3min continuously, the unit will stop as communication malfunction protection; if communication malfunction resume and compressor has stopped for 3min, the unit will resume running.

11.12.8 IPM module protection

When the compressor starts, if there is over current or control voltage low for IPM module as some abnormal results, IPM will detect module protection signal as the unit is on. Once the

module protective signal is detected, stop the unit with module protection immediately. If the module protection is resumed and compressor has stopped for 3min, the unit will be allowed to operate.

If the module protection continuously occurs for 6 times, it should not be resumed automatically, it can resume by pressing ON/OFF.

11.12.9 Compressor overload protection

If the compressor OLP is over 115 °C, the system will stop as protection
If the OLP is below 95 °C and compressor has stopped for 3min, the unit will be allowed to operate.

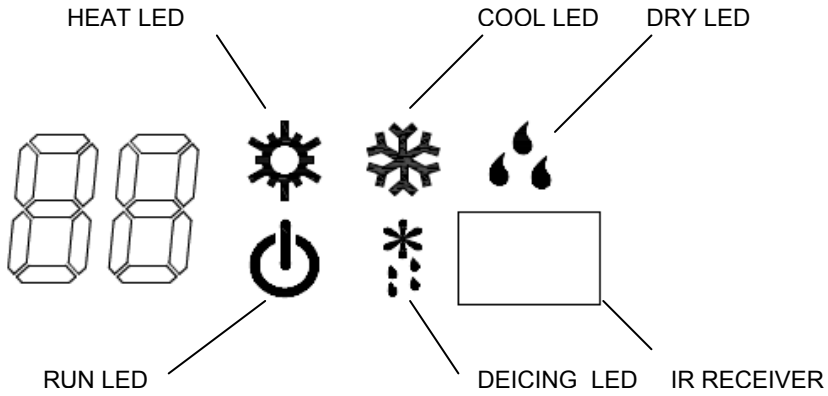
If the unit stops as compressor overload protection occurred for 6 times continuously, it can not resume running automatically and display malfunction, it can resume by pressing ON/OFF.

11.13 Operating the Unit from the ON/OFF Button

The ON/OFF button allows to operate the unit in AUTO mode, the microcomputer will monitor the room temperature and select the (COOL, HEAT, FAN) mode automatically, and temperature/Fan speed settings can not be changed.

11.14 Indoor Unit Controllers and Indicators

The following is schematic drawing for the display:



RUN INDICATOR	1. Lights up when the Air Conditioner is connected to power and the mode is STBY. 2. When the unit is turned on remotely, the RUN LED goes out while the current setting running mode is displayed
DEICING INDICATOR	1. Lights up when the Air Conditioner is under deicing protection

COOL INDICATOR DRY INDICATOR HEAT INDICATOR	1. Lights up during specified operation mode (COOL/DRY/HEAT).
2* 7 segments display	1. In normal situation, the setting temperature is displayed. 2. Shows outdoor temperature or indoor temperature when receiving the corresponding demand from controller. It resumes displaying setting temperature 5s later 3. Shows the alarm code whenever there is an alarm.(Refer to Diagonostic part)
Unit ON/OFF Button	**Short pressing(Less than 5s)** : Unit will swich between Auto mode and STBY. System will select the COOL/HEAT/FAN mode automatically and temperature/Fan speed settings can not be changed. **Long pressing (5~10s):** System will enter into Force cooling operating

11.15 Test Mode

11.15.1 Entering Test Mode

Test mode(Mode of testing capacity) can be achieved through special remote control settings as following table depends on models

Model	Mode (Shown on display)	Settings of Remote control		Operation of Remote control	Display (2*7 segments)
		Cooling	Heating		
09/12	P0(Minimum capacity)	SPT=16	SPT=27	Press "light" button 4 times in 3 secs.	Show "P0"
	P1(Norminal capacity)	SPT=18	SPT=29		Show "P1"
	P2(Maximum capacity)	SPT=19	SPT=30		Show "P2"
	P3(Medium capacity)	SPT=17	SPT=28		Show "P3"

11.15.2 Unit Operation in Test Mode

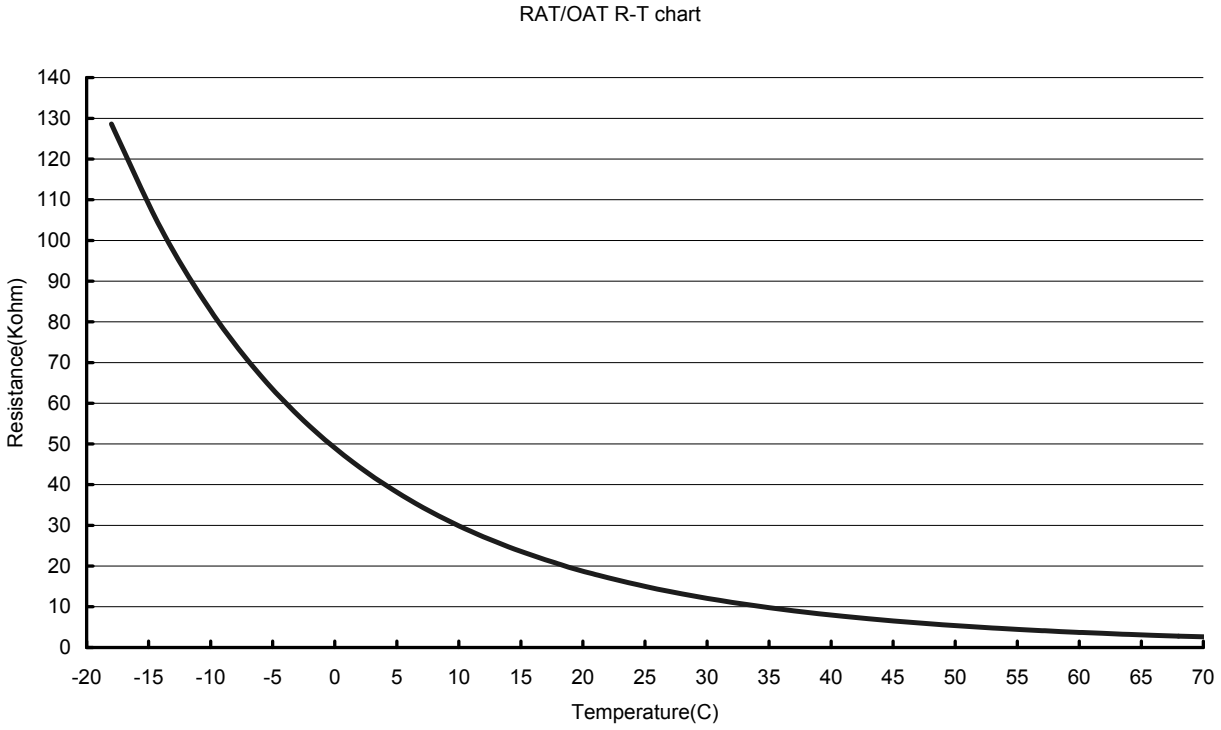
Compressor frequency will be set in the following ways.

Model		09	12
P0(Minimum capacity)	Cooling	15Hz	26Hz
	Heating	15Hz	26Hz
P1(Norminal capacity)	Cooling	50Hz	62Hz
	Heating	59Hz	63Hz
P2(Maximum capacity)	Cooling	88Hz	75Hz
	Heating	92Hz	80Hz
P3(Medium capacity)	Cooling	27Hz	27Hz
	Heating	30Hz	33Hz

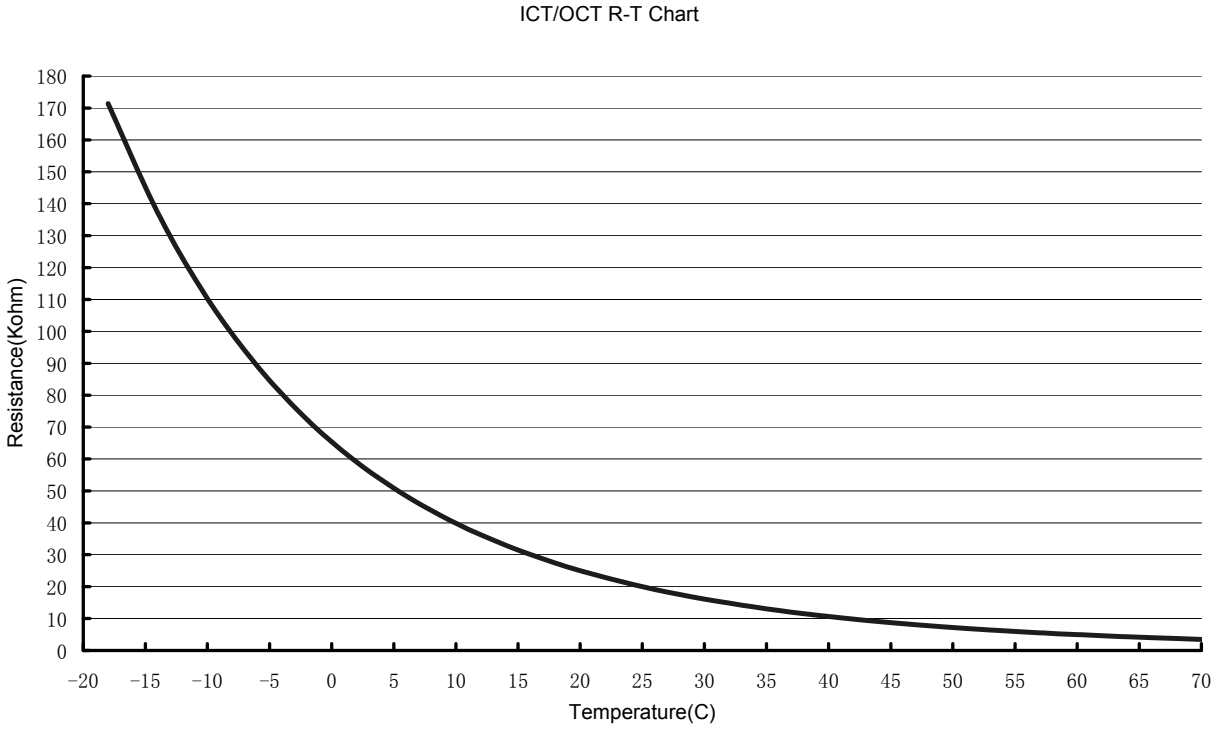
IFAN speed need to set to Turbo before entering test mode.

11.16 Characteristics of sensor

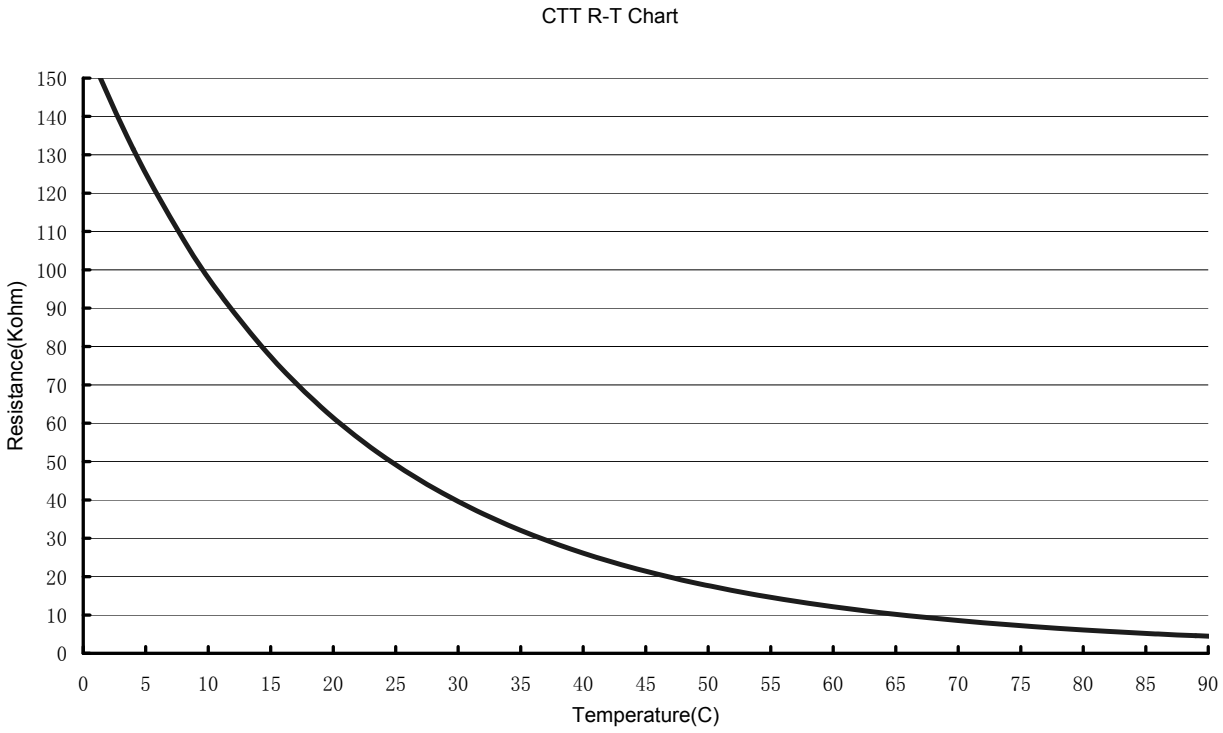
11.16.1 RAT/OAT



11.16.2 ICT/OCT



11.16.3 CTT


CTT R-T Chart
Resistance(Kohm)
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90
Temperature(C)

12. TROUBLESHOOTING

12.1 ELECTRICAL & CONTROL TROUBLESHOOTING

12.1.1 Precautions before Performing Inspection or Repair

Be cautious during installation and maintenance. Do operation following the regulations to avoid electric shock and casualty or even death due to drop from high attitude.

* **Static maintenance** is the maintenance during de-energization of the air conditioner. For static maintenance, make sure that the unit is de-energized and the plug is disconnected.

***Dynamic maintenance** is the maintenance during energization of the unit. Before dynamic maintenance, check the electricity and ensure that there is ground wire on the site. Check if there is electricity on the housing and connection copper pipe of the air conditioner with voltage tester. After ensure insulation place and the safety, the maintenance can be performed.

Take sufficient care to avoid directly touching any of the circuit parts without first turning off the power. At time such as when the circuit board is to be replaced, place the circuit board assembly in a vertical position. Normally,diagnose troubles according to the trouble diagnosis procedure as described below.(Refer to the check points in servicing written on the wiring diagrams attached to the indoor/outdoor units.)

Precautions when inspecting the control section of the outdoor unit:
A large-capacity electrolytic capacitor is used in the outdoor unit controller (inverter).Therefore,if the power supply is turned off, charge(charging voltage DC280V to 380V)remains and discharging takes a lot of time. After turning off the power source,if touching the charging section before discharging, an electrical shock may be caused.
The outdoor unit can not be started up until the unit is de-energized for 20min

12.1.2 Confirmation

12.1.2.1 Confirmation of Power Supply Confirm that the power breaker operates(ON) normally;

12.1.2.2 Confirmation of Power Voltage Confirm that power voltage is AC220~240V +/- 10%. If power voltage is not in this range, the unit may not operate normally.

12.1.3 Judgment by Indoor/Outdoor Unit Diagnostics

If there is malfunction, error code will be shown from IDU display, and the outdoor LEDs blinking can also show the faults from ODU.

Remark:

☆means LED Blink (☆ x 1 means blink once, and the LED blink: 0.5 second on, 0.5 second off, between two error cycles, it will be 2 seconds off interval.)

□ means: LED OFF

No	Outdoor indicators (LED)			IDU display	Status/Failure	Possible Reasons
	YELLOW	RED	GREEN			
1	☆ x 1				Compressor operates	
2	☆ x 2			H1	Deicing	● Normal function during heating
3	☆ x 3			E2	Indoor coil defrost protection	● Poor air-return in indoor unit ● Fan speed is abnormal ● Evaporator is dirty.
4	☆ x 4			H5	IPM protection	● Abnormal power input voltage. ● Compressor wiring mistake. ● Liquid and gas valve are not open. ● EEV damaged or not proper working ● Poor heat exchange ● Over charged system
5	☆ x 5			E5	AC over current protection	● Supply voltage is unstable ● Supply voltage is too low and load is too high
6	☆ x 6			H4	Overload of system	● System is abnormal, check if the evaporator and condenser is dirty and blocked
7	☆ x 7			E4	Compressor over Heating Protection	● EEV connection problem or damage ● Refrigerant leakage ● Poor heat exchange
8	☆ x 8			H3	Compressor overload protection	● Connection of compressor OLP is loosen (the resistance for this terminal should be less than 1ohm) ● EEV connection problem or damaged / Capillary problem ● Refrigerant leakage
9	☆ x 9			L9	Over power protection	● Too high ambient temperature ● Poor heat exchange (including blockage and bad radiating environment)
10	☆ x 11				EPROM error	●
11	☆ x 12			PL	DC under voltage	● AC power supply voltage is less than 150VAC ● Outdoor PCB circuit malfunction
12	☆ x 13			PH	DC over voltage	● AC power supply is higher than 265V ● Outdoor PCB circuit malfunction
13	☆ x 14			HC	PFC over current protection	● PFC module assembly problem. ● Poor heat exchange of Heatsink ● PFC reactor problem. ● Abnormal power voltage ● PFC circuit problem on PCB
14	☆ x 16			LP	IDU/ODU mismatch	● Check the jumper setting
15		☆ x 1			Limit frequency (Over current)	● Power supply voltage is too low ● Higher system pressure and overload
16		☆ x 3			Limit frequency (Compressor overheating)	● Overload or temperature is too high ● Insufficient refrigerant ● EEV Problem
17		☆ x 3			Limit frequency (System overload)	● Too high ambient temperature ● Poor heat exchange (including blockage and bad radiating environment)
18		☆ x 4			Limit frequency (Indoor defrosting)	● Poor air-return in indoor unit ● Fan speed is abnormal ● Evaporator is dirty.
19		☆ x 6		F3	OAT failure	● Senor was broken or damaged ● PCB temperature detection circuit has problem
20		☆ x 5		F4	OCT failure	
21		☆ x 7		F5	CTT failure	

22		☆ x 8			Reaching temperature set point	
23		☆ x 13			Limit frequency(Over power)	● Too high ambient temperature ● Poor heat exchange (including blockage and bad radiating environment)
24		☆ x 14			Protection of fan	
25			☆		Normal communication	
26			□	E6	Communication malfunction	● Wiring mistakes ● IDU or ODU PCB problem
27				F1	RAT failure	● Senor was broken or damaged ● PCB temperature detection circuit has problem
28				F2	ICT failure	

12.1.4 Checking the refrigeration system

Checking system pressures and other thermodynamic measures should be done when system is in Test Mode (in Test mode, system operates in fixed settings). The performance curves given in this manual are given for unit performance in test mode when high indoor fan speed is selected.
Entering test mode please refer to section 11- Control system.

12.2 Simple procedures for checking the Main Parts

12.2.1 Checking Mains Voltage.

Confirm that the Mains voltage is between 198 and 264 VAC. If Mains voltage is out of this range, abnormal operation of the system is expected. If in range check the Power (Circuit) Breaker and look for broken or loosed cable lugs or wiring mistake(s).

12.2.2 Checking Power Input.

If Indoor unit power LED is unlighted, power down the system and check the fuse of the Indoor unit. If the fuse is OK replace the Indoor unit controller. If the fuse has blown, replace the fuse and power up again.
Checking Power Input procedure for the Outdoor unit is the same as with the Indoor unit.

12.2.3 Checking the Compressor.

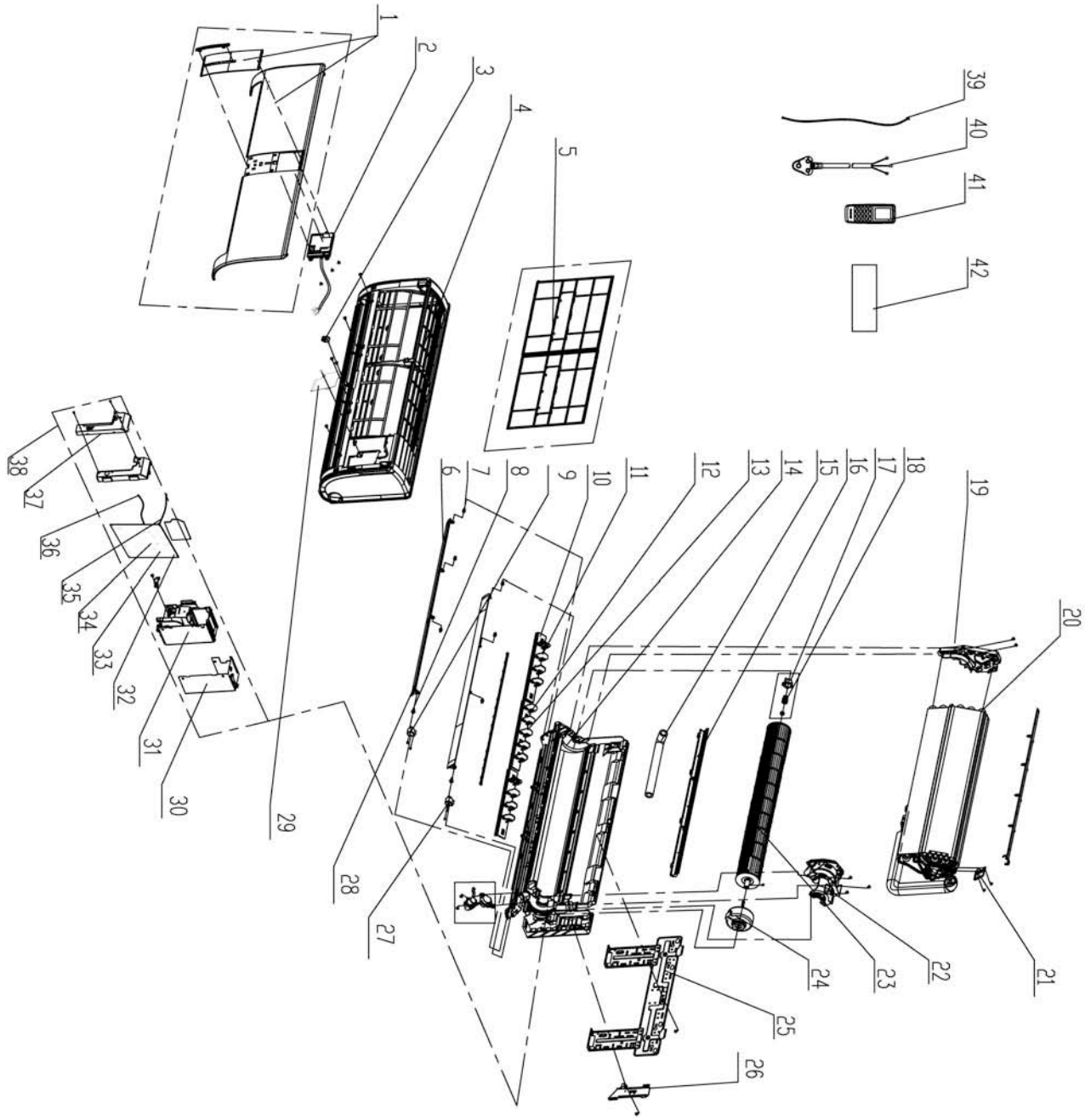
The compressor is brushless permanence magnetic DC motor. Three coil resistance is same. Check the resistance between three poles. The normal value should be ~ 1.764 Ohm (at 20C). Pay attention U,V, W are respective to connect to RED,YELLOW,BLUE wires.

12.2.4 Checking the Reverse Valve (RV).

Running in heating mode, check the voltage between two pins of reverse valve connector, normal voltage is 220~240VAC.

13. EXPLODED VIEW & SPARE PART LIST

13.1 Exploded view of indoor unit: HGD009, HGD012



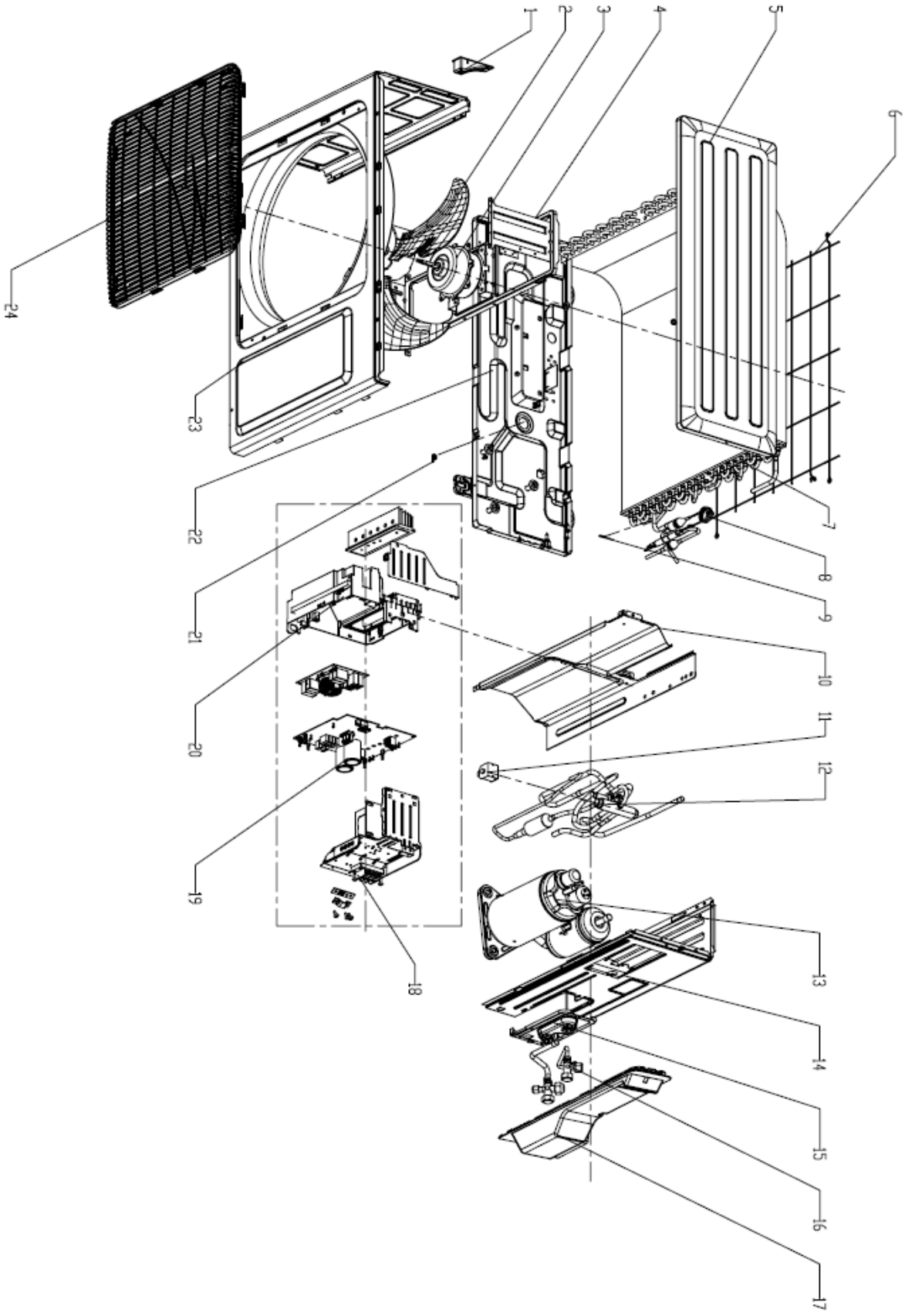
13.2 Spare part list of indoor Unit: HGD009

NO.	Part Code	Part Description	qty
1		Front Panel Assy	1
2	30565133	Display Board	1
3	24252023	Screw Cover	1
4	20012631	Front Case Sub-Assy	1
5	11122134	Filter Sub-Assy	2
6	10512186	Guide Louver 2	1
7	1054202001	Shaft of Guide Louver	6
8	73012005	Crank	2
9	1521212201	Step Motor	1
10	26112263	Louver Clamp1	2
11	10512184	Air Louver 1	2
12	26112264	Louver Clamp2	1
13	10512185	Air Louver 2	1
14	22202200	Rear Case assy	1
15	05230014	Drain Pipe	1
16	26112262	Helicoid Tongue	1
17	10542024	Axile Bush sub-assy	1
18	76512011	Damping washer sub-assy	1
19	24212128	Evaporator Support	1
20	0100229401	Evaporator Assy	1
21	01382010	Shield board (elbow)	1
22	26112261	Motor Press Plate	1
23	10352041	Cross Flow Fan	1
24	150120874	Motor FN20J-PG	1
25	01252121	Wall Mounting Frame	1
26	26112164	Pipe Clamp	1
27	1521210804	Step Motor	1
28	10512183	Guide Louver 1	1
29	2012207507	Electric Box Cover2	1
30	01592300	Lower Shield sub-assy of Electric Box	1
31	20112121	Electric Box	1
32	33010002	Capacitor CBB61	1
33	301388701	Main Board	1
34	4202300102	Jumping Connector	1
35	390000592	Temperature Sensor	1
36	390000455	Temperature Sensor	1
37	01592301	Upper Shield Cover sub-assy of Electric Box	1
38	2020273801	Electric Box Assy	1
39	400204055	Connecting Cable	0
40	4002046422	Power Cord	1
41	30510460	Remote Controller	1
42	11122129	Filter	1

13.3 Spare part list of indoor unit: HGD012

NO.	Part Code	Part Description	qty
1		Front Panel Assy	1
2	30565133	Display Board	1
3	24252023	Screw Cover	1
4	20012631	Front Case Sub-Assy	1
5	11122134	Filter Sub-Assy	2
6	10512186	Guide Louver 2	1
7	1054202001	Shaft of Guide Louver	6
8	73012005	Crank	2
9	1521212201	Step Motor	1
10	26112263	Louver Clamp1	2
11	10512184	Air Louver 1	2
12	26112264	Louver Clamp2	1
13	10512185	Air Louver 2	1
14	22202200	Rear Case assy	1
15	05230014	Drain Pipe	1
16	26112262	Helicoid Tongue	1
17	10542024	Axile Bush sub-assy	1
18	76512011	Damping washer sub-assy	1
19	24212128	Evaporator Support	1
20	01002294	Evaporator Assy	1
21	01382010	Shield board (elbow)	1
22	26112261	Motor Press Plate	1
23	10352041	Cross Flow Fan	1
24	150120874	Motor FN20J-PG	1
25	01252121	Wall Mounting Frame	1
26	26112164	Pipe Clamp	1
27	1521210804	Step Motor	1
28	10512183	Guide Louver 1	1
29	2012207507	Electric Box Cover2	1
30	01592300	Lower Shield sub-assy of Electric Box	1
31	20112121	Electric Box	1
32	33010002	Capacitor CBB61	1
33	301388701	Main Board	1
34	4202300104	Jumper Cap	1
35	390000592	Temperature Sensor	1
36	390000455	Temperature Sensor	1
37	01592301	Upper Shield Cover sub-assy of Electric Box	1
38	2020273802	Electric Box Assy	1
39	400204055	Connecting Cable	0
40	4002046422	Power Cord	1
41	30510460	Remote Controller	1
42	11122129	Filter	1

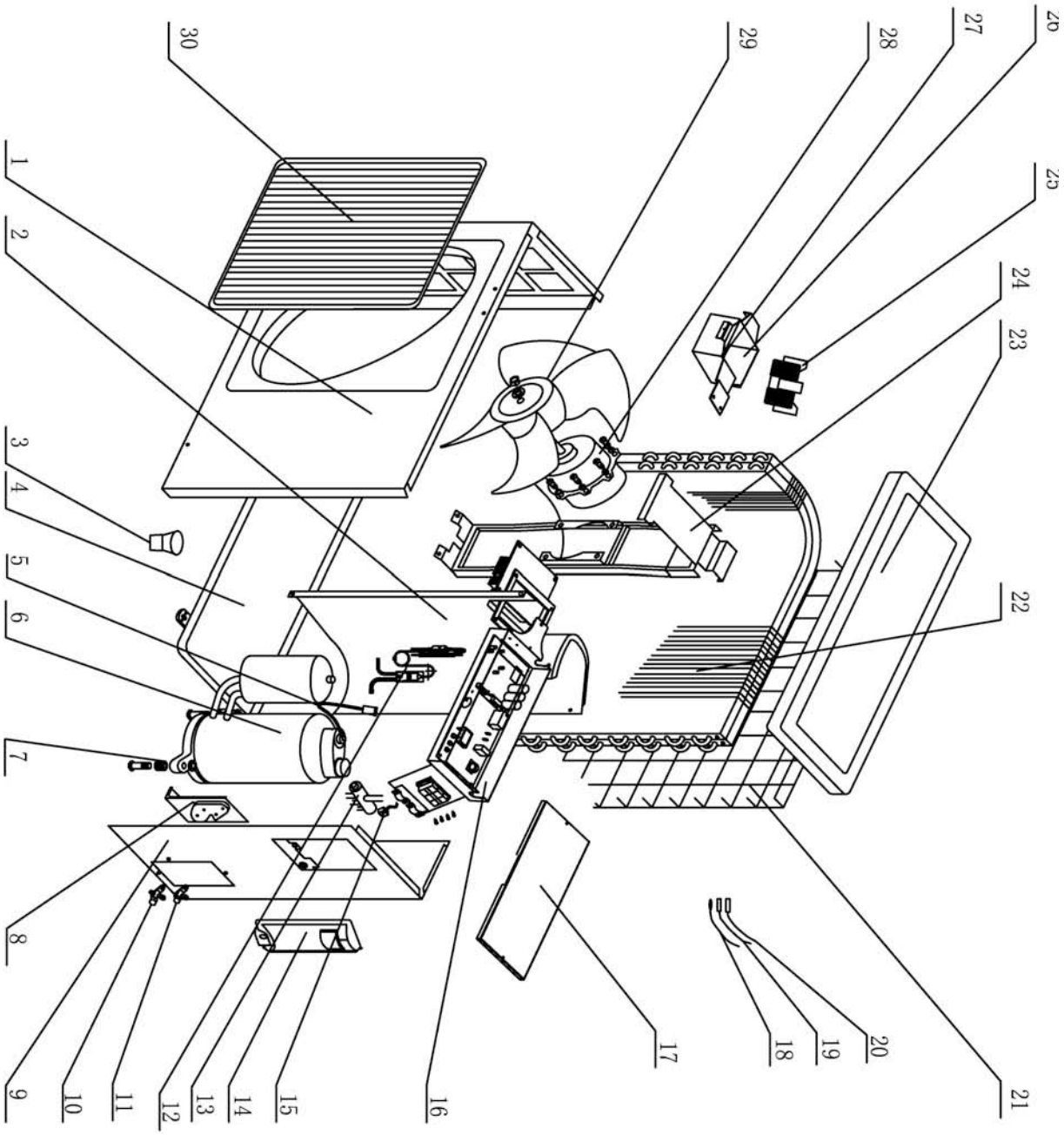
13.4 Exploded view of outdoor unit: YGD009



13.5 Spare part list of outdoor Unit: YGD009

NO.	Part Code	Part Description	qty
1	26233100	Small Handle	1
2	10333427	Axial Flow Fan	1
3	1501308502	Brushless DC Motor	1
4	0170310401	Motor Support	1
5	01253454	Top Cover Sub-Assy	1
6	01473009	Rear Grill	1
7	01113546	Condenser Assy	1
9	3900030804G	Temperature Sensor	1
10	01233385	Clapboard Sub-Assy	1
11	4300040050	Magnet Coil	1
12	03123385	4-way Valve Assy	1
13	00103224	Compressor and Fittings	1
14	0130317801	Right Side Plate Sub-Assy	1
15	0170308901P	Valve Support	1
16	07100005	Valve	1
17	26233433	Big Handle	1
18	42011113	Terminal Board	1
20	0260347801	Electric Box Assy	1
21	06123401	Drainage Connecter	1
22	01203912P	Chassis Sub-assy	1
23	01533029P	Front Panel	1
24	22413433	Front Grill	1

13.6 Exploded view of outdoor unit: YGD012



13.7 Spare part list of outdoor Unit: YGD012

NO.	Part Code	Part Description	qty
1	015330124	Front Panel	1
2	01233034	Clapboard Sub-Assy	1
3	06123401	Drainage Connecter	1
4	0120391901P	Chassis Sub-assy	1
5	39000310G	Temperature Sensor	1
6	00103215	Compressor and Fittings	1
8	01713041	Valve Support	1
9	0130200404	Right Side Plate Assy	1
10	07100006	Valve	1
11	07133082	Cut off Valve	1
12	03063596	Capillary Sub-assy	1
13	0312342001	4-Way Valve Assy	1
14	26233433	Big Handle	1
15	4300040047	Magnet Coil	1
16	0140398695	Electric Box Assy	1
17	0260309601	Electric box cover sub-assy	1
21	01473014	Rear Grill	1
22	01163124	Condenser Assy	1
23	01253443	Top Cover Plate	1
24	017030501	Motor Support Sub-Assy	1
25	43130185	Reactor	1
26	01403616	Reactor ASSY	1
28	15013085	Brushless DC Motor	1
29	10333427	Axial Flow Fan	1
30	22413433	Front Grill	1

APPENDIX