Airwell

Service Manual

CN Fixed RPM Series

Indoor Units	Outdoor Units
CN 9	GCN 9 R410A
CN 12	GCN 12 R410A
CN 18	ONG3-17 R410A

REFRIGERANT R410A	HEATPUMP

REV: 01	Oct 2008

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 ..... 0 ..... 1 October 2008

Total number of pages in this publication is **127** consisting of the following:

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

Title……..0
A……0
i……0
1-1 ~ 1-3……..0
2-1 ~ 2-4……..0
3-1……..……..0
4-1 ~ 4-2……..0
5-1 ~ 5-6……..0
6-1 ~ 6-6……..0
7-1 ~ 7-4……..0
8-1 ……..……..0
9-1 ~ 9-3……..0
10-1……..0
11-1 ……..0
12-1 ~ 12-47..……..0
13-1 ~ 13-2……0
14-1 ~14-9……0
Appendix A……..0

- Zero in this column indicates an original page.

Table of Contents

1. Introduction

1.1 General

The CN Fixed RPM Cassette type split air conditioner has the same appearance and structure with CN DCI model. It comprise RC (heat pump) models, as follows:

CN 9, CN 12, CN 18

1.2 Main Features

The CN Fixed RPM series benefits from the most advanced technological innovations, namely:

- R410A refrigerant
- High COP
- Precharged refrigerant
- Low Sound level for both Indoor and Outdoor
- 60 x60 cm dimenstion designed for integration in suspended ceilings
- New grille, modern style with elegant lines in line with every interior decor , 2 panels optional available (hard ceiling / Suspended ceiling)
- Motorized air distribution flaps
- Very slim profile 219mm at size 9-12, and 270mm at size 18
- Option of fresh air intake, and air distribution to adjacent room
- Integrated condensate pump with a lift of 1m Max.
- Up to 15 m pipe length between indoor and outdoor units
- Up to 7 m vertical high between indoor and outdoor units
- Heating operation at outdoor temprature down to -9°C
- Built in over-flow protection against the condensate water
- Easy installation and service.
- Fan speed can be adjusted by air flow compensation setting according to different installation height (Field option)

1.3 Indoor Unit

The indoor unit is cassette type indoor unit, and can be easily fitted to many types of residential and commercials applications.

It includes:

- Coil with hydrophilic aluminum fins.
- Motorized air flap (two step motors)
- Advanced electronic control box assembly
- Low sound level of the indoor fan

1.4 Control

The microprocessor indoor controller, and an infrared remote control, supplied as standard, provide complete operating function and programming. For further details please refer to the Operation Manual, Appendix A.

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.
- Service valves" flare" type connection.
- 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, Chapter 10.

1.7 Accessories

Remote Control
Panel 625x625 for gird ceiling
Panel 725x725 for hard ceiling

1.8 Inbox Documentation

Each unit is supplied with its own installation manual, operation manual and Remote Controller operation manual.

1.9 Matching Table

Indoor Units / Outdoor Units		CN 9	CN 12	CN 18
				
GCN 9 R410A		√		
GCN 12 R410A			√	
ONG3-17 R410A				√

In addition the listed outdoor units can be matched with other types of indoor units such as Lex,Alpha.
For further information please refer to the relevant Service Manual.

2. PRODUCT DATA SHEET

Model Indoor Unit				**CN-9**		
Model Outdoor Unit				**GCN-9**		
Installation Method of Pipe				Flared		
Characteristics			**Units**	**Cooling Only**	**Cooling**	**Heating**
Capacity (4)			Btu/hr	9380	9380	9720
			kW	2.75	2.75	2.85
Power input (4)			kW	0.81	0.81	0.74
EER (Cooling) or COP(Heating) (4)			W/W	3.40	3.40	3.85
Energy efficiency class				A	A	A
Power supply			V	220-240		
			Ph	1		
			Hz	50		
Rated current			A	3.7	3.7	3.4
Power factor				0.96	0.96	0.96
Prated (IDU)			W	35		
Prated (IDU+ODU)			W	1350		
Starting current			A	16.6		
Circuit breaker rating			A	10		
INDOOR	Fan type & quantity			Centrifugal x 1		
	Fan speeds	H/M/L	RPM	650/550/450		
	Air flow (1)	H/M/L	m3/hr	490/400/320		
	External static pressure	Min	Pa	0		
	Sound power level (2)	H/M/L	dB(A)	48/45/43		
	Sound pressure level(3)	H/M/L	dB(A)	36/33/31		
	Moisture removal		l/hr	0.92		
	Condenstate drain tube I.D		mm	16		
	Dimensions	WxHxD	mm	575X575X219(625X625X40/725X725X40)		
	Net Weight		kg	12.9(2.2/2.7)		
	Package dimensions	WxHxD	mm	681X681X297(700X700X103/800X800X103)		
	Packaged weight		kg	16.2(3.4/4.2)		
	Units per pallet		units	12		
	Stacking height		units	6levels		
OUTDOOR	Refrigerant control			Capillary tube		
	Compressor type,model			Rotary Toshiba(GMCC) PA103X1C-4FZDE1		
	Fan type & quantity			Propeller(direct) x 1		
	Fan speeds	H	RPM	750		
	Air flow	H	m3/hr	1370		
	Sound power level	H	dB(A)	61		
	Sound pressure level(3)	H	dB(A)	51		
	Dimensions	WxHxD	mm	830x545x245		
	Net Weight		kg	31	32	
	Package dimensions	WxHxD	mm	880x600x320		
	Packaged weight		kg	33	34	
	Units per pallet		Units	9		
	Stacking height		units	3 levels		
	Refrigerant type			R410		
	Standard charge		kg(7.5m)	0.97		
	Additional charge			4m L 10m: +0g; 10m L 15m: +50g		
	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.7		
Operation control type				Remote control		
Heating elements (Option)			kW	N/A		
Others						

(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).

(5)The declared value's tolerance is in accordance with Eurovent.

Model Indoor Unit				**CN-12**		
Model Outdoor Unit				**GCN-12**		
Installation Method of Pipe				Flared		
Characteristics			**Units**	**Cooling Only**	**Cooling**	**Heating**
Capacity (4)			Btu/hr	11090	11090	11940
			kW	3.25	3.25	3.50
Power input (4)			kW	1.04	1.04	0.98
EER (Cooling) or COP(Heating) (4)			W/W	3.12	3.12	3.50
Energy efficiency class				B	B	B
Power supply			V	220-240		
			Ph	1		
			Hz	50		
Rated current			A	4.7	4.7	4.5
Power factor				0.96	0.96	0.96
Prated (IDU)			W	35		
Prated (IDU+ODU)			W	1400		
Starting current			A	24		
Circuit breaker rating			A	10		
INDOOR	Fan type & quantity			Centrifugal x 1		
	Fan speeds	H/M/L	RPM	650/550/450		
	Air flow (1)	H/M/L	m3/hr	490/400/320		
	External static pressure	Min	Pa	0		
	Sound power level (2)	H/M/L	dB(A)	48/46/44		
	Sound pressure level(3)	H/M/L	dB(A)	36/34/32		
	Moisture removal		l/hr	1.35		
	Condenstate drain tube I.D		mm	16		
	Dimensions	WxHxD	mm	575X575X219(625X625X40/725X725X40)		
	Net Weight		kg	12.9(2.2/2.7)		
	Package dimensions	WxHxD	mm	681X681X297(700X700X103/800X800X103)		
	Packaged weight		kg	16.2(3.4/4.2)		
	Units per pallet		units	12		
	Stacking height		units	6levels		
OUTDOOR	Refrigerant control			Capillary tube		
	Compressor type,model			Rotary,Panasonic,5PS132EAC22		
	Fan type & quantity			Propeller(direct) x 1		
	Fan speeds	H	RPM	830		
	Air flow	H	m3/hr	1450		
	Sound power level	H	dB(A)	63		
	Sound pressure level(3)	H	dB(A)	53		
	Dimensions	WxHxD	mm	830x545x245		
	Net Weight		kg	32	33	
	Package dimensions	WxHxD	mm	880x600x320		
	Packaged weight		kg	34	35	
	Units per pallet		Units	9		
	Stacking height		units	3 levels		
	Refrigerant type			R410A		
	Standard charge		kg(7.5m)	0.96		
	Additional charge			4m≤Lin≤10m:+0g 10m<Lin≤15m:+50g		
	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.7		
Operation control type				Remote control		
Heating elements (Option)			kW	N/A		
Others						

(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).

(5)The declared value's tolerance is in accordance with Eurovent.

Model Indoor Unit				**CN-18**		
Model Outdoor Unit				**ONG3-17**		
Installation Method of Pipe				Flared		
Characteristics			**Units**	**Cooling Only**	**Cooling**	**Heating**
Capacity (4)			Btu/hr	17400	17400	18420
			kW	5.10	5.10	5.40
Power input (4)			kW	1.66	1.66	1.61
EER (Cooling) or COP(Heating) (4)			W/W	3.07	3.07	3.35
Energy efficiency class				B	B	C
Power supply			V	220-240		
			Ph	1		
			Hz	50		
Rated current			A	7.5	7.5	7.3
Power factor				0.96	0.96	0.96
Prated (IDU)			W	55		
Prated (IDU+ODU)			W	2150		
Starting current			A	32		
Circuit breaker rating			A	15		
INDOOR	Fan type & quantity			Centrifugal x 1		
	Fan speeds	H/M/L	RPM	750/650/550		
	Air flow (1)	H/M/L	m3/hr	680/580/490		
	External static pressure	Min	Pa	0		
	Sound power level (2)	H/M/L	dB(A)	52/49/47		
	Sound pressure level(3)	H/M/L	dB(A)	41/39/37		
	Moisture removal		l/hr	2.40		
	Condenstate drain tube I.D		mm	16		
	Dimensions	WxHxD	mm	575X575X270(625X625X40/725X725X40)		
	Net Weight		kg	15.2(2.2/2.7)		
	Package dimensions	WxHxD	mm	681X681X348(700X700X103/800X800X103)		
	Packaged weight		kg	18.7(3.4/4.2)		
	Units per pallet		units	12		
	Stacking height		units	6 levels		
OUTDOOR	Refrigerant control			Capillary tube		
	Compressor type,model			Rotary,TOSHIBA PA200X2CS-4KT1		
	Fan type & quantity			Propeller(direct) x 1		
	Fan speeds	H	RPM	910		
	Air flow	H	m3/hr	2160		
	Sound power level	H	dB(A)	65		
	Sound pressure level(3)	H	dB(A)	54		
	Dimensions	WxHxD	mm	795x610x290		
	Net Weight		kg	42	43	
	Package dimensions	WxHxD	mm	970x650x394		
	Packaged weight		kg	45	46	
	Units per pallet		Units	9		
	Stacking height		units	3 levels		
	Refrigerant type			R410A		
	Standard charge		kg(7.5m)	1.28kg		
	Additional charge			4m Length 10m: +0g; 10m Length 15m: +100g		
	Connections between units	Liquid line	In.(mm)	1/4"(6.35)		
		Suction line	In.(mm)	1/2"(12.7)		
		Max.tubing length	m.	Max.15		
		Max.height difference	m.	Max.7		
Operation control type				Remote control		
Heating elements (Option)			kW	N/A		
Others						

(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).

(5)The declared values tolerance is in accordance with Eurovent.

Optional accessory

Panel 625x625(Optional accessory)		For all the models
Dimensions (H x L x D)	mm	625x625x40
Weight	kg	2.2
Package Dimensions (H x L x D)	mm	700x700x103
Package Weight	kg	3.4
Units per pallet	units	20
Stacking height	units	10 levels

Panel 725x725(Optional accessory)		For all the models
Dimensions (H x L x D)	mm	725x725x40
Weight	kg	2.7
Package Dimensions (H x L x D)	mm	800x800x103
Package Weight	kg	4.2
Units per pallet	units	10
Stacking height	units	10 levels

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

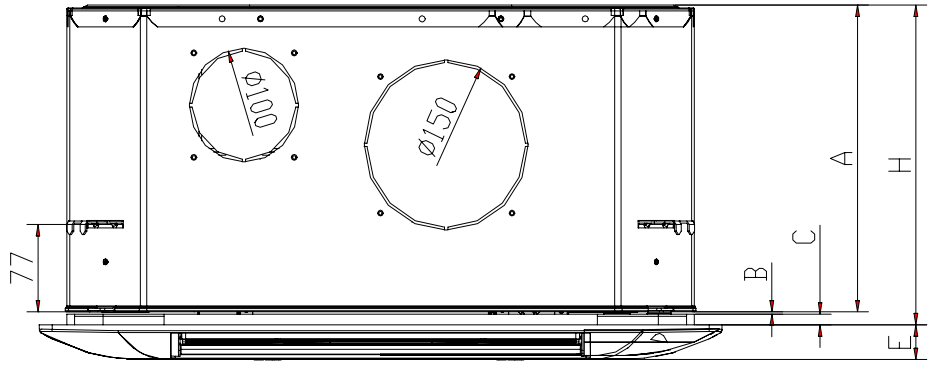
Operating Limits

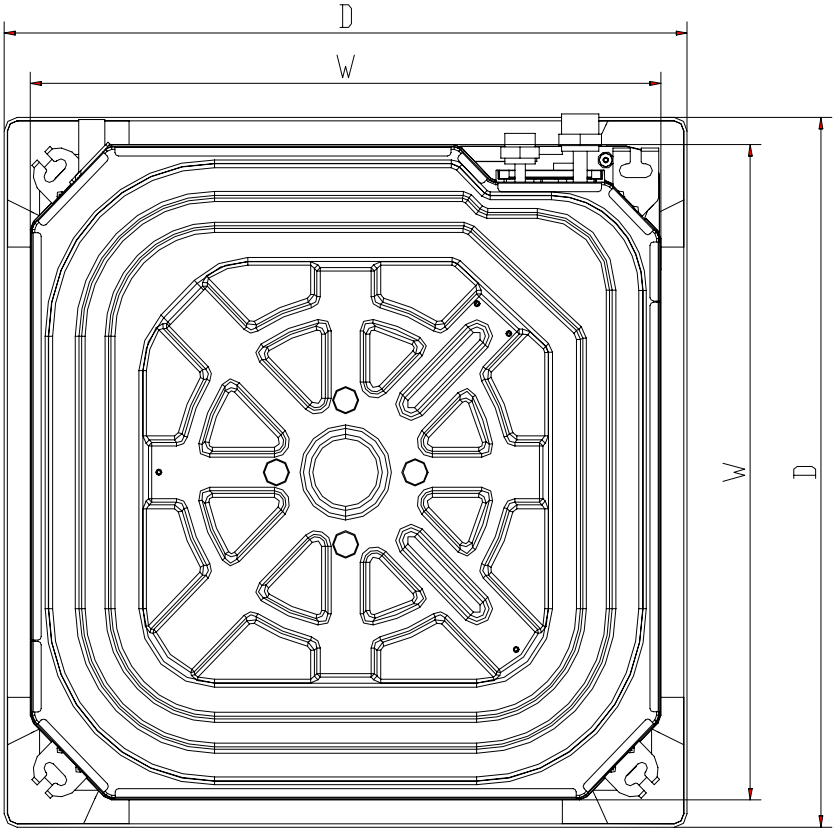
R410A

		Indoor	Outdoor
Cooling	Upper limit	32°C DB 23°C WB	46°C DB
	Lower limit	21°C DB 15°C WB	21°C DB
Heating	Upper limit	27°C DB	24°C DB 18°C WB
	Lower limit	10°C DB	-9°C DB -10°C WB
Voltage		198 – 264 V	

4. OUTLINE DIMENSIONS

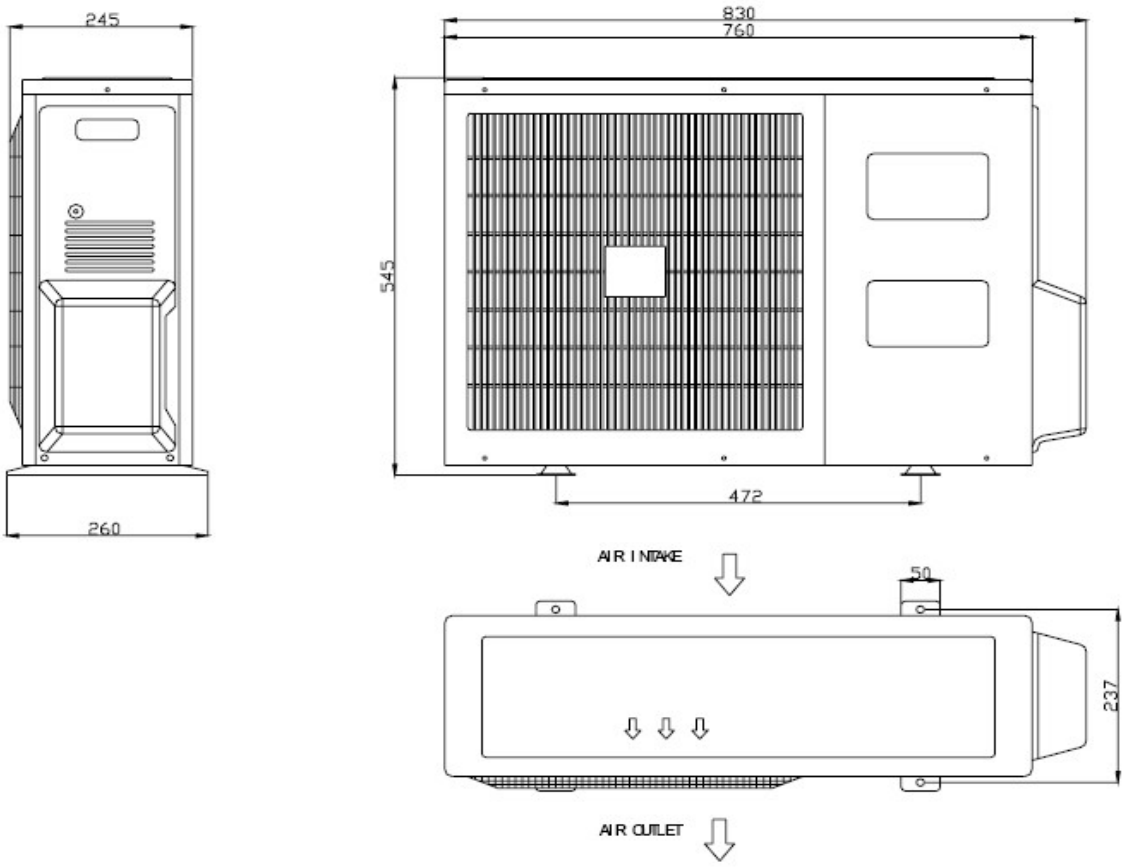
4.1 Indoor Unit: CN 9/12/18



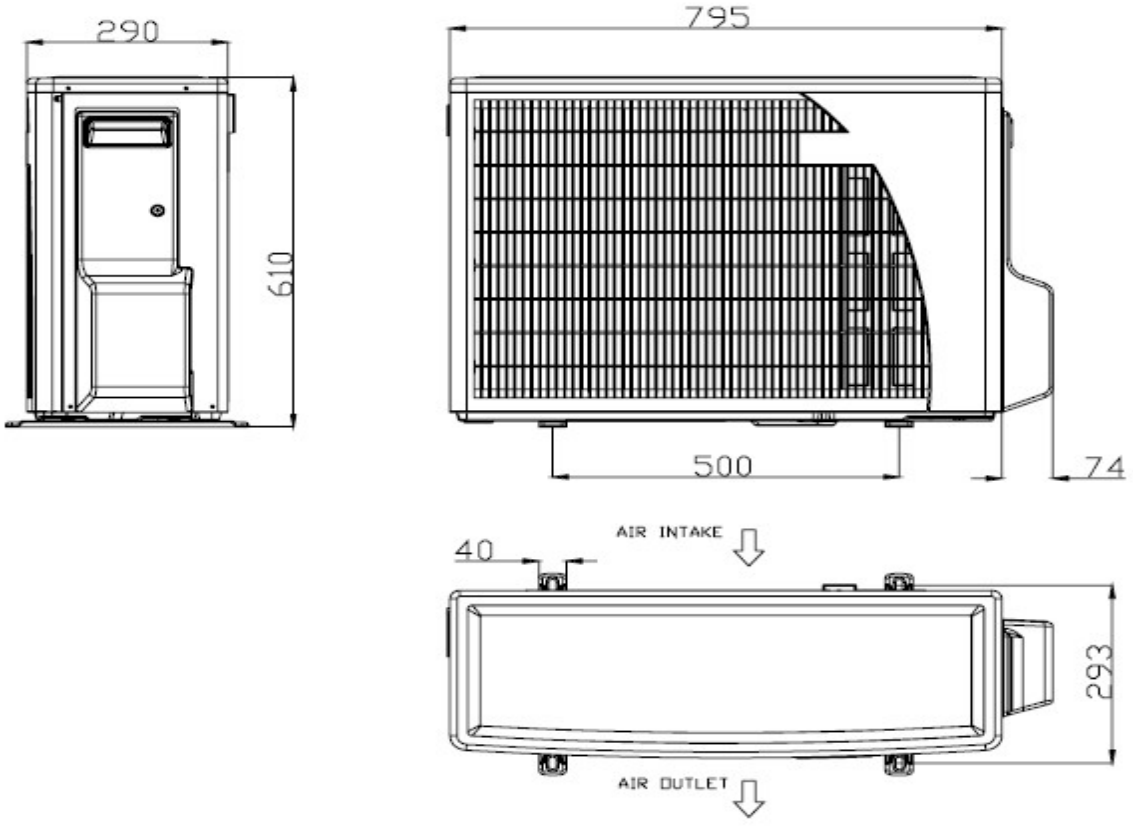


Unit Model	Main unit A	Insulation B	Front Step C	Front width D	Front height E	Effective Height H
CN 9/12	219	2	9	625/725	40	230
CN 18	270	2	9	625/725	40	281

4.2 Outdoor Unit: GCN 9/12 R410A



4.3 Outdoor Unit: ONG3-17 R410A



5. PERFORMANCE DATA

5.1 CN 9/GCN 9 R410A

5.1.1 Cooling Capacity (kW)

Entering Air DB OD Coil(°C)	Data	Entering Air WB/DB ID Coil(°C)				
		15/21	17/24	19/27	21/29	23/32
15	TC	2.86	3.02	3.16	3.30	3.42
	SC	0.58	0.62	0.65	0.63	0.64
	PI	0.58	0.58	0.58	0.58	0.58
20	TC	2.83	3.00	3.14	3.28	3.39
	SC	2.02	2.14	2.26	2.20	2.25
	PI	0.62	0.62	0.63	0.63	0.63
25	TC	2.72	2.91	3.08	3.22	3.33
	SC	0.56	0.60	0.64	0.63	0.64
	PI	0.67	0.68	0.68	0.69	0.69
30	TC	2.55	2.74	2.97	3.08	3.19
	SC	0.54	0.58	0.62	0.61	0.64
	PI	0.73	0.73	0.74	0.75	0.75
35	TC	2.35	2.55	**2.80**	2.94	3.05
	SC	0.50	0.55	**0.60**	0.59	0.62
	PI	0.78	0.80	**0.81**	0.82	0.82
40	TC	2.13	2.32	2.58	2.72	2.83
	SC	0.47	0.52	0.57	0.56	0.59
	PI	0.85	0.86	0.87	0.88	0.89
46	TC	1.85	2.04	2.30	2.44	2.55
	SC	0.43	0.47	0.53	0.52	0.55
	PI	0.93	0.94	0.96	0.97	0.98

LEGEND

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

5.1.2 Heating Capacity (kW)

	ENTERING AIR DB ID COIL(°c)					
	15		20		25	
ENTERING WB OD COIL(°C)	TH	PI	TH	PI	TH	PI
-10	1.45	0.57	1.39	0.60	1.34	0.64
-7	1.56	0.58	1.50	0.61	1.45	0.65
-2	1.65	0.59	1.60	0.62	1.54	0.66
2	2.01	0.62	1.93	0.66	1.84	0.70
6	2.84	0.66	**2.75**	**0.71**	2.66	0.75
10	3.08	0.70	3.00	0.75	2.92	0.80
15	3.33	0.73	3.25	0.79	3.17	0.84
20	3.51	0.75	3.43	0.82	3.33	0.88

LEGEND

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

5.1.3 Capacity Correction Factor Due to Tubing Length

Cooling

TOTAL TUBING LENGTH								
3m	**7.5m**	10m	15m	20m	25m	30m	40m	50m
1.03	**1**	0.984	0.953	---	---	---	---	---

* Minimum recommended tubing length between indoor and outdoor units is 3m.

Heating

TOTAL TUBING LENGTH								
3m	**7.5m**	10m	15m	20m	25m	30m	40m	50m
1.06	**1**	0.962	0.886	---	---	---	---	---

* Minimum recommended tubing length between indoor and outdoor units is 3m.

5.2 CN 12/GCN 12 R410A

5.2.1 Cooling Capacity (kW)

Entering Air DB OD Coil(°C)	Data	Entering Air WB/DB ID Coil(°C)				
		15/21	17/24	19/27	21/29	23/32
15	TC	3.32	3.51	3.67	3.84	3.97
	SC	0.89	0.94	0.99	0.97	0.99
	PI	0.75	0.75	0.75	0.75	0.75
20	TC	3.28	3.48	3.64	3.80	3.93
	SC	2.34	2.49	2.63	2.55	2.61
	PI	0.81	0.81	0.81	0.82	0.82
25	TC	3.15	3.38	3.58	3.74	3.87
	SC	0.86	0.93	0.98	0.96	0.99
	PI	0.87	0.88	0.89	0.89	0.89
30	TC	2.96	3.19	3.45	3.58	3.71
	SC	0.82	0.89	0.96	0.94	0.98
	PI	0.94	0.95	0.96	0.97	0.98
35	TC	2.73	2.96	**3.25**	3.41	3.54
	SC	0.77	0.84	**0.92**	0.91	0.95
	PI	1.02	1.03	**1.05**	1.06	1.06
40	TC	2.47	2.70	2.99	3.15	3.28
	SC	0.72	0.79	0.87	0.86	0.90
	PI	1.10	1.11	1.13	1.14	1.15
46	TC	2.15	2.37	2.67	2.83	2.96
	SC	0.65	0.72	0.82	0.80	0.84
	PI	1.20	1.22	1.24	1.26	1.27

LEGEND

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

5.2.2 Heating Capacity (kW)

	ENTERING AIR DB ID COIL(°c)					
	15		20		25	
ENTERING WB OD COIL(°C)	TH	PI	TH	PI	TH	PI
-10	1.81	0.80	1.74	0.85	1.67	0.90
-7	1.95	0.82	1.88	0.87	1.81	0.91
-2	2.07	0.83	2.00	0.88	1.93	0.93
2	2.52	0.87	2.42	0.93	2.31	0.98
6	3.55	0.94	**3.45**	**1.00**	3.33	1.06
10	3.86	0.99	3.76	1.06	3.66	1.13
15	4.17	1.03	4.07	1.11	3.97	1.18
20	4.40	1.06	4.30	1.15	4.17	1.24

LEGEND

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

5.2.3 Capacity Correction Factor Due to Tubing Length

Cooling

TOTAL TUBING LENGTH								
3m	**7.5m**	10m	15m	20m	25m	30m	40m	50m
1.03	**1**	0.981	0.946	---	---	---	---	---

* Minimum recommended tubing length between indoor and outdoor units is 3m.

Heating

TOTAL TUBING LENGTH								
3m	**7.5m**	10m	15m	20m	25m	30m	40m	50m
1.05	**1**	0.974	0.922	---	---	---	---	---

* Minimum recommended tubing length between indoor and outdoor units is 3m.

5.3 CN 18/ONG3-17 R410A

5.3.1 Cooling Capacity (kW)

Entering Air DB OD Coil(°C)	Data	Entering Air WB/DB ID Coil(°C)				
		15/21	17/24	19/27	21/29	23/32
15	TC	5.25	5.56	5.82	6.08	6.28
	SC	1.50	1.59	1.67	1.64	1.66
	PI	1.18	1.18	1.18	1.19	1.19
20	TC	5.20	5.51	5.77	6.03	6.23
	SC	3.71	3.94	4.16	4.04	4.13
	PI	1.27	1.28	1.29	1.29	1.30
25	TC	5.00	5.36	5.67	5.92	6.13
	SC	1.46	1.56	1.65	1.62	1.66
	PI	1.37	1.39	1.40	1.41	1.41
30	TC	4.69	5.05	5.46	5.67	5.87
	SC	1.38	1.49	1.61	1.58	1.65
	PI	1.49	1.51	1.53	1.54	1.54
35	TC	4.33	4.69	**5.15**	5.41	5.61
	SC	1.30	1.42	**1.55**	1.53	1.59
	PI	1.61	1.63	**1.66**	1.67	1.68
40	TC	3.91	4.27	4.74	5.00	5.20
	SC	1.21	1.33	1.47	1.44	1.51
	PI	1.73	1.76	1.79	1.81	1.82
46	TC	3.40	3.76	4.22	4.48	4.69
	SC	1.10	1.22	1.37	1.35	1.41
	PI	1.90	1.93	1.97	1.99	2.01

LEGEND

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

5.3.2 Heating Capacity (kW)

	ENTERING AIR DB ID COIL(°c)					
	15		20		25	
ENTERING WB OD COIL(°C)	TH	PI	TH	PI	TH	PI
-10	2.76	1.27	2.65	1.35	2.55	1.42
-7	2.97	1.30	2.86	1.38	2.76	1.45
-2	3.15	1.32	3.05	1.40	2.94	1.48
2	3.83	1.38	3.68	1.47	3.52	1.56
6	5.41	1.49	**5.25**	**1.59**	5.07	1.69
10	5.88	1.57	5.72	1.68	5.57	1.79
15	6.35	1.64	6.20	1.76	6.04	1.88
20	6.69	1.69	6.54	1.83	6.35	1.97

LEGEND

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

5.3.3 Capacity Correction Factor Due to Tubing Length

Cooling

TOTAL TUBING LENGTH								
3m	**7.5m**	10m	15m	20m	25m	30m	40m	50m
1.04	**1**	0.977	0.930	---	---	---	---	---

* Minimum recommended tubing length between indoor and outdoor units is 3m.

Heating

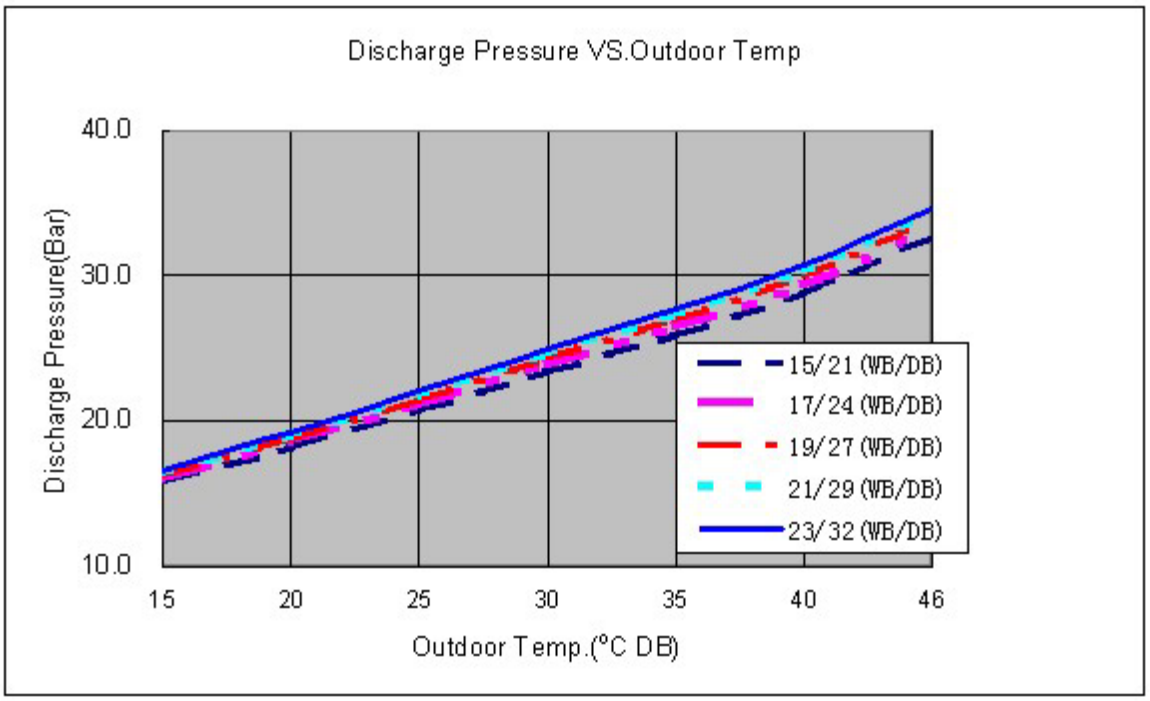
TOTAL TUBING LENGTH								
3m	**7.5m**	10m	15m	20m	25m	30m	40m	50m
1.05	**1**	0.974	0.923	---	---	---	---	---

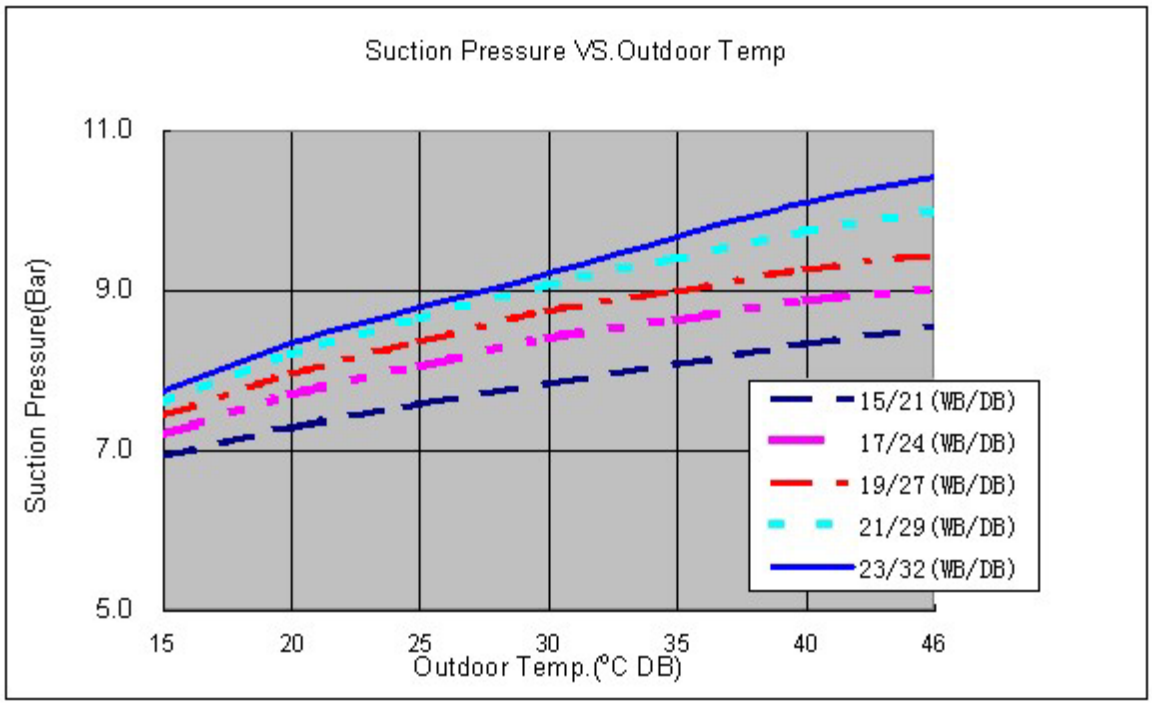
* Minimum recommended tubing length between indoor and outdoor units is 3m.

6. PRESSURE CURVES

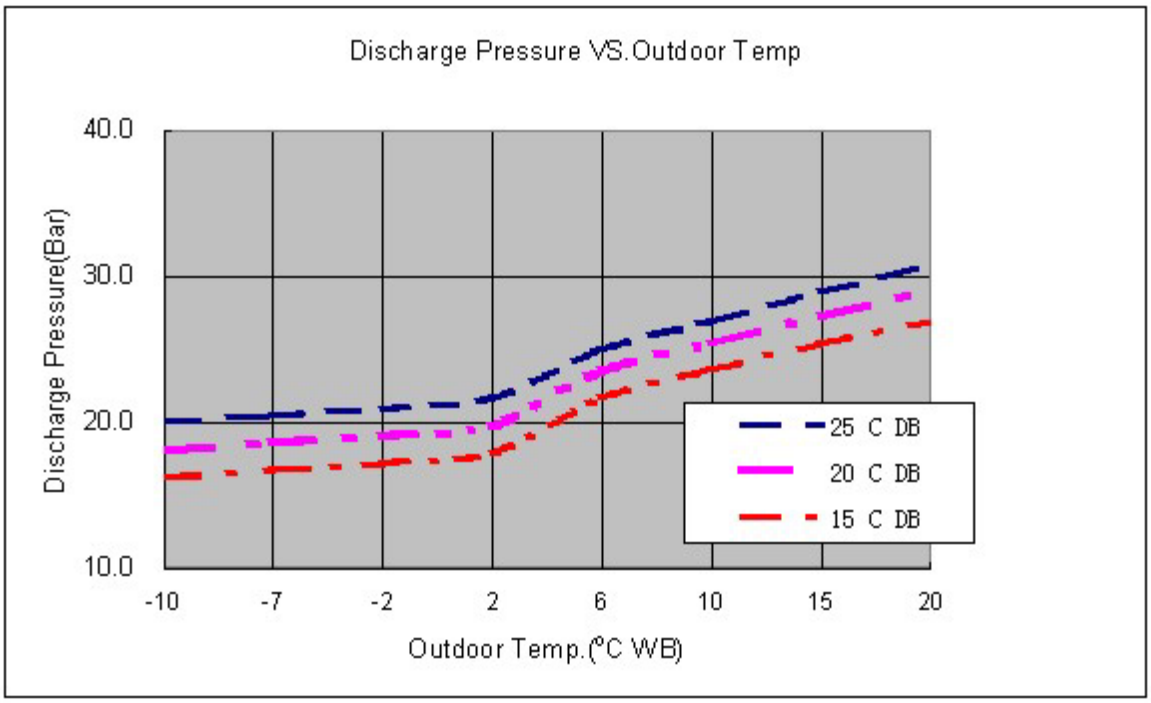
6.1 Model: CN9/GCN 9 R410A

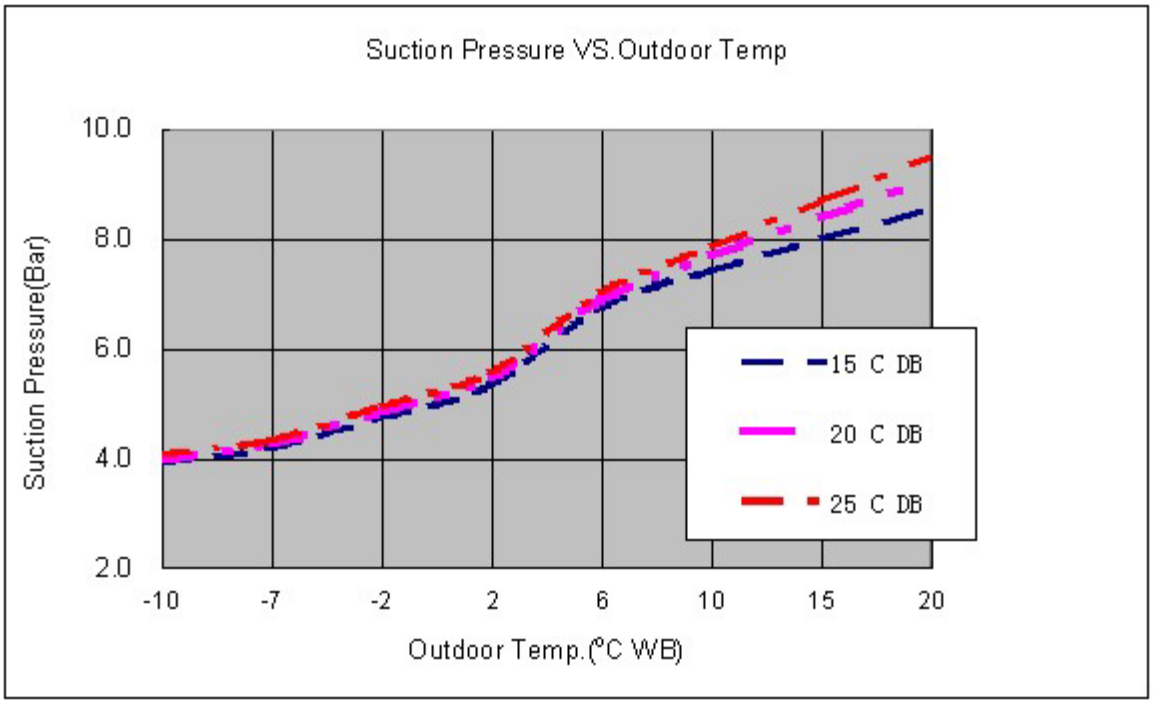
6.1.1 Cooling





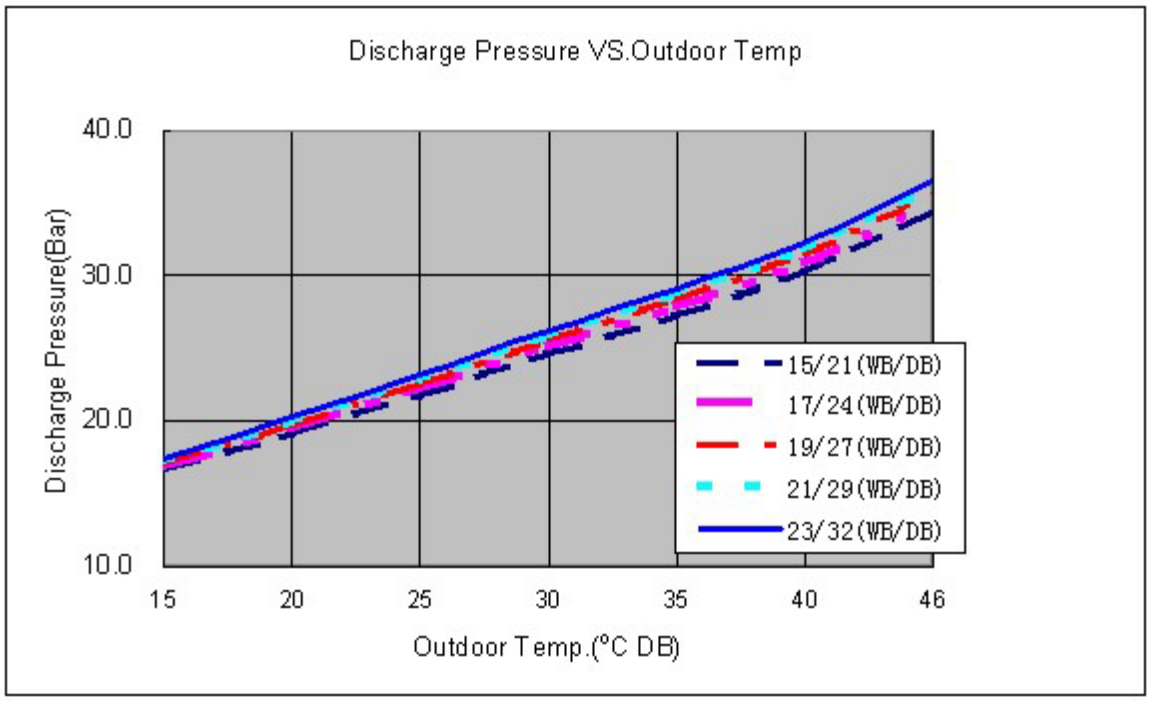
6.1.2 Heating

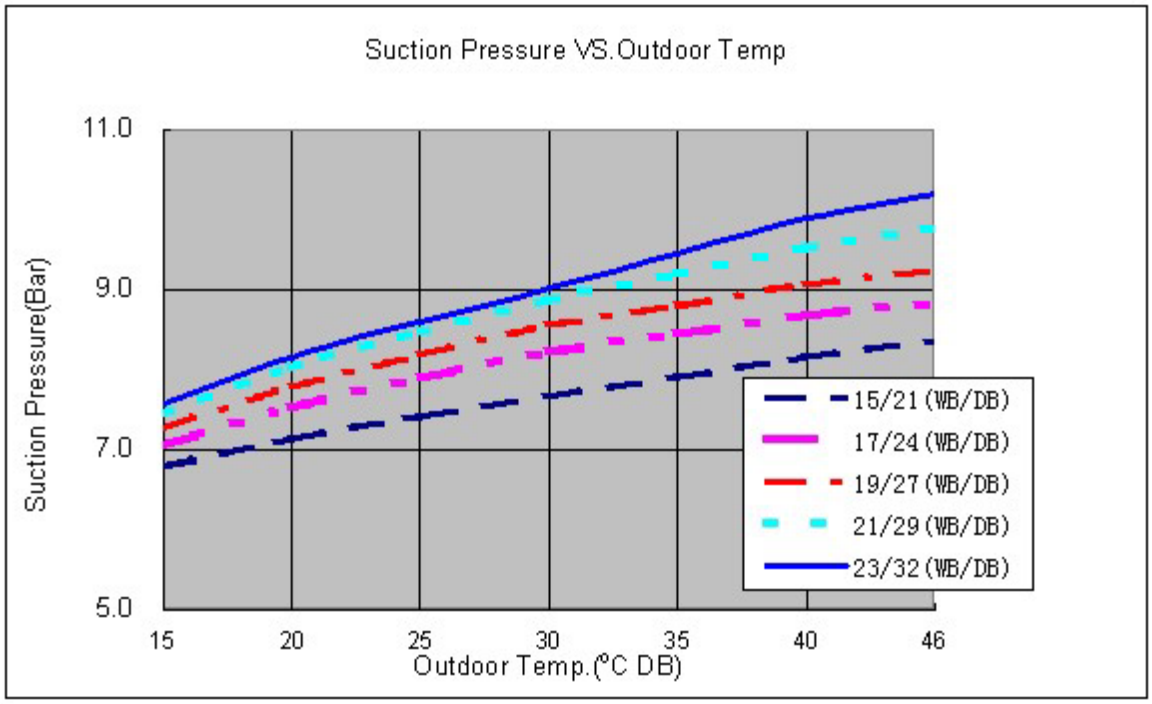

Discharge Pressure VS.Outdoor Temp
Discharge Pressure(Bar)
40.0
30.0
20.0
10.0
-10
-7
-2
2
6
10
15
20
Outdoor Temp.(°C WB)
25 C DB
20 C DB
15 C DB


Suction Pressure VS.Outdoor Temp
Suction Pressure(Bar)
10.0
8.0
6.0
4.0
2.0
-10
-7
-2
2
6
10
15
20
Outdoor Temp.(°C WB)
15 C DB
20 C DB
25 C DB

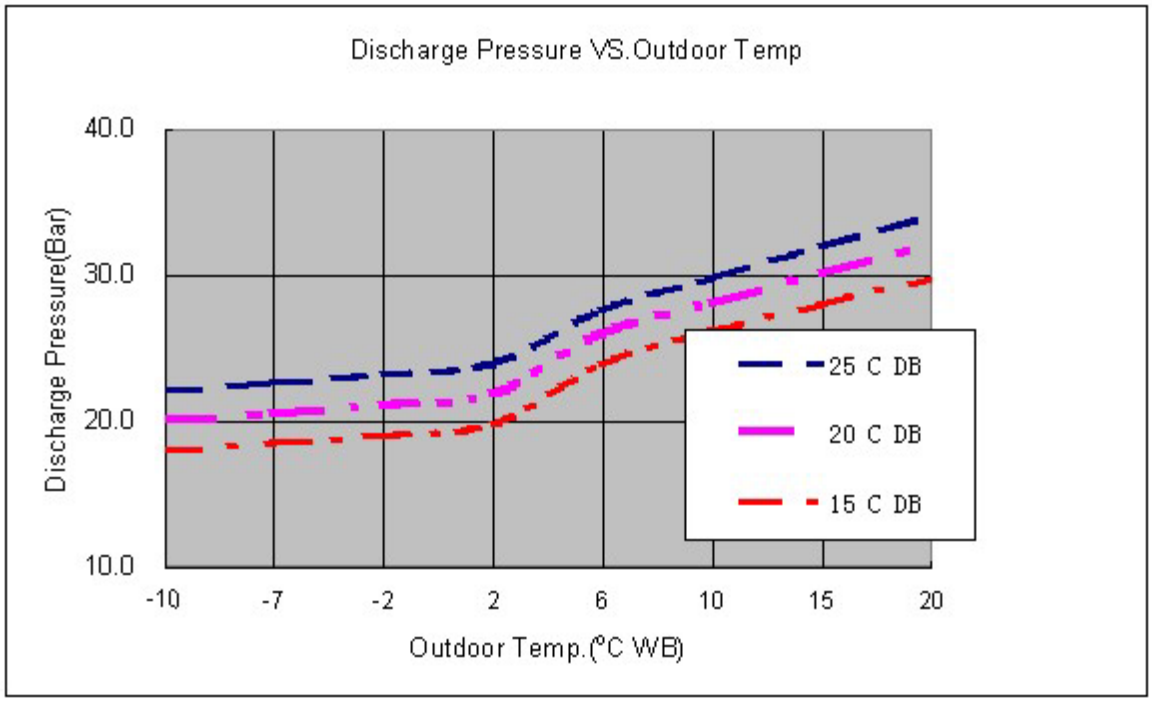
6.2 Model: CN12/GCN 12 R410A

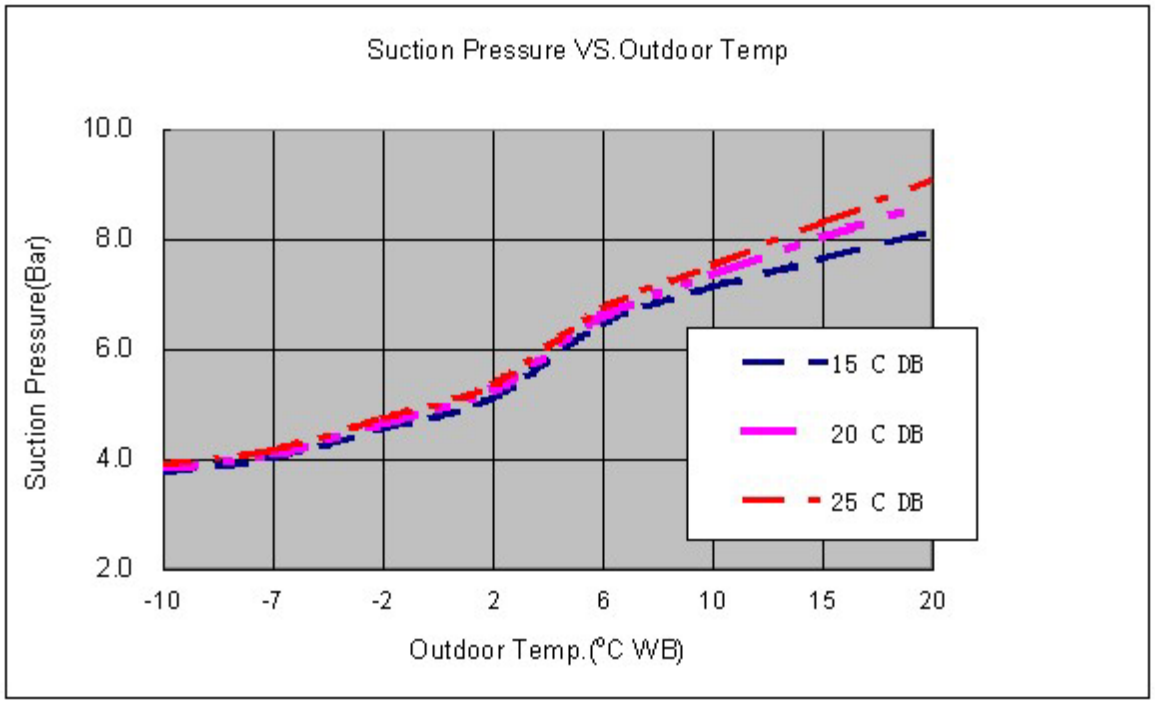
6.2.1 Cooling





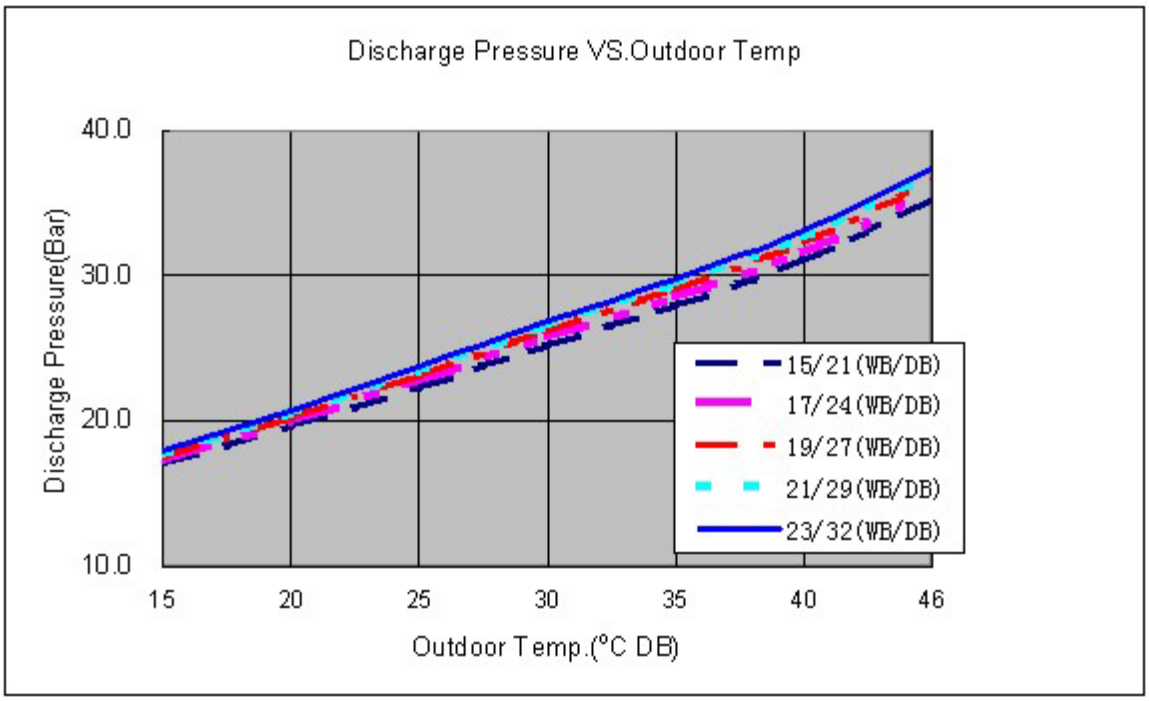
6.2.2 Heating

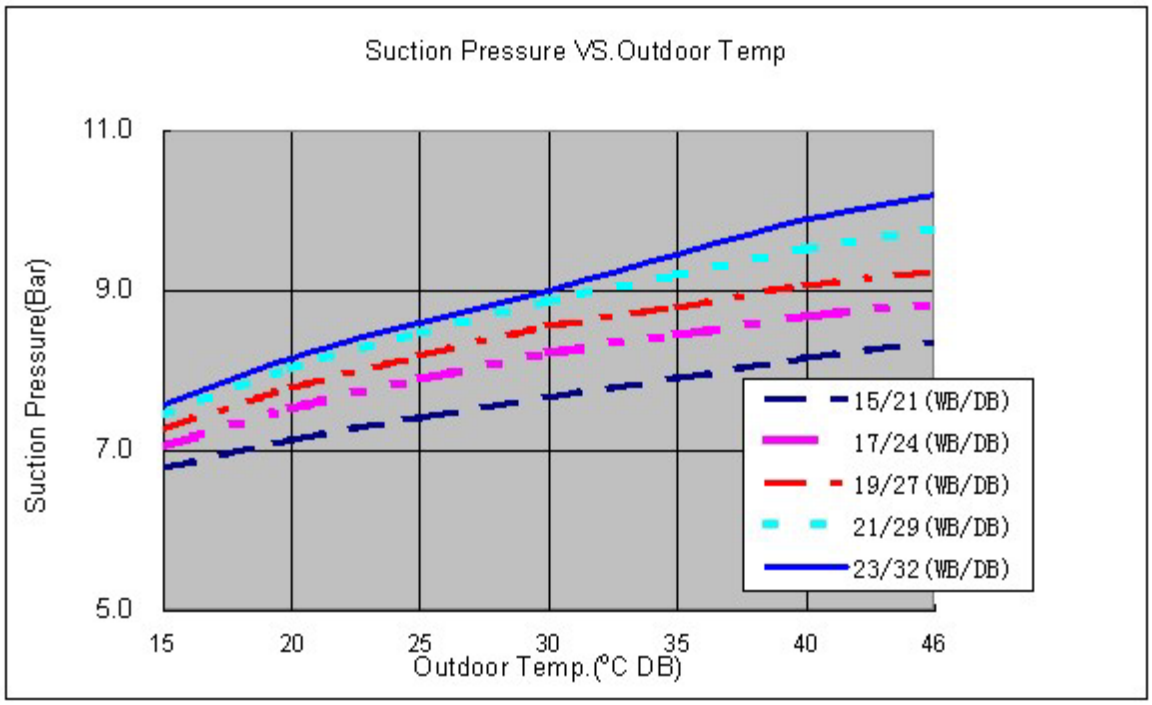

Discharge Pressure VS.Outdoor Temp
Discharge Pressure(Bar)
40.0
30.0
20.0
10.0
-10
-7
-2
2
6
10
15
20
Outdoor Temp.(°C WB)
25 C DB
20 C DB
15 C DB


Suction Pressure VS.Outdoor Temp
Suction Pressure(Bar)
10.0
8.0
6.0
4.0
2.0
-10
-7
-2
2
6
10
15
20
Outdoor Temp.(°C WB)
15 C DB
20 C DB
25 C DB

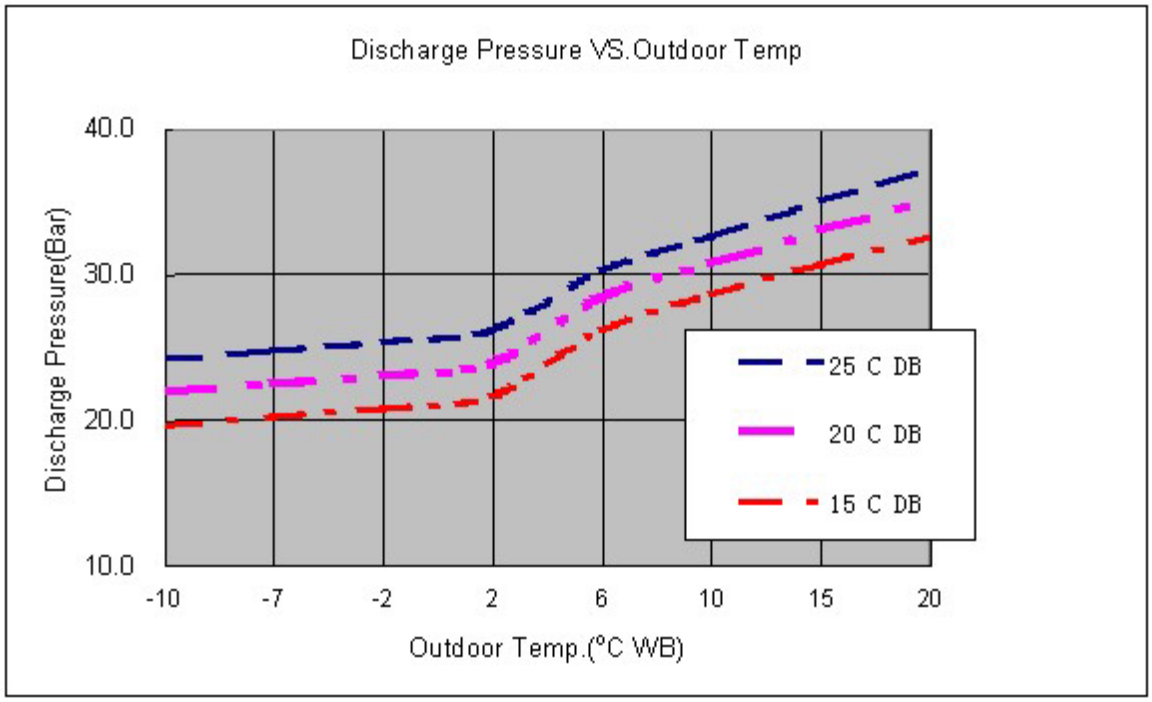
6.3 Model: CN18/ONG3-17 R410A

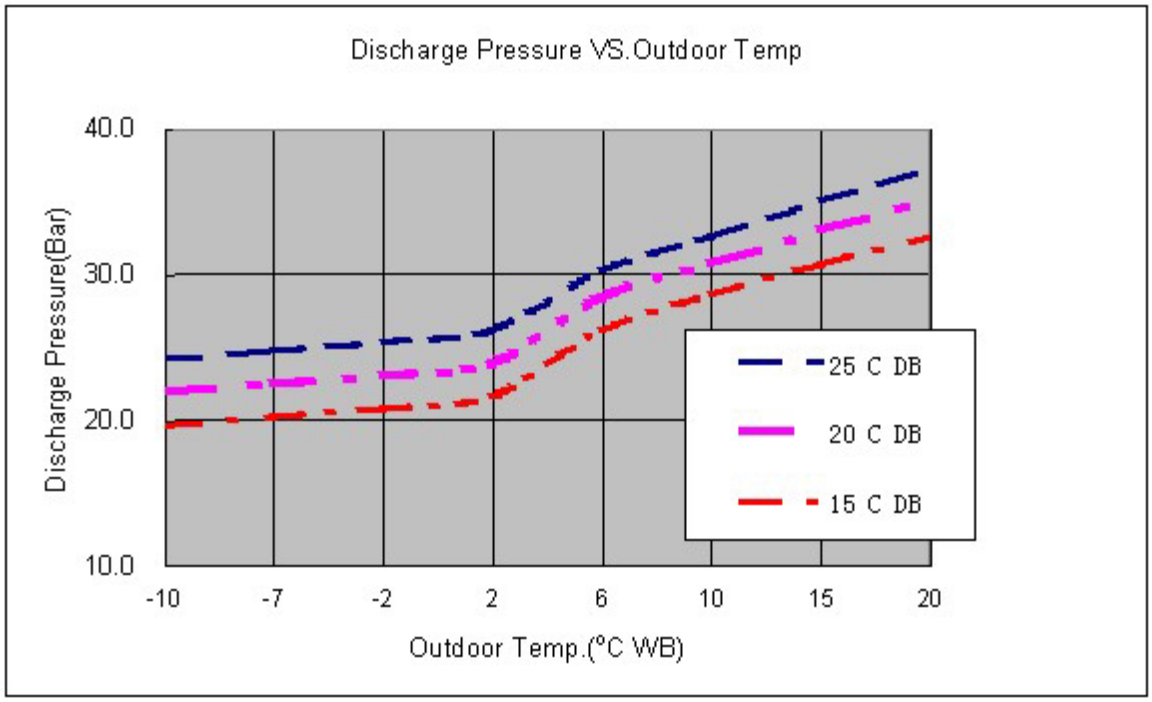
6.3.1 Cooling





6.3.2 Heating


Discharge Pressure VS.Outdoor Temp
Discharge Pressure(Bar)
40.0
30.0
20.0
10.0
-10
-7
-2
2
6
10
15
20
Outdoor Temp.(°C WB)
25 C DB
20 C DB
15 C DB


Discharge Pressure VS.Outdoor Temp
Discharge Pressure(Bar)
40.0
30.0
20.0
10.0
-10
-7
-2
2
6
10
15
20
Outdoor Temp.(°C WB)
25 C DB
20 C DB
15 C DB

7. SOUND LEVEL CHARACTERISTICS

7.1 Indoor unit

7.1.1 Sound Pressure Level

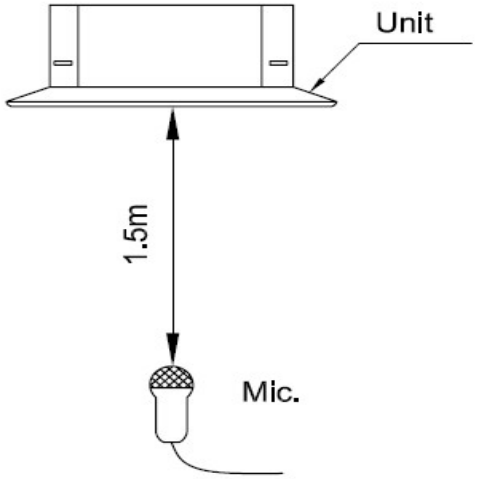
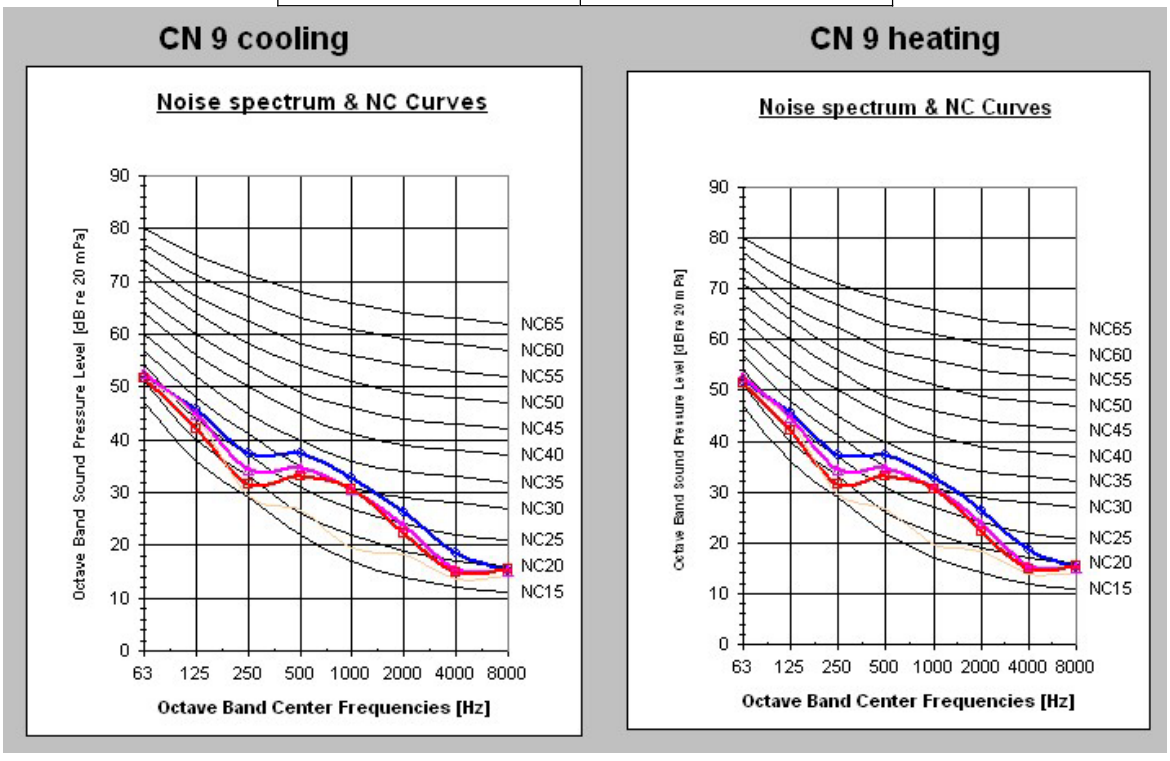


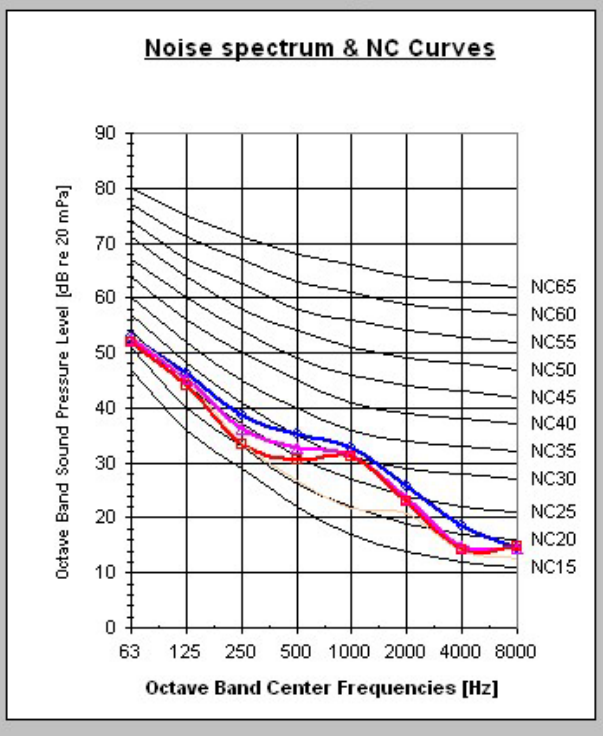
Figure 1

7.1.2 Soud Pressure Level Spectrum (Measured as Figure 1)

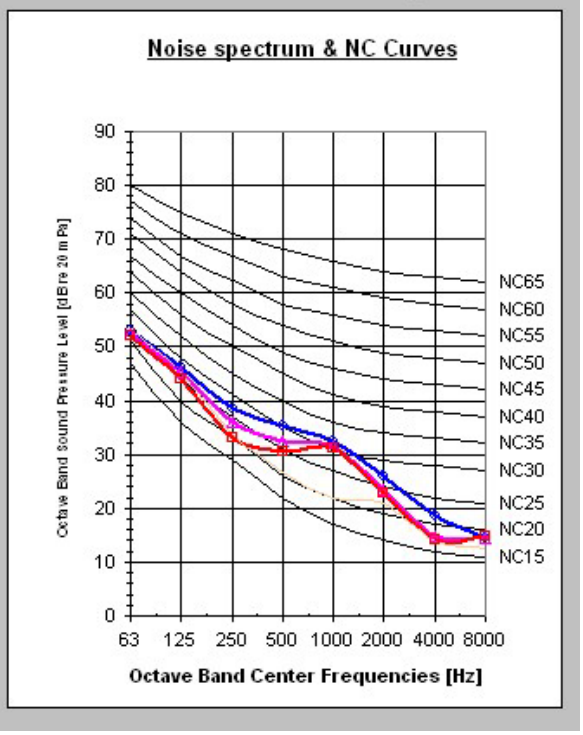
FAN SPEED	LINE
HI	
ME	
LO	



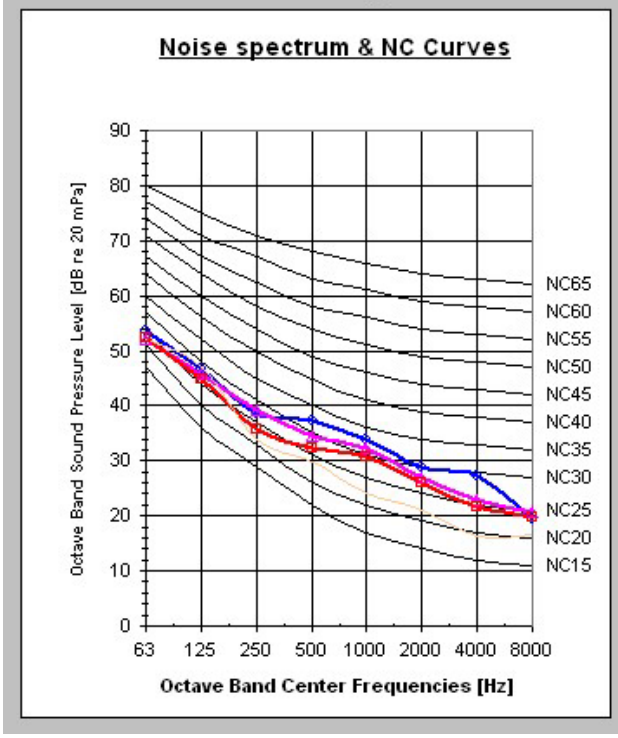
CN 12 cooling



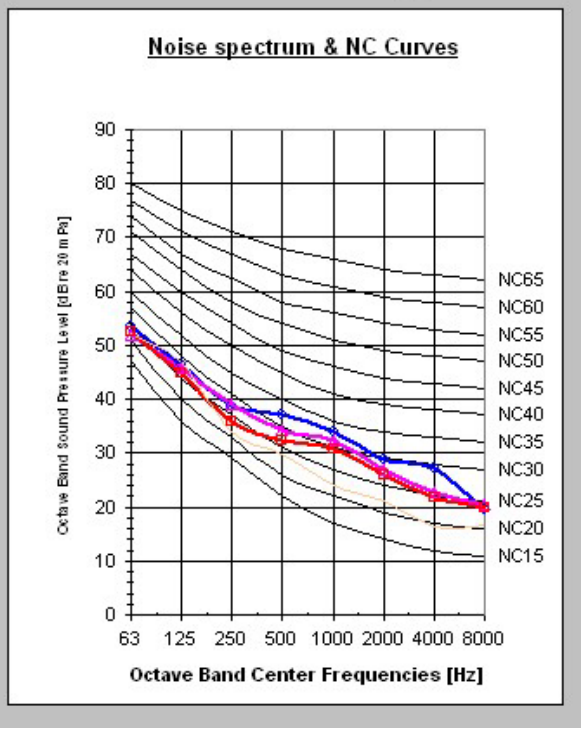
CN 12 heating



CN 18 cooling



CN 18 heating



7.2 Outdoor unit

7.2.1 Sound Pressure Level

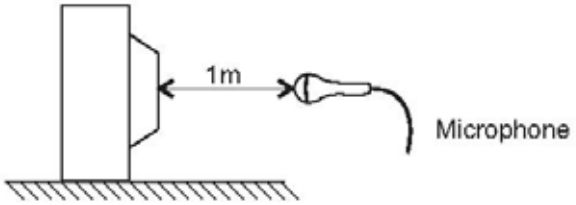
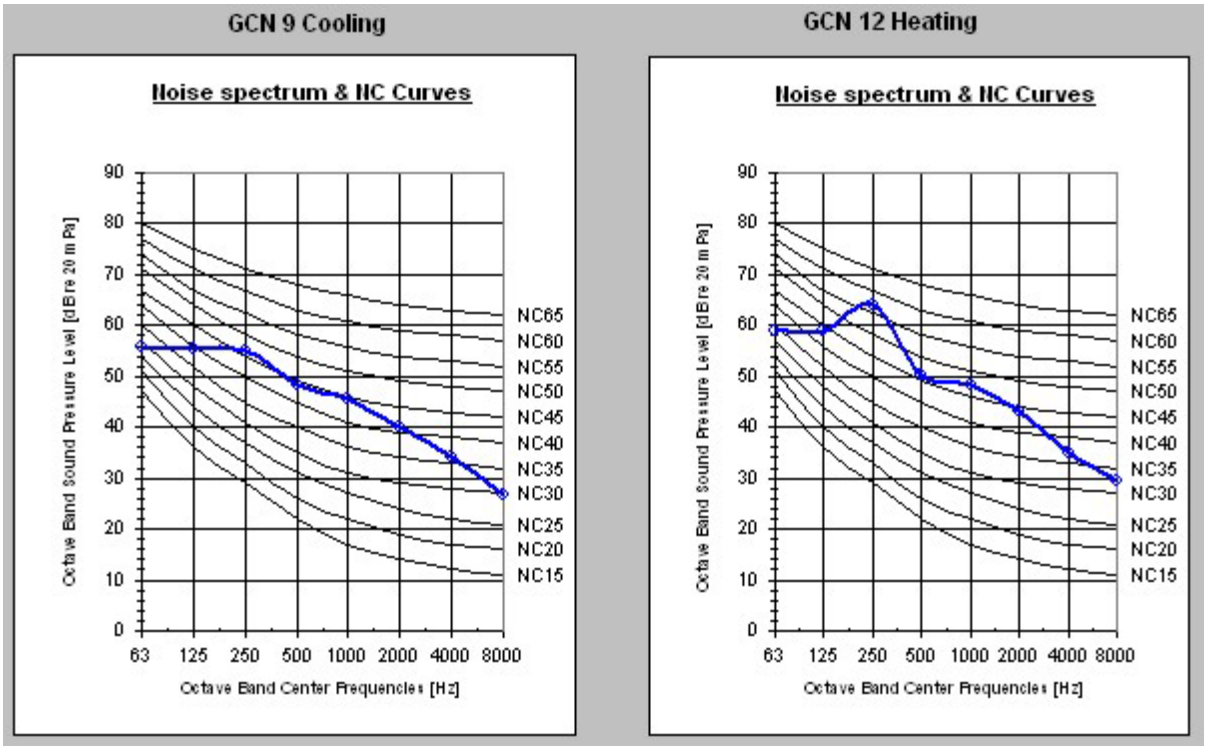


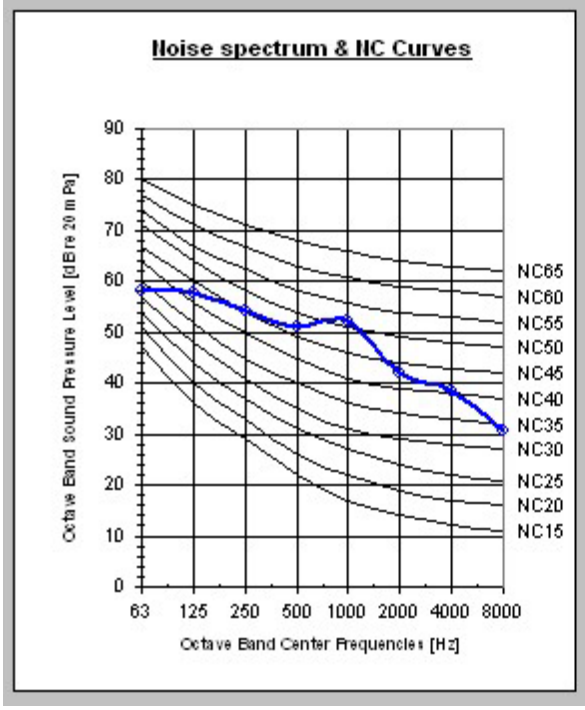
Fig.5

Figure 2

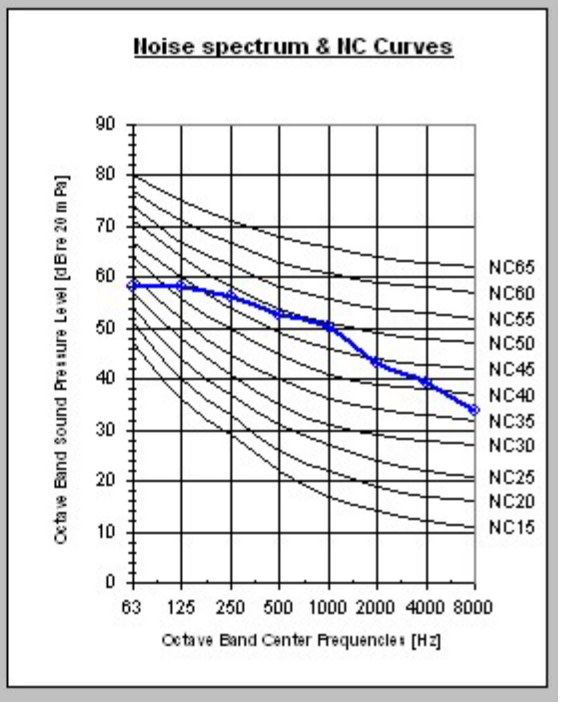
7.2.2 Soud Pressure Level Spectrum (Measured as Figure 2)



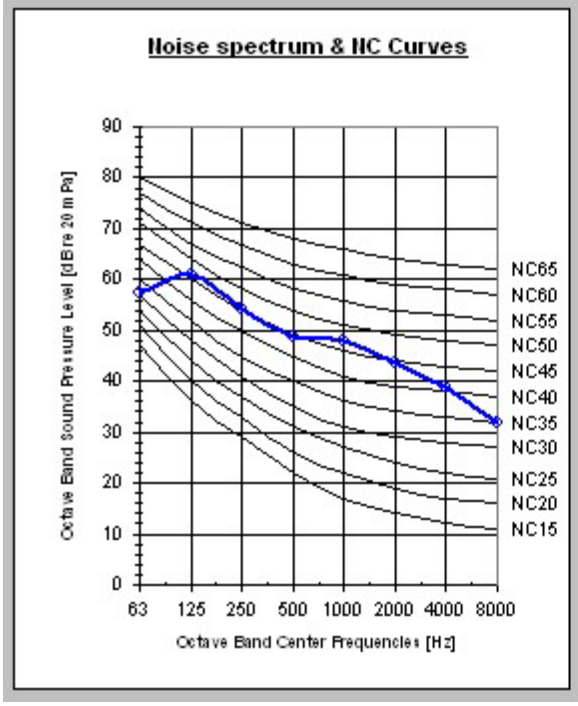
GCN 12 Cooling



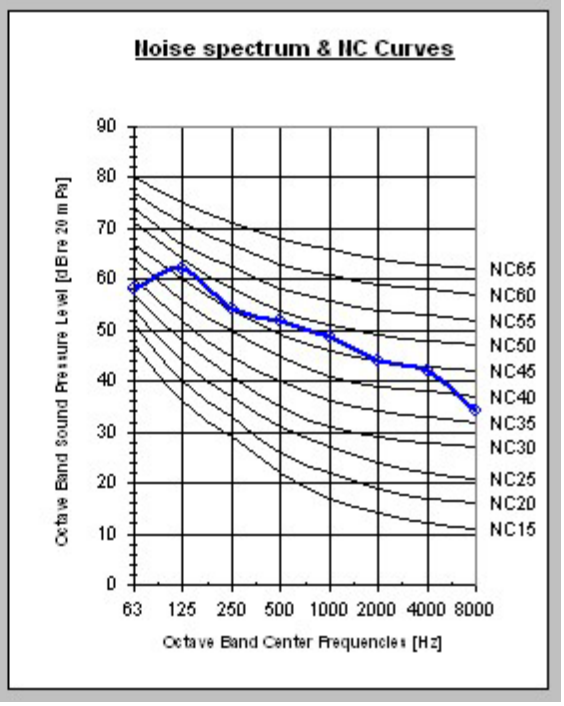
GCN 12 Heating



ONG3-17 Cooling



ONG3-17 Heating



8. ELECTRICAL DATA

	CN 9/GCN 9 R410A	CN 12/GCN 12 R410A	CN 18/ONG 3-17 R410A
Power Supply	1PH-230V-50Hz	1PH-230V-50Hz	1PH-230V-50Hz
Power Supply From	Indoor Unit	Indoor Unit	Indoor Unit
Max Current(A)	5.3	7	11.3
Circuit Breaker	10	10	15
Power Supply Cord No.×Cross section mm^2	3×1.0mm^2	3×1.0mm^2	3×1.5mm^2
Interconnecting Cable RC Model No.×Cross section mm^2	5×1.0mm^2 2×0.5mm^2(OCT Sensor)	5×1.0mm^2 2×0.5mm^2(OCT Sensor)	5×1.5mm^2 2×0.5mm^2(OCT Sensor)
Interconnecting Cable ST Model No.×Cross section mm^2	4×1.0mm^2	4×1.0mm^2	4×1.5mm^2

Option(When outdoor unit have the terminal L)

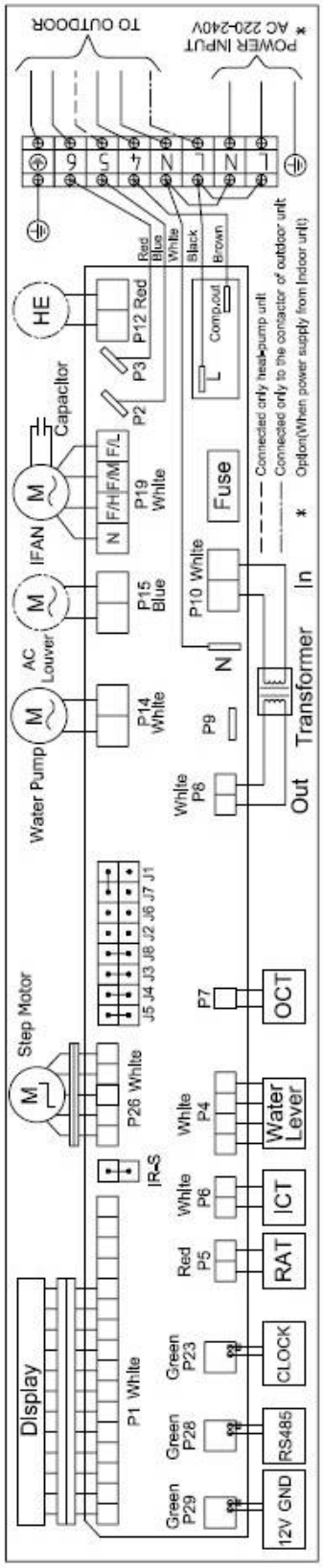
	CN 9/GCN 9 R410A	CN 12/GCN 12 R410A	CN 18/ONG 3-17 R410A
Power Supply	1PH-230V-50Hz	1PH-230V-50Hz	1PH-230V-50Hz
Power Supply From	Outdoor Unit	Outdoor Unit	Outdoor Unit
Max Current(A)	5.3	7	11.3
Circuit Breaker	10	10	15
Power Supply Cord No.×Cross section mm^2	3×1.0mm^2	3×1.0mm^2	3×1.5mm^2
Interconnecting Cable RC Model No.×Cross section mm^2	6×1.0mm^2 2×0.5mm^2(OCT Sensor)	6×1.0mm^2 2×0.5mm^2(OCT Sensor)	6×1.5mm^2 2×0.5mm^2(OCT Sensor)
Interconnecting Cable ST Model No.×Cross section mm^2	5×1.0mm^2	5×1.0mm^2	5×1.5mm^2

NOTE

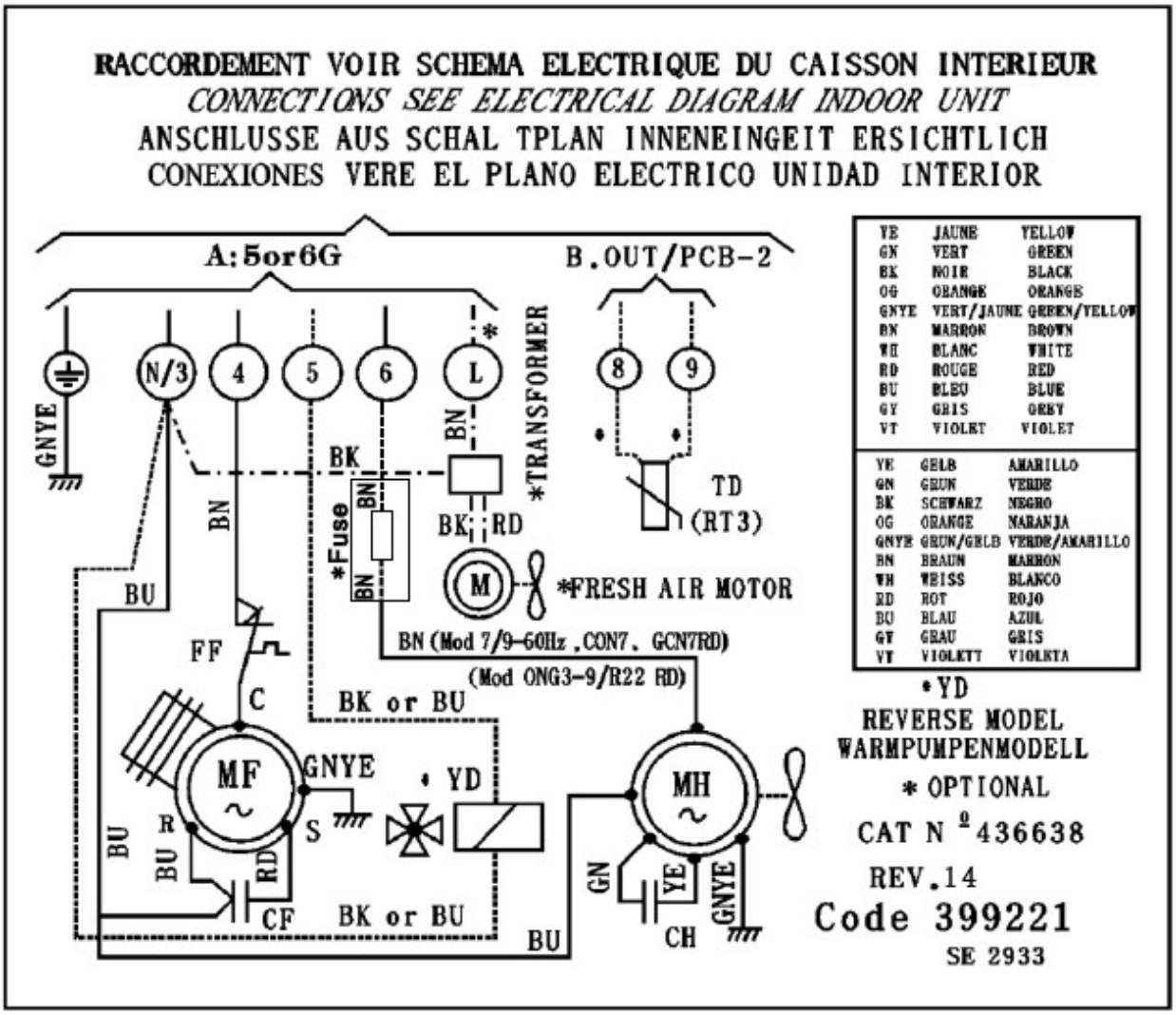
Power wiring cord should comply with local laws and electrical regulations requirements.

9. WIRING DIAGRAMS

9.1 Indoor Unit: CN 9/12/18

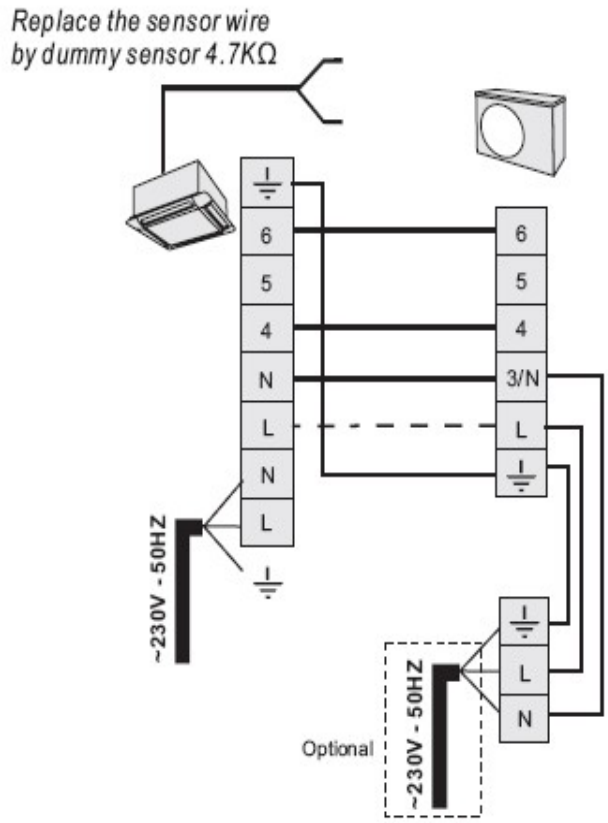


9.2 Outdoor Unit: GCN 9 R410A/GCN 12 R410A/ONG3-17 R410A

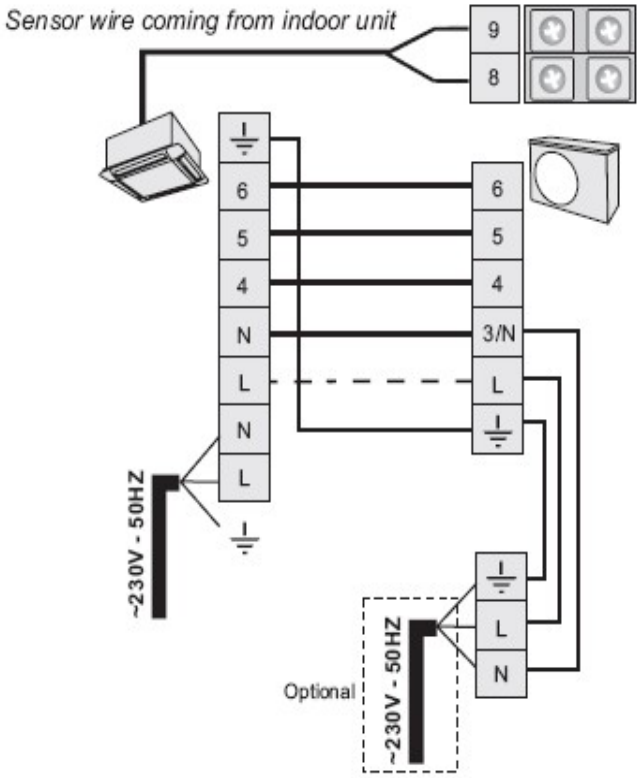


9.3 Connections between indoor unit and outdoor unit

Cooling only



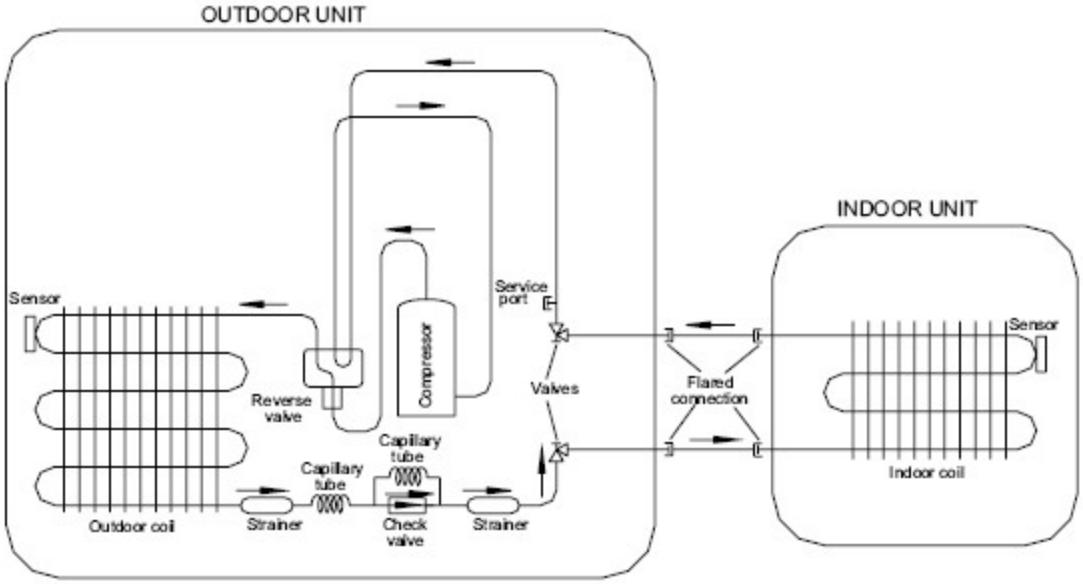
Heat Pump



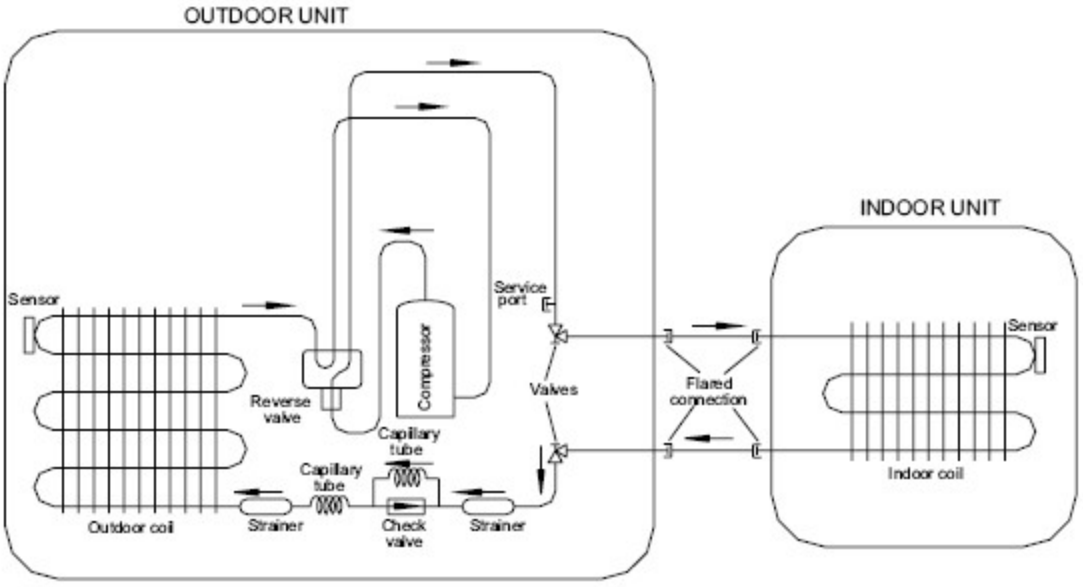
------ Connected only when the outdoor unit have the terminal L

10. REFRIGERATION DIAGRAMS

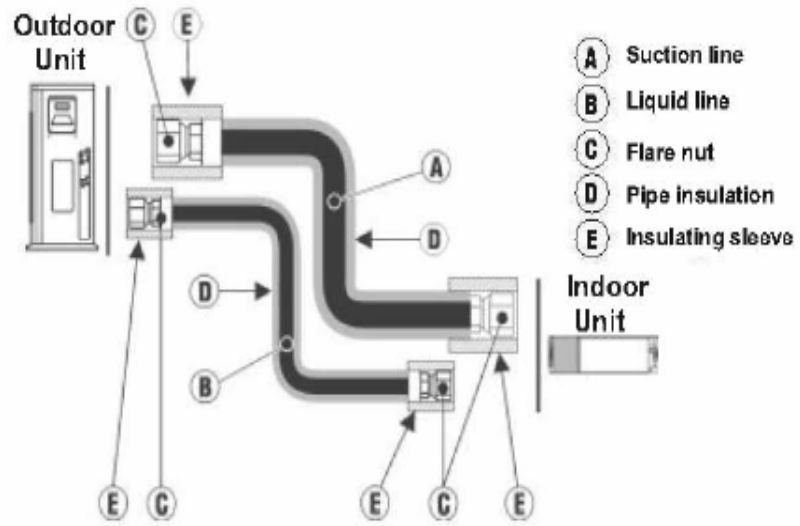
10.1 Cooling Mode

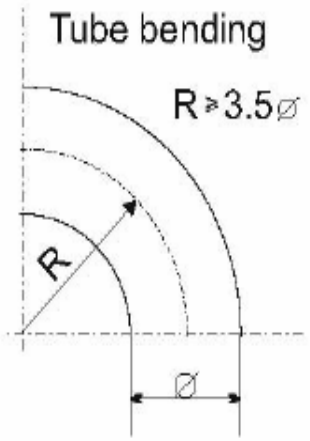


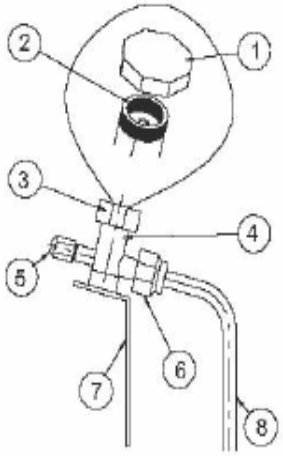
10.2 Heating Mode



11. TUBING CONNECTIONS



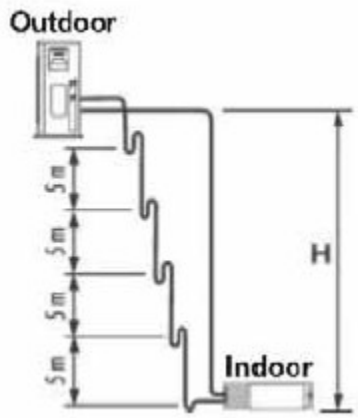




TUBE (Inch) / TORQUE (Nm)	1/4"	3/8"	1/2"	5/8"	3/4"
Flare Nuts	15-18	40-45	60-65	70-75	80-85
Valve Cap	13-20	13-20	18-25	18-25	40-50
Service Port Cap	11-13	11-13	11-13	11-13	11-13

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.



12. CONTROL SYSTEM

12.1 Electronic Control

Introduction

The electronic control information is designed for service application, and is common to the following groups of air-conditioners:

ST/RC Group -Cooling only/ cooling and heating by heat pump

SH Group -Cooling and heating by heat pump and supplementary heater.

RH Group -Cooling, heating by heaters only.

Jumpers Settings

0 = Open Jumper (disconnect jumper).

1 = Close Jumper (connect jumper).

Self test Jumper - J1

OPERATION	J1
SELF-TEST	1
NORMAL	0

Group Jumper - J2, J6

GROUP	J2	J6
ST	1	0
RC	0	0
SH	0	1
RH	1	1

Model selection Jumper - J8, J3, J4 and J5

MODEL	J8	J3J4J5
WNG 7/9/12/14	1	000
MBX	1	001
WMF	1	010
PX	1	011
NFC	1	100
ALPHA	1	101
EMD/ELD	1	110
CN	1	111
Reserved	0	000
P2000	0	001
WMN4	0	010
PXD	0	011
WAX	0	100
APLPHA17	0	101
NKN	0	110
WNG 18/24	0	111

Water Source Heat Pump Jumper - J7 (Cf.:. Sect 7.1)

J7	**Unit Type**
0	Normal Fix-RPM
1	Water Source Heat Pump (WSHP)

Note:

1. J9 & J10 are software jumpers stored in the EEPROM.

12.2 LEGEND

12.2.1 Abbreviations

AC	-Alternate Current
A/C	- Air-Conditioner
ANY	- ON or OFF status
CLOCK	- ON/OFF Operation Input, (dry contact)
COMP	- Compressor
CPU	- Central Processing Unit
ELUM	- Extended Louver Upward Movement (Software Jumper)
E²PROM, EEP	- Erase Enable Programmable Read Only Memory
HE	- Heating Element
HPC	- High Pressure Control
H/W	- Hardware
ICP	- Indoor Condensation Pump
ICT	- Indoor Coil Temperature (RT2) sensor
IF, IFAN	- Indoor Fan
IR	- Infra Red
LEVEL1	- Normal Water Level
LEVEL2/3	- Medium/High Water Level
LEVEL4	- Overflow Level
Max	- Maximum
Min	- Minimum
min	- Minute (time)
NA	- Not Applicable
OCP	- Outdoor Condensation Pump
OCT	- Outdoor Coil Temperature (RT3) sensor
OF, OFAN	- Outdoor Fan
OPER	- Operate
Para.	- Paragraph
RAT	- Return Air Temperature (RT1) sensor
RC	- Reverse Cycle (Heat Pump)
R/C	- Remote Control
RCT	- Remote Control Temperature
RH	- Resistance Heater
RT	- Room Temperature (i.e. RCT in IFEEL mode, RAT otherwise)
RV	- Reversing Valve
SB, STBY	- Stand-By
sec	- Second (time)
Sect	- Section
SH	- Supplementary Heater
SPT	- Set Point Temperature
ST	- Standard (a Model with Cooling Only)

S/W	- Software
TEMP	- Temperature
W/O	- Without
T	-The difference between SPT and RT. In Heat Mode: T=SPT-RT In Cool/Dry/Fan Mode: T= RT –SPT

12.2.2 List of A/C Models

Model	Type
NFC	Ceiling Mounted
NKN	Wall Mounted
CN	Cassette

12.2.3 List of A/C Groups

The following table defines the different A/C groups, and the applicable operation modes for each group.

Operating Mode	ST	RH	RC	SH
Fan	Yes	Yes	Yes	Yes
Cool (3)	Yes	Yes	Yes	Yes
Heat (3)	No	Yes (1)	Yes	Yes (2)
Dry (3)	Yes	Yes	Yes	Yes
Auto Cool/Heat (3)	No	Yes (1)	Yes	Yes (2)

Notes:

1. Heating is done by electric heaters.
2. Heating is done by Compressor (Heat Pump), and by electric heaters.

12.3 GENERAL FUNCTIONS FOR ALL MODELS

12.3.1 COMP operation

For each Mode including POWER OFF & SB, a Min time delay of 3 min before COMP restarting, excluding DEICING Mode

The Min operation time of COMP under different operating conditions is

Operation Mode	Min operation time of COMP
Heat, Cool or Auto Modes	3 min.
Fan, Dry, Overflow, Protection modes, or mode change	ignored

12.3.2 IFAN operation

Min time interval between IFAN speed change in AUTOFAN Mode, is 30 sec.

Min time interval between IFAN speed change in H/M/L Mode is 1 sec.

IFAN speed in Heat/Cool Autofan Mode is determined according to the following table:

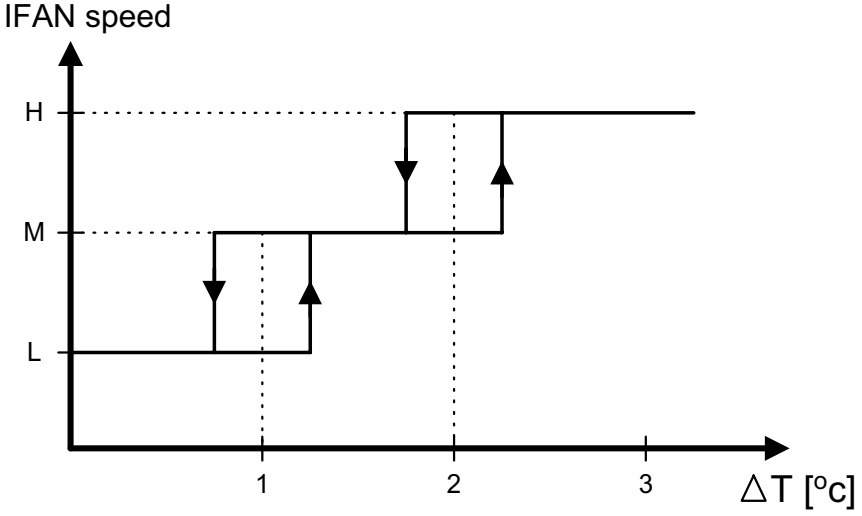
ΔT	IFAN Speed
$\Delta T \geq 2$	HIGH
$2 \geq \Delta T \geq 1$	MED
$1 \geq \Delta T$	LOW

Where In Heat Mode: T=SPT-RT

In Cool Mode: T= RT –SPT

Note:

1. In Heat Mode, the rules in section 4.0.3 have the higher priority.
2. The table above can be represent by a hysteresis curve which will minimize the switching of the IFAN relay and will minimize the change in IFAN speed:



12.3.3 OFAN operation

Min time interval between OFAN ON/OFF state change is 30 sec.

In general, OFAN starts together with COMP.

12.3.4 HE operation

Minimum Heaters ON or OFF time is 30 sec.

Heaters can be activated only if IFAN is on.

In RH group, HE-1 and HE-2 will be activated only when COMP is not operating, except in Dry Mode.

12.3.5 Protections

High pressure protection is applicable to all operating modes.

Deicing control is valid in Heat and Auto Heat Mode only.

Defrosting control is valid in Dry, Cool, Heat and Auto Modes.

No reset after protection modes.

12.3.6 Thermistors operation

Return air Temp. is detected by RAT (RT1) in normal Mode, or by RCT (R/C sensor) in I-FEEL Mode.

Indoor Coil Temp. is detected by ICT (RT2).

Outdoor Coil Temp. is detected by OCT (RT3).

Similarly, in the Indoor Units of a WMQ/T system, 4.7k Ohm (5%) resistors must be connected to the OCT ports to disable the “Thermistor Temp reading doesn’t change” error checking.

Definition of thermistor faults:

a. Thermistor is disconnected -

   The thermistor reading is below -30^{o}c.

b. Thermistor is shorted -

   The thermistor reading is over 75^{o}c.

c. Thermistor Temp reading doesn’t change (irrelevant for RT1) -

   (i) This test is performed only once after a unit is switched from OFF/STBY to operation. At the first occurrence of 10 min continuous COMP operation, the current ICT & OCT are compared with those when the COMP was switched from OFF to ON 10 min before. If the ΔT is less than 3^{o}c, the thermistor is regarded as defective.

   (ii) The ICT and OCT no-change error can be disabled together by connecting a 4.7 k or 3.9 k ohm resistor (5%) to the OCT connector. These resistors are equivalent to a thermistor at 43+/-1^{o}c and 48+/-1^{o}c respectively.

   (iii) Connecting a 4.7k resistor to the ICT connector will disable the ICT no-change error only.

Cases for disabling thermistor short/disconnected detection

1. The detection of thermistor faults (a) and (b) above, are disabled when Deicer Protection is started. The detection will be enabled again only after (1) the deicing is completed, and (2) COMP has been restarted and operated for 30 sec.
2. When all the following conditions are fulfilled:
   a. 4.7K Ohm resistor is connected on the OCT
   b. IFAN is OFF
   c. Compressor is ON
   d. ICT < -30 (disconnected)

   This condition come to detect and prevent IFAN operation in Deicer in multi spilt units.

Handling the thermistor faults in a COMP unit

i. ICT/OCT thermistor is disconnected or shorted -

The invalid thermistor temperature is replaced by 43°c, so that the unit can continue the normal operation. All protections related to that faulty thermistor will be disabled. For example, in case of any ICT fault, the ICT high pressure protection in Heat Mode and ICT defrost protection in Cool Mode will not operate anymore. The same is also applied to the OCT fault.

There is an EEPROM option that, when the OCT thermistor is not connected, the buzzer will be ON continuously until the user turn off the alarm by

(i) switching the unit to STBY using a R/C, or

(ii) pressing the mode switch once.

Once the alarm is turned OFF, it will not be active again unless the unit is reset.

ii. RAT thermistor is disconnected or shorted –

The RAT will be derived from the ICT by using the equations :

Heat Mode: RAT=ICT/2.3

Cool Mode: RAT=ICT*4

Notes:

1. In case of Shorted/Disconnected thermistor failure, the STBY LED will be blinking until the fault condition is corrected. In case of “Temp No change” fault the STBY LED will never blink.
2. User can use the system diagnostics function to find out the nature of the thermistor faults.

Notes:

1. As in the COMP unit, the STBY LED will be blinking to indicate a thermistor fault. And, the user can use the system diagnostics function to find out the nature of the fault.

Recover from the thermistor faults

1. ICT/OCT/RAT is disconnected or shorted –

   The fault status will be cleared automatically when the connection is back to normal.

2. ICT/OCT reading doesn't change -

   The ICT no-change error is cleared automatically if a 3°c change in ICT is detected afterward. Similarly, the OCT no-change error is cleared by a change in OCT.

   This faults can also be cleared by switching the unit from STBY mode to operate mode, or when the unit is reset (e.g. reset by power interrupt).

12.4 COOLING MODE

12.4.1 Cooling Mode – General

a. Room Temperature, RT, is detected by
   - RAT in normal operation, or
   - RCT (R/C sensor) in I-FEEL mode.

b. The resolution of RT is 1°c.
   - RT is activating COMP if (RT > SPT), and
   - RT is stopping COMP if (RT =< SPT).

c. Indoor Coil Temp is detected by ICT (RT2).

d. Outdoor Coil Temp is detected by OCT (RT3).

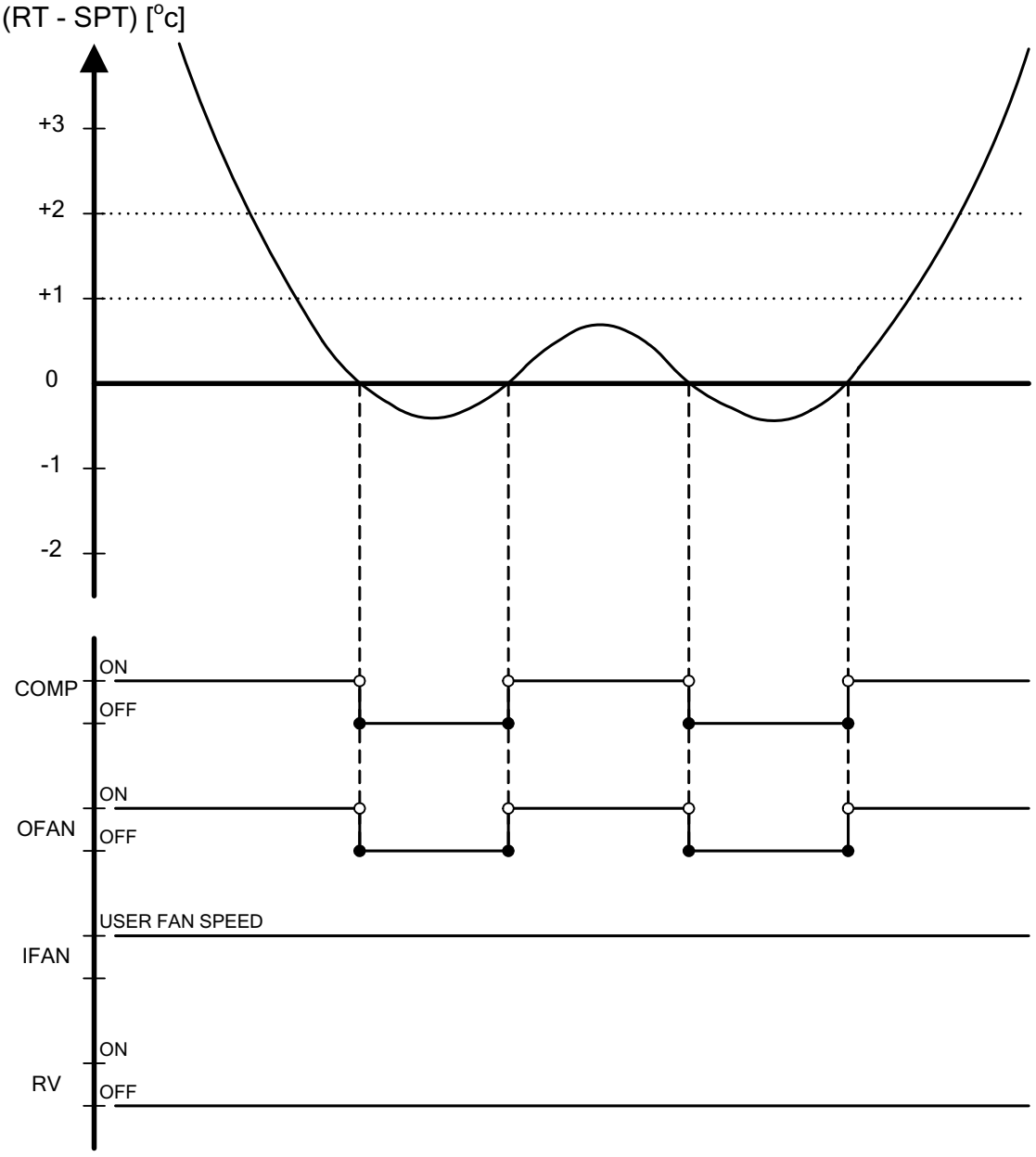
e. OFAN OPERATIONS
   - OFAN starts together with COMP in general.

12.4.2 Cooling

Mode: Cool, Auto (at Cooling)
Temp: Selected desired temperature.
Fan: HIGH, MED, LOW
Timer: Any
I Feel: On or Off

Control function

Maintains room temp at desired level by comparing RT and SPT.



Note:

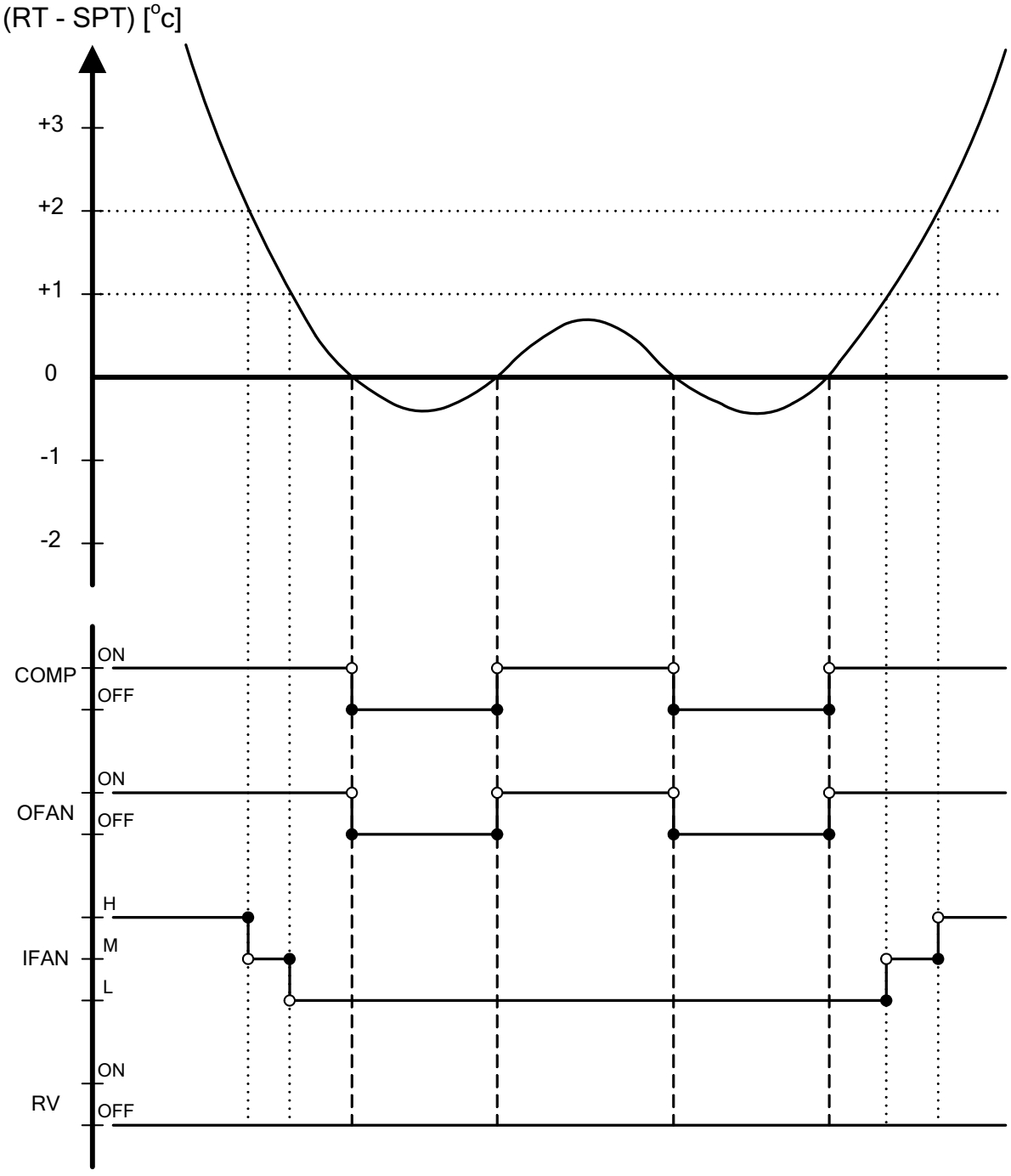
1) IFAN is always running at High, Medium or Low speed selected by user.
2) In IFEEL mode, the Room Temperature (RT) is the RCT from a R/C. Otherwise, the RT is the RAT from the Room Thermistor.

12.4.3 Cooling with Autofan

Mode: Cool, Auto (at cooling)
Temp: Selected desired temperature
Fan: Auto
Timer: Any
I Feel: On or Off

Control function

Maintains room temp at desired level and controls the IFAN speed for optimal comfort.



12.5 HEATING MODE

12.5.1 Heating Mode – General

1. In heating Mode, temp. compensation schedule will be activated for wall mounted, ducted models, and ceiling mounted (i.e. NKN, CN, and NFC) according to the following table:

SPT [°c]	Add to SPT	
	I-FEEL ON	I-FEEL OFF
18 ≤ SPT ≤ 27	0 °c	+2 °c
27 < SPT ≤ 30	0 °c	+3 °c

Notes :

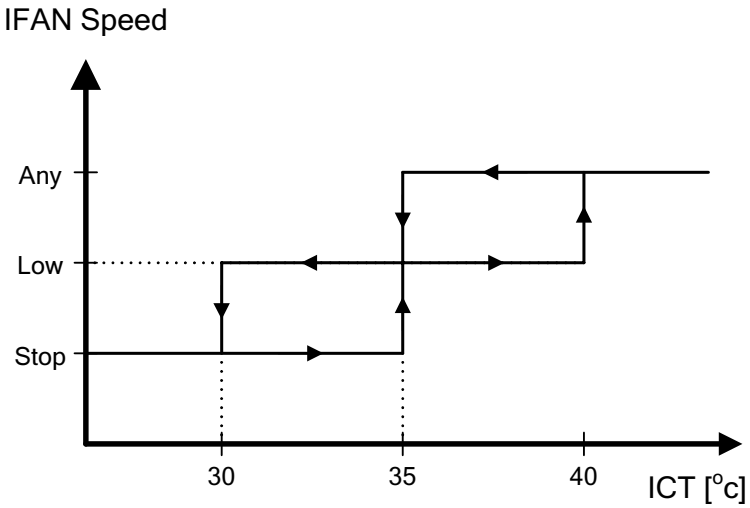
1) compensation will be activated in Forced operation modes

2. RV is OFF in RH group.

3. IF operating rules

(a) As a general rule for **RC and SH groups**, when **COMP is ON**, excluding protection modes, IFAN will be switched ON if

- ICT > 35°c or
- at the 30 second (4) after the COMP is switched ON. In this case, the IFAN will be started at low speed (5).



Notes :

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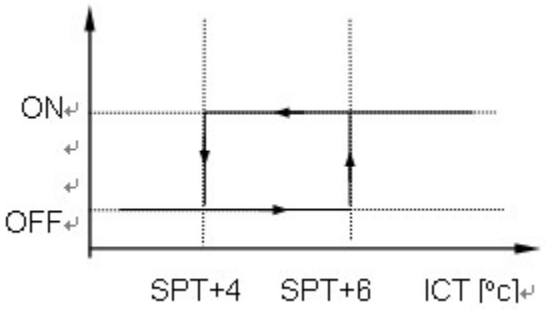
1) In **SH or RC group**, if HE is set to OFF due to low ICT, IFAN will be switched to LOW and will be turned OFF after 30 sec.
2) An exception to this rule is the Back-up mode for SH group. 3)
3) If the IFAN is turned ON by the 30 seconds operation, its minimum operation time before stopping due to low ICT temperature is 60 sec.

(b) In **RC and SH groups**, whenever **COMP & HE are both OFF**, excluding protection modes, IFAN operation will be according to the following:

In **other models** IFAN will operate in low speed for 30 sec and then stop. If COMP is OFF for more than 3 minutes and IFEEL Mode is inactive, IFAN will operate in low speed according to the following graph:

IFAN (Low Speed)



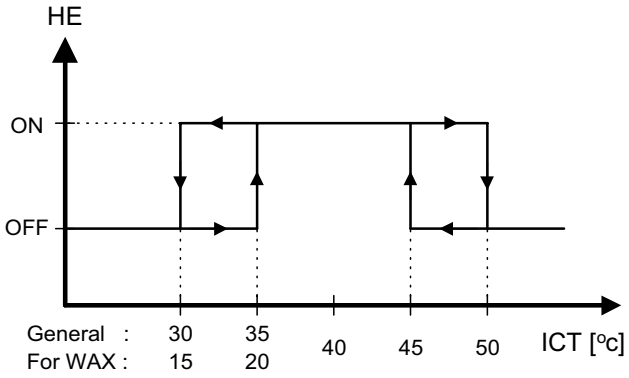
(c) In **RH group**, IFAN starts when HE starts. When HE switches to OFF, IFAN switches to LOW for 30 sec and then stops.

4. HE operation

(a) For **all Groups**, HE can be ON only when IFAN is ON.

(b) For **all Groups**, HE switches to OFF when ICT > 50 °c, and is activated again when ICT ≤ 45°c.

(c) In **SH or RC group**, HE operation is limited by the following graph:



(d) Back-up mode for **SH group**

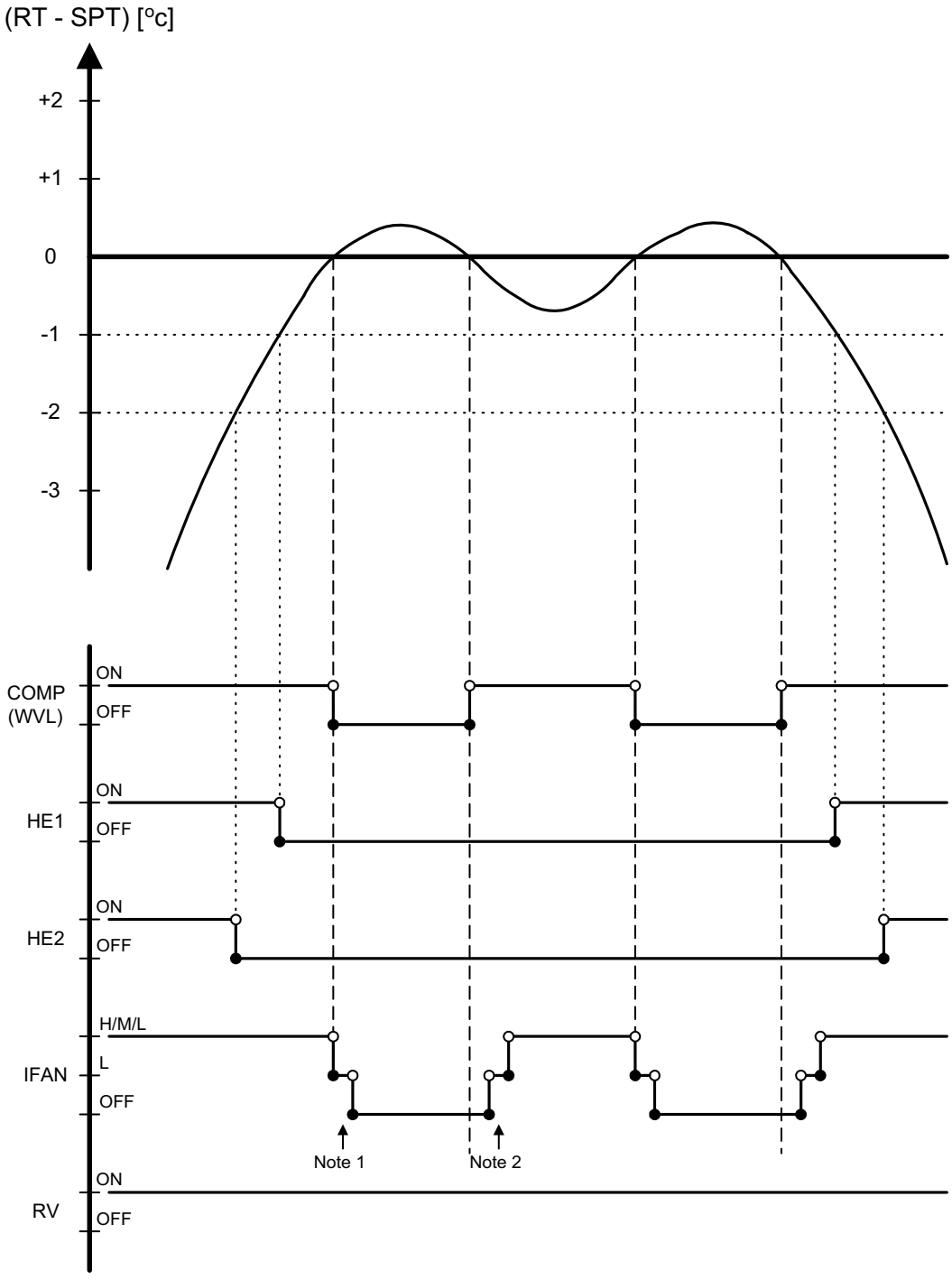
After COMP has been working for 5 minutes, HE & IFAN are activated even if the ICT is still below 35°c. This situation is called Back-up Mode. Both HE & IFAN will work in Back-up Mode until the ICT reaches 35°c. Then, the operation goes on in the usual mode

12.5.2 Heating, RC or SH Group

Mode: Heat, Auto (at heating)
Temp: Selected desired temperature
Fan: HIGH, MED, LOW
Timer: Any
I Feel: On or Off

Control function

Maintains room temp. at desired level by comparing RAT or RCT to SPT.

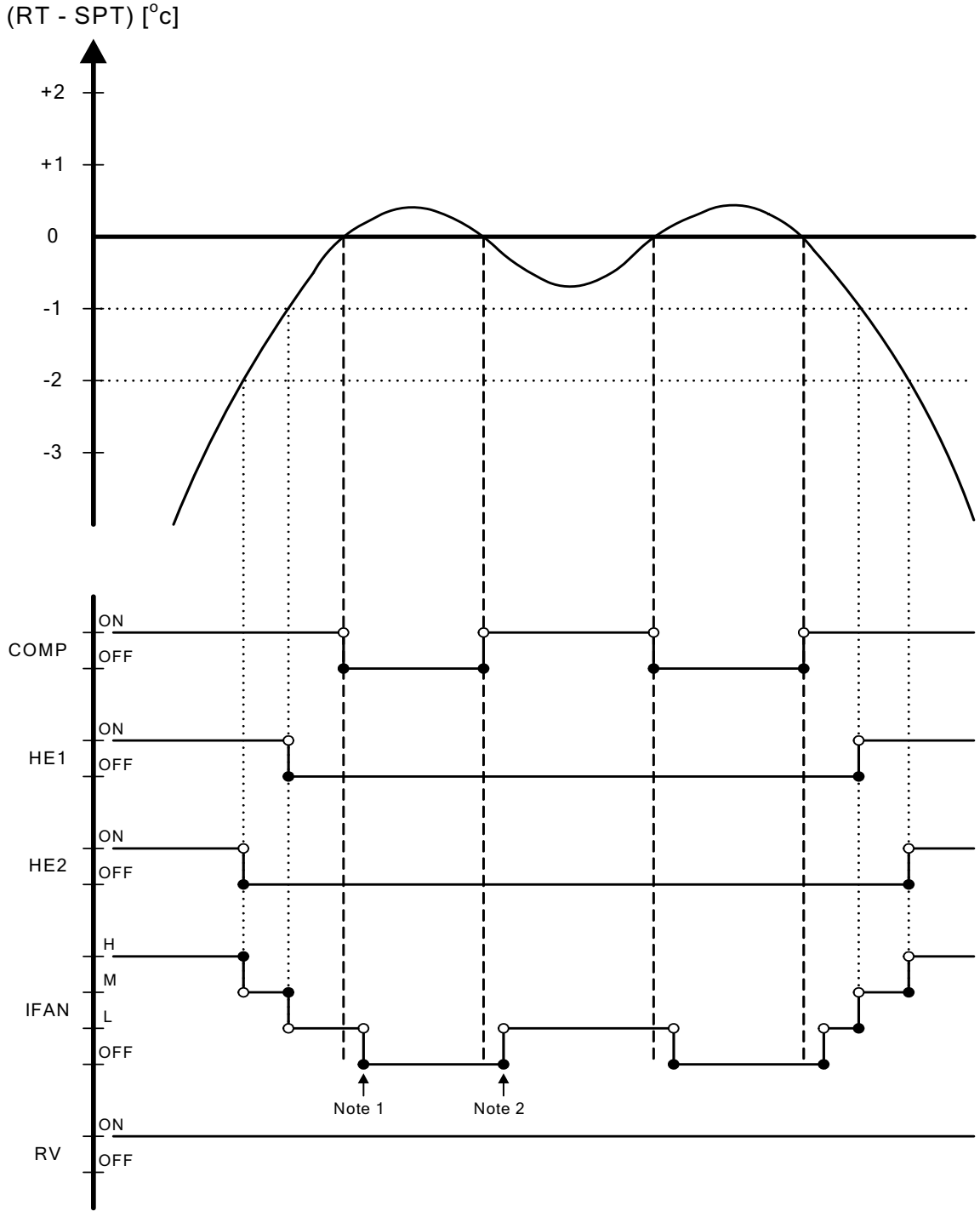


12.5.3 Heating, RC or SH Group with Autofan

Mode: Heat, Auto (at heating)
Temp: Selected desired temperature
Fan: Auto
Timer: Any
I Feel: On or Off

Control function

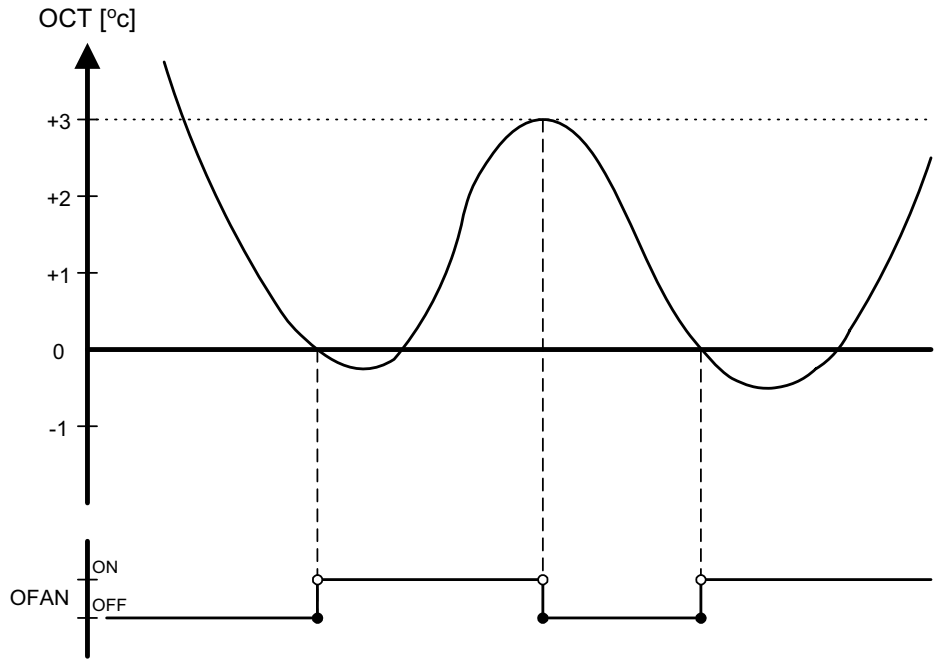
Maintains room temp at desired level by controlling COMP, IFAN and OFAN.



Note: OFAN operation is controlled by the graph below when

1. (RAT ≥ SPT – 2°c), AND
2. (ICT ≥ 45°c), AND
3. (COMP is ON)

Otherwise, OFAN runs together with COMP.



12.6 AUTOMATIC COOLING OR HEATING

12.6.1 Automatic Cooling or Heating - General

1. Switching-temperature between Cooling and Heating is SPT ± 3°c.
2. Autofan in Automatic Cooling and Heating Mode will activate “Cooling with Autofan Mode” and“Heating with Autofan Mode” respectively.
3. When the Auto Mode is started with SPT +/-0°c, the unit will not select Auto Heat or Auto Cool mode immediately. Instead, the unit will be in a temporary Fan Mode with IFAN operating at low speed. The proper Auto Heat mode or Auto Cool will be started whenever the RT reaches SPT-1°c or SPT+1°c respectively.
4. For RC & SH units, Mode change between Auto Heat & Auto Cool Modes are possible only after the COMP has been OFF during the last T minutes.

Mode Change	time, T
Auto Cool to Auto Heat	3 min
Auto Heat to Auto Cool	4 min

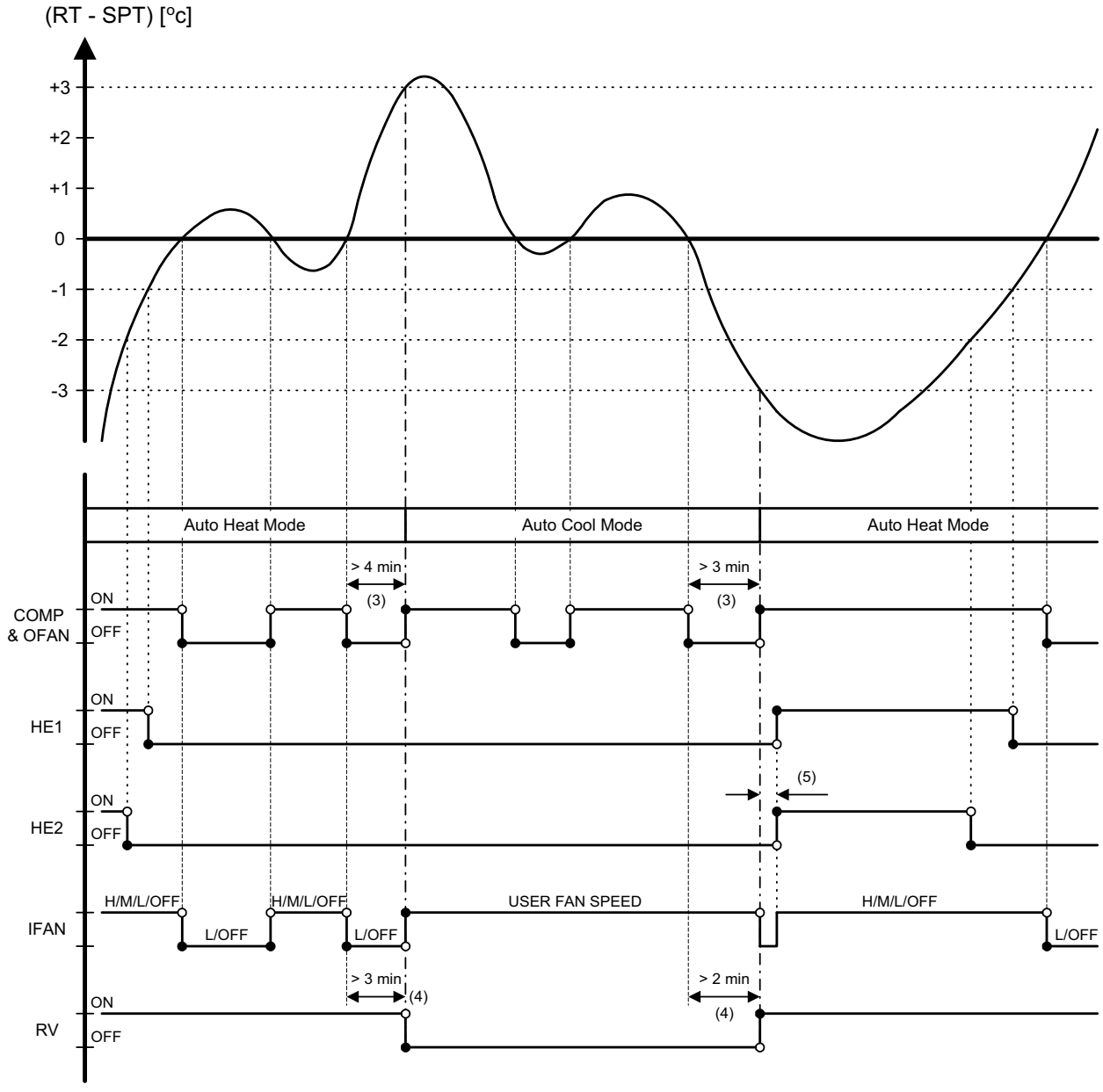
5. When unit is changed form Cool/Dry mode to Auto Mode, the unit will continue to operate at (Auto) Cool Mode until the conditions for switching from Auto Cool to Auto Heat are satisfied.

   Similarly, when unit is changed from Heat Mode to Auto Mode, the unit will continue to operate at (Auto) Heat Mode until the conditions for switching from Auto Heat to Auto Cool are satisfied.

12.6.2 Auto Cooling or Heating, RC or SH Groups

Mode: Auto
Temp: Selected desired temperature
Fan: Any
Timer: Any
I Feel: On or Off

Control function
Maintains room temp at desired level by selecting between cooling and heating modes.



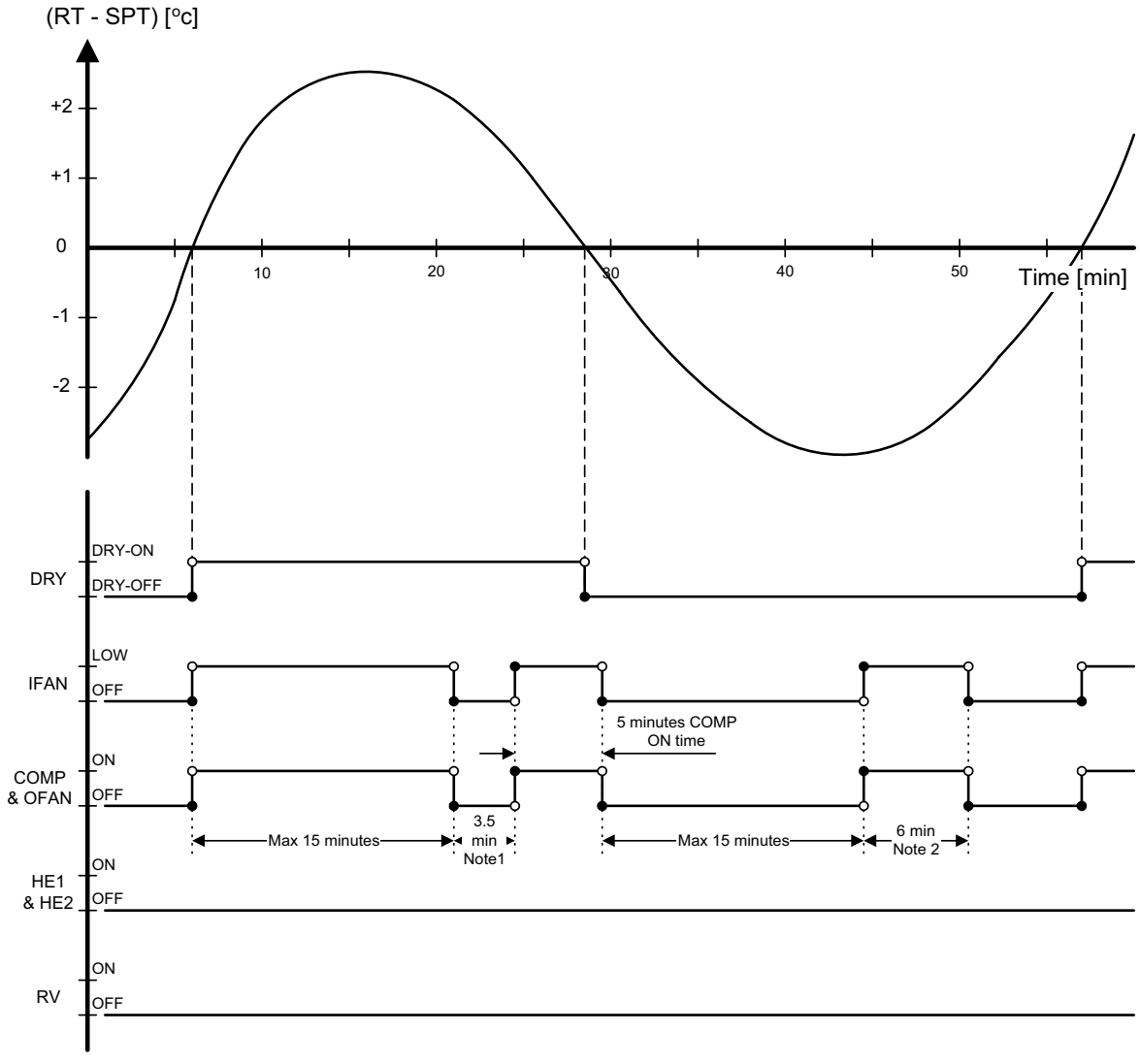
12.7 Dry Mode

12.7.1 Dry, ST or RC group

Mode: Dry
Temp: Selected desired temp
Fan: Low (automatically selected by software)
Timer: Any
I FEEL: Any

Control function

Reduce room humidity with minimum temp. fluctuations by operating in Cool Mode with low speed IFAN.



Notes :

1. When Dry is ON, the COMP is forced OFF for 3.5 min (longer than the 3 min Min COMP-Off time) after every 15 min of continuous COMP operation.
2. When Dry is OFF, the COMP is forced ON for 6 min (longer than the 3 min Min COMP-On time) after every 15 min of continuous COMP OFF time.

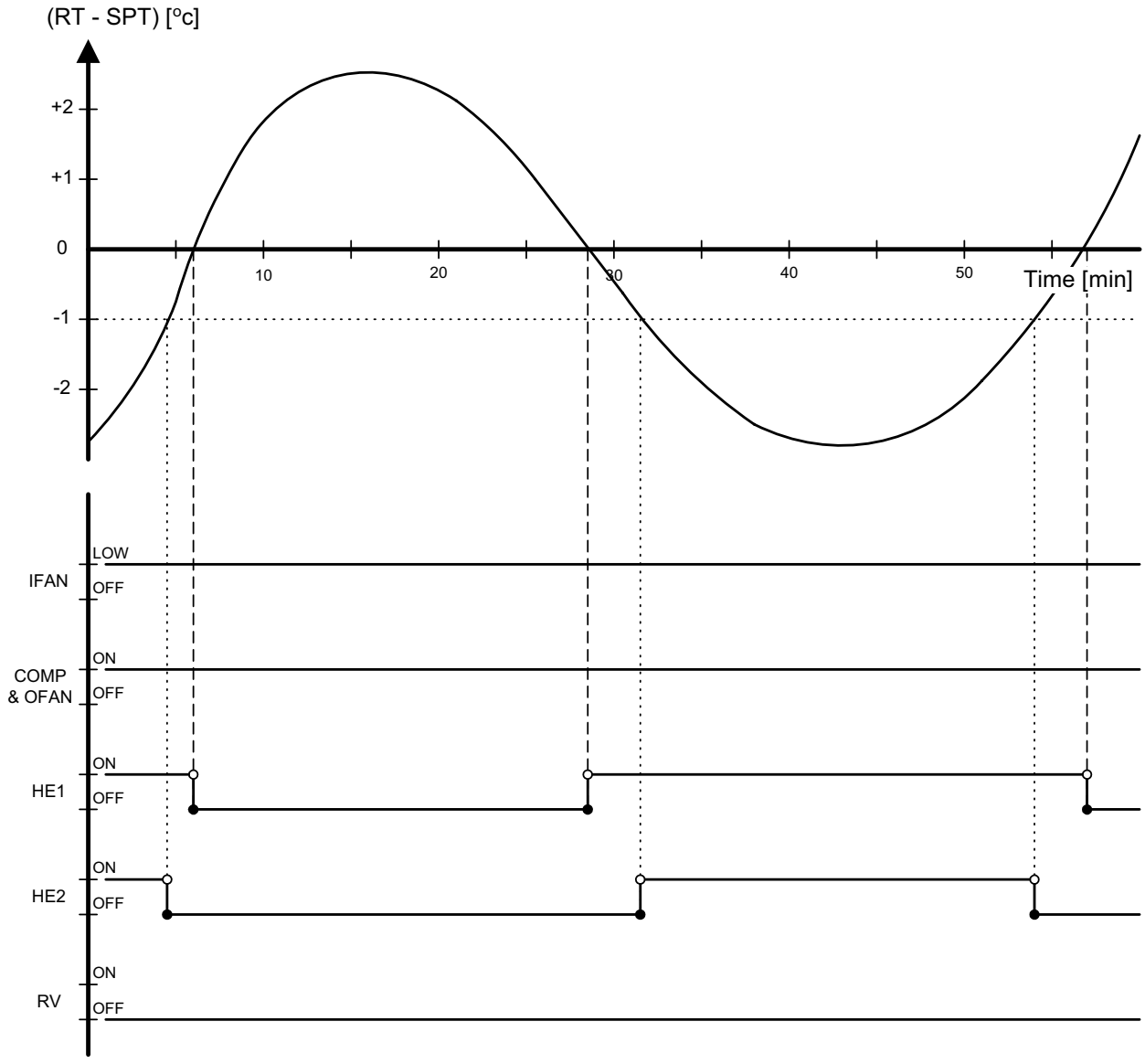
3. When Dry is changed from ON to OFF or vice versa, the limits mentioned in (1) & (2) are ignored. The COMP operation is only controlled by the 3 min Min OFF time and 1 min Min ON time.
4. In Dry Mode, IFAN is LOW when COMP is ON, and is OFF when COMP is OFF.
5. HEs are always OFF in Dry Mode.

12.7.2 Dry, SH

Mode: Dry
Temp: Selected desired temp.
Fan: Low (automatically selected by software)
Timer: Any
I FEEL: Any

Control function

Reduce room humidity with minimum Temp. fluctuations by operating in Cool Mode with low speed IFAN and HE.



Notes :

1) HP and Defrost protections are the same as in Cool Mode.
2) IFAN is operating continuously at low speed.
3) For MBX model, HE1 and HE2 will be activated simultaneously as the HE1 above.

12.8 Protection

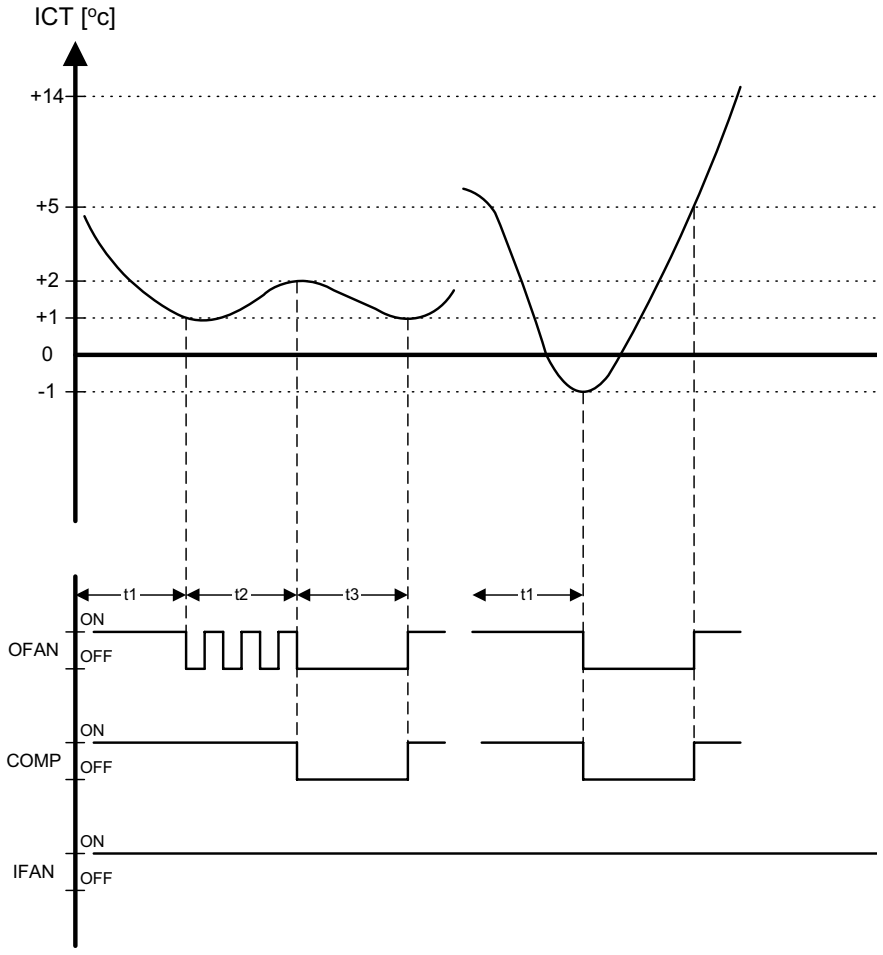
12.8.1 Cooling Mode Protections

1. Indoor Coil Defrost

Mode: Cooling, Dry, Auto
Temp: Selected desired temp.
Fan: Any
Timer: Any
I Feel: On or Off

Control Function

Protect the indoor coil from ice formation at low ambient temperature.



t1 = 5 min minimum for each COMP starting

t2 = OFAN cycling (alternate between ON and OFF every 30 sec) for 20 min maximum

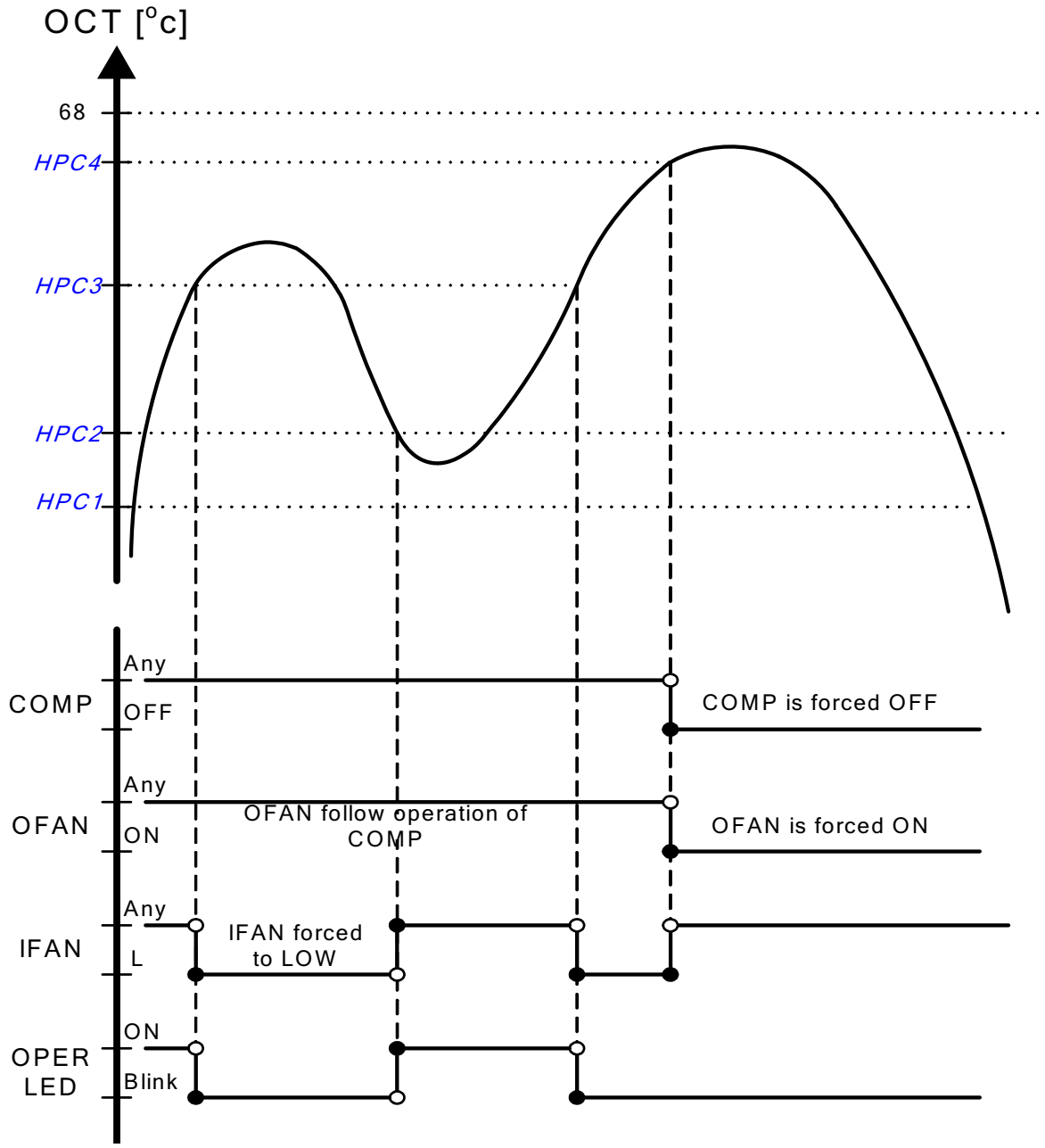
t3 = COMP and OFAN stop for 10 min minimum

2. High Pressure Protection

Mode: (Auto) Cooling or Dry
Temp: Selected desired temp.
Fan: Any
Timer: Any
I Feel: On or Off

Control Function

To protect the COMP from the high pressure built-up in the outdoor coil during normal cooling operation, by switching OFF the IFAN and COMP.



Note:

1. The ICT is also monitored during Cool and Dry mode, in case the RV control circuit is faulty. Whenever ICT reaches 70°c, which indicates a high pressure in the indoor coil, the COMP will be forced off automatically. The COMP can be turned on again only after the ICT is under 70°c again and after the 3 min COMP ON delay time. The OPER LED will not blink in this case.
2. Parameters values:

Parameter	Regular Fix-RPM unit	Water Source Heat Pump Unit
HPC1	52	38
HPC2	55	42
HPC3	61	45
HPC4	66	48

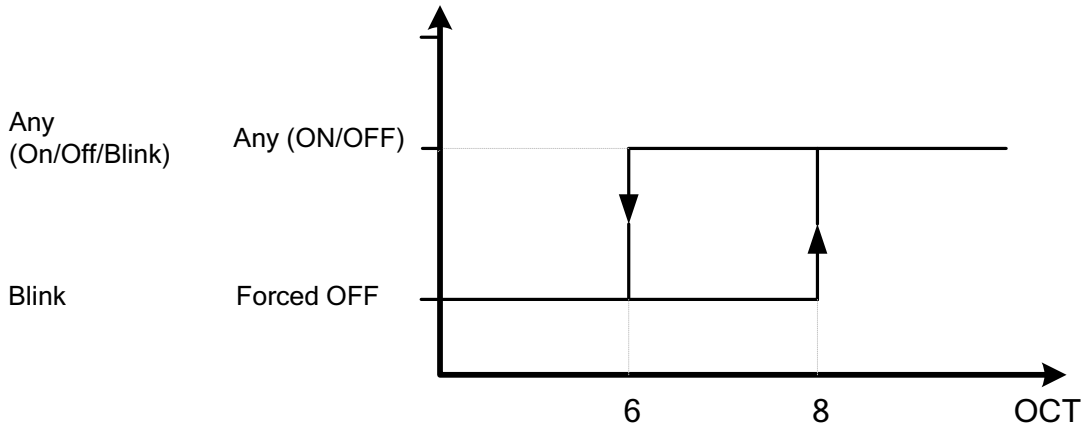
3. Low Condensing Protection

Mode: (Auto) Cooling or Dry
Temp: Selected desired temp.
Fan: Any
Timer: Any
I Feel: On or Off

Unit: **Enabled only in WSHP units type (Disabled for all other unit types).**

Control Function

To protect the COMP from Low condensing pressure built-up in the outdoor coil during normal cooling operation, by switching OFF the COMP.



12.8.2 Heating Mode Protections

1. Outdoor coil Deicing (excluding RH Group)

Mode: Heating, Auto (at heating)
Temp: Selected desired Temp
Fan: Any
Timer: Any
I FEEL: Any

Control function

Protects the Outdoor coil from ice formation by controlling COMP & RV operation.

Scope

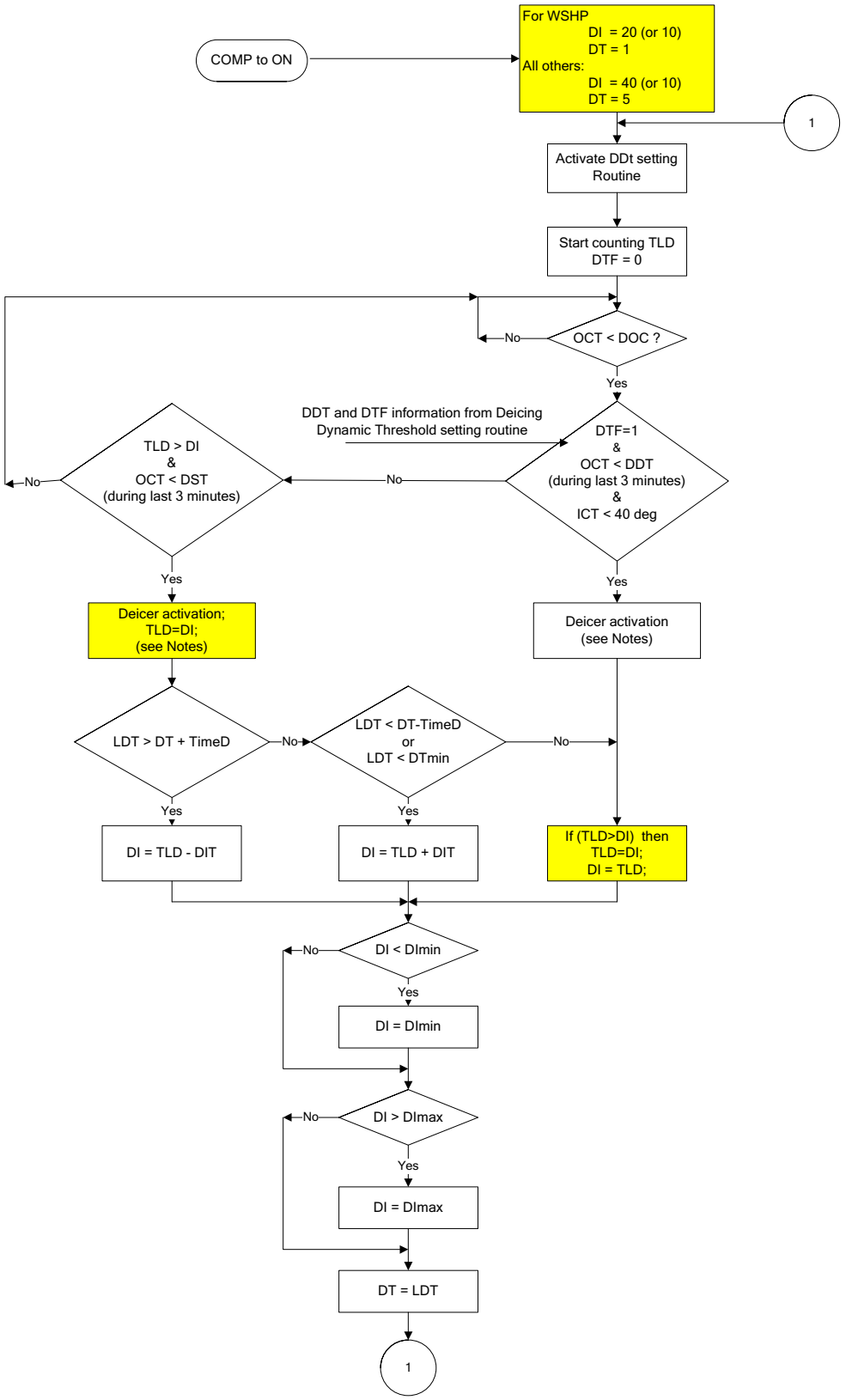
This new deicer is designed to operate at extreme temp conditions. The deicing cycle could be triggered from:

1. OCT temp and time between two consecutive deicing cycles.

2. Detection of ice forming by change of the OCT temp.

Both algorithms adjust the time between deicing cycles to optimize the A/C performance. The algorithm will automatically increase the time between deicing cycles and reduce the deicing cycle as needed.

A. DEICER ACTIVATION ALGORITHM

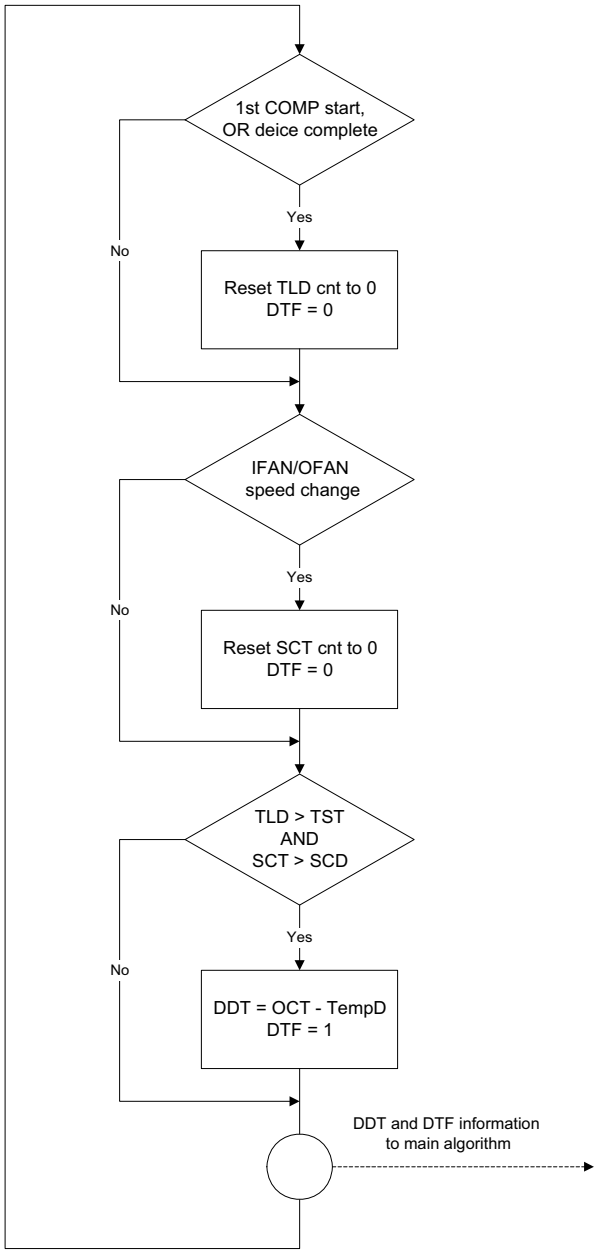


Notes:

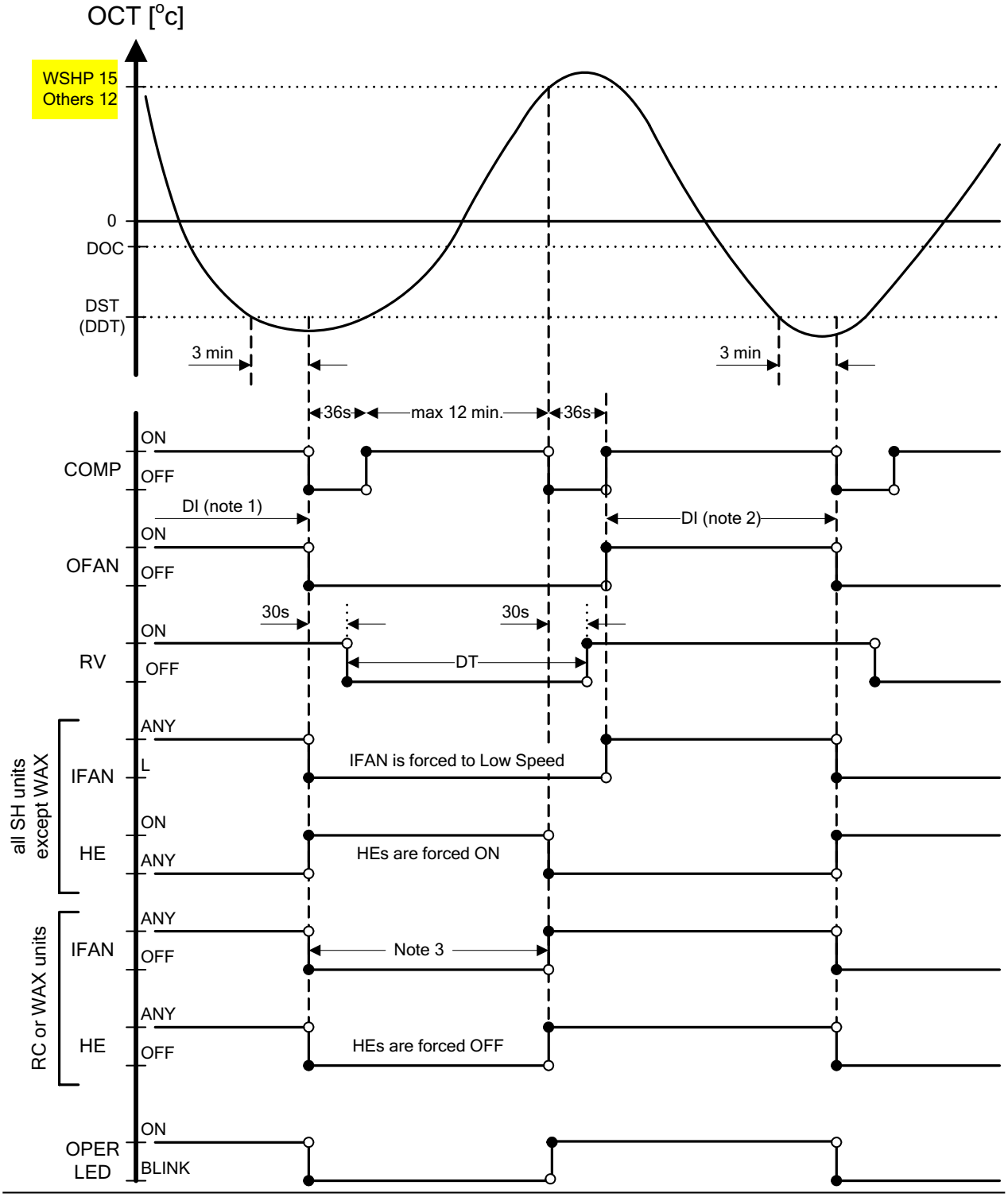
1. Count LDT while Deicing
2. In first COMP activation (after SB or OFF),
   2.1. For WSHP: if OCT < 5°c, DI = 10 min, else DI = 20 min
   2.2. For all other: if OCT < 0°c, DI = 10 min, else DI = 40 min.

B. Deicer Dynamic Threshold Setting Routine

The following routine run continuously while A/C is working in Heat Mode. the routine outputs Deicing Dynamic Threshold (DDT) and Deicer Threshold Flag (DTF) to the main Deicer routine.



C. Deicing procedure



Notes :

1. In the following Deicing cycles, the time interval between two Deicing cycles activation is between 30 to 80 min.
2. For RC group, HEs are forced OFF. IFAN operation is as in Heat Mode, Sect 4.0.3.a, i.e. IFAN will be set to OFF when ICT<30°c.

For WAX, the IFAN is simply forced OFF.

4. For SH group, HEs are forced ON and IFAN is forced to operate in Low speed, regardless of the ICT and difference between RAT & SPT.

D. Definitions of Variables and Parameters

Variable Definitions:

Variable	Details	Abv	Comments
Time_from_Last_Deicer	Time that RV is ON	TLD	Time from last Deicer or from SB
Deicer_Interval	Time interval before the next deicing cycle	DI	
Deicing_Time	Actual time that RV is OFF	DT	
Last_Deicing_Time	Time of last deicing cycle	LDT	
Deicing_Dynamic_Threshold	OCT threshold to start Deicing cycle	DDT	OCT - Temp_Delta
Deicer_Threshold_Flag	Indication of a valid dynamic threshold temp	DTF	0 = ref temp NOT set 1 = ref temp set
Speed_Change_Timer	Time from last speed change	SCT	

Parameters to be stored in the EEPROM:

Variable	Details	Abv	Default
Temp_Stabilization_Time	OCT temp stabilization time	TST	20 min
Minimal_Deicer_Interval	Min. time between two consecutive deicing cycles	DImin	30 min
Maximal_Deicer_Interval	Max. time between two consecutive deicing cycles	DImax	80 min
Deicing_Operating_Condition	OCT temp threshold to enable deicing cycles	DOC	WSHP: +2°c Others: -2°c
Deicing_Static_Threshold	OCT Static threshold to start Deicing cycle	DST	WSHP: +2°c Others: -8°c
Temp_Delta	Temp delta to identify a change from the steady state temp	TempD	3°c
Time_Delta	Time difference to identify a change in deicing duration	TimeD	1 min
Minimum_Deicing_Time	Minimum time for actual deicing (RV is OFF)	DTmin	1 min

Deicer_Incremental_Time	An unit change in the deicer time	DIT	10 min
Speed_Change_Delay	Delay from last IFAN speed change	SCD	5 min

Definition of parameters in the EEPROM :

Abv.	EEP Addr	Details	Default
TST	Addr-1AH-NXXX	0-fH ➔ time from 0 to 30 minutes	0aH
DImin	Addr-18H-XXNN	00-ffH ➔ time from 0 to 255 minutes	1eH
DImax	Addr-18H-NNXX	00-ffH ➔ time from 0 to 255 minutes	50H
DOC	Addr-19H-XXXN	0-fH ➔ temperature from -7 to 8 degree C	5
DST	Addr-19H-XXNX	0-fH ➔ temperature from 0 to -15 degree C	8
TempD	Addr-19H-XNXX	0-fH ➔ temperature from 0 to 15 degree C	3
TimeD	Addr-19H-NXXX	0-fH ➔ time from 0 to 15 minutes	1
DTmin	Addr-1AH-XXXN	0-fH ➔ time from 0 to 15 minutes	1
DIT	Addr-1AH-XXNX	0-fH ➔ time from 0 to 15 minutes	0aH
SCD	Addr-1AH-XNXX	0-fH ➔ time from 0 to 15 minutes	5

Note:

In the EEP Addr Field

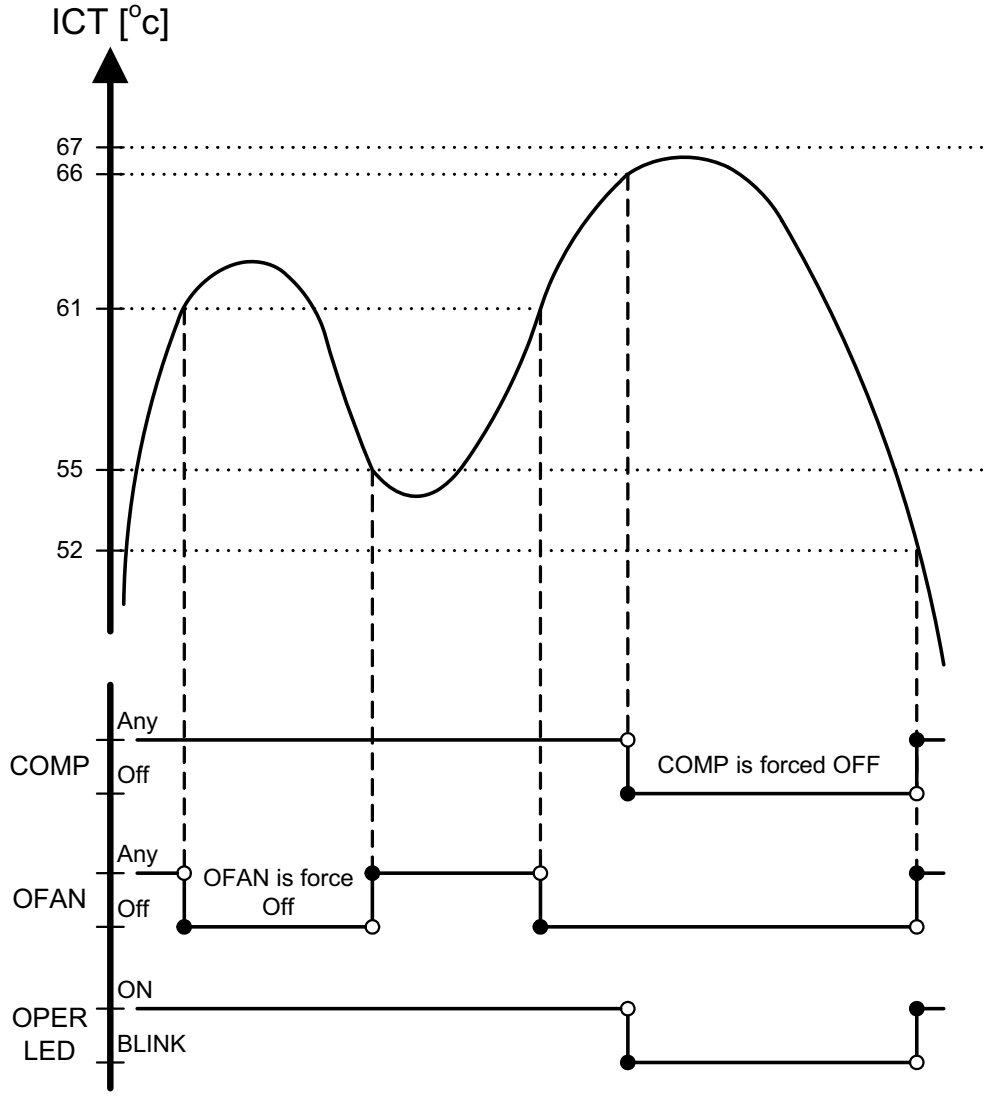
- X is don't care nibble
- N is data nibble for setting

2. Outdoor coil Deicing (excluding RH Group)

Mode: (Auto) Heating
Fan: Any
Timer: Any
I Feel: On or Off

Control Function

Protect the Compressor from high pressure by switching OFF the OFAN and COMP.



Notes:

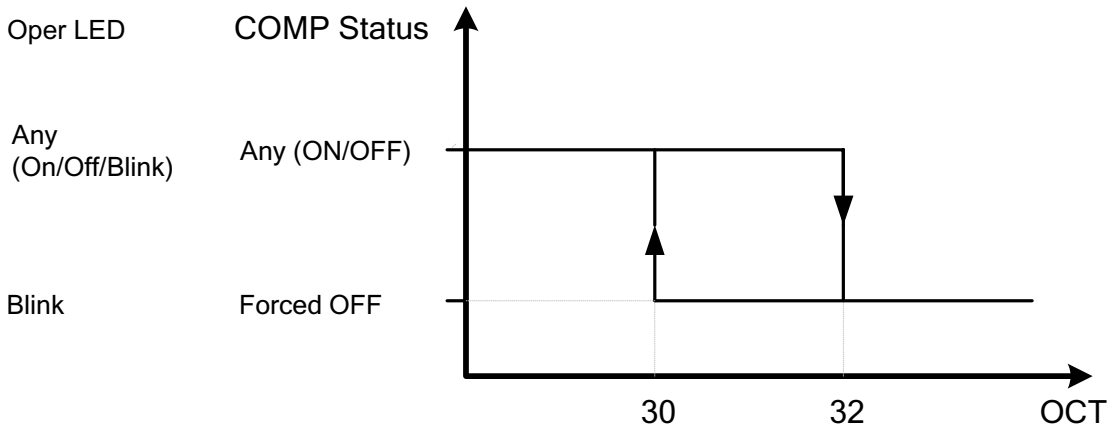
1. IFAN, HE1 and HE2 will be activated according to the relevant Heating Mode Sect.
2. In case of any malfunction in the relay control circuit, the OCT is also monitored during Heating mode. Whenever OCT reaches 70°c, which indicates a high pressure in the outdoor coil, the COMP will be forced off automatically. The COMP can be turned on again only after the 3 min COMP ON delay and the OCT is under 70°c. The OPER LED will not blink in this case.

3. High Evaporating Protection

Mode: Heating, Auto (at heating)
Temp: Selected desired temp.
Fan: Any
Timer: Any
I Feel: On or Off
Unit: Enabled only in WSHP units type (Disabled for all other unit types).

Control Function

To protect the COMP from High Evaporating pressure built-up in the outdoor coil during normal heating operation, by switching OFF the COMP.



12.8.3 Indoor Condensation Pump (ICP) Operation and Overflow Protection (NFC Model)

Mode: Cooling, Dry, Auto (at Cooling)

Temp: Desired temp selected

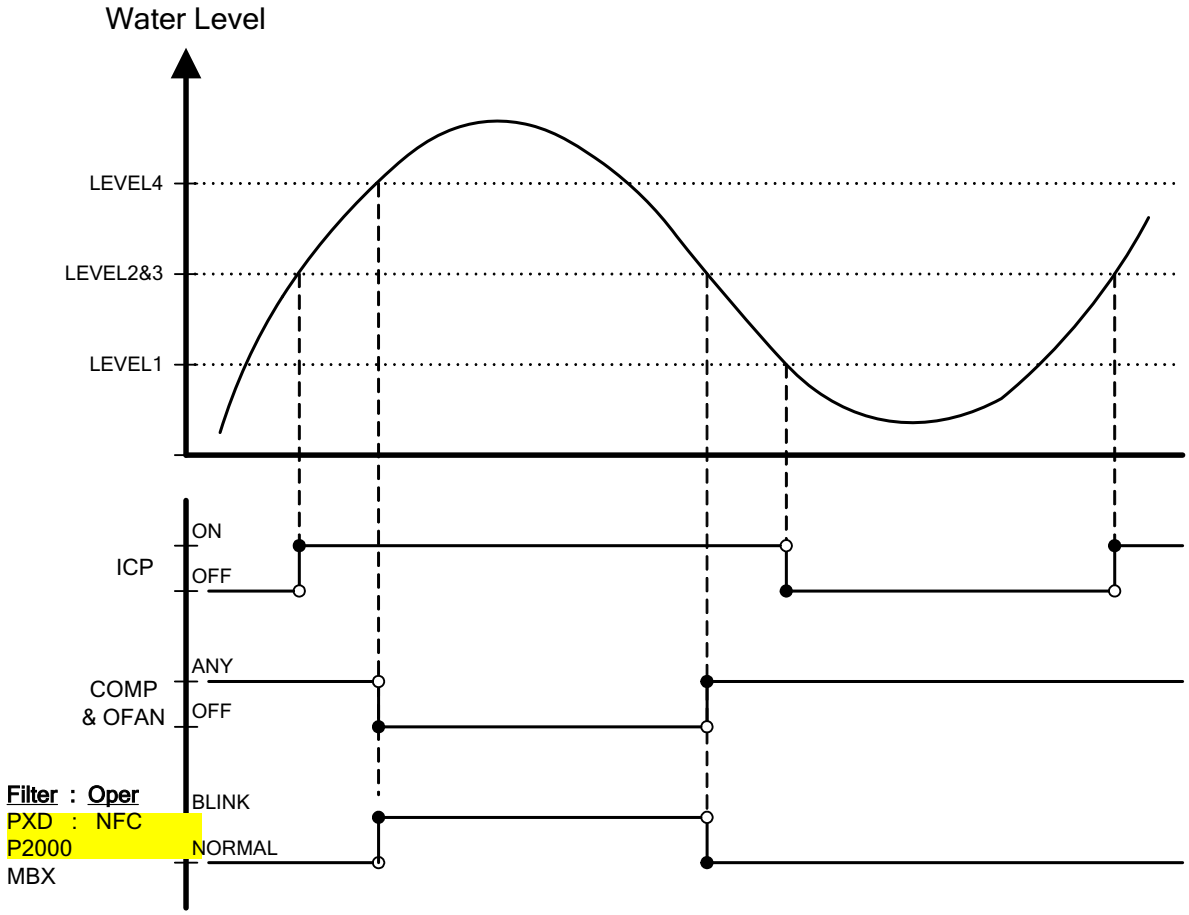
Fan: Any

Timer: Any

I Feel: On or Off

Control function:

To prevent the overflow of condensed water by turning ON the ICP.



Notes:

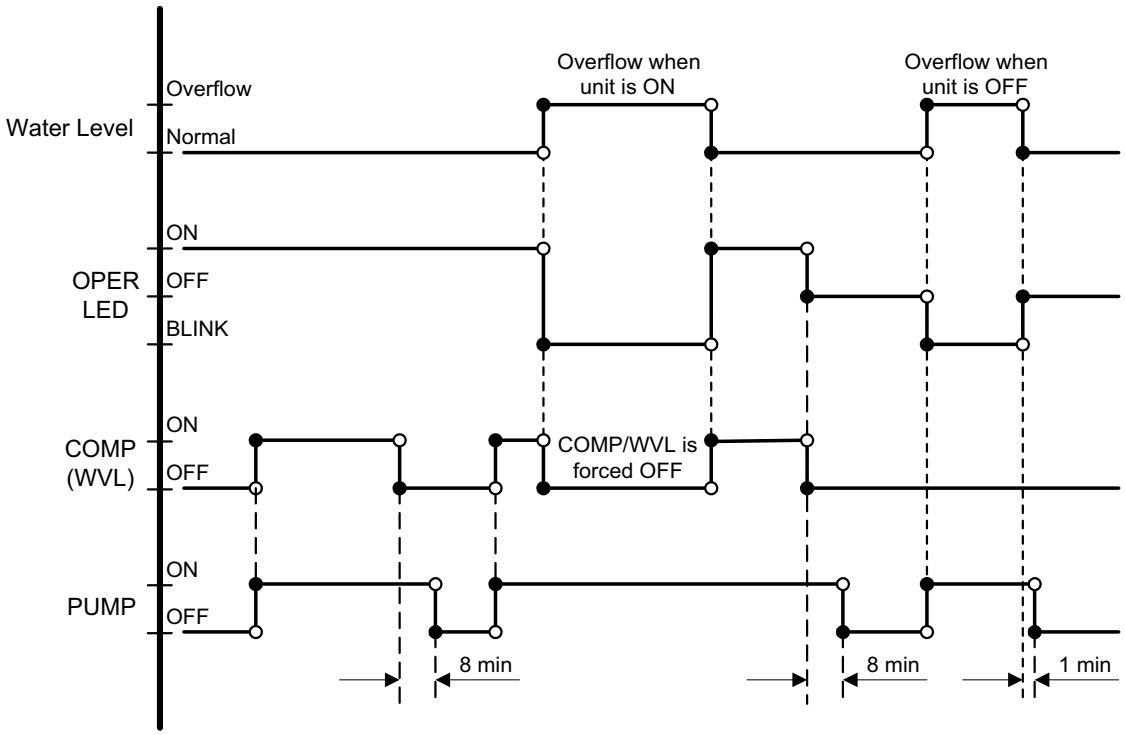
1. When water level reaches LEVEL 4, ICP will be turned ON even if the unit is in SB mode, Heat, and Auto Heat modes.
2. Under normal operation, at least one of the water level inputs must be active. If all LEVEL1, LEVEL2&3 and LEVEL4 are inactive, it is assumed that the connection has been broken and the ICP will be turned ON when the unit is operating in Cool or Dry mode.
3. The operation of the pump is not related to the ON/OFF state of the COMP. On the contrary, the COMP can be forced to OFF when the water level is high (level 4).

12.8.4 Condensation Pump (CN/NKN models only)

Mode: Cool, Dry, Auto
Temp: Selected desired temperature
Fan: Any
Timer: Any
I FEEL: Any

Control function:

Prevent Condensed water from Overflowing.



Notes:

1. The switch used for water level detection is closed under normal condition, and is open when water overflow.
4. The “Overflow” condition can activate the water pump in SB and operating modes.

12.9 Timer

Mode: Any
Temp. Selected desired temp
Fan: Any
Timer: Timer On, Timer Off
I Feel: On or Off

Control function

1. Starts or stops the unit operation after pre-set time.

   If RC-1 is used, the timer setting will be (0.5 - 24 Hr) from the moment the timer is set. The minimum resolution is 30 minutes.

   If RC-2 or later version of remote controls is used, the timer setting will be (0:00 - 23:50) real time with 10 minutes resolution.

2. After power failure, all pre-set timers are cleared. The system is forced to STBY mode and the Timer LED indicator is blinked to indicate the situation. The LED keeps blinking until the timer settings can be reloaded from a R/C message.

   Note: If all timers are inactive, the system will not be forced OFF after the power failure. The last OPER/STBY status will be loaded from the EEP instead.

3. When the A/C receives any valid message from a R/C, the current ON/OFF timer settings will be replaced by the new timer settings in the R/C message.

   Note: The following timer related operations will not affect the A/C operating mode (Heat/Cool/Auto/Dry/Fan) setting.

   - Set ON/OFF timer
   - Clear ON/OFF timer
   - R/C ON Timer is time-up
   - R/C OFF Timer is time-up

   E.g. When a STBY A/C unit (with Cool Mode setting in its EEP) is turned on by the ON-TIMER of a R/C with heat mode setting, the A/C will start in Cool Mode.

12.10 I Feel Mode

Mode: Any
Temp: Selected desired Temp.
Fan: Any
Timer: On or Off
I Feel: On

Control function:

Maintains room temp by comparing RAT to RCT sensor at the R/C.

Depending on the version of the R/C (RC1, 2, 3 or 4), a R/C in IFEEL mode will automatically send out its RCT (in I-FEEL data) with a time interval from 0 to 6 minutes continuously. The ELCON will blink the OPER LED to acknowledge the reception of this I-FEEL data but the buzzer is not activated.

Notes:

1. The I-Feel function is cancelled when an ELCON unit is turned OFF OR after a power interrupt.
2. An ELCON will enter I-FEEL Mode automatically when it receives any I-FEEL data from any R/C.
3. If an ELCON is in I-FEEL Mode and no I-FEEL data has been received from the R/C for more than 4 min (6 min for RC4 short IFEEL messages), the I-FEEL mode would be suspended. And, the temp is replaced by the RAT from the local thermistor.

   As soon as a new I-FEEL data is received from the R/C, the I-FEEL mode will be resumed (same as the case described in Note 2).
4. There are 3 different format of I-FEEL data
   - the 32-bits data format of RC-1
   - the 34-bits data format of RC-2, RC-3 and RC-4 (in RC-2 compatible mode)
   - the 12-bits data format of stand-alone temperature sensor and RC-4 (in RC-4 mode)
5. The formats of the R/C data are provided in the Appendix section.

12.11 Air flow direction control

Mode: Any
Temp: Selected desired temp.
Fan: Any
Timer: On or Off.
I Feel: On or Off.
Control function

Control airflow direction by setting the Horizontal or Vertical louvers to Auto-swing or User-position modes.

According to the ELCON models, the louvers are driven by AC Swing Motor or DC Step Motor which operations are defined in Section 10.1 and 10.2 respectively.

12.11.1 AC-Swing Motor operation

1.General Operations of Louvers driven by AC-Swing Motor

(i) The louvers, which are driven by AC-Swing motor, turn from right to left (move horizontally).
(ii) The louvers are stopped automatically when the units are switched to SB.
(iii) The last Auto-swing status is always stored in the EEPROM and can be restored when the unit is switched from SB to operation mode or when the power to the unit is switched ON. (1)
(iv) The louver is stopped when the IFAN is OFF (e.g. in Heat Mode or deicing). Normal louver operation will be resumed when IFAN is turned ON again.
(v) When RC2 or compatible remote is use -
For all models, tthe AC swing motor works in Auto-swing or Manual Positioning Mode together with the DC Step Motor. Therefore, the vertical louver can be driven by either AC motor or step motor. No change in jumper setting is necessary.
For NFC, the AC swing motor is always stopped.

2.Controlling the louvers driven by AC-Swing Motor by using a R/C

Operation	Auto-swing ON/OFF	Manual positioning
Operation with RC4	Activated by the Horizontal Swing button in the R/C. The ON/OFF status of the swing motor is the same as that shown on the LCD display of the R/C.	N . A.
Operation with RC2 or RC3 compatible remote control (2)	Activate by the Auto-swing button in the R/C. The ON/OFF status of the swing motor is the same as that shown on the LCD display of the R/C.	Activated by the Manual Positioning button in the R/C. Each pressing will set the relay ON for 2 sec, then the relay is turned OFF automatically.
Operation with RC1, RC1/W	Activated by go-home button in the R/C. Change relay position from ON to OFF, or OFF to ON for each pressing.	Activated by the Manual Positioning button in the R/C. Each pressing will set the relay ON for 2 sec, then the relay is turned OFF automatically.

1. The Auto-swing is turned OFF whenever the Operation Button of the RC2/RC3 is pressed. Therefore, if the unit is turned ON by a RC2 or RC3, the unit will be ON with Auto-swing cancelled.
2. Such as a RC4 remote controller in RC2 compatible mode.

12.11.2 DC Stepping-Motor operation

Caution: All the louver angles or louver positions mentioned in this specification are the rotation angles of the stepping motors. They are NOT necessary equal to the rotation angles of the louvers.

List of models with stepping motor and the Swing-angle limits of these models:

A/C models w/ step motor	Total Anlge (Max_Swg)	Travel at Auto Swing, (Auto_Swg_Limit)		Limit in User Position mode (User_Swg_Limit)	LockAngle	MTR closing direction (1)
		Heat Mode	Other modes			
NFC	110°	60-110°	60-110°	60-110°	5°	A
CN	40°	5-40°	5-40°	5-40°	5°	C
NKN	45°	5-42°	5-42°	5-45°	5°	C

Note:

1. The Motor Direction is defined to be the rotation direction (Clockwise | Anticlockwise) when the louver is closing. (Viewed from the top of the motor.)
2. The Auto_Swg_Limit of WMF is 60-60°. Therefore, its Auto-swing operation is disabled, and the louver will only stay at the 60° position. The louver position reset (Cf.: 10.2.1 (x)) would be disabled in this case, to prevent unnecessary louver movement.
3. The Max_Swg angle is an independent mechanical angle (by the step motor taking into account the gears transmission) of the product (ROM value).
4. Travel at Auto Swing angles are 4 independent parameters set under this mode (EEPROM values).
5. The user angles are the same as the cooling Auto Swing Angles.
6. For LockAngle, refer to the rule from Operation to STBY.

1.General Operations of Louvers driven by DC Stepping Motor

(i) The louver position is defined by the angular position of the stepping motor. When the louver is completely closed, the motor position is defined to be 0°. When the louver is completely opened, the motor position is defined to be the Total Angle (Max_Swg).

(ii) Max Swg of the motors are model dependent as shown in the table above.

(iii) If the louver is in Auto-swing mode, it would move to-and-fro continuously within the Auto_Swg_Limit except the 1st swing cycle (see (iv) below). Both the upper and lower limits are determined by the type of models and current operating mode as shown in the table above.

(iv) When a step motor start to operate in Auto-swing mode, the motor will move between the User_Swg_Limit during the 1st swing cycle. The purpose of this operation is to let the user set the “louver user position” by using only the swing button (e.g. the Vertical Swing Button in RC-4). In the following cycles, the motor will move between the Auto_Swg_Limit.

(v) The Louver is closed automatically when a unit is turned to SB or in the initialisation stage after a power failure.

When the initialisation stage after the power failure is completed, the louver would stay at the closed position or resume the last louver operation (i.e. Auto-swing or User-position mode). It depends on whether the unit would stay in STBY mode or restart the last operating mode from the EEPROM.

The current operation of the step motor (Auto-swing or User-position mode) and the step motor position in User-position mode, are stored in the EEPROM.

(vi) Each step of the stepping motor consists of 8 states (Cf. Sect 10.3.2). To guarantee a large enough torque, the duration of each state is 9.75ms. Therefore, the duration of each step cycle is 78 ms (=9.75ms x8).

(vii) Each step of the stepping motor is equivalent to 0.703°.
(360°/2048 phases) x (8 states per step) x (4 phases / 8 states) = 0.703°

(viii) Default ELUM is 5° for all models by default (Cf. Sect. 15.2).

(ix) When user presses the Manual Positioning Button in a R/C, the louver will move 10 steps (7°) and then stop automatically.

(x) To ensure the louver will stay at the correct range of Auto-swing angle, a “position reset in Auto-swing” is performed once for every 8 auto-swing cycle

(xi) Summary of different type of Louver movement :

Note	Status	Action
1.	Louver-Reset (after power failure or power up)	The louver is closed by an angular movement of (Max_Swg + ELUM) to ensure that it will be closed completely. The louver position counter is then reset to 0°. Any further louver movement will be relative to this angle.
2.	From OPER to SB	The louver is closed by moving toward the (0° – LockAngle°) position. The louver position counter is then reset to 0°. Any further louver movement will be relative to this angle.
3.	From SB to OPER	If the unit is turned ON by the R/C, the louver will enter Auto-swing mode or User-position according to the setting in the R/C. If the unit is turned ON by CLOCK, internal On-Timer or the emergency Mode Button, the last louver operation is resumed. When the louver leaves the SB (closed) position, it is always open to (MAX_SWG + ELUM) and reset the louver position counter to MAX_SWG before carries on with the normal louver operations.
4.	After power failure	“Louver-Reset” first. Then, if the unit would stay in SB mode, the louver would remain closed. Otherwise, “from SB to OPER”, then continue with the last

	or Reset	operating mode before the power failure. All the louver control information will be restored from the EEPROM.
5.	From mode to mode	If the louver is stationary (not in Auto-swing), it will automatically go to the default position of the new mode. That is open to the Max position of the Auto_Swing_Limit. If the louver is in Auto-swing mode, it will continue to move between the Auto_Swing_Limit of the new mode.
6.	Travel angle at Auto-Swing	Refer to the table in Sect 10.2.
7.	Position Reset in Auto-Swing	The louver is open to the maximum plus the ELUM angle.
8.	Manual Positioning Movement	10 steps (= 7°) per action (in the direction of last rotation). The position of louver is limited by the User_Swg_Limit.
9.	Total movement	Total movement from close to open position is Max_Swg, refer to the table in Sect 10.2.

2.Model Dependent Operations of Louvers driven by DC Stepping Motor

NFC model:

These are the only models with two independent louvers:

- the horizontal louver which is driven by an AC motor, and
- the vertical louver which is driven by a DC stepping motor

Since the RC2 or RC3 can support only one louver, the user must use a RC4 or RC1 to control the operation of the two louvers of a NFC. If RC2/RC3 is used, only the vertical louver is controllable, the AC motor is always stopped.

3.Controlling the Louvers driven by DC Stepping Motor by using a R/C

Operation	Autoswing and User-position modes	Manual positioning
Operation with RC4	These modes are activated by the Vertical swing button and Horizontal swing button in the R/C. The Vertical and Horizontal buttons are used to control the operation of the independent Vertical and Horizontal louvers respectively. The Auto-swing and User-position modes are selected alternatively for each pressing of the swing button.	Although there is no Manual positioning button in the R/C for fine adjustment of the louver position, the user can still use the Auto-swing buttons to set the User Louver Position. Whenever the Auto-swing mode is cancelled, the last louver position is saved in the EEP as the user louver position.
Operation with RC2 or RC3	The modes are activated by the Auto-swing button in the R/C. The Auto-swing and User-position modes are selected alternatively for each pressing of this button.	Activated by the Manual-positioning button in the R/C. Each time this button is pressed, the louver would move 7°. Then, the louver would stop and stay at User-position mode.
Operation with RC1 or RC1W	Auto-swing mode is activated by the Auto-swing button in the R/C. When the Go-Home button is activated, the louver would go to the completely open position. Then the louver would stop and stay at User-position mode.	Activated by the Manual-positioning button in the R/C. Each time this button is pressed, the louver would move 7°. Then, the louver would stop and stay at User-position mode.

Notes:

1). In the Manual positioning process, when the louver reaches the limits defined by User_Swg_Limit, the direction of the louver movement is reversed automatically.

2). The Auto-swing mode is cancelled (go to User-position Mode) in the following conditions:

- The unit is turned ON/OFF by the operation button in the R/C
- The OFF timer in the R/C reaches the pre-set OFF time.

The Auto-swing mode is reserved in the following conditions:

- The unit is turned ON/OFF by the CLOCK control
- The unit is turned ON by the ON Timer of the R/C
- The unit is turned ON/OFF by the mode button on the display board

12.12 Forced operation

Forced operation allows units to start, stop and operate in Cooling or Heating in pre-set temperature according to the following table:

Forced operation mode	Pre-set Temp for : NKN , CN, NFC,
Cooling	22°C
Heating	26°C

Note:

1. While under the forced operation, the temperature compensation schedule (Cf.: Sect 4.0.1) is disabled.
2. The forced operation is activated when the mode button on the Display Board is used to switch the unit to Cool or Heat mode.
3. The IFAN is always set to Autofan Speed in forced operation.

12.13 SLEEP

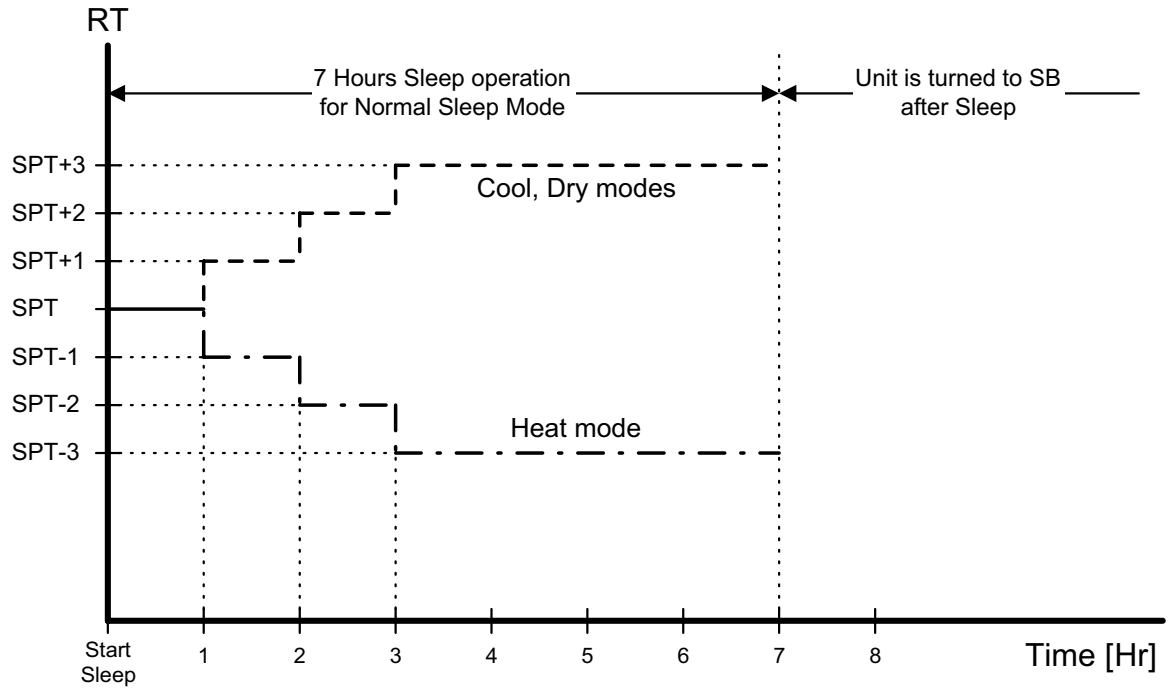
Mode: Any
Temp: Set – desired temperature selected
Fan: Any
Timer: Interact with Sleep Timer as described in sect 12.2
I Feel: On or Off

The Sleep mode is activated by using the sleep button on the R/C. In Sleep Mode, the unit will automatically adjust the SPT to turn up/down the room temperature (RT) gradually to provide maximum comfort to the user in sleep.

Sleep is treated as TIMER function. Therefore, the TIMER LED is activated similar to TIMER function.

12.13.1 SPT adjustment in Sleep Mode

1. In cool, auto cool or dry modes, the SPT adjustment is positive (from 0 to +3°c).
2. In heat or auto heat modes, the SPT adjustment is negative (from 0 to -3°c).
3. In other modes, there is no SPT adjustment.
4. The SPT adjustment is cancelled when the Sleep mode is cancelled.



Note: If Off-timer is active, the unit may go to SB before or after 7 hours of sleep operation.

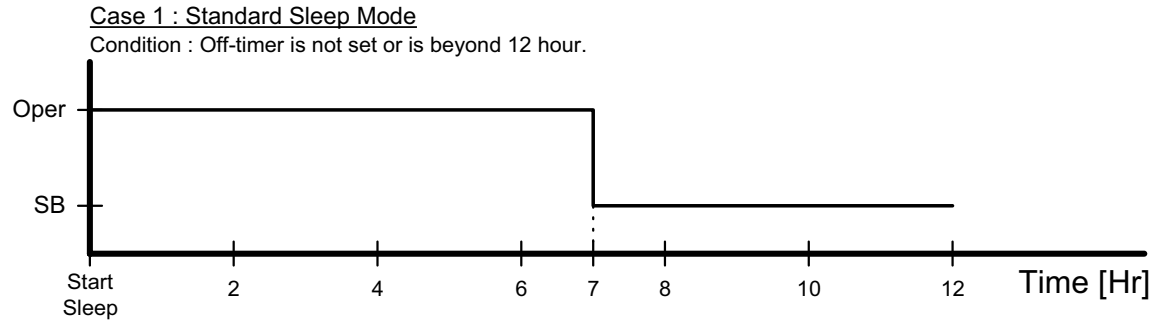
12.13.2 Time adjustment in Sleep Mode

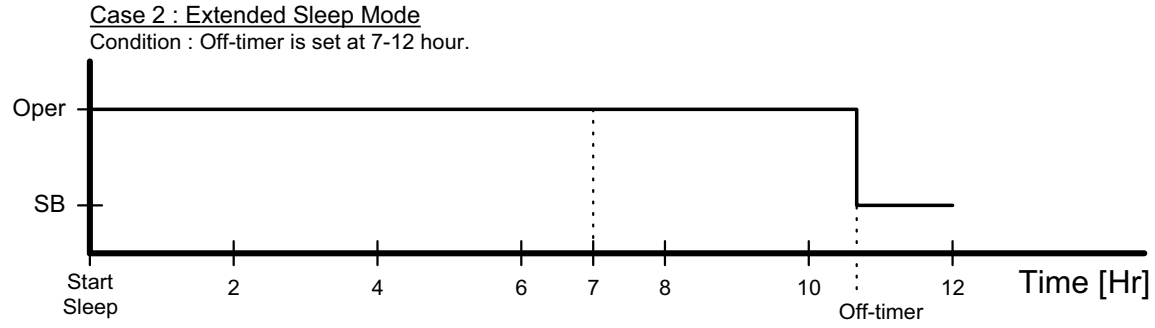
In 10V6, the user can make use of the Off-Timer to extend the Sleep Time from 7 hours to 12 hour (max). The operation of the new “Extended Sleep Mode” is illustrated by the graphs below.

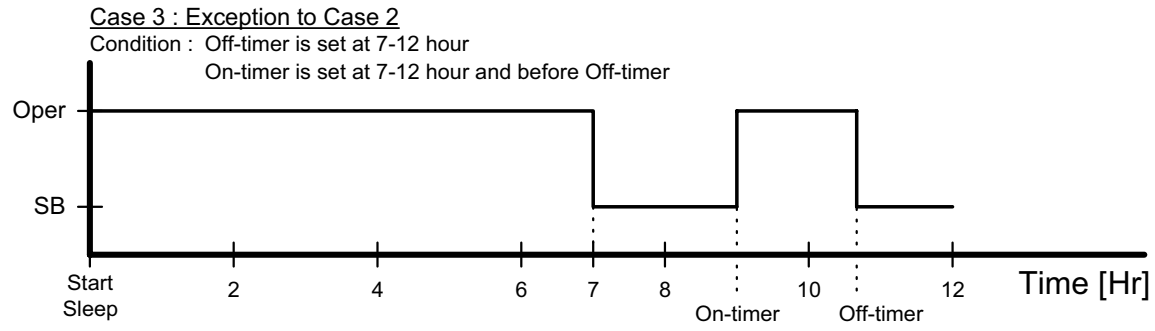
Case 1 is the Standard Sleep Mode, which is the only sleep mode in previous version of MCU. The A/C unit simply works for 7 hours, then goes to SB.

Case 2 is the new Extended Sleep Mode. If an active Off-Timer is set to turn off the A/C between 7-12 hour, relative to the starting of Sleep, the Sleep time is extended. And, instead of going to SB at the 7th hour, the A/C will work until reaching the Off-time.

Case 3 is an exception to case 2. The Sleep Mode will not be extended to the Off-Time when the Off-Timer is preceded by an On-Timer, which is also between 7-12 hour.







12.14 Clogged Air filter

Filter LED ON after 512 HR or as set in the EEPROM Addr-11H-XXX**N**.
Filter LED is turned OFF, and the Filter Timer is restarted by pressing the reset button.

12.15 ON UNIT INDICATORS AND CONTROLS

STAND BY INDICATOR	Lights up during STBY mode. Turns off during operaiton mode. The STBY LED blinks only in the following cases: Fault #1, #2, #4, #5, #8, and #9 The STBY LED will NEVER blink in the following cases: Fault 7, 11, and 12 (temp does not change).
OPERATION INDICATOR	1. Lights up during operation (turns off during STBY mode) 2. Blinks for 300 ms, to announce that a R/C infrared signal has been received and stored. 3. Blinks continuously during • OCT High Pressure Protection Mode (Cf.: Sect 7.1.2) • ICT High Pressure Protection Mode (Cf.: Sect. 7.2.2) • Deicing in Heating Mode (Cf.: Sect. 7.2.1) • Water Over Flow in CN/NKN/NFC Model (Cf.: Sect. 7.5)
TIMER INDICATOR	Lights up during Timer and Sleep operation.
FILTER INDICATOR	1. Lights up when Air Filter needs to be cleaned. 2. Blinks during Water Over Flow in MBX/P2000 models. (Cf.: Sect. 7.3)
COOLING INDICATOR	1. Lights up when system is switched to Cool Mode by using the Mode Switch on the unit. 2. Show the thermistor status in Diagnostic Mode (Cf.: Sect. 23)
HEATING INDICATOR	1. Lights up when system is switched Heat Mode by using the Mode Switch on the unit. 2. Show the thermistor status in Diagnostic Mode (Cf.: Sect. 23)
MODE BUTTON (Cool, Heat, SB)	1. Use to cycle the operation mode of the A/C unit among COOL, HEAT and SB modes, without using the R/C. Every time this switch is pressed, the next operation mode is selected, in this order : SB ➔ Cool Mode ➔ Heat Mode ➔ SB ➔ ... 3. Press this button continuously for 5 sec or more to start the Diagnostic Mode (Cf.: Sect 23) 4. Whenever the filter LED is on, short pressing on the Mode will reset the filter timer and turns off the Filter LED
RESET / FILTER BUTTON	1. When the Filter LED is ON, press to turn off the Filter LED after a clean filter has been reinstalled. 2. When the Filter LED is OFF, use this button to enable/disable the buzzer announcer.

12.16 CLOCK RANDOM DELAY FROM 0 TO 2.5 SECONDS

0 = Clock Switch Open
1 = Clock Switch close

The Clock is activate according to the following table:

A/C STATE (before clock is changed)	CLOCK STATE (before clock is changed)	CLOCK ACTION (clock is changed)	A/C NEW STATE (after clock is changed)
ON	1	0	OFF
OFF	0	1	ON
OFF by interrupt (1)	1	0	OFF
ON by interrupt (1)	0	1	ON

Notes :

1. Clock can be interrupted by :
   - R/C - POWER ON/OFF Push-button.
   - R/C - TIMER.
   - R/C - SLEEP.
   - A/C - MODE SWITCH.

   2 Any change in the CLOCK level during the first 6 sec after the system reset is ignored.

12.17 SYSTEM DIAGNOSTICS

Pressing Mode button for 5-10 seconds in SB or any other operation mode will activate diagnostic mode by the acknowledgment of 3 short beeps and lighting of COOL and HEAT LEDs.

In diagnostic mode, system problems will be indicated by blinking of Heat & Cool LEDs.

The coding method will be as follow:

Heat led will blink 5 times in 5 seconds, and then will be shut off for the next 5 seconds. Cool led will blink during the same 5 seconds according to the following table:

No	Problem	○	○	○	○	○
1	RT1 is disconnected	○	●	●	●	●
2	RT1 is shorted	○	●	●	●	○
3	(Reserved)	○	●	●	○	●
4	RT2 is disconnected	●	○	●	●	●
5	RT2 is shorted	●	○	●	●	○
6	(Reserved)	●	○	●	○	●
7	RT2 temp reading doesn’t change	●	○	●	○	○
8	RT3 is disconnected	●	●	○	●	●
9	RT3 is shorted	●	●	○	●	○
10	(Reserved)	●	●	○	○	●
11	RT3 temp reading doesn’t change	●	●	○	○	○
12	RT2 & RT3 temp reading doesn’t change	●	○	○	○	○

○ - ON, ● - OFF

Notes:

1. If faults occur in more than one thermistor (except case number 12 on the table above), only one fault will be indicated according to the following order: RT3, RT2, RT1.
2. A/C will jump out to normal mode if sending a command by the R/C in the system diagnostics mode. If this command from the R/C contain a Group ID, this ID will become the new Group ID of the ELCON unit.

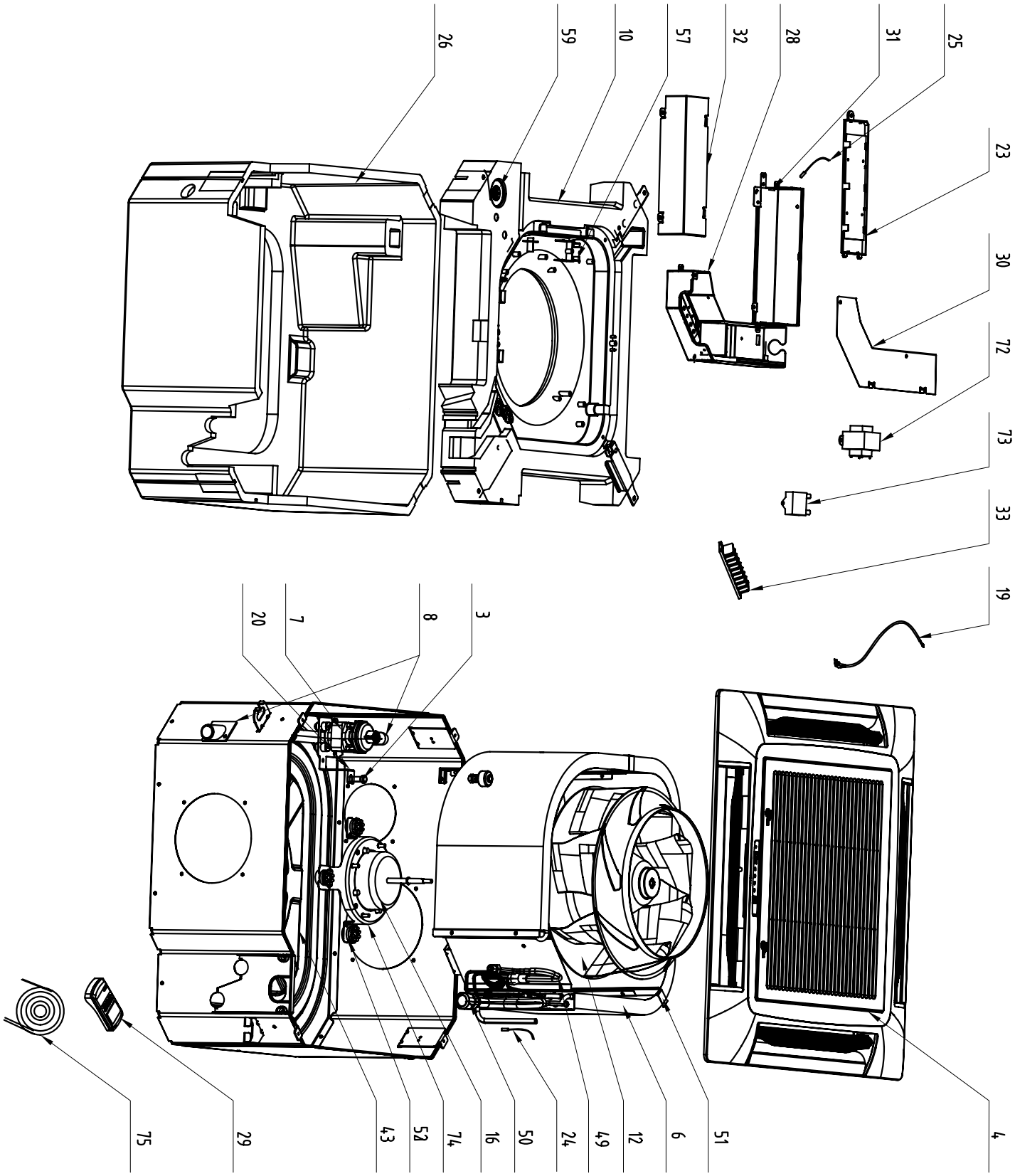
13. TROUBLESHOOTING

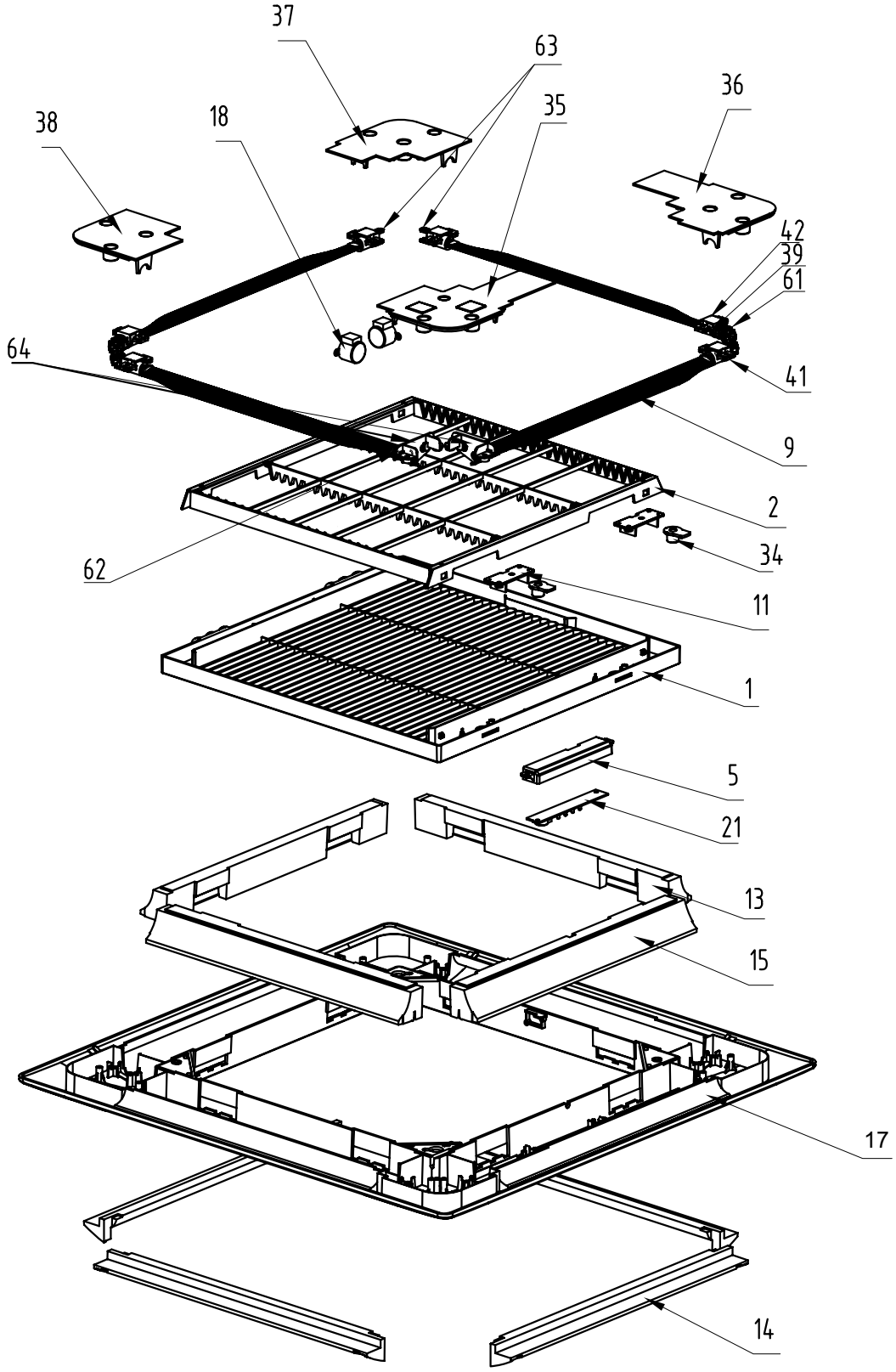
No.	SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
1	Power supply indicator (Red LED) does not light up.	No power supply.	Check power supply. If power supply is OK, check display and display wiring, if OK, replace PCB.
2	Unit does not respond to remote control command.	Remote control command did not reach the indoor unit.	Check remote control batteries. If batteries are OK, check display and display wiring, if OK, replace PCB.
3	Unit responds to remote control command but operate indicator (Green LED) does not light up.	Problem with display PCB.	Replace display PCB.
4	Indoor fan does not start (louvers are opened and Green LED lights up).	Unit in HEAT MODE and coil is still not warm.	Change to COOL MODE and check.
		Problem with PCB or capacitor.	Change to HIGH speed and check power supply to motor is higher than 130 VAC. If OK replace capacitor, if not OK replace controller.
5	Indoor fan works when unit is OFF, and indoor fan speed is not changed by remote control command.	PCB problem.	Replace controller.
6	Compressor does not start.	Electronics control problem or protection.	Perform diagnostics, and follow the actions described below.
7	Compressor stops during operation and Green LED remains on.	Electronic control or power supply problem.	Perform diagnostics, and follow the actions described below.
8	Compressor is ON but outdoor fan does not work.	Problem with outdoor electronics or outdoor fan capacitor.	Switch unit to COOL mode, HIGH speed with 16 degrees set point (summer) or HEAT mode high speed with 30 degrees set point (winter). Check power supply to motor is higher than 130 VAC. If OK replace capacitor, if not OK replace controller.
9	Unit works in wrong mode (cool instead of heat or heat instead of cool).	Electronics or power connection to RV.	Check RV power connections. If OK, check RV operation with direct 230 VAC power supply, if OK, replace outdoor controller.
10	All components are operating properly but no cooling or heating.	Refrigerant leak.	Check refrigeration system.

No.	SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
11	One of the protections is activated and compressor is stopped with no apparent reason.	Control problem or refrigeration system problem.	Perform diagnostics to detect active protection, and take action accordingly.
12	Compressor motor is noisy and no suction is present.	Wrong phase order to compressor.	Check compressor phase order.
13	Water leakage from indoor unit.	Indoor unit drainage tube is blocked.	Check and open drainage tube.
14	Freezing of outdoor unit in HEAT Mode and outdoor unit base is blocked with ice.		Connect base heater.
15	Unit operates with wrong fan speeds or wrong frequency.	Wrong jumper settings.	Perform diagnostics to obtain unit model or if operating by EEPROM parameters.
16	Filter LED comes ON after 512 hours of operation	Clogged air-filter	Replace air-filter. Press the RESET button.

14. EXPLODED VIEWS AND SPARE PARTS LISTS

14.1 EXPLODED VIEWS(CN 9/12/18)

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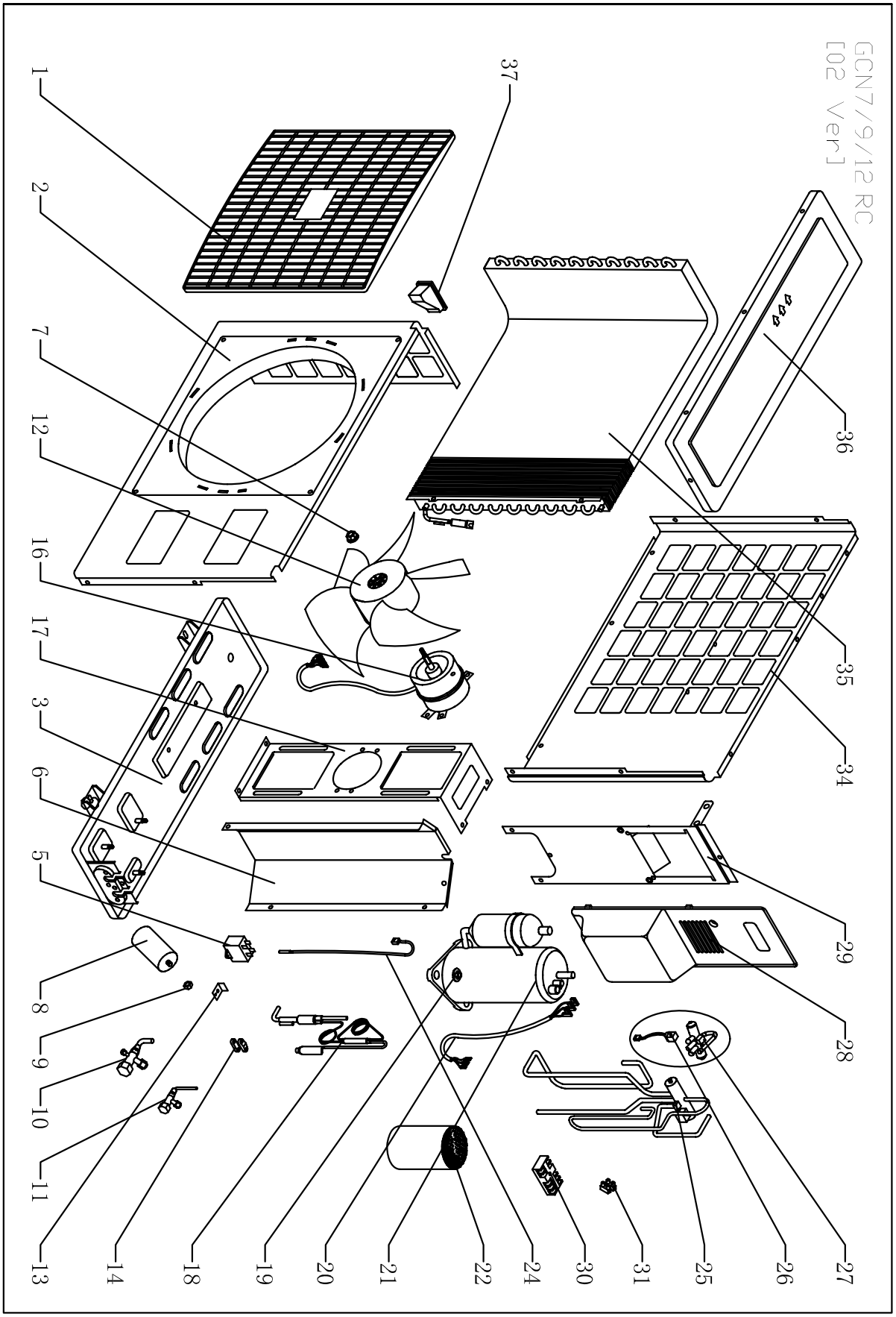
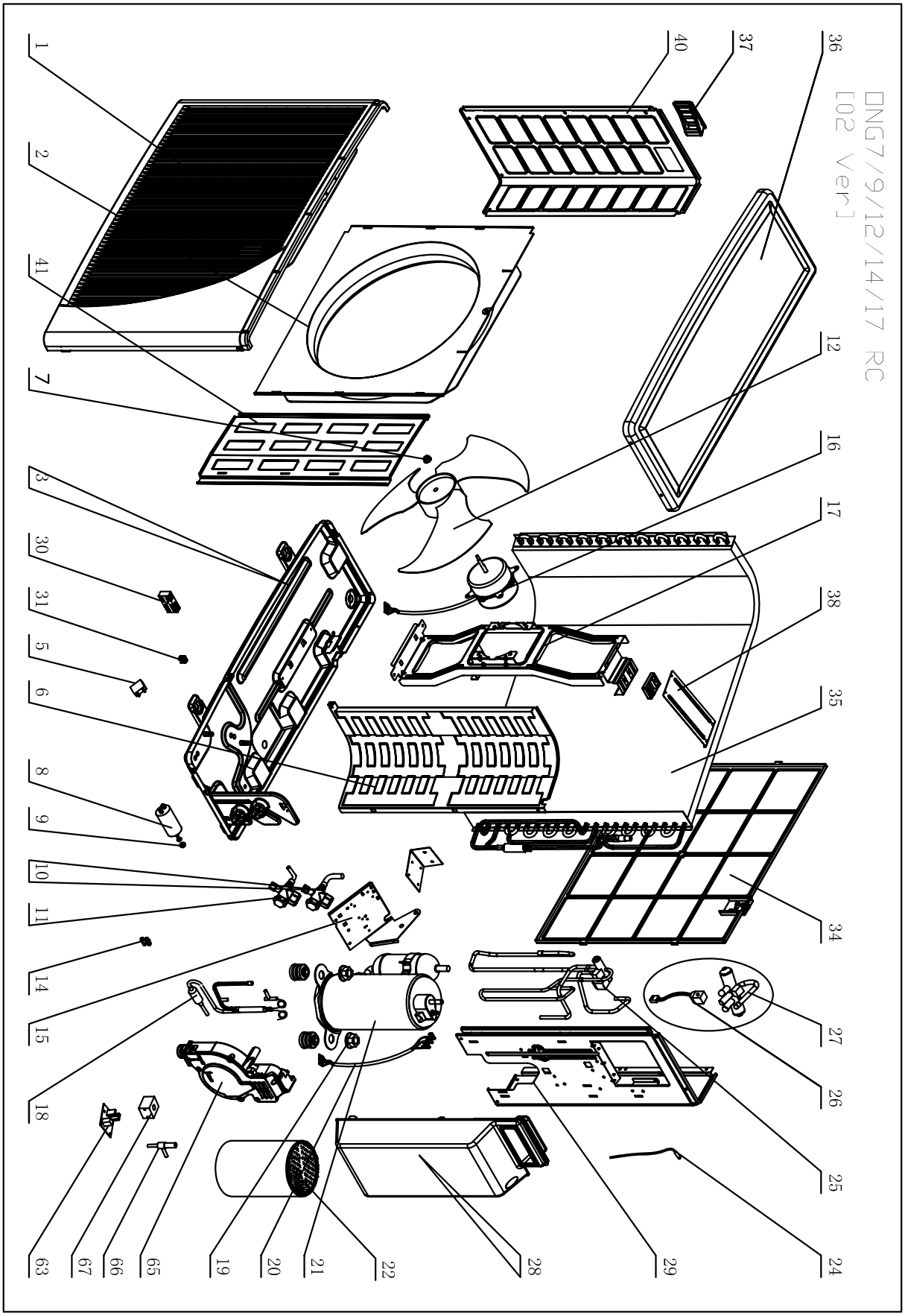
14.2 EXPLODED VIEWS(GCN 9/12)



14.3 EXPLODED VIEWS(ONG3-17)



14.4 Spare part list of Intdoor Unit:CN 9&12 Airwell

No.	Part No.	Name	Quantity
1	453189500	Grille	1
2	453189900	Filter Assy.	1
3	453192700	Water-Level Switch	1
4	465720163	Front Plate Assy. 625x625 /CN Airwell	1
4	465720169	Front Plate Assy. 725x725 /CN Airwell	1
5	465080003	Display Cover	1
6	462350089	Evaporator welding Assy./CN 9/12 Fixed R410A	1
7	453192600	Pump CN	1
8	465800084	Drain Pipe Assy/CN.	1
9	453189700	Horizontal Flap	4
10	453191300	Drain pan Assy	1
11	465360021	Support/Grill Clasp	2
12	466010002	Centrifugal Fan Low Height) CN60x60	1
13	453191600	EPS 1 / Front Frame	3
14	453191700	EPS 2 / Front Frame	4
14	470250017	Air Outlet/Front Frame 725X725	4
15	470250004	EPS 3/Front Frame	1
16	466100018R	Metal Motor 13W 750/650/550/450RPM	1
17	465020104	Front Frame 625x625) (Airwell)./CN	1
17	465020105	Front Frame 725x725) (Airwell)./CN	1
18	433050	STEP MOTOR	2
19	455013705R	Power Cord Without Plug/3G/1.5/2100	1
20	464250066	Fixing Plate/Pump Assy.	1
21	467300128R	Display Board/CN	1
23	467300223R	Controller / CN Fixed RPM	1
24	232299	Indoor Sensor BLACK	1
25	4519813	Thermistor room	1
26	470250006	EPS/Air Housing Low Height)	1
28	464750006	Controll Box1 Assy.	1
29	436670R	R/C RC4-RCL 974-670-00	1
30	464750003	Cover/Controll Box 1	1
31	464750002	Controll Box 2/CN	1
32	464750004	Cover/Controll Box 2	1
33	467420022	8 Poles Terminal Block/CN Fixed	1
34	453189600	Grille Clasp	2
35	465340022	Cover1 /Front Plate	1
36	453190600	Cover2 /Front Plate	1
37	465340040	Cover3 /Front Plate	1
38	465080002	Cover4 /Front Plate	1
39	465800089	Support 1/lever Assy/CN	4
41	465800090	Support 2/lever Assy./CN	4
42	465360028	Orienting Support/Lever	6
43	464600087	Base Plate Assy./CN Fixed	1
49	463750123	Liquid Pipe Assy. /6.35	1
50	463750122	Gas Pipe Assy./9.53	1
51	464250047	Fixing Plate/Evaporator (Low height)	2
52	470120020	Cushion Rubber/CN Fixed	4
57	465120005	Air Intake Panel/Low	1
59	453195100	Drain Jam	1
61	465800091	Linkage Assy./Flap/CN	2
62	465440018	connect Shaft/Motor	2
63	453190000	Linkage /Flap	2
64	465360022	Support/Step Motor	1
64	465360032	Support/Step Moter 2	1
72	467450000	Transformer/Input230V/Output12.4V 0.5A	1
73	455000108	Double patch Capacitor for fan motor 2uF	1
74	464200028	Motor Support/CN fixed	1
75	4520416	Defrost cable EXPORT UNITS	1

14.5 Spare part list of Intdoor Unit:CN 18 Airwell

No.	Part No.	Name	Quantity
1	453189500	Grille	1
2	453189900	Filter Assy.	1
3	453192700	Water-Level Switch	1
4	465720163	Front Plate Assy. 625x625 /CN Airwell	1
4	465720169	Front Plate Assy. 725x725 /CN Airwell	1
5	465080003	Display Cover	1
6	462350090	Evaporator welding Assy./CN 17 Fixed R410A	1
7	453192600	Pump CN	1
8	465800084	Drain Pipe Assy/CN.	1
9	453189700	Horizontal Flap	4
10	453191300	Drain pan Assy	1
11	465360021	Support/Grill Clasp	2
12	453189300	Centrifugal Fan High)CN60X60	1
13	453191600	EPS 1 / Front Frame	3
14	453191700	EPS 2 / Front Frame	4
14	470250017	EPS /Air Outlet/Front Frame 725X725	4
15	470250004	EPS 3/Front Frame	1
16	466100019R	Metal Motor 27W 850/750/650/550RPM	1
17	465020104	Front Frame 625x625) (Airwell)./CN	1
17	465020105	Front Frame 725x725) (Airwell)./CN	1
18	433050	STEP MOTOR	2
19	455013705R	Power Cord Without Plug/3G/1.5/2100	1
20	464250066	Fixing Plate/Pump Assy.	1
21	467300128R	Display Board/CN	1
23	467300223R	Controller / CN Fixed RPM	1
24	232299	Indoor Sensor BLACK	1
25	4519813	Thermistor room	1
26	453191800	EPS/Air Housing (high)	1
28	464750006	Controll Box1 Assy.	1
29	436670R	R/C RC4-RCL 974-670-00	1
30	464750003	Cover/Controll Box 1	1
31	464750002	Controll Box 2/CN	1
32	464750004	Cover/Controll Box 2	1
33	467420022	8 Poles Terminal Block/CN Fixed	1
34	453189600	Grille Clasp	2
35	465340022	Cover1 /Front Plate	1
36	453190600	Cover2 /Front Plate	1
37	465340040	Cover3 /Front Plate	1
38	465080002	Cover4 /Front Plate	1
39	465800089	Support 1/lever Assy/CN	4
41	465800090	Support 2/lever Assy./CN	4
42	465360028	Orienting Support/Lever	6
43	464600087	Base Plate Assy./CN Fixed	1
49	463750124	Liquid Pipe Assy. /6.35	1
50	463750120	Gas Pipe Assy./12.7	1
51	453188400	Fixing Plate/Evaporator high)	2
52	470120020	Cushion Rubber/CN Fixed	4
57	453190900	Air Intake Panel (high)	1
59	453195100	Drain Jam	1
61	465800091	Linkage Assy./Flap/CN	2
62	465440018	connect Shaft/Motor	2
63	453190000	Linkage /Flap	2
64	465360022	Support/Step Motor	1
64	465360032	Support/Step Moter 2	1
72	467450000	Transformer/Input230V/Output12.4V 0.5A	1
73	455000108	Double patch Capacitor for fan motor 2uF	1
74	464200028	Motor Support/CN fixed	1
75	4520416	Defrost cable EXPORT UNITS	1

14.6 Spare part list of Outdoor Unit:GCN 9 R410A Airwell

No.	Part No.	Name	Quantity
1	4522551	Grille A of GCN	1
2	4523441	Front panel A Painting assy	1
3	464600053	Painting Base ASSY.	1
5	455000108	Double patch Capacitor for fan motor 2uF	1
6	464160018	Partition plate/GCZ 9/12	1
7	4519300	Nut M5 L	1
8	455000502	Compressor Capacitor With Screw 25uF (CBB65)	1
9	201019	Nut M8	1
10	461000004	Liquid Valve 1/4" R410A	1
11	461010004	Gas Valve 3/8" R410A	1
12	4519251	Axial Fan OD=400	1
13	4518022	Cap. Clip	1
14	204107	Cable clip Nylon	1
16	4522765R	Motor of outdoor (670/750rpm)	1
17	464860002	Motor Support Assy.	1
18	463750214	Check Valve Assy. /2.6x1.4x(800+800)/GCN 9 R410A/PA103	1
19	4510677	Nut With Flange M8 -D=24 GB6187-86	3
20	391498	Wire assy	1
21	460170001R	Compressor Assy./ PA103X1C-4FZDE1(Toshiba)	1
22	469100003	Insulation Felt/ Compressor	1
24	4516637	Out sensor Black	1
25	461600076	4-Way Valve Assy./GCN 9 R410A/PA103X1C	1
26	4518951	4-W valve SHF-4H for R410A	1
27	4520071	4-W valve coil for R410A	1
28	4516857	BIG SIDE COVER	1
29	453086200	Side Plate Painting Assy./Right	1
30	4514588	5 Poles terminal block	1
31	236179	2 Poles terminal block	1
34	464770001	Rear Plate/Left Painting Assy	1
34	464770007	Rear Plate/Right Painting Assy/GCZ 9/12	1
34	464800000	Guard Net/ODU Painting Assy	1
35	462000032	Condenser/GCZ 12	1
36	4516158	Cover panel Painting assy	1
37	436358	L. lifter	1

14.7 Spare part list of Outdoor Unit:GCN 12 R410A Airwell

No.	Part No.	Name	Quantity
1	4522551	Grille A of GCN	1
2	4523441	Front panel A Painting assy	1
3	464600085	Base Plate Painting assy/GCN 12 R410A /Panisonic	1
5	455000108	Double patch Capacitor for fan motor 2uF	1
6	464160018	Partition plate/GCZ 9/12	1
7	4519300	Nut M5 L	1
8	455000503	Compressor Capacitor With Screw 30uF (CBB65)	1
9	201019	Nut M8	1
10	461000004	Liquid Valve 1/4" R410A	1
11	461010004	Gas Valve 3/8" R410A	1
12	4519251	Axial Fan OD=400	1
13	4518022	Cap. Clip	1
14	204107	Cable clip Nylon	1
16	466100029R	Metal Motor /Outdoor Unit/GCN 7 Israel 2008	1
17	464860002	Motor Support Assy.	1
18	463750215	Check Valve Assy. /2.6x1.4x(600+500)/GCN 12 R410A/5PS132	1
19	4510677	Nut With Flange M8 -D=24 GB6187-86	3
20	391498	Wire assy	1
21	460150005R	Compressor Assy./ 5PS132EAC22 Panasonic	1
22	469100003	Insulation Felt/ Compressor	1
24	4516637	Outdoor sensor Black	1
25	461600077	4-Way Valve Assy./GCN 12 R410A/5PS132	1
26	4518951	4-W valve SHF-4H for R410A	1
27	4520071	4-W valve coil for R410A	1
28	4516857	BIG SIDE COVER	1
29	453086200	Side Plate Painting Assy./Right	1
30	4514588	5 Poles terminal block	1
31	236179	2 Poles terminal block	1
34	464770001	Rear Plate/Left Painting Assy	1
34	464770007	Rear Plate/Right Painting Assy/GCZ 9/12	1
34	464800000	Guard Net/ODU Painting Assy	1
35	462000032	Condenser/GCZ 12	1
36	4516158	Cover panel Painting assy	1
37	436358	L. lifter	1

14.8 Spare part list of Outdoor Unit: ONG3-17 R410A

No.	Part No.	Name	Quantity
1	433218	Front Panel A	1
2	433221	Air Inlet Ring-420	1
3	464860054	Painting Insulation Plate Assy/ONG	1
4	4519251	Axial Fan OD=400	1
5	4520171R	Fan Motor (910rpm)	1
6	4527203	Motor Support	1
7	464600001	Base Plate Painting Assy.	1
8	4527202	Partition Plate	1
9	455000506	Compressor Capacitor With Screw 45uF (CBB65)	1
10	453012700	Electric Panel	1
11	4524176	1/4" Liqiud Valve(R410A)	1
12	4524595	1/2" Gas Valve for ONG R410A	1
13	455000001	single patch Capacitor for fan motor 2uF (CBB61S)	1
14	4514588	5 Poles terminal block	1
15	204107	Cable clip Nylon	1
16	236179	2 Poles terminal block	1
17	4516637	Out sensor Black	1
18	463600000	Capillary Assy	1
19	469270002	Insulation Rub+Felt/Compressor	1
20	463230014	2-Way Strainer	1
21	4510677	Nut With Flange M8 -D=24 GB6187-86	3
22	4519987	Wire assy	1
23	460000000	Compressor Assy./ GMCC PA200X2CS-4KT1	1
24	433229	Valve Cover	1
26	4519606	Right side panel (painting plate)	1
27	461600001	4-Way Valve Assy.	1
28	4518952	4-W valve SHF-7H for R410A	1
29	4520071	4-W valve coil for R410A	1
30	433228	Back Side Net	1
31	4526298	Bridge	1
32	462300003	Condenser Assy.	1
33	4519614	Painting Top Cover	1
34	4519300	Nut M5 L	1
35	433225	Handle	1
36	4519607	Left Side Panel Painting Plate	1
37	470120001	Rubber Cushion /Base Plate	4
38	453121300	Install. Accessory	1

APPENDIX A

INSTALLATION AND OPERATION MANUAL

Installation manual

AIR CONDITIONER CASSETTE

English

Indoor unit cassette type

Part Number:
468050324/01

CE

Content

The appliance shall not be installed in the laundry

Note:
This manual is for single split applications.
For multi split applications please use installation manual supplied within outdoor unit package.

This manual can be modified at any moment

1. REQUIRED TOOLS FOR INSTALLATION WORK

1. Screw driver
2. Electric drill, hole core drill (Φ60mm)
3. Hexagonal wrench
4. Spanner
5. Pipe cutter
6. Reamer
7. Knife
8. Gas leak detector
9. Measuring tape
10. Thermometer
11. Megameter
12. Multimeter
13. Torque wrench
    18 N. m (1.8kgf.m)
    35 N .m (3.5kgf.m)
    55 N .m (5.5kgf.m)
14. Vacuum pump
15. Gauge manifold (for R-410A)

2. SAFETY PRECAUTIONS

- Installation should be in accordance with local and national electrical and building fire safety regulations or codes.
- Read the following "SAFETY PRECAUTIONS" carefully before installation.
- Electrical work must be installed by a licensed electrician. Be sure to use the correct rating of the power plug and main circuit for the model to be installed.
- The caution items stated here must be followed because these important contents are related to safety. The meaning of each indication used is as below. Incorrect installation due to ignoring of the instruction will cause harm or damage, and the seriousness is classified by the following indications.
- Carry out test running to confirm that no abnormality occurs after the installation. Then, explain to user the operation, care and maintenance as stated in instructions. Please remind the customer to keep the operating instructions for future reference.

WARNING

1) Engage qualified installers and follow instruction carefully. Otherwise it will cause electrical shock, water leakage, or esthetic problem.
2) Install at a strong and firm location which is able to withstand the set's weight. If the strength is not enough or installation is not properly done, the set will drop and cause injury.
3) For electrical work, follow the local national wiring standard, regulation and this installation instruction. An independent circuit and single outlet must be used. If electrical circuit capacity is not enough or defect found in electrical work, it will cause electrical shock or fire.
4) Use the specified cable and connect tightly for indoor/outdoor connection. Connect tightly and clamp the cable so that no external force will be acted on the terminal. If connection or fixing is not perfect, it will cause heat-up or fire at the connection.
5) Wire routing must be properly arranged so that control board cover is fixed properly. If control board cover is not fixed perfectly, it will cause heat-up at connection point of terminal, fire or electrical shock.
6) When carrying out piping connection, take care not to let air substances other than the specified refrigerant go into refrigeration cycle. Otherwise, it will cause lower capacity, abnormal high pressure in the refrigeration cycle, explosion and injury.
7) Do not damage or use unspecified power supply cord. Otherwise, it will cause fire or electrical shock.
8) Do not modify the length of the power supply cord or use of the extension cord, and do not share the single outlet with other electrical appliances. Otherwise, it will cause fire or electrical shock.
9) This equipment must be earthed. It may cause electrical shock if grounding is not perfect.

10) Do not install the unit at place where leakage of flammable gas may occur. In case gas leaks and accumulates at surrounding of the unit, it may cause fire.

11) Carry out drainage piping as mentioned in installation instructions. If drainage is not perfect, water may enter the room and damage the furniture.

12) For appliances with supplementary heaters, the minimum clearance from the appliance to combustible is 50cm other wise, it will cause fire.

ATTENTION

1) Selection of the installation location.
Select an installation location which is rigid and strong enough to support or hold the unit, also for easy maintenance and repair.

2) Power supply connection to the room air conditioner.
Connect the power supply cord of the room air conditioner to the mains using one of the following method.
Power supply point shall be the place where there is ease for access for the power disconnection in case of emergency.
In some countries, permanent connection of this room air conditioner to the power supply is prohibited.

3) Do not release refrigerant.
Do not release refrigerant during piping work for installation, reinstallation and during repairing a refrigeration parts. Take care of the liquid refrigerant. it may cause frostbite.

4) Installation work. It may need two people to carry out the installation work.

5) Do not install this appliance in a laundry room or other location where water may drip from the ceiling, etc.

6) The temperature of refrigerant circuit will be high, please keep the interconnection cable away from the copper tube.

3. INSTALLATION/SERVICE TOOLS (Only for R410A product)

CAUTION

New Refrigerant Air Conditioner Installation

THIS AIR CONDITIONER ADOPTS THE NEW HFC REFRIGERANT (R410A) WHICH DOES NOT DESTROY OZONE LAYER. R410A refrigerant is apt to be affected by impurities such as water, oxidizing membrane, and oils because the working pressure of R410A refrigerant is approx. 1.6 times of refrigerant R22. Accompanied with the adoption of the new refrigerant, the refrigeration machine oil has also been changed. Therefore, during installation work, be sure that water, dust, former refrigerant, or refrigeration machine oil does not enter into the new type refrigerant R410A air conditioner circuit.

To prevent mixing of refrigerant or refrigerating machine oil, the sizes of connecting sections of charging port on main unit and installation tools are different from those used for the conventional refrigerant units. Accordingly, special tools are required for the new refrigerant (R410A) units. For connecting pipes, use new and clean piping materials with high pressure fittings made for R410A only, so that water and/or dust does not enter. Moreover, do not use the existing piping because there are some problems with pressure fittings and possible impurities in existing piping.

Changes in the product and components

In air conditioners using R410A, in order to prevent any other refrigerant from being accidentally charged, the service port diameter size of the outdoor unit control valve (3 way valve) has been changed. (1/2 UNF 20 threads per inch)

- In order to increase the pressure resisting strength of the refrigerant piping, flare processing diameter and opposing flare nuts sizes have been changed. (for copper pipes with nominal dimensions 1/2 and 5/8)

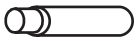
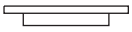
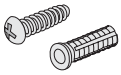
New tools for R410A

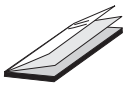
New tools for R410A	Applicable to R22 model		Changes
Gauge manifold	×		As the working pressure is high, it is impossible to measure the working pressure using conventional gauges. In order to prevent any other refrigerant from being charged, the port diameters have been changed.
Charge hose	×		In order to increase pressure resisting strength, hose materials and port sizes have been changed (to 1/2 UNF 20 threads per inch). When purchasing a charge hose, be sure to confirm the port size.
Electronic balance for refrigerant charging	○		As working pressure is high and gasification speed is fast, it is difficult to read the indicated value by means of charging cylinder, as air bubbles occur.
Torque wrench (nominal dia. 1/2, 5/8)	×		The size of opposing flare nuts have been increased. Incidentally, a common wrench is used for nominal diameters 1/4 and 3/8.
Flare tool (clutch type)	○		By increasing the clamp bar's receiving hole size, strength of spring in the tool has been improved.
Gauge for projection adjustment	–		Used when flare is made by using conventional flare tool.

Vacuum pump adapter	O		Connected to conventional vacuum pump. It is necessary to use an adapter to prevent vacuum pump oil from flowing back into the charge hose. The charge hose connecting part has two ports -- one for conventional refrigerant (7/16 UNF 20 threads per inch) and one for R410A. If the vacuum pump oil (mineral) mixes with R410A a sludge may occur and damage the equipment.
Gas leakage detector	X		Exclusive for HFC refrigerant.

- Incidentally, the "refrigerant cylinder" comes with the refrigerant designation (R410A) and protector coating in the U.S's ARI specified rose color (ARI color code: PMS 507).
- Also, the "charge port and packing for refrigerant cylinder" requires 1/2 UNF 20 threads per inch corresponding to the charge hose's port size.

4. ACCESSORIES

Shape	Name	Qty	Used for
	Installation template	1	Full scale paper template for installation
	Drain hose	1	Adaptor for drainage
	Insulation	1	Insulation for drainage
	Hose clamp	1	Securing drain hose
	Pipe insulation	2	Insulation for gas and liquid tubes
	Washer	8	For suspension bolts
	Bolt	4	For installation template
	Bolt	4	For attaching the panel
	Clamp	6	For securing insulation
	Sealing material	2	Sealing specified air outlets
	Remote controller with batteries	1	For operating the unit
	Remote control bracket	1	Wall mounting of the remote control
	Screws Dowels	2	Wall mounting of remote control bracket
	Outdoor unit drain connector	1	Outdoor unit water drain
	Mounting pads	4	Padding of outdoor unit bottom support
	Low voltage cable	1	Signal transmission

	Cable ties	2	Securing wires in the indoor and outdoor unit
	Manual	3	Remote control manual Operating manual Installation manual

5. OPTIONAL ACCESSORIES

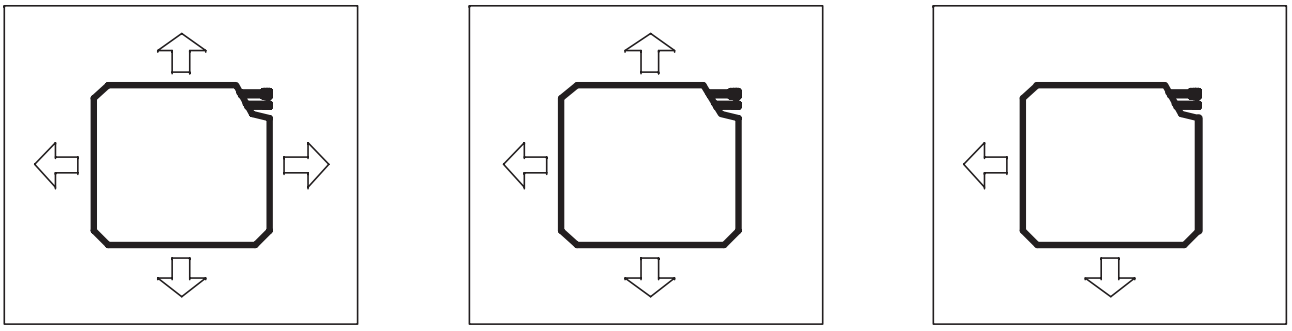
Name	Used for
Panel 625X625	Gird ceiling installation
Panel 725X725	Hard ceiling installation

Note: Decoration panel is separated from unit when packaging, select proper panel for different installation situation.

6. LOCATION OF THE INDOOR AND OUTDOOR UNITS

This air conditioner has the optional 2-way/3-way air discharging according to installation location. Use sealing material in accessory parts to seal the related air outlets.

Air flow direction (example)



4-way direction (Default) 3-way direction 2-way direction

Indoor unit

1. Do not install the cassette in a room where gasses, acids or inflammable products are stored, in order to avoid damage to the aluminum and copper evaporators and the internal plastic parts.
2. Do not install the cassette in a workshop or a kitchen. Oil vapor attracted by the treated air could form deposits on the cassette evaporators and modify their performance or damage the cassette's internal plastic parts.
3. Do not install the cassette in a laundry, or a room where steam is produced.
4. The appliance must be positioned so that the plug is accessible.
5. Installing the cassette will be easier with the use of a fork lift truck. Use the packing base by placing it between the cassette and the truck forks.
6. It is recommended to install the cassette, as far as possible, in the centre of the room, in order to optimize treated air distribution.
7. For the chosen location, check that the distribution grilles can be removed and that there is sufficient space available for maintenance and repairs.

Outdoor unit

1. The location must allow easy servicing and provide good air circulation as shown in fig 4.
2. The unit may be suspended from a wall by a bracket (Optional) or located in a free standing position on the floor (preferably slightly elevated).
3. If the unit is suspended, ensure that the bracket is firmly connected and the wall is strong enough to withstand vibrations.
4. Unit location should not disturb neighbors with noise or exhaust air stream.
5. Place the mounting pads under the unit legs.
6. Refer to figure 4 for allowed installation distances.

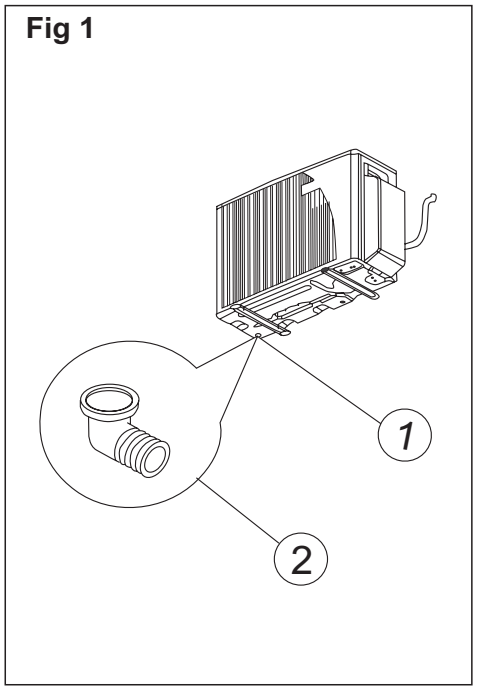
When the unit is installed on a wall, install the drain connector hose and drain plug as shown in fig1 and fig2.

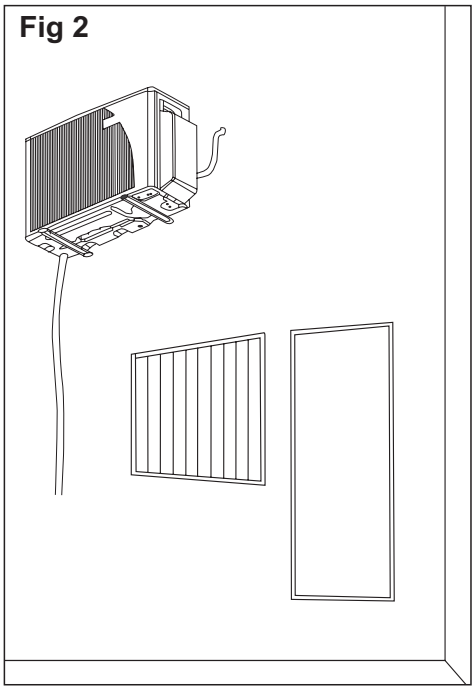
Fig.1

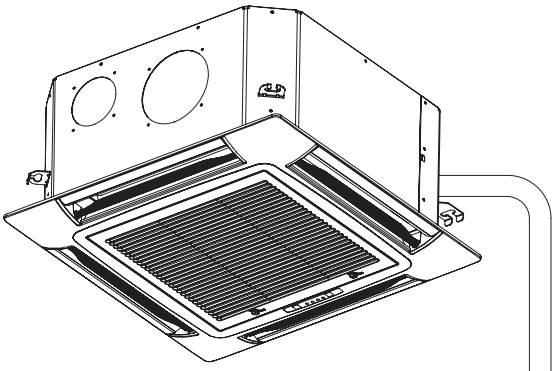
1. Bottom of outdoor unit
2. Drain connector

Fig.2

Drain installation
Example







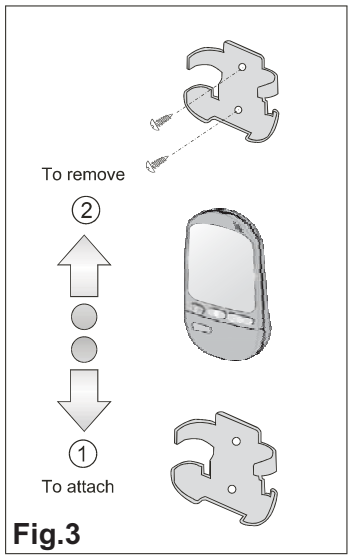


Fig.3

Capacity	L.MAX(m)	H.MAX(m)
9000Btu/h 12000Btu/h 18000Btu/h	15	7

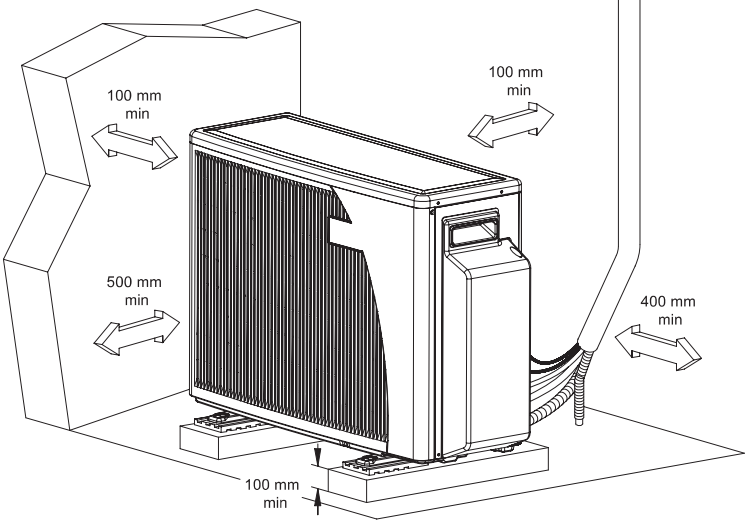


Fig.4

Note:
No additional charge is required.

Fig. 4
Mounting pads (x4)

7. INSTALLATION OF THE INDOOR UNIT

Deciding ceiling opening size

1. Gird ceiling installation situation (60x60 standard ceiling):
   Because this unit is a mini-cassette, there is no need to make an opening cut on the ceiling, just remove one piece of ceiling panel.

Caution!
Under this installation situation, Panel 625x625 is recommended

2. Hard ceiling installation situation:
   Create the ceiling opening required for installation, below shows the relationship of the ceiling opening to unit and the panel (Fig 5)

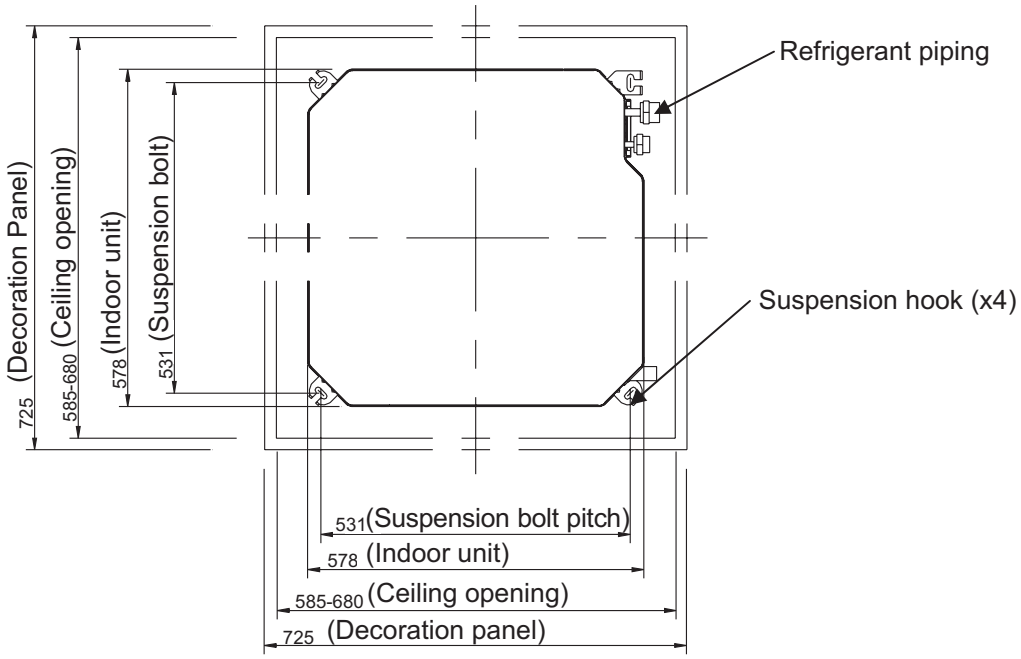


Fig.5

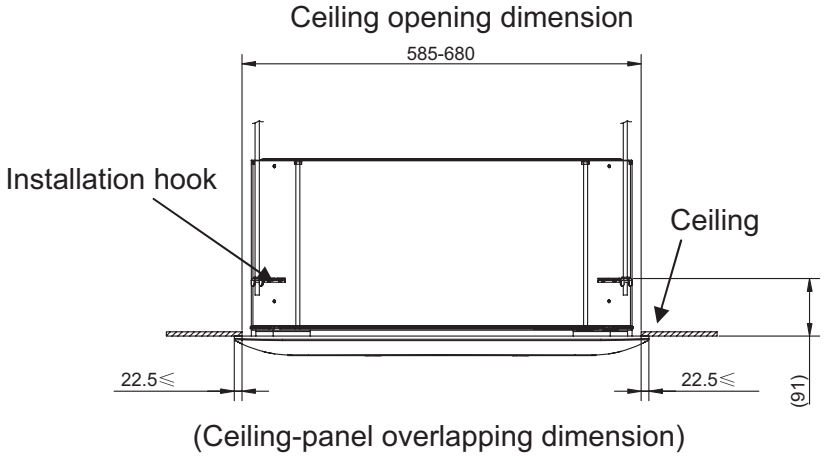


Fig.6

Caution

Under this installation situation, Panel 725X725 is recommended; the maximum ceiling opening size is 680mm. Pay attention that there must be a overlapping between panel and ceiling. (Fig 6)

Installing the indoor unit

1. Use installation template (supplied with the panel) when deciding the suspension bolt position.Fig.7 and table 1 show the dimensions relationship.

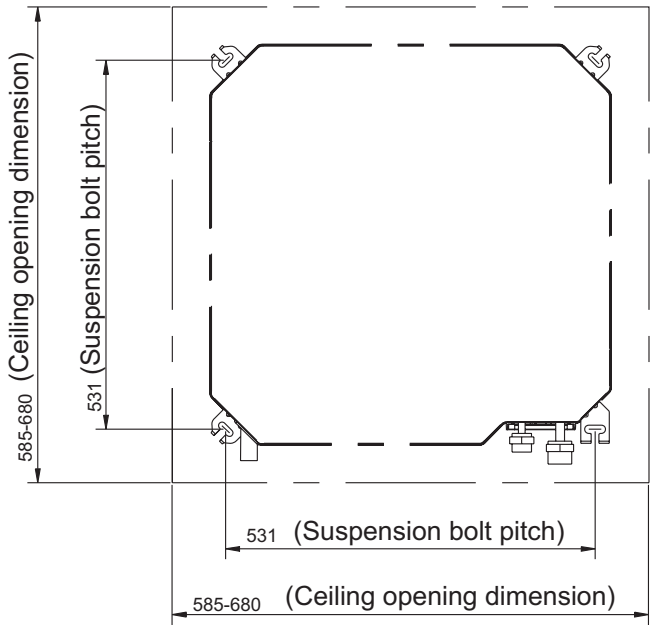
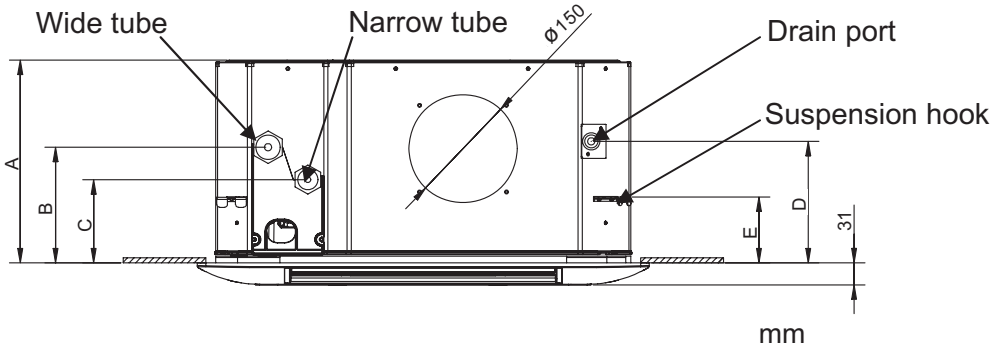


Fig.7

Table 1

Length / Type	A	B	C	D	E
9000 Btu/h 12000 Btu/h	230	160	115	169	91
18000 Btu/h	281	160	115	169	91



2. Tubing and wiring must be prepared beforehand inside the ceiling when suspending the unit.

3. The length of suspension bolts must be appropriate for a distance between the bottom of the bolt and the bottom of the unit of more than 15mm as shown in Fig.8

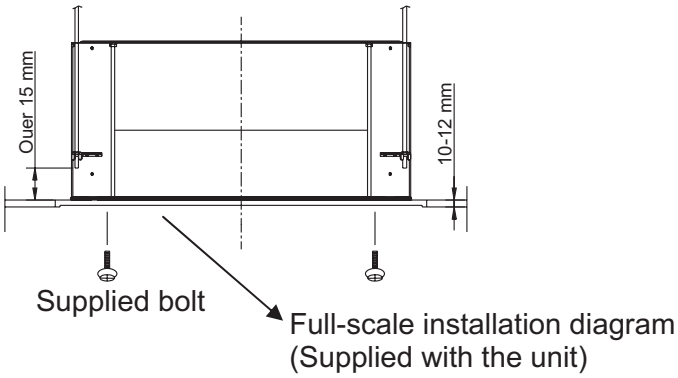


Fig.8

4. In order to prevent a possible looseness, it is recommended to use 3 hexagonal nuts (Prepared on site) and 2 washers (accessory) for each suspension bolt. Pay attention that 2 nuts will be used in the lower side.(Fig.9)
5. Adjust the distance between the unit and the ceiling bottom to 10~12mm. Tighten all the nuts on the suspending bolts.(Fig.9)

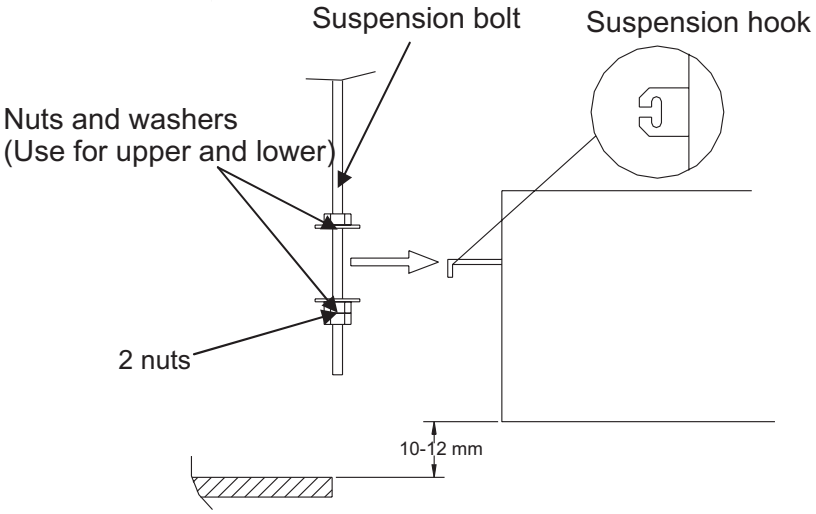


Fig.9

Duct installation

1. Side openings are provided for installing separate ducts for outside air intake and treated air distribution to an adjacent room.
2. Use a punch to remove the knock-down openings on the casing. Use a knife to make the suitable opening on the polystyrene behind the casing.

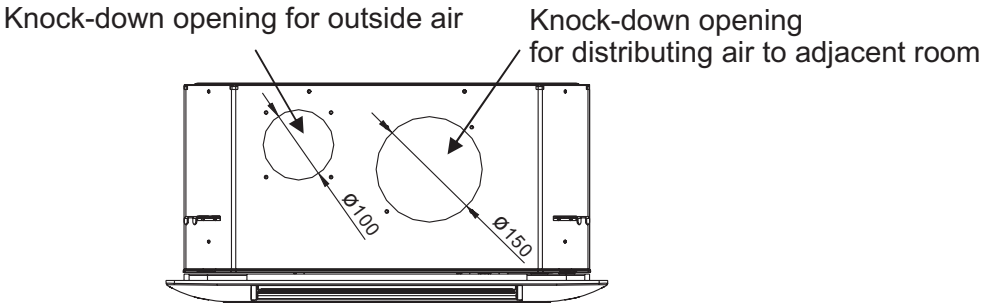


Fig.10

TAKE CARE not to damage the heat exchanger coil located behind the openings.

3. Plug the gaps between the ducts and the opening edge with anti-condensation insulation.
4. Use material which can withstand a continuous operating temperature of 60℃. The ducts can be of the flexible type with a spring core or of corrugated aluminum, covered inside with an insulating material (12 to 25 mm thick glass fiber).
5. When the installation is finished, all the surfaces of the non-insulated ducts must be covered with anti-condensation insulation material (6mm thick expanded polystyrene or expanded neoprene). Fireproofing classification: M1.

   IF THE ABOVE INSTRUCTIONS ARE NOT FOLLOWED, CONDENSATE FLOWS WILL BUILD UP.

6. Distributing air to an adjacent room requires the corresponding panel air outlets to be sealed by using the sealing material (Accessory)
7. A decoration grille must be fitted in the partition between the air conditioned room (where the c-assette is installed) and the adjacent room.

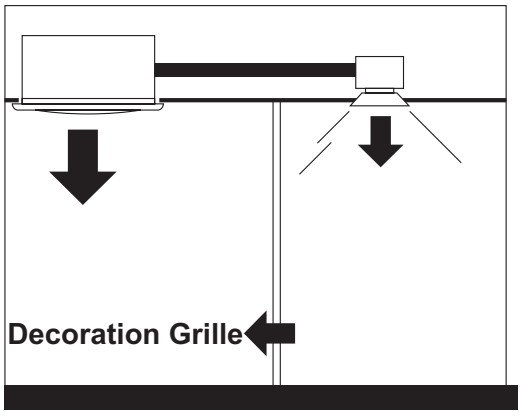


Fig.11

8. CONDENSATE HOSE CONNECTION

Drain hose connection

1. Use standard hard PVC pipe (19mm) for the drain pipe.
2. Use the drain hose (Accessory) to change the direction.
3. Insert the drain hose until it connects the drain port very well, and then secure it tightly with the hose clamp(Accessory)(Fig.12)
4. After checking the drainage, wrap the drain hose with the insulation and clamps (Accessory). (Fig.12)

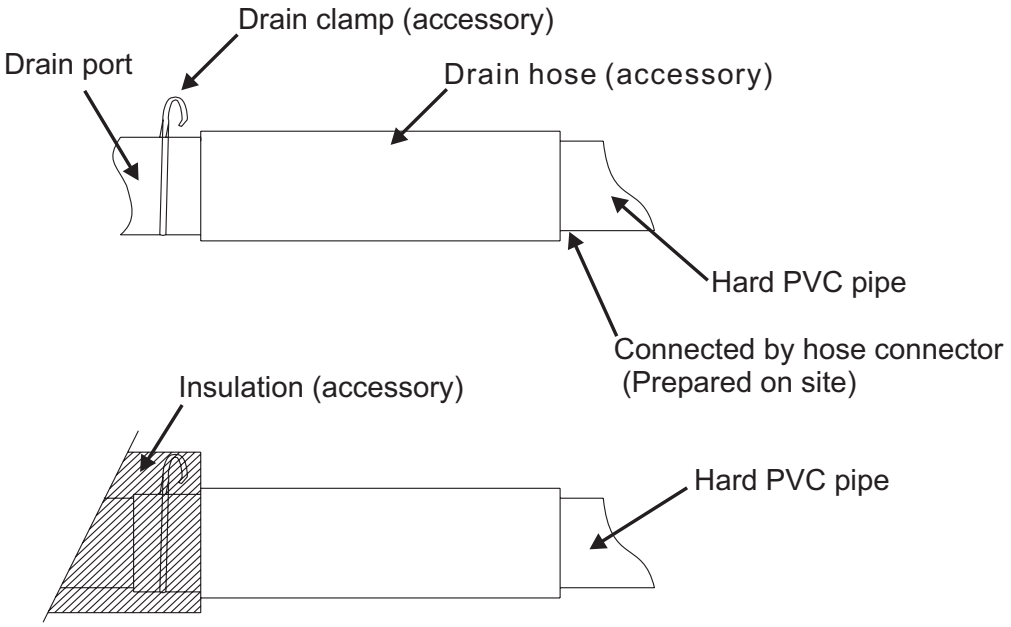


Fig.12

Caution!

1. Do not raise the drain pipe higher than 1m, or else there will be water leak risk.(Fig.13)
2. Make sure the drain pipe has a downward gradient (no less than 1/100) and there are no water traps (Fig.13).
3. To hold the drain pipe, space bracket every 1 to 1.5m.(Fig.13)

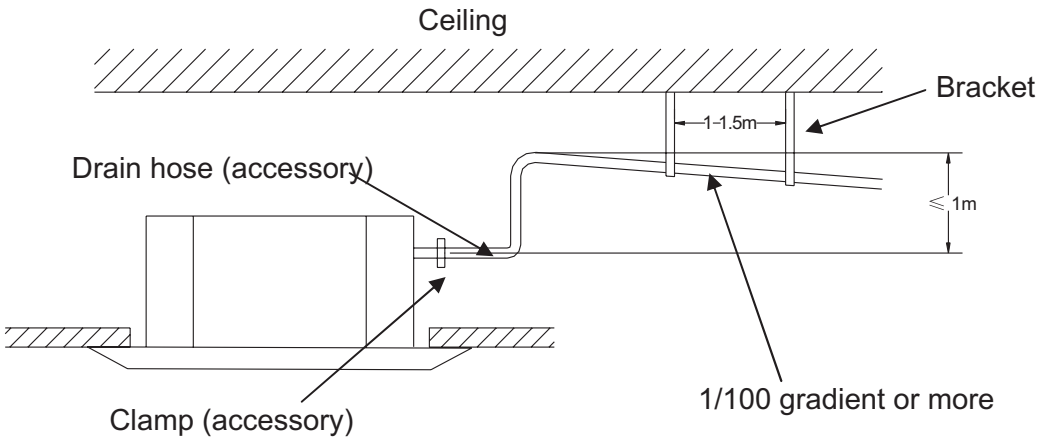


Fig.13

Check the drainage

1. After wiring and drain piping are completed, check the drainage according to the following procedure. If necessary, prepare a bucket and cloth to catch and wipe up the water spilled out.
2. Connect the AC 220V~240V power to the terminal blocks (L, N terminals) inside the electrical box.
3. Slowly inject about 1,000 cc of water into the drain pan.(Fig.14)
4. Operate the unit in cooling mode. Check the drainage through the transparent drain port to see if any drain leakage happens.
5. When the check is finished, do not forget to cut off the power input.

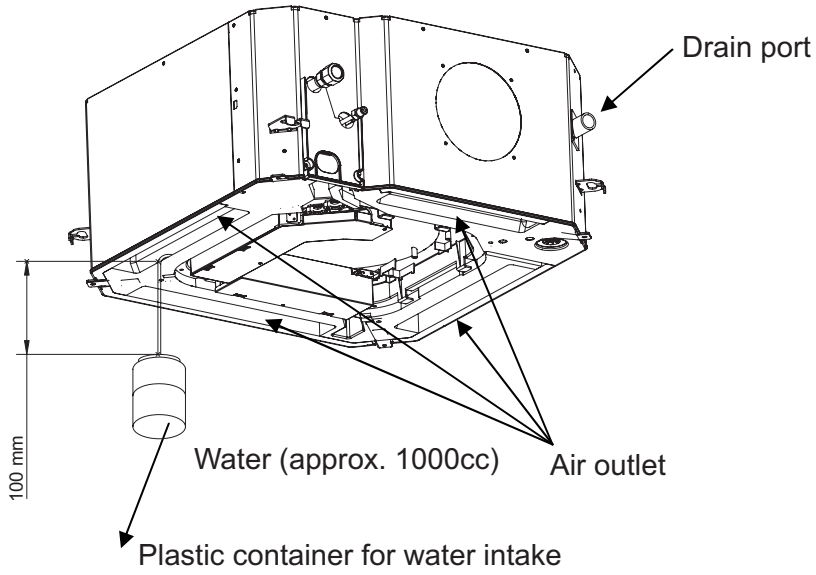


Fig.14

> **Caution!**
> During this operation, the fan will start working. So pay attention to the rotating fan.

Finish the drainage work.

After checking the drainage, make sure that heat insulation is wrapped around the indoor drain pipe to avoid any dew condensation. (The material should have M1 fireproofing classification)

9. ELECTRICAL CONNECTION BETWEEN INDOOR AND OUTDOOR UNIT

Electrical requirements

Electrical wiring and connections should be made by qualified electricians and in accordance with local electrical codes and regulation. The air conditioner units must be grounded.
The air conditioner unit must be connected to an adequate power outlet from a separate branch circuit protected by a time delay circuit breaker, as specified on unit's nameplate.
Voltage should not vary beyond ±10% of the rated voltage.

1. To connect the indoor unit to the outdoor unit uses the following electrical cables.

Electrical connections:

CAPACITY			9000/12000 Btu/h	18000 Btu/h
Power supply from indoor unit	Power cord	mm^2	3G,1.0	3G,1.5
	Cable between indoor and outdoor unit (ST model)	mm^2	4G,1.0	4G,1.5
	Cable between indoor and outdoor unit (RC model)	mm^2	5G,1.0	5G,1.5
Power supply from outdoor unit	Power cord	mm^2	3G,1.0	3G,1.5
	Cable between indoor and outdoor unit (ST model)	mm^2	5G,1.0	5G,1.5
	Cable between indoor and outdoor unit (RC model)	mm^2	6G,1.0	6G,1.5
Low voltage cable (option)		mm^2	2G,0.5	

2. Prepare the cable ends for the power input and for the cables between outdoor and indoor units as shown in figure 15a and 15b respectively.
3. Connect the cable ends to the terminals of the indoor and outdoor units, as shown in fig 16.
4. Secure the multiple wire power cable with the cable clamps.

Notes: The wire color code can be selected by the installer.

• Power input cable

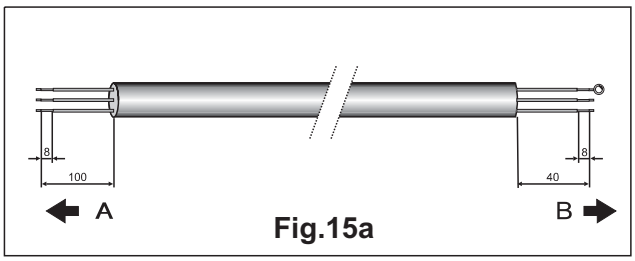


Fig.15a

• Cable between indoor and outdoor units

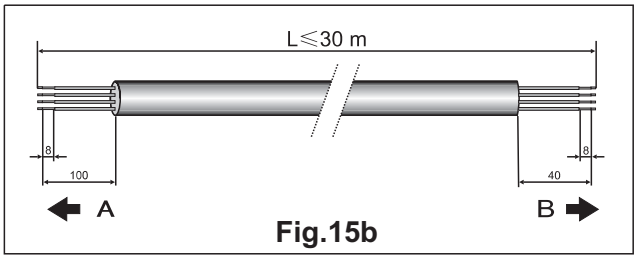
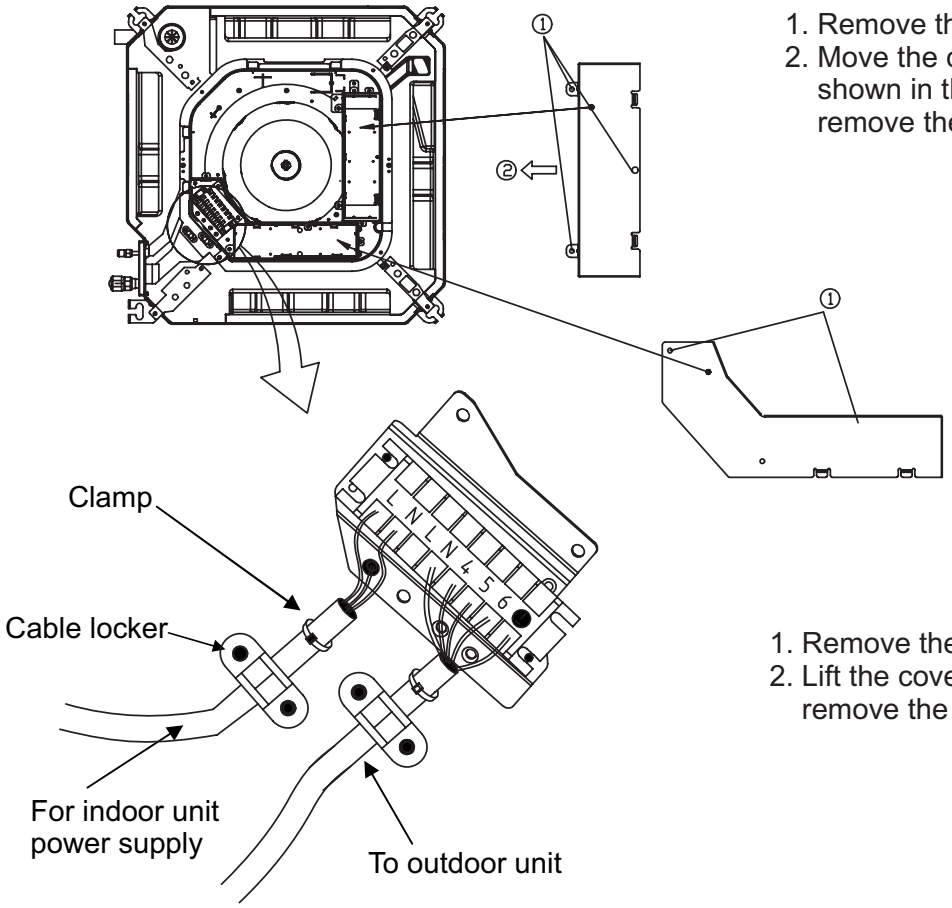


Fig.15b

Fig.15 A. OUTDOOR B. INDOOR

Wiring procedures



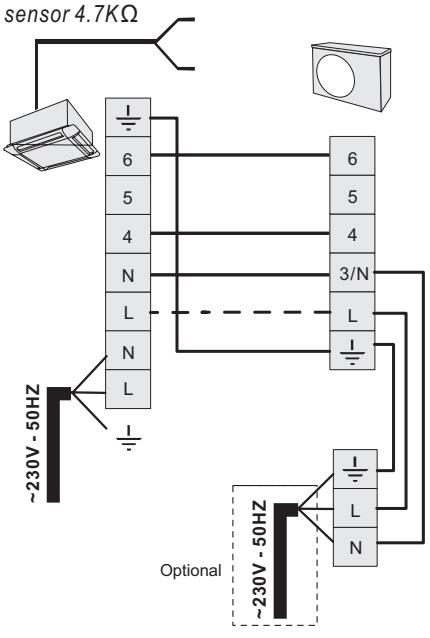
1. Remove the three screws
2. Move the cover along the direction shown in the figure and then remove the cover

1. Remove the two screws
2. Lift the cover towards you and then remove the cover

Fig.16

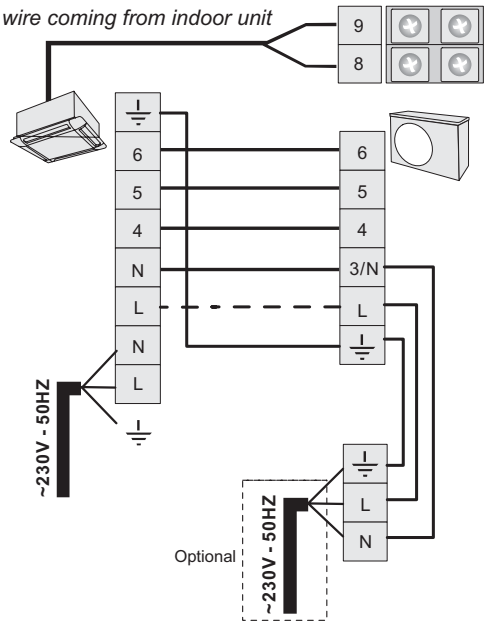
Cooling only

Replace the sensor wire by dummy sensor 4.7KΩ



Heat Pump

Sensor wire coming from indoor unit



– – – – – – Connected only when the outdoor unit have the terminal L

10. REFRIGERANT TUBING

Connect the indoor to the outdoor unit

The indoor unit contains a small quantity of nitrogen. Do not unscrew the nuts from the unit is supplied with sufficient refrigerant charge (R410A). Refer to outdoor unit nameplate.

To prevent crushing, bend tubes using a bending tool.

NOTE: Use R410A refrigerant type copper tubing only.

1. Open the valve cover.
2. Use tubing diameter that corresponds to the tubing diameter of the indoor and outdoor units. Note that the liquid and suction tubes have different diameters. (See tube size, torque tightening table.)
3. Place flare nuts on tube ends before preparing them with a flaring tool. Use the flare nuts that are mounted on the supplied outdoor and indoor units.
4. Connect the all ends of the tubing to the indoor and outdoor units. Notice the sign. All ends should correspond one by one.
5. Insulate each tube separately, and their unions, with at least 6 mm thick of insulation. Wrap the refrigerant tubing, drain hose and electric cables together with a vinyl tape (UV protected).

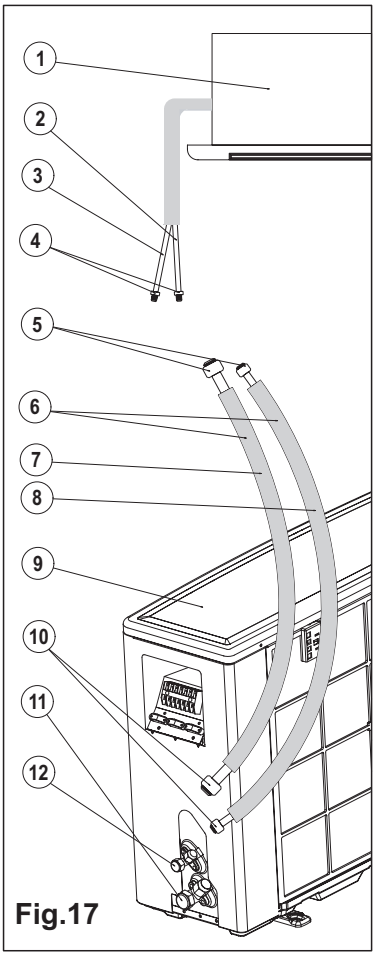


Fig.17

Caution!
When unscrewing the valve caps, do not stand in front of them or the spindles at any time, as the system is under pressure.

Fig.17
1. Indoor unit
2. Liquid tube (small dia.)
3. Suction tube (large dia.)
4. Plugs
5. Flare nuts
6. Tubing between units
7. Suction tube
8. Liquid tube
9. Outdoor unit
10. Flare nuts
11. Suction valve (large)
12. Liquid valve (small)

Tightening torques of unions and valve caps:

TUBE SIZE	TORQUE
Liquid line 1/4”	15-20 N.M.
Suction line 3/8”	30-35 N.M
Suction line 1/2”	50-54N.M.
Suction line 5/8”	75-78N.M.

Fig.18

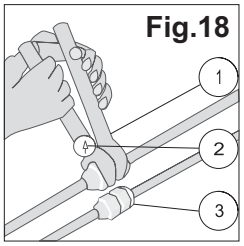


Fig.18
1.Wrench
2.Torque wrench
3.Union

Fig.19

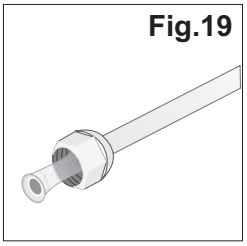


Fig.19
To prevent refrigerant leakage, coat the flared surface with refrigeration oil

Fig.20

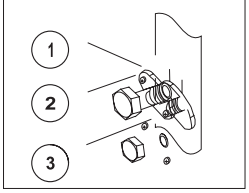


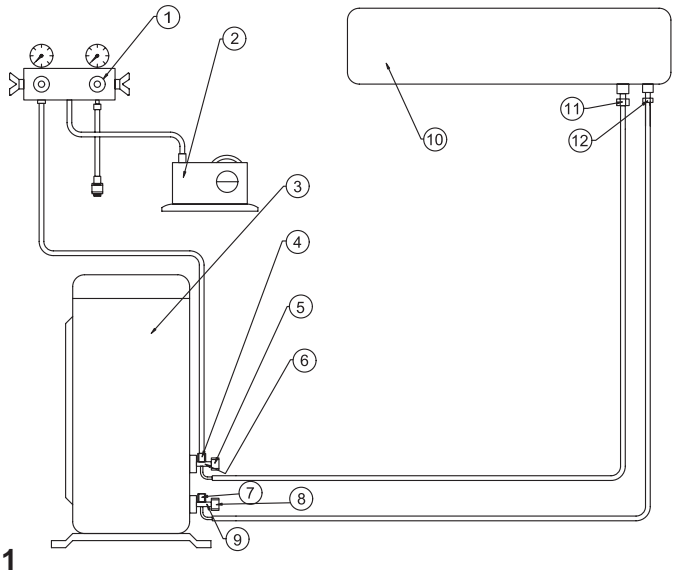
Fig.20
1.Suction valve
2.Service port
3.Liquid valve
4.Union

Do the vacuum of the refrigeration tubes and the indoor unit

After connecting the unions of the indoor and outdoor units, purge the air from the tubes and indoor unit as follows:

1. Connect the charging hoses with a push pin to the low side of the charging set and the service port of the suction valve. Be sure to connect the end of the charging hose with the push pin to the service port.
2. Connect the center hose of the charging set to a vacuum pump.
3. Turn on the power switch of the vacuum pump, turn off the high side switch and make sure that the needle in the needle in the gauge moves from 0 MPa (0cm Hg) to -0.1MPa (-76cm Hg). Let the pump run for fifteen minutes.
4. Close the valve of the low side of the charging set and turn off the vacuum pump. Note that the needle in the gauge should not move after approximately five minutes.
5. Not any problem for five minutes, turn on the power switch of the vacuum pump and open the valve of the low side of the charging set.
6. Disconnect the charging hose from the vacuum pump and from the service ports of the suction valve.
7. Tighten the service port caps of suction valve.
8. Redo 1 to 7 for other indoor units.
9. Remove the valve caps from all valves, and open them using a hexagonal Allen wrench.
10. Remount valve caps from all of the valves.
11. Check for gas leaks from all the connecting position.

Test with electronic leak detector or with a sponge immersed with soapy water for bubbles.



Note
For additional charge of various tubing lengths, refer to outdoor unit nameplate.

Fig.21

1. Charging set
2. Vacuum pump
3. Outdoor unit
4. Service port
5. Cap
6. Suction valve
7. Service port *
8. Cap
9. Liquid valve
10. Indoor unit
11. Suction flare connection
12. Liquid flare connection

* In some models only

11. PANEL INSTALLING

Removing the grille:

1. To open the grille, rotate the grille lock counterclockwise from horizontal position to vertical position.(fig.22)

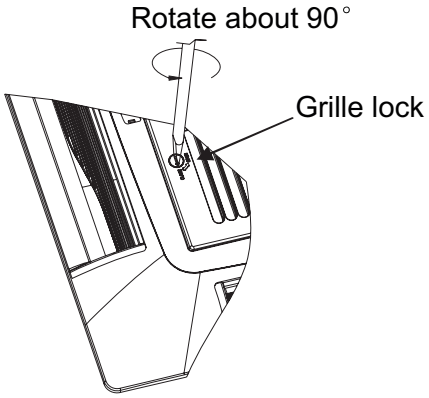


Fig.22

2. With the grille fully opened, remove the grille along the direction shown in Fig.23.

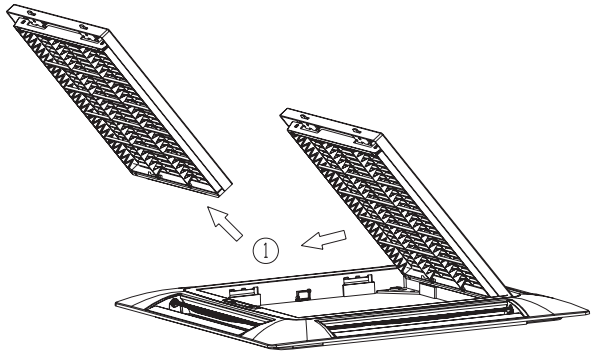


Fig.23

Temporary installation of the panel

1. Install two bolts (Accessory) onto the main unit (the corner of refrigerant tubing side and the opposite corner).The detail is shown in Fig.24. Pay attention that leave 15-20mm bolt unscrewed so as to hang the panel easily

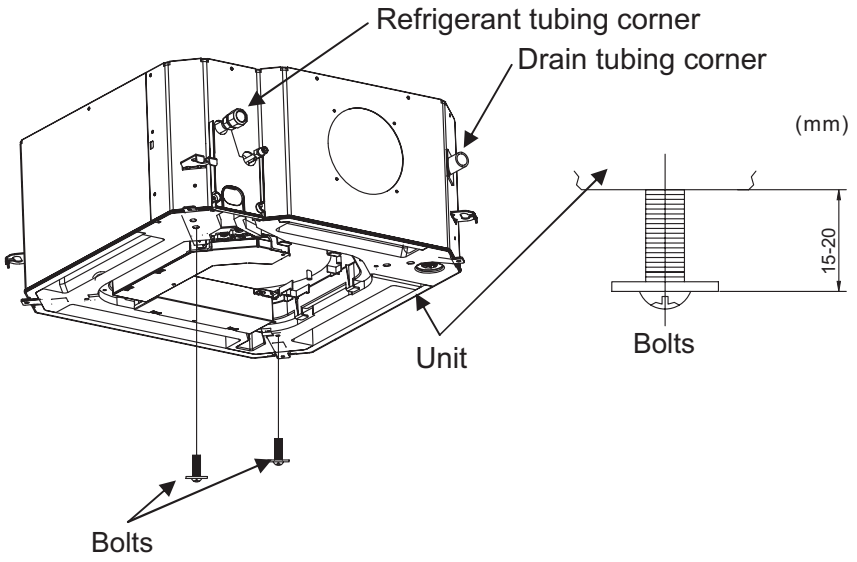


Fig.24

2. Attach the panel to the main unit, twist the panel to make sure that the two bolts mentioned above are screwed into the cavity on the panel. Thus the panel can keep balance with the two bolts.
3. Pay attention that the TUBE and DRAIN marks on the ceiling panel are in the correct positions on the unit.
4. Tighten all bolts (the previously two installed bolts as well as the two remaining bolts.) to secure the panel.
5. Pay attention that there should be no gaps between the unit and the ceiling panel, or between the ceiling panel and the ceiling.

Wiring of panel

1. Connect the 12Pin cable connector from the ceiling panel to the relative connector which comes out of the control box. Fig.25

Caution!

If this connector is not connected, the display will not work. Make sure the cable is connected securely.

2. Connect the 5Pin cable connector from the ceiling panel to the relative connector comes out of the control box.(Fig.25)

Caution!

If this connector is not connected, the louver will not work. Make sure the cable is connected securely.

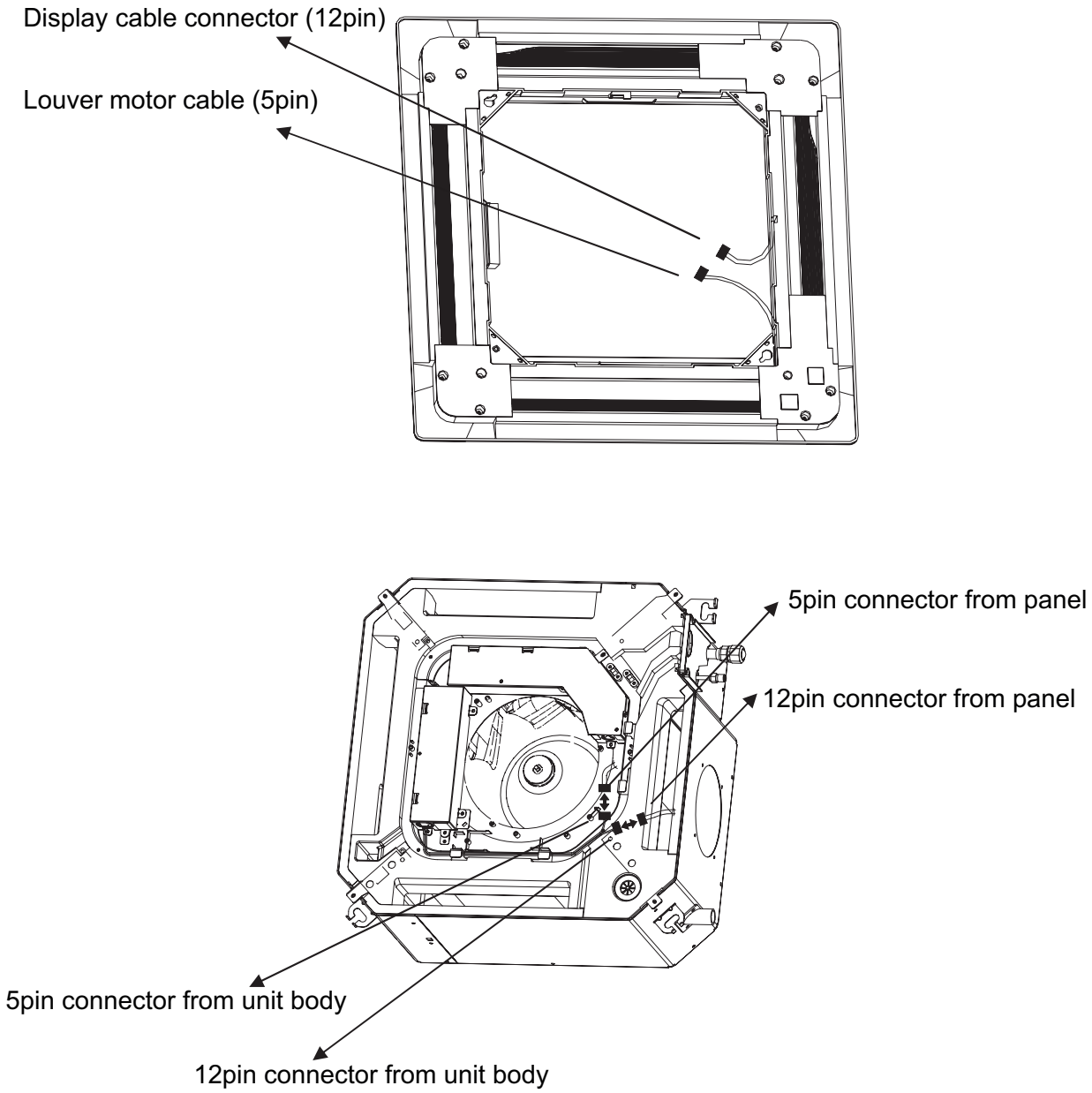


Fig.25

Attaching the grille

1. To attach the grille, refer to the section removing the grille and follow the steps in reverse order.
2. The panel is designed so that the grille can be installed into the panel in 4 directions. Select the convenient direction for service.

12. SPECIAL SETTINGS

According to the installation height, the air flow compensation setting should follow below instruction:

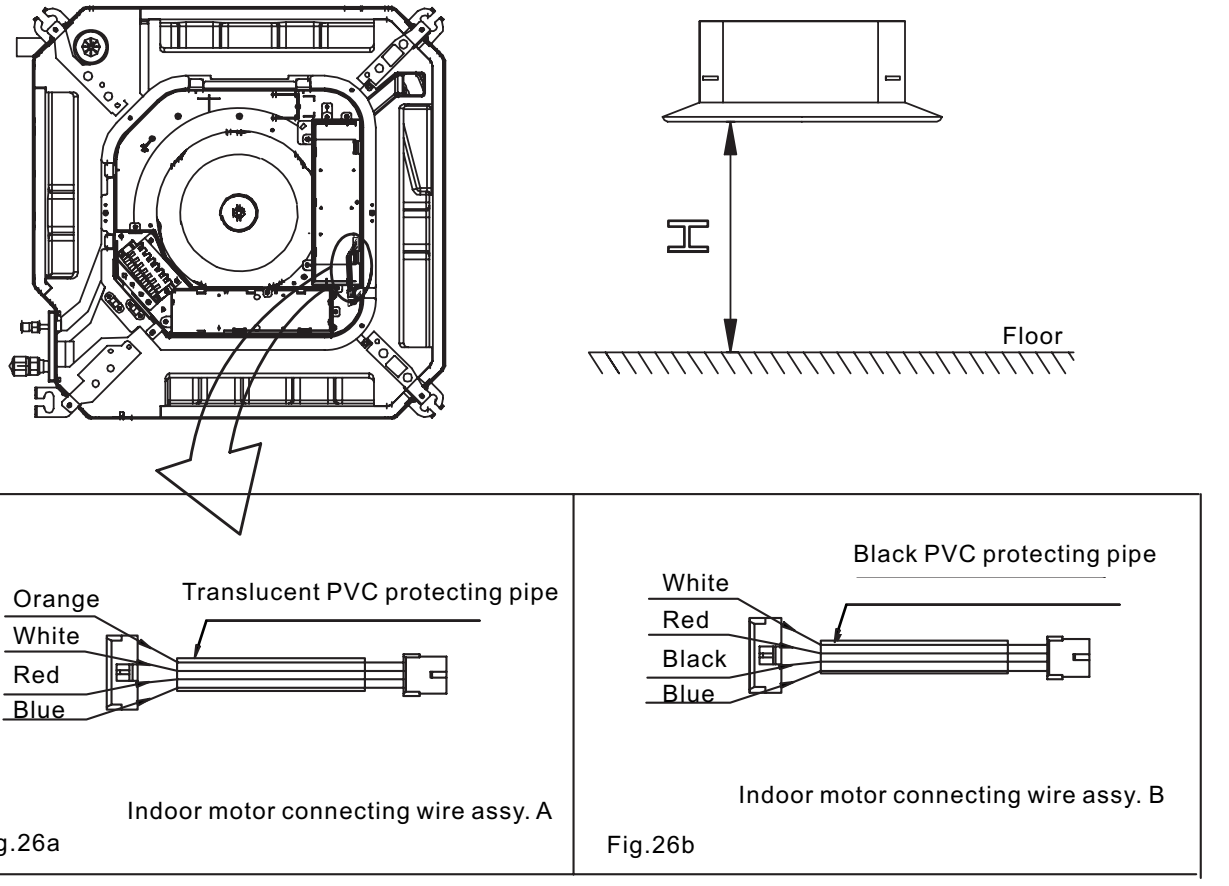


Fig.26

Installation Height	Air flow compensation setting
H⩽ 3.3m	Use the indoor motor connecting wire assy.A Fig.26a (Default setting)
H> 3.3m	Use the indoor motor connecting wire assy.B Fig.26b (Accessory)

13. FINAL TASKS

1. Check all valve caps and ensure that they had been tightened properly. Close the valve cover.
2. Fill gaps on the wall between hole sides and tubing with sealer.
3. Attach wiring and tubing to the wall with clamps where necessary.
4. Operate the unit for no less than 5 minutes at heating or cooling mode.
5. Explain filter removal, cleaning and installation.
6. Operate the air conditioner together with the customer and explain all functions.
7. Give the operating and installation manuals to the customer.

OPERATION MANUAL

ENGLISH

CONTENT

Thank you for purchasing our Room Air Conditioner.

Before using your air-conditioner, please read this operating instruction carefully and keep it for future reference.

Part No. 468100326/01

FEATURES AND FUNCTIONS

AUTO CHANGE OVER

The operation mode (cooling, dry, heating) is switched automatically to maintain the set temperature, and the set temperature is kept constant at all times.

VERTICAL AIR SWING

Automatic swing of supply air in vertical direction. The flap moves automatically in upward and downward direction to spread the conditioned air evenly throughout the room.

WIRELESS REMOTE CONTROL UNIT

The Wireless Remote Control Unit allows convenient control of air conditioner operation.

SLEEP TIME

When the SLEEP button is pressed during heating mode, the air conditioner's the thermostat setting is gradually lowered during the period of operation; during cooling mode, the thermostat setting is gradually raised during the period of operation. When the set time is reached , the unit automatically turns off.

OPERATING TEMPERATURE RANGE

R410A & R407C		Indoor		Outdoor	
		DB[°C]	WB[°C]	DB[°C]	WB[°C]
Cooling	Upper Limit	32	23	46	NA
	Lower Limit	21	15	21	NA
Heating	Upper Limit	27	NA	24	18
	Lower Limit	10	NA	-9	-10

R22		Indoor		Outdoor	
		DB[°C]	WB[°C]	DB[°C]	WB[°C]
Cooling	Upper Limit	32	23	46	NA
	Lower Limit	21	15	21	NA
Heating	Upper Limit	27	NA	24	18
	Lower Limit	15	NA	-5	-6

PRECAUTIONS

⚠ Danger

This sign warns of death or serious injury.

- Do not attempt to install this air conditioner by yourself.
- This unit contains no user-serviceable parts. Always consult authorized service personnel for repairs.
- When moving, consult authorized service personnel for disconnection and installation of the unit.
- Do not become excessively chilled by staying for lengthy periods in the direct cooling airflow.
- Do not insert fingers or objects into the outlet port or intake grilles.
- Do not start and stop air conditioner operation by disconnecting the power supply cord and so on.
- Take care not to damage the power supply cord.
- In the event of a malfunction (burning smell, etc.), immediately stop operation, disconnect the power supply plug, and consult authorized service personnel.
- If the power supply cord of this appliance is damaged, it should only be replaced by the authorized service personnel, since special purpose tools and specified cord are required.
- The appliance is not intended for use by young children of infirm persons without supervision.
- Please pre-heat the air conditioner for at least 12 hours before operation. If use it for a long time, please keep the power on.

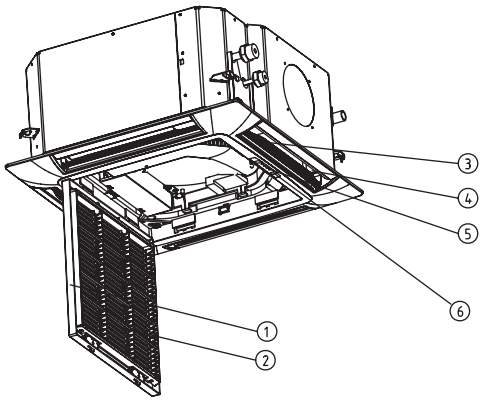
⚠ Caution

This sign warns of damage to property.

- Provide occasional ventilation during use.
- Do not direct air flow at fireplaces or heating apparatus.
- Do not climb on, or place objects on the air conditioner.
- Do not hang objects from the indoor unit.
- Do not set flower vases or water containers on top of air conditioner.
- Do not expose the air conditioner directly to water.
- Do not operate the air conditioner with wet hands.
- Do not pull power supply cord.
- Turn off power source when not using the unit for extended periods.
- Check the condition of the installation stand for damage.
- Do not place animals or plants in the direct path of the air flow.
- Do not drink the water drained from the air conditioner.
- Do not use in applications involving the storage of foods, plants or animals, precision equipment, or art works.
- Connection valves become hot during heating; handle with care.
- Do not apply any heavy pressure to radiator fins.
- Operate only with air filters installed.
- Do not block or cover the intake grille and outlet port.
- Ensure that any electronic equipment is at least one metre away from either the indoor or outdoor units.
- Avoid installing the air conditioner near a fireplace or other heating apparatus.
- When installing the indoor and outdoor units, take precautions to prevent access to infants.
- Do not use inflammable gases near the air conditioner.

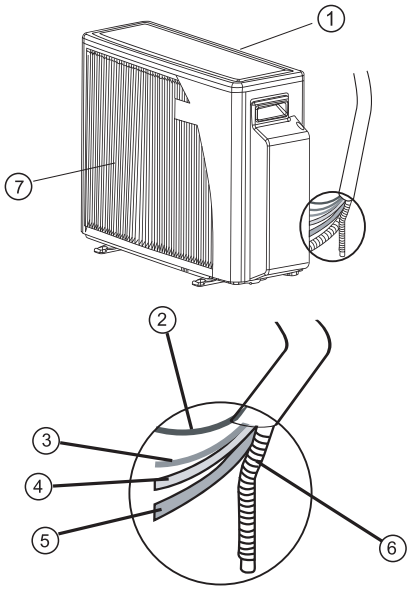
NAME OF EACH PART

INDOOR UNIT



1. Air intake grille
2. Air filter
3. Supply air flap louver
4. Air outlet
5. Unit's indicatiors
6. On unit operation

OUTDOOR UNIT

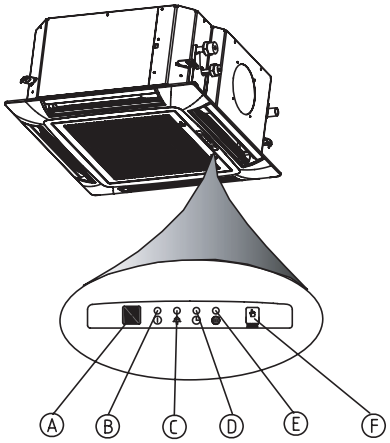


1. Outdoor unit air intake
2. Power cable
3. Control wire
4. Liquid line
5. Suction line
6. Drain hose
7. Outdoor unit air outlet

Note: These instructions also apply if the products differ externally to those appearing in the manual.

NAME OF EACH PART

Unit's indicators and on unit operation



A. Signal receiver

Receive signals from the remote control.

B. Stand-by indicator

Lights up in red when the units is connected to power and ready to receive the remote control commands.

Operation indicator

Lights up in green during operations.
Blinks when compressor is stopped as a result of a thermodynamic protection.

C. ESF/Ionizer indicator

Dummy function(just for diagnostic test)

D. Timer indicator

Lights up during timer and sleep operation.

Blinks when the timer setting is invalid when power failure occurred.

E. Filter indicator

Lights up when air filter requires cleaning.

F. Unit mode button / Reset button

- Used to switch the unit off or to turn it on for cooling or heating without the remote control.
- Press to turn off the filter indicator and to reset the filter function, after the cleaned filter has been reinstalled.

If the air-conditioner can not be operated by the Remote Control , it can be turned on for cooling or heating, or completely turned off, by every short pressing on MODE button (F) on the air-conditioner. The MODE button will change the operating status of the unit between –COOLING – HEATING – STAND BY positions. In long pressing the system enters into diagnostic mode.
When the filter indicator is on, turn off the filter indicator after a clean filter has been reinstalled.

OPERATION TIPS

- Set a suitable room temperature; excessively low room temperature is not good for your health and wastes electricity. Avoid frequent setting of the temperature.
- During cooling, avoid direct sun. Keep curtains and blinds closed. Close doors and windows to keep the cool air in the room.
- Avoid generating heat or using of heating appliances while the air conditioner in cooling mode.
- Make sure that the air flap is positioned properly: horizontal flow in cooling and downward vertical flow in heating.
- Keep the room temperature uniform by adjusting the left/right vertical air blades.
- Position the air flap and the left/right air blades in such a manner as to prevent your body from being exposed directly to air drafts.
- During prolonged operation, ventilate the room occasionally by opening a window from time to time.
- In a power failure, the microprocessor memory is retained. When restarted, operation will be resumed in the last mode of operation. However, if the timer was used, the unit will be turned off by the timer only if the remote control is aimed at the unit. Otherwise the power failure will cause the timer data to be erased from the microprocessor memory.
- After turning on, allow more than 3 minutes for cooling, heating or dry operation to start.
- When DRY mode is used, make sure that the room temperature is between 20ºC and 27ºC. When used out of this range, the unit may protect itself and become inoperative.
- When COOL or DRY modes are used, make sure that the room's relative humidity is below 78%. If the unit is used for a prolonged periods of time in high humidity, moisture may form on the air outlet and drip down.
- Remote control signals may not be received if the indoor unit controls cover is exposed to direct sunlight or strong light. In such a case, block the sunlight or dim the lighting.
- The remote control is operative in a range of 8 meters. If you are out of range, the remote control may have difficulties in transmitting signals.

PROTECTION MODES(optional)

Your air-conditioner includes several automatic protection modes which enables you to use it virtually at any time and in any season regardless of the outdoor temperature. Some of the protection modes are listed below:

Mode	Operation conditions	Protection from	Controlled remedy
Cool And Dry	Low outdoor temperature	Indoor coil freezes up	Stop outdoor fan and compressor when approaching freezing conditions Resumes operation automatically. Operating indicator blinks
	High outdoor temperature	Outdoor coil overheating	Stops compressor when approaching over heating conditions. Resumes operation automatically. Operating indicator blinks
Heating	Low outdoor temperature	Outdoor coil ice build up	Reverses Operation from heating to cooling for short periods to de-ice outdoor coil. Operating indicator blinks
	High Indoor or outdoor temperature	Indoor coil overheating	Stop outdoor fan and compressor when approaching high indoor coil temperature. Resumes operation automatically. Operating indicator blinks

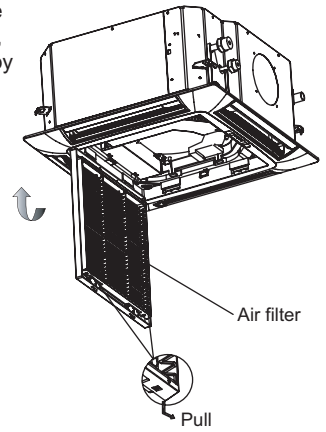
Note: When switching the unit to OFF after heating operation,the unit may perform outdoor coil deicing operation. In such a case, the compressor will continue to run for some time after the unit has switched to OFF, and the indoor unit louvers are closed. This feature is a part of the normal unit operation

CARE AND MAINTENANCE

Only a qualified service technician is allowed to perform the maintenance. When cleaning the filter, make sure the main power should be cut off. Or else fingers touching the electrical parts or rotating fan by mistake can lead to body injury.

CLEANING THE AIR FILTER

To remove the air filters, open the front panel by rotating the 2 locks counterclockwise from horizontal to vertical position, pull out the filters, and clean them by washing in warm soapy water and dry thoroughly. Align and fit the filters in place. Close the panel by rotating the lock to horizontal position.



- If your air conditioner is provided with a filter cleaning indicator, a light blinks when filter cleaning is needed. In this case, remove the filters as indicated above, clean them and press the RESET button to turn OFF the indicator.

DO NOT OPERATE THE UINT WITHOUT FILTERS!

CLEANING THE AIR CONDITIONER

- Wipe the unit with a soft dry cloth or clean it using a vacuum cleaner.
- Do not use hot water or volatile materials which could damage the surface of the air conditioner.

AT THE BEGINNING OF THE SEASON

- Make sure there are no obstacles blocking the flow of inlet or outlet air, in both indoor and outdoor units.
- Make sure the power is properly connected.

PROTECT THE ELECTRONIC SYSTEM

- Indoor unit and remote control must be at least 1 meter away from a TV, radio or any other home electronic appliance.
- Protect the inner unit from direct sun or lighting.

TROUBLESHOOTING

Before calling for service, please check the following common malfunctions and correct it as needed.

Problem	Cause	Remedy
• Unit does not operate. Stand-by indicator does not light up	❑ Unit not connected to power ❑ Power failure	■ Plug in the power cord ■ Check main fuse
• Unit does not operate. Stand-by indicator lights.	❑ Remote control malfunctions ❑ The remote control is locked	■ Check remote control batteries ■ Try to operate from a closer distance ■ Start from on-unit controls ■ Unlock the remote control
• Unit does not respond properly to remote control command	❑ IR signal does not reach unit ❑ Distance between remote control and unit too large or aimed at from improper angle ❑ IR receiver on-unit exposed to strong light source	■ Check for obstruction between unit and remote control. Clear if needed. ■ Get closer to unit. ■ Dim lights, fluorecent especially
• Air does not blow out from indoor unit	❑ De-icing protection mode is activated ❑ Unit in AUTO FAN mode ❑ Over cooling in DRY	■ Normal operation in HEATING mode ■ Normal operation in DRY mode
• COOLING, DRY or HEATING does not start immediately	❑ 3-min. Compressor delayed start	■ Normal operation for these modes
• Unit functions but does not perform sufficiently	❑ Improper temperature setting ❑ Unit capacity in sufficient for load or room size	■ Reset temperature ■ Consult your dealer