Airwell

Service Manual

PNXA DCI Series

Indoor Units	Outdoor Units
PNXA 9 DCI	GC 9 DCI
PNXA 12 DCI	GC 12 DCI
PNXA 18 DCI	YBD 018
PNXA 21 DCI	YBD 022
PNXA 24 DCI	YBD 024

REFRIGERANT

R410A

HEAT PUMP

SM PNXADCI 1-A.1 GB

APRIL – 2012

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.

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*Due to constant improvements please note that the data on this service manual can be modified with out notice.
**Photos are not contractual

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1. INTRODUCTION

1.1 General

The new **PNX DCI INVERTER** split wall mounted range has expanded, comprising the following RC (heat pump) models:

- **PNXA 9 DCI**
- **PNXA 12 DCI**
- **PNXA 18 DCI**
- **PNXA 21 DCI**
- **PNXA 24 DCI**

The indoor **PNX DCI** units are available as LED display types, featuring esthetic design, compact dimensions, and low noise operation.

1.2 Main Features

The **PNXA DCI** series benefits from the most advanced technological innovations, namely:

- DC inverter technology.
- R410A.
- High COP.
- Lego concept.
- Pre-Charged units up to the max' allowing tubing distance.
- Networking system connectivity.
- A dry contact for clock or power shedding functions (configurable).
- Base heater connection.
- Cooling operation at outdoor temperature down to -10°C.
- Heating operation at outdoor temperature down to -15°C.
- Supports Indoor Air Quality features, such as – Ionizer and Active Electrostatic Filter.
- Indoor large diameter cross flow fan, allowing low noise level operation.
- Bended indoor coil with treated aluminum fins and coating for improved efficiency.
- Easy access to the interconnecting tubing and wiring connections, so that removing the front grill or casing is not necessary.
- Refrigerant pipes can be connected to the indoor unit from 5 different optional directions.
- Water condensate tray is equipped with two optional drain connections
- Automatic treated air sweep.
- Low indoor and outdoor noise levels.
- Easy installation and service.

1.3 Indoor Unit

The indoor unit is wall mounted, and can be easily fitted to many types of residential and commercials applications.
New design is available in LED version.

Indoor Unit features:

Feature	PNXA 9	PNXA 12	PNXA 18	PNXA 21	PNXA 24
Display	LED				
Ionizer	Optional				
ESF	Optional				
Freshe aire	Optional				
Indoor fan motor	PG	PG	PG	PG	DCI
Horizontal motorized louver	Yes				
Vertical motorized louver	Optional				
Heating element	No				
M2L Cable port	Yes				
Dry contact	Presence detector or (jumper selected) power shedding				

1.4 Filtration

The **PNXA DCI INV** series presents several types of air filters:

- Easily accessible, and re-usable pre-filters (mesh)
- Pre-charged electrostatic filter (disposable)
- Active carbon filter (disposable)
- ESF. Active Electro Static re-usable filter (optional)

1.5 Ionizer (Optional)

A special design Ionizer protected by unique patents integrated into the indoor unit, generating negative ions to the room providing comfort and upgraded indoor air quality.

1.6 Control

The microprocessor indoor controller, and an infrared remote control, supplied as standard, provides complete operating function and programming.
Remote controllers: RC-2/3/4/5/7, RC-4i-1, RC-7i-1,RCW,µBMS.
Networking system Airconet version 4.2 and up, MIU SW version H8 and up.
For further details please refer to the Operational Manual.

1.7 Outdoor Unit

The **PNXA DC INV** outdoor units can be installed as floor or wall mounted units by using a wall supporting bracket. The metal sheets are protected from 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.

Outdoor Unit Feature

Feature	GC 9 DCI	GC 12 DCI	YBD 018	YBD 022	YBD 024
Display	3 LED's		HMI		3 LED's
Base Heater	Optional				
Outdoor Fan	DCI	DCI	Triac	Triac	DCI

1.8 Tubing Connections

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

1.9 Accessories

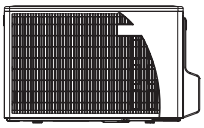
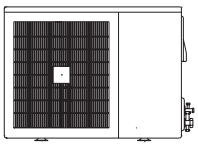
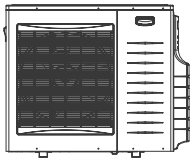
Item	Description
MIU	MODBUS interface unit
RS485 Adapter	To be used as an interface with RCW or µBMS remote controllers
Base Heater	
M2L cable Port	

1.10 Inbox Documentation

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

1.11 Matching Table

1.11.1 R410A

OUTDOOR UNITS			INDOOR UNITS				
							
	MODEL	REFR"	PNXA 9	PNXA 12	PNXA 18	PNXA 21	PNXA 24
	GC 9 DCI	R410A	√				
	GC 12 DCI	R410A		√			
	YBD 018	R410A			√		
	YBD 022	R410A				√	
	YBD 024	R410A					√

2. PRODUCT DATA SHEET

2.1 PNXA 9 DCI

Model Indoor Unit				**PNXA 9 DCI**	
Model Outdoor Unit				**GC 9 DCI R410A**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (1)			Btu/hr	8530(4780-12280)	10240(5120-17060)
			kW	2.5(1.4-3.6)	3.0(1.5-5.0)
Power input (1)			kW	0.50(0.42-1.0)	0.60(0.39-1.6)
EER (Cooling) or COP(Heating) (1)			W/W	5.00	5.00
Energy efficiency class				A	A
Power supply			V	220-240	
			Ph	1	
			Hz	50	
Rated current			A	2.2	2.7
Power factor				0.97	0.97
Prated (IDU)			W	32	
Prated (IDU+ODU)			W	1600	
Starting current			A	10.5	
Circuit breaker rating			A	15	
INDOOR	Fan type & quantity			Crossflow x 1	
	Fan speeds	H/M/L	RPM	1050/900/800	
	Air flow (2)	H/M/L	m3/hr	530/430/330	
	External static pressure	Min	Pa	0	
	Sound power level (3)	H/M/L	dB(A)	51/ - /39	
	Sound pressure level (4)	H/M/L	dB(A)	39/ - /26	
	Moisture removal		l/hr	1	
	Condenstate drain tube I.D		mm	16	
	Dimensions	WxHxD	mm	810x285x210	
	Net Weight		kg	11.5	
	Package dimensions	WxHxD	mm	870x356x282	
	Packaged weight		kg	14	
	Units per pallet		units	28	
	Stacking height		units	7 levels	
OUTDOOR	Refrigerant control			Electronical Expansion Valve	
	Compressor type,model			Single Rotary DC Inverter,Panasonic 5RS102XAB	
	Fan type & quantity			Propeller x 1	
	Fan speeds	H	RPM	830	
	Air flow	H	m3/hr	1780	
	Sound power level	H	dB(A)	61	
	Sound pressure level (4)	H	dB(A)	51	
	Dimensions	WxHxD	mm	795x610x290	
	Net Weight		kg	38	
	Package dimensions	WxHxD	mm	970x650x394	
	Packaged weight		kg	42	
	Units per pallet		Units	9	
	Stacking height		units	3 levels	
	Refrigerant type			R410A	
	Standard charge		kg(7.5m)	1.1	
	Additional charge			No need	
	Connections between units	Liquid line	In.(mm)	1/4"(6.35)	
		Suction line	In.(mm)	3/8"(9.53)	
		Max.tubing length	m.	Max.20	
		Max.height difference	m.	Max.10	
Operation control type				Remote control	
Heating elements (Option)			kW		
Others					

(1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN 14511.
(2) Airflow in ducted units; at nominal external static pressure.
(3) Sound power in ducted units is measured at air discharge.
(4) Sound pressure level measured at 1 meter distance from unit.

2.2 PNXA 12 DCI

Model Indoor Unit				**PNXA 12 DCI**	
Model Outdoor Unit				**GC 12 DCI R410A**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (1)			Btu/hr	11940(4780-14670)	13650(5100-19790)
			kW	3.5(1.4-4.3)	4.0(1.5-5.8)
Power input (1)			kW	0.87(0.42-1.25)	1.00(0.39-1.75)
EER (Cooling) or COP (Heating) (1)			W/W	4.02	4.00
Energy efficiency class				A	A
Power supply			V	220-240	
			Ph	1	
			Hz	50	
Rated current			A	3.9	4.5
Power factor				0.97	0.97
Prated (IDU)			W	40	
Prated (IDU+ODU)			W	1800	
Starting current			A	10.5	
Circuit breaker rating			A	15	
INDOOR	Fan type & quantity			Crossflow x 1	
	Fan speeds	H/M/L	RPM	1100/950/800	
	Air flow (2)	H/M/L	m3/hr	550/450/350	
	External static pressure	Min	Pa	0	
	Sound power level (3)	H/M/L	dB(A)	52/ - /39	
	Sound pressure level (4)	H/M/L	dB(A)	40/ - /26	
	Moisture removal		l/hr	1.5	
	Condenstate drain tube I.D		mm	16	
	Dimensions	WxHxD	mm	810x285x210	
	Net Weight		kg	11.5	
	Package dimensions	WxHxD	mm	870x356x282	
	Packaged weight		kg	14	
	Units per pallet		units	28	
	Stacking height		units	7 levels	
OUTDOOR	Refrigerant control			Electronical Expansion Valve	
	Compressor type,model			Single Rotary DC Inverter,Panasonic 5RS102XAB	
	Fan type & quantity			Propeller x 1	
	Fan speeds	H	RPM	830	
	Air flow	H	m3/hr	1780	
	Sound power level	H	dB(A)	62	
	Sound pressure level (4)	H	dB(A)	52	
	Dimensions	WxHxD	mm	795x610x290	
	Net Weight		kg	38.5	
	Package dimensions	WxHxD	mm	970x650x394	
	Packaged weight		kg	42.5	
	Units per pallet		Units	9	
	Stacking height		units	3 levels	
	Refrigerant type			R410A	
	Standard charge		kg(7.5m)	1.2	
	Additional charge		g/m	No need	
	Connections between units	Liquid line	In.(mm)	1/4"(6.35)	
		Suction line	In.(mm)	3/8"(9.53)	
		Max.tubing length	m.	Max.20	
		Max.height difference	m.	Max.10	
Operation control type				Remote control	
Heating elements (Option)			kW		
Others					

(1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN 14511.
(2) Airflow in ducted units; at nominal external static pressure.
(3) Sound power in ducted units is measured at air discharge.
(4) Sound pressure level measured at 1 meter distance from unit.

2.3 PNXA 18 DCI

Model Indoor Unit				**PNXA 18 DCI**	
Model Outdoor Unit				**YBD 018**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (1)			Btu/hr	17060(5120-20470)	19110(4440-23200)
			kW	5.00(1.50-6.00)	5.60(1.30-6.80)
Power input (1)			kW	1.37(0.40-2.00)	1.46(0.35-2.00)
EER (Cooling) or COP(Heating) (1)			W/W	3.65	3.84
Energy efficiency class				A	A
Power supply			V/Ph/Hz	220-240V/Single/50Hz	
Rated current			A	6.1	6.5
Starting current			A	10.5	
Circuit breaker rating			A	20	
INDOOR	Fan type & quantity			Crossflow x 1	
	Fan speeds	H/M/L	RPM	1200/1050/900	
	Air flow (2)	H/M/L	m3/hr	850/760/620	
	External static pressure	Min-Max	Pa	0	
	Sound power level (3)	H/M/L	dB(A)	55/51/47	
	Sound pressure level(4)	H/M/L	dB(A)	43/39/34	
	Moisture removal		l/hr	2	
	Condenstate drain tube I.D		mm	16	
	Dimensions	WxHxD	mm	1060x295x210	
	Weight		kg	15	
	Package dimensions	WxHxD	mm	1125x360x280	
	Packaged weight		kg	18	
	Units per pallet		units	16 units per pallet	
	Stacking height		units	8 levels	
OUTDOOR	Refrigerant control			EEV	
	Compressor type,model			Rotary,Panasonic 5RS132ZAD21	
	Fan type & quantity			Propeller(direct) x 1	
	Fan speeds	H/L	RPM	910	
	Air flow	H/L	m3/hr	2160	
	Sound power level	H/L	dB(A)	63	
	Sound pressure level(4)	H/L	dB(A)	53	
	Dimensions	WxHxD	mm	795x610x290	
	Weight		kg	38	
	Package dimensions	WxHxD	mm	945x655x395	
	Packaged weight		kg	41	
	Units per pallet		Units	9 units per pallet	
	Stacking height		units	3 levels	
	Refrigerant type			R410A	
	Refrigerant chargless distance		kg/m	1.26/7.5	
	Additional charge per 1 meter		g/m	No need	
	Connections between units	Liquid line	In.(mm)	1/4”(6.35)	
		Suction line	In.(mm)	1/2”(12.7)	
		Max.tubing length	m.	Max. 20	
		Max.height difference	m.	Max. 10	
Operation control type				Remote control	
Heating elements			kW		
Others					

(1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN 14511.
(2) Airflow in ducted units; at nominal external static pressure.
(3) Sound power in ducted units is measured at air discharge.
(4) Sound pressure level measured at 1 meter distance from unit.

2.4 PNXA 21 DCI

Model Indoor Unit				**PNXA 21 DCI**	
Model Outdoor Unit				**YBD 022**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (1)			Btu/hr	20470(6140-23200)	21500(5460-26950)
			kW	6.00(1.80-6.80)	6.30(1.60-7.90)
Power input (1)			kW	1.82(0.50-2.40)	1.74(0.50-2.40)
EER (Cooling) or COP(Heating) (1)			W/W	3.30	3.62
Energy efficiency class				A	A
Power supply			V/Ph/Hz	220-240V/Single/50Hz	
Rated current			A	8.2	7.8
Starting current			A	15	
Circuit breaker rating			A	20	
INDOOR	Fan type & quantity			Crossflow x 1	
	Fan speeds	H/M/L	RPM	1250/1100/1000	
	Air flow (2)	H/M/L	m3/hr	900/760/620	
	External static pressure	Min-Max	Pa	0	
	Sound power level (3)	H/M/L	dB(A)	56/53/48	
	Sound pressure level(4)	H/M/L	dB(A)	45/40/34	
	Moisture removal		l/hr	2.4	
	Condenstate drain tube I.D		mm	16	
	Dimensions	WxHxD	mm	1060x295x210	
	Weight		kg	15	
	Package dimensions	WxHxD	mm	1125x360x280	
	Packaged weight		kg	18	
	Units per pallet		units	16 units per pallet	
	Stacking height		units	8 levels	
OUTDOOR	Refrigerant control			EEV	
	Compressor type,model			Two Rotary,GMCC DA150S1C-20FZ	
	Fan type & quantity			Propeller(direct) x 1	
	Fan speeds	H/L	RPM	800	
	Air flow	H/L	m3/hr	2860	
	Sound power level	H/L	dB(A)	66	
	Sound pressure level(4)	H/L	dB(A)	56	
	Dimensions	WxHxD	mm	846x690x302	
	Weight		kg	45	
	Package dimensions	WxHxD	mm	990x770x430	
	Packaged weight		kg	49	
	Units per pallet		Units	9 units per pallet	
	Stacking height		units	3 levels	
	Refrigerant type			R410A	
	Refrigerant chargless distance		kg/m	1.60/7.5	
	Additional charge per 1 meter		g/m	No need	
	Connections between units	Liquid line	In.(mm)	1/4”(6.35)	
		Suction line	In.(mm)	1/2”(12.7)	
		Max.tubing length	m.	Max. 20	
		Max.height difference	m.	Max. 10	
Operation control type				Remote control	
Heating elements			kW		
Others					

(1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN 14511.
(2) Airflow in ducted units; at nominal external static pressure.
(3) Sound power in ducted units is measured at air discharge.
(4) Sound pressure level measured at 1 meter distance from unit.

2.5 PNXA 24 DCI

Model Indoor Unit				**PNXA 24 DCI**	
Model Outdoor Unit				**YBD 024**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (1)			Btu/hr	23188(5100~25575)	25916(5100~30000)
			kW	6.8(1.5-7.5)	7.6(1.5~8.8)
Power input (1)			kW	2.25(0.5-2.8)	2.35(0.45~3.0)
EER (Cooling) or COP(Heating) (1)			W/W	3.01	3.23
Energy efficiency class				B	C
Power supply			V/Ph/Hz	220-240V/Single/50Hz	
Rated current			A	10	10.5
Starting current			A	15	
Circuit breaker rating			A	20	
INDOOR	Fan type & quantity			Crossflow x 1	
	Fan speeds	H/M/L	RPM	1300/1150/1000	1350/1200/1050
	Air flow (2)	H/M/L	m3/hr	950/800/650	1000/850/700
	External static pressure	Min-Max	Pa	0	
	Sound power level (3)	H/M/L	dB(A)	60/56/51	
	Sound pressure level (4)	H/M/L	dB(A)	47/43/38	
	Moisture removal		l/hr	2.5	
	Condenstate drain tube I.D		mm	16	
	Dimensions	WxHxD	mm	1080x295x221	
	Weight		kg	15	
	Package dimensions	WxHxD	mm	1125x360x295	
	Packaged weight		kg	18	
	Units per pallet		units	16	
	Stacking height		units	8 levels	
OUTDOOR	Refrigerant control			EEV	
	Compressor type,model			Two Rotary, SANYO C-7RZ233H1A	
	Fan type & quantity			Propeller(direct) x 1	
	Fan speeds	H/L	RPM	850	
	Air flow	H/L	m3/hr	3600	
	Sound power level	H/L	dB(A)	66	
	Sound pressure level (4)	H/L	dB(A)	56	
	Dimensions	WxHxD	mm	950x835x412	
	Weight		kg	64.5	
	Package dimensions	WxHxD	mm	1080x910x477	
	Packaged weight		kg	72	
	Units per pallet		Units	4	
	Stacking height		units	2 levels	
	Refrigerant type			R410A	
	Refrigerant chargless distance		kg/m	2.3kg/30m	
	Additional charge per 1 meter		g/m	No Need	
	Connections between units	Liquid line	In.(mm)	3/8"(9.53)	
		Suction line	In.(mm)	5/8"(15.88)	
		Max.tubing length	m.	Max.30	
		Max.height difference	m.	Max.15	
Operation control type				Remote control	
Heating elements (Option)			kW		
Others					

(1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN 14511.
(2) Airflow in ducted units; at nominal external static pressure.
(3) Sound power in ducted units is measured at air discharge.
(4) Sound pressure level measured at 1 meter distance from unit.

3. RATING CONDITIONS

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

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

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

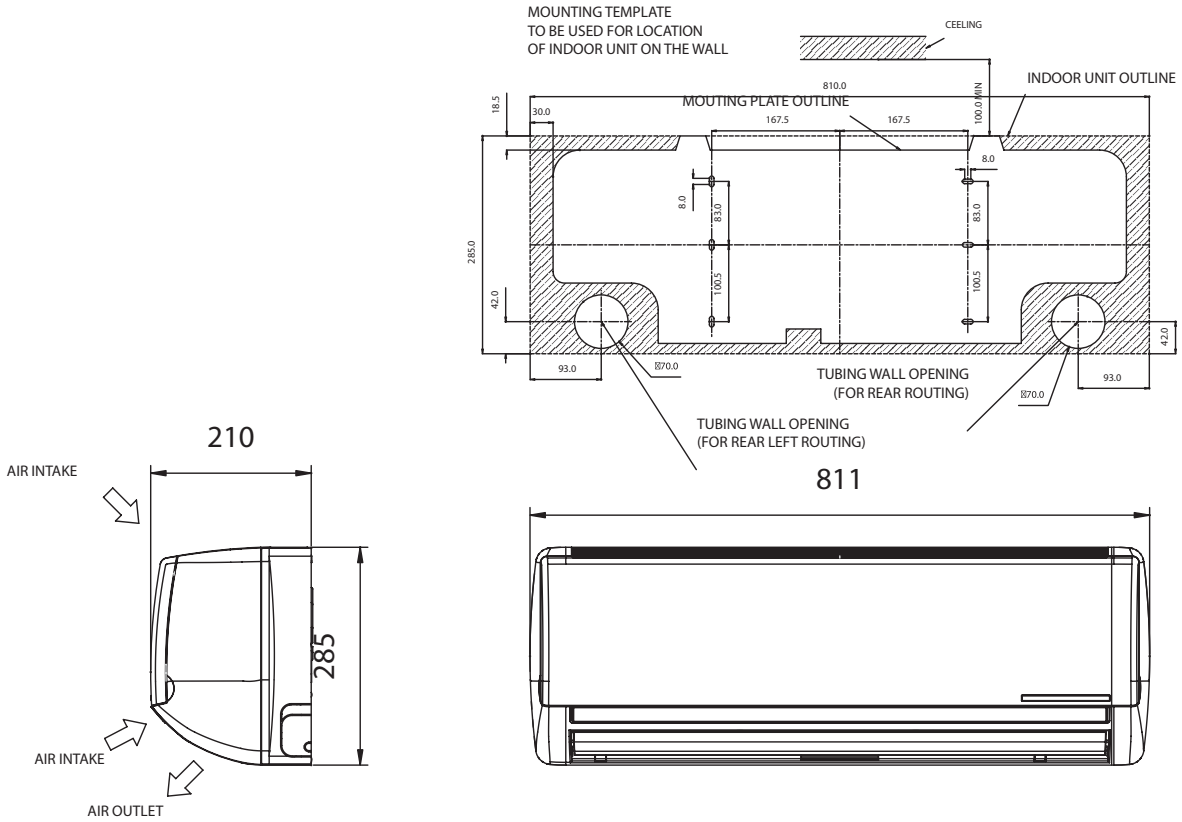
3.1 Operating Limits

3.1.1 R410A

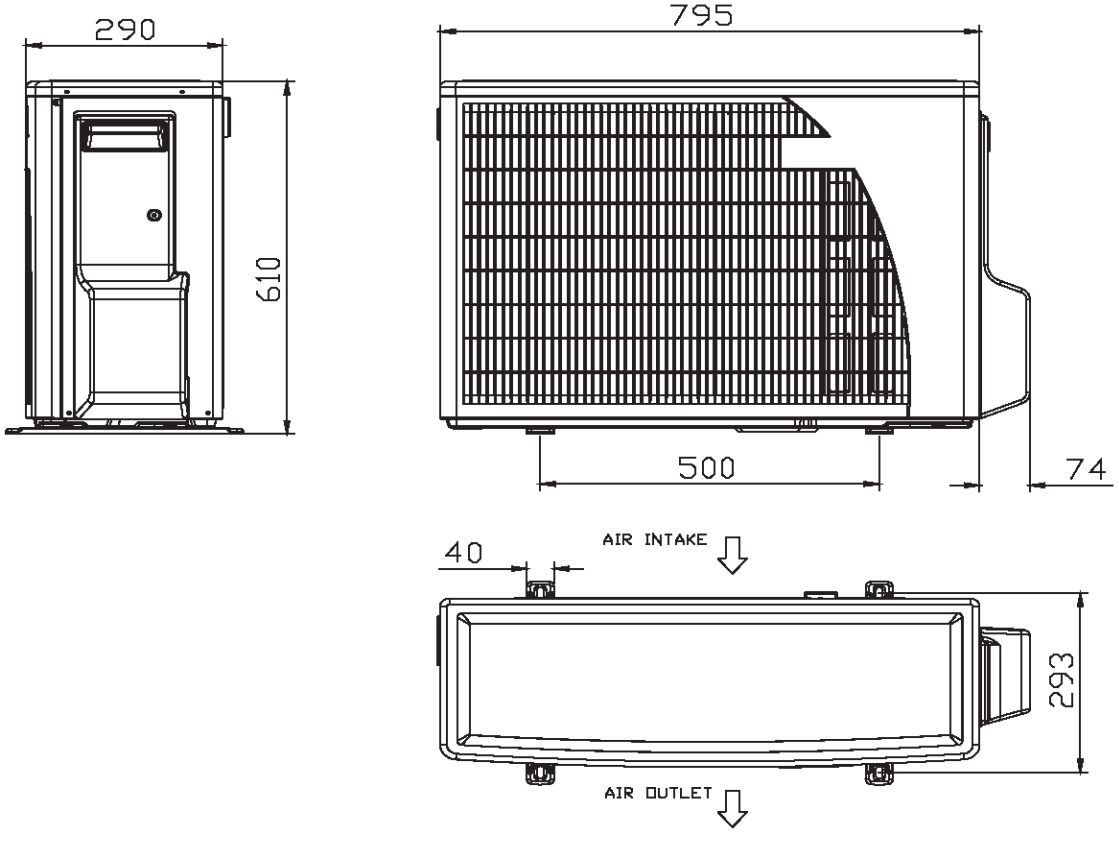
		Indoor	Outdoor
Cooling	**Upper limit**	32°C DB 23°C WB	46°C DB
	Lower limit	21°C DB 15°C WB	-10°C DB
Heating	**Upper limit**	27°C DB	24°C DB 18°C WB
	Lower limit	10°C DB	-15°C DB -16°C WB
Voltage		198 – 264 V	

4. OUTLINE DIMENSIONS

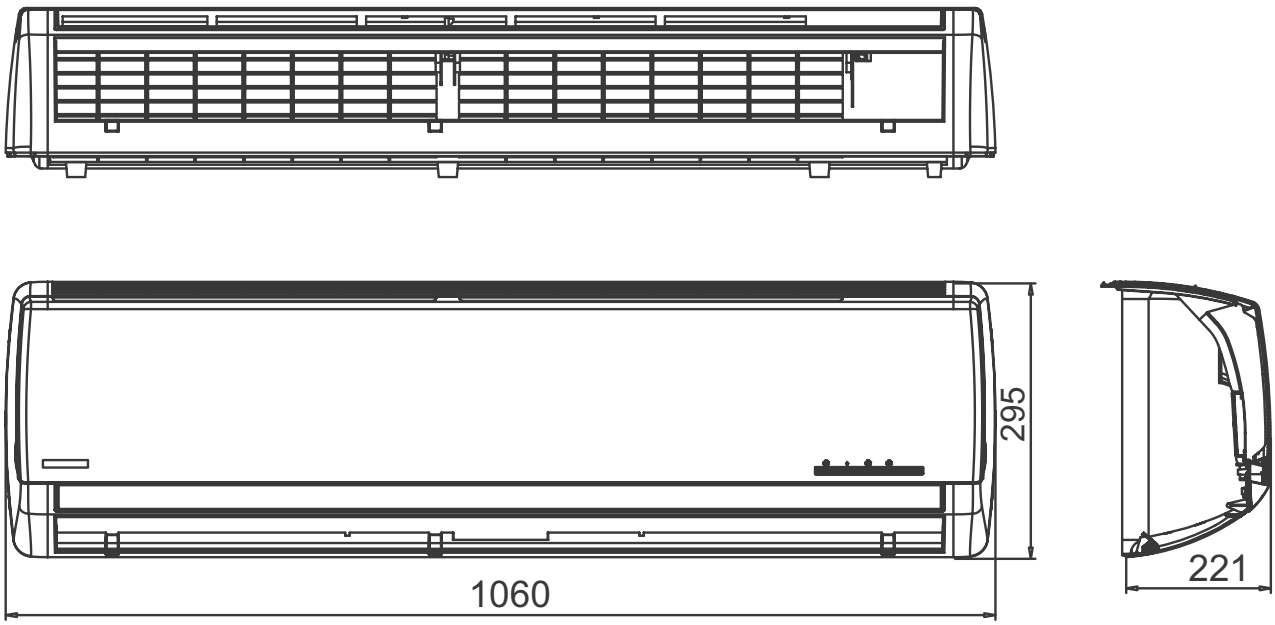
4.1 Indoor Unit: PNXA 9 / 12 DCI



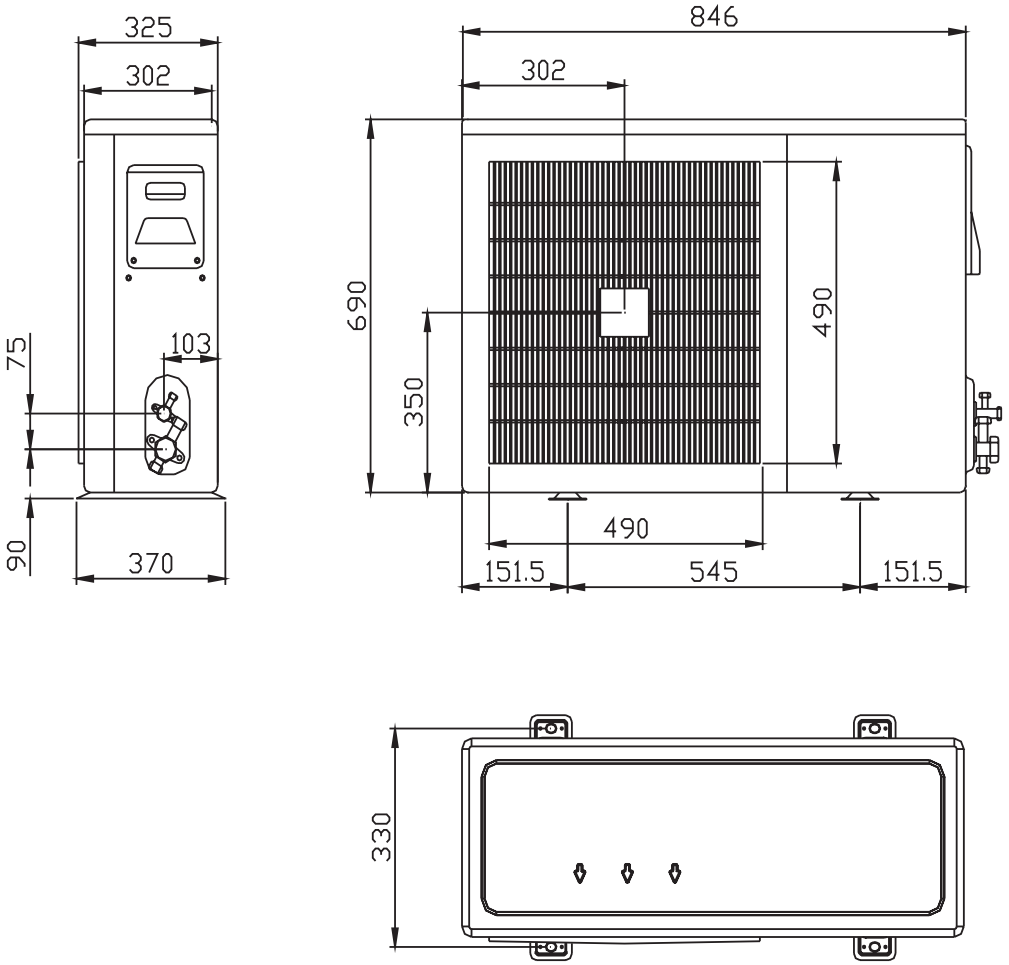
4.2 Outdoor Unit: GC 9 / 12 YBD 018



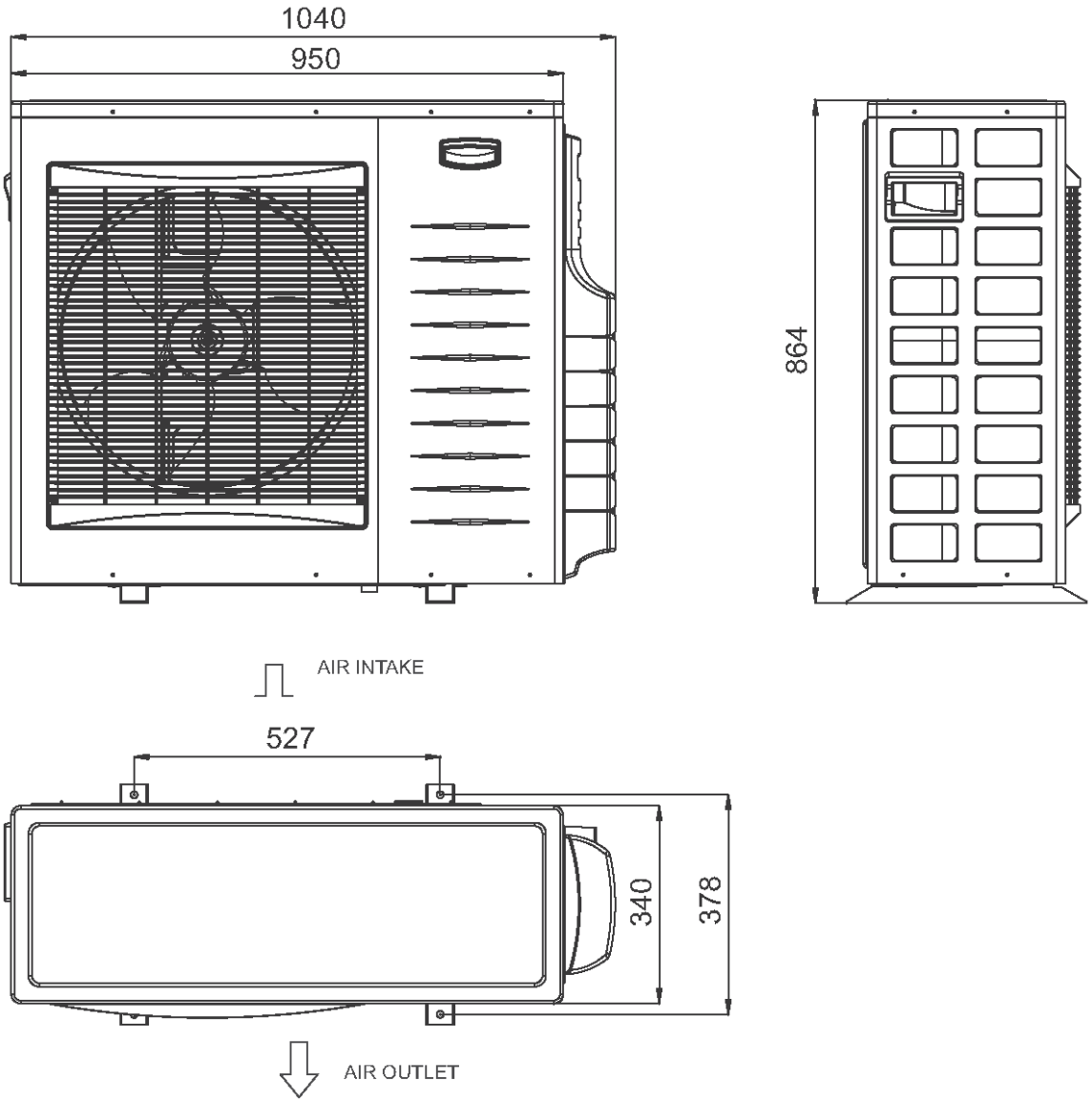
4.3 Indoor Unit: PNXA 18 / 21 / 24



4.4 Outdoor Unit: YBD 022



4.5 Outdoor Unit: YBD 024



5. PERFORMANCE DATA

5.1 PNXA 9 / GC 9 DCI

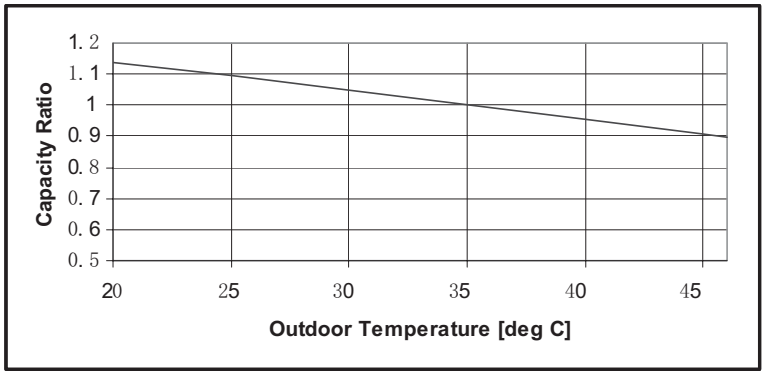
5.1.1 Cooling Capacity (kW) - Run Mode

OD COIL ENTERING AIR DB TEMPERATURE [C^0]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [ºC]				
		22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	2.46	2.61	2.75	2.90	3.04
	SC	1.71	1.74	1.76	1.79	1.81
	PI	0.38	0.39	0.40	0.40	0.41
30	TC	2.34	2.48	2.63	2.77	2.92
	SC	1.65	1.67	1.70	1.72	1.75
	PI	0.43	0.44	0.45	0.46	0.46
35	TC	2.21	2.36	**2.50**	2.65	2.79
	SC	1.58	1.60	**1.63**	1.66	1.68
	PI	0.48	0.49	**0.50**	0.51	0.52
40	TC	2.08	2.23	2.37	2.52	2.66
	SC	1.51	1.54	1.56	1.59	1.61
	PI	0.54	0.54	0.55	0.56	0.77
46	TC	1.93	2.08	2.22	2.37	2.51
	SC	1.43	1.46	1.48	1.51	1.53
	PI	0.60	0.61	0.62	0.62	0.63

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 Capacity Correction Factors



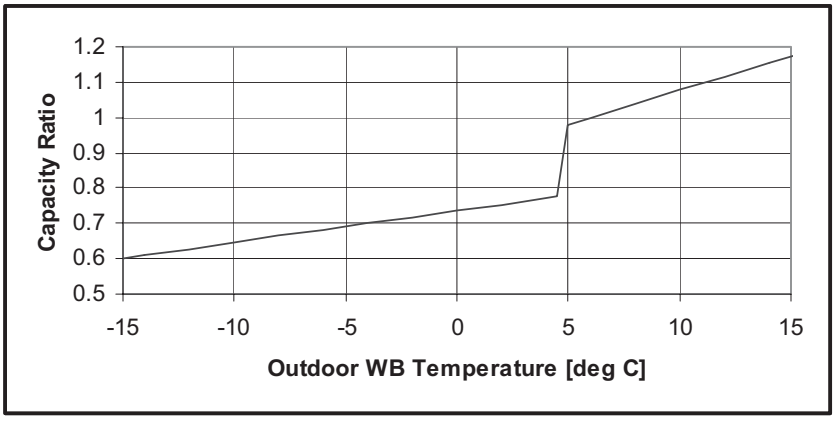
5.1.3 Heating Capacity (kW) - Run Mode)

		ID COIL ENTERING AIR DB TEMPERATURE [ºC]		
OD COIL ENTERING AIR DB/WB TEMPERATURE [ºC]	**DATA**	**15**	**20**	**25**
-15/-16	TC	1.37	1.17	0.97
	PI	0.42	0.45	0.48
-10/-12	TC	1.80	1.61	1.41
	PI	0.47	0.50	0.53
-7/-8	TC	2.13	1.93	1.74
	PI	0.52	0.55	0.58
-1/-2	TC	2.29	2.10	1.90
	PI	0.54	0.57	0.60
2/1	TC	2.40	2.21	2.01
	PI	0.55	0.58	0.61
7/6	TC	3.20	**3.00**	2.80
	PI	0.57	**0.60**	0.63
10/9	TC	3.36	3.17	2.97
	PI	0.58	0.61	0.64
15/12	TC	3.53	3.33	3.13
	PI	0.59	0.62	0.65
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

LEGEND

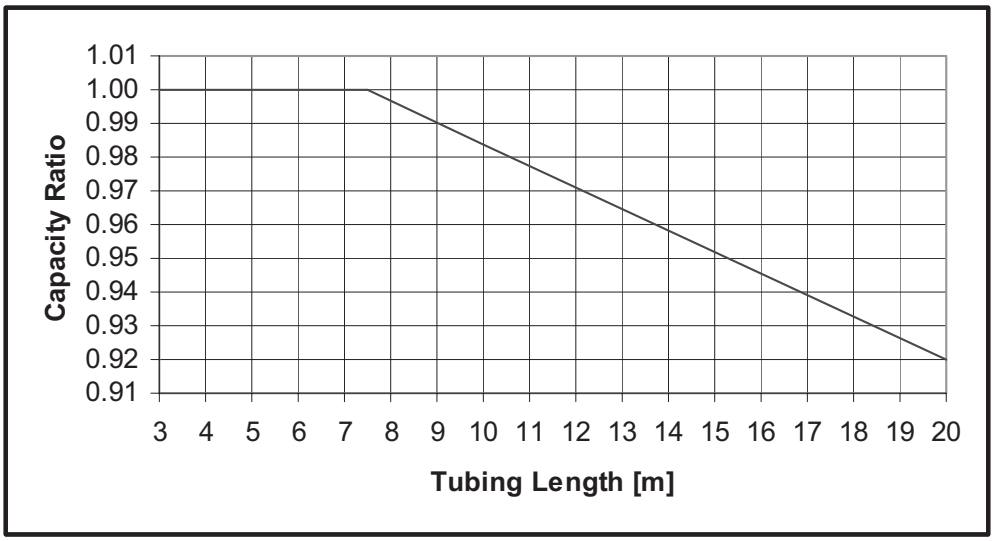
TC – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OU - Outdoor

5.1.4 Capacity Correction Factors

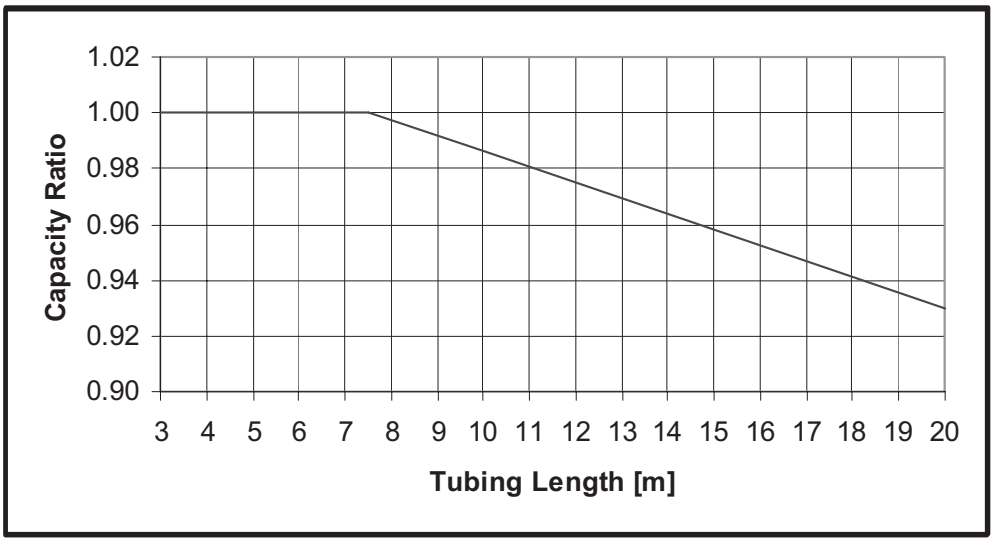


5.2 Capacity Correction Factor Due to Tubing Length

5.2.1 Cooling



5.2.2 Heating



5.3 PNXA 12 / GC 12 DCI

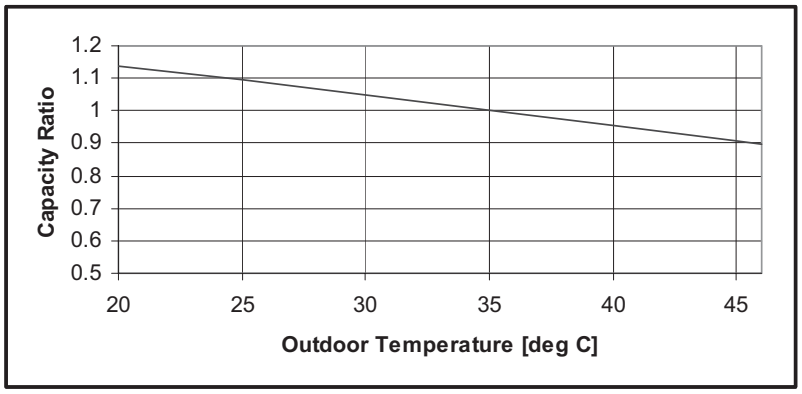
5.3.1 Cooling Capacity (kW) - Run Mode

OD COIL ENTERING AIR DB TEMPERATURE [ºC]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [ºC]				
		22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	3.45	3.65	3.85	4.06	4.26
	SC	2.50	2.54	2.58	2.61	2.65
	PI	0.66	0.67	0.69	0.70	0.72
30	TC	3.27	3.47	3.68	3.88	4.08
	SC	2.40	2.44	2.48	2.51	2.55
	PI	0.75	0.76	0.78	0.79	0.81
35	TC	3.09	3.30	**3.50**	3.70	3.91
	SC	2.31	2.34	**2.38**	2.42	2.45
	PI	0.84	0.86	**0.87**	0.88	0.90
40	TC	2.92	3.12	3.32	3.53	3.73
	SC	2.21	2.25	2.28	2.32	2.36
	PI	0.93	0.95	0.96	0.98	0.99
46	TC	2.71	2.91	3.11	3.31	3.52
	SC	2.09	2.13	2.17	2.20	2.24
	PI	1.04	1.06	1.07	1.09	1.10

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 Capacity Correction Factors



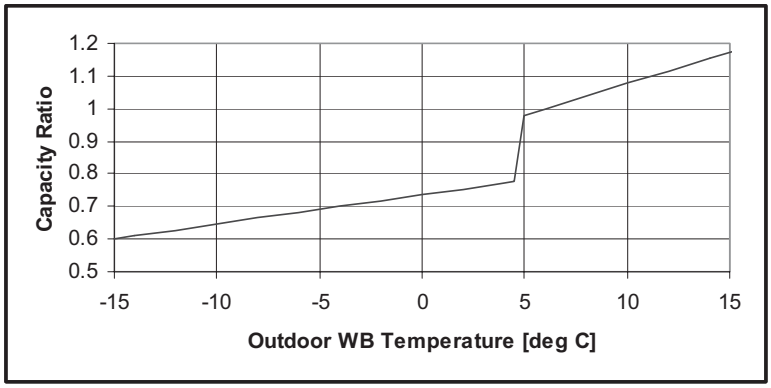
5.3.3 Heating Capacity (kW) - Run Mode

		ID COIL ENTERING AIR DB TEMPERATURE [ºC]		
OD COIL ENTERING AIR DB/WB TEMPERATURE [ºC]	**DATA**	**15**	**20**	**25**
-15/-16	TC	1.82	1.56	1.30
	PI	0.70	0.75	0.80
-10/-12	TC	2.40	2.14	1.88
	PI	0.79	0.84	0.89
-7/-8	TC	2.84	2.58	2.32
	PI	0.86	0.91	0.96
-1/-2	TC	3.06	2.80	2.53
	PI	0.89	0.94	0.99
2/1	TC	3.20	2.94	2.68
	PI	0.92	0.97	1.02
7/6	TC	4.26	**4.00**	3.74
	PI	0.95	**1.00**	1.05
10/9	TC	4.48	4.42	3.96
	PI	0.97	1.02	1.07
15/12	TC	4.70	4.44	4.18
	PI	0.99	1.04	1.09
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

LEGEND

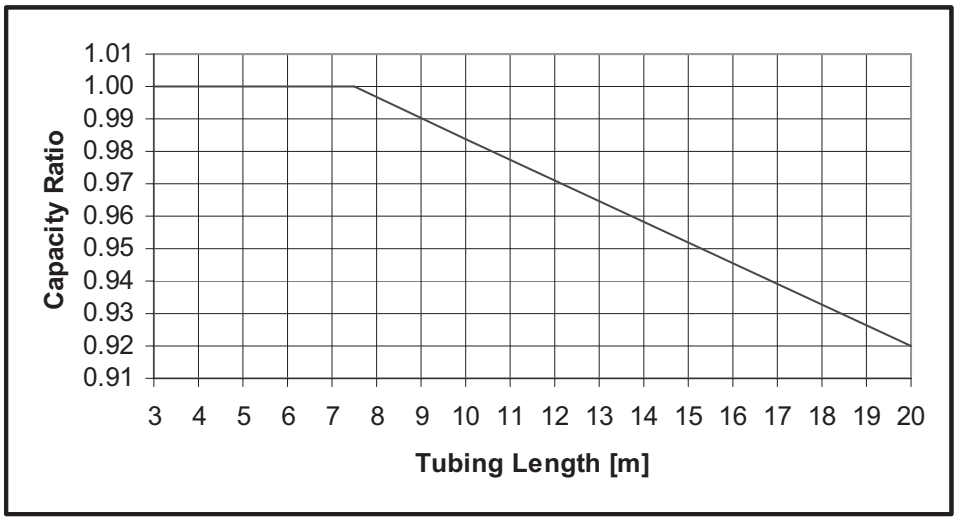
TC – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OU - Outdoor

5.3.4 Capacity Correction Factors

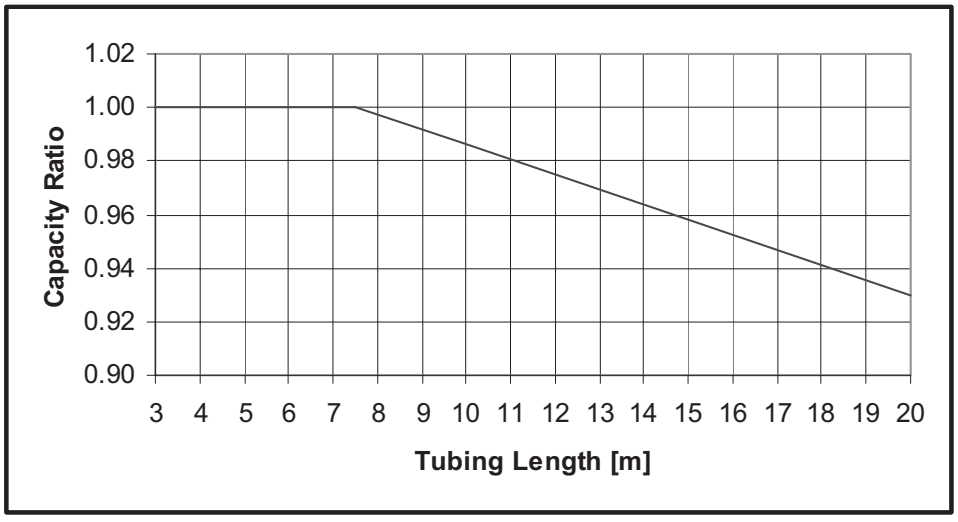


5.4 Capacity Correction Factor Due to TUbing Length

5.4.1 Cooling



5.4.2 Heating



5.5 PNXA 18 / YBD 018

5.5.1 Cooling Capacity (kW) - Run Mode

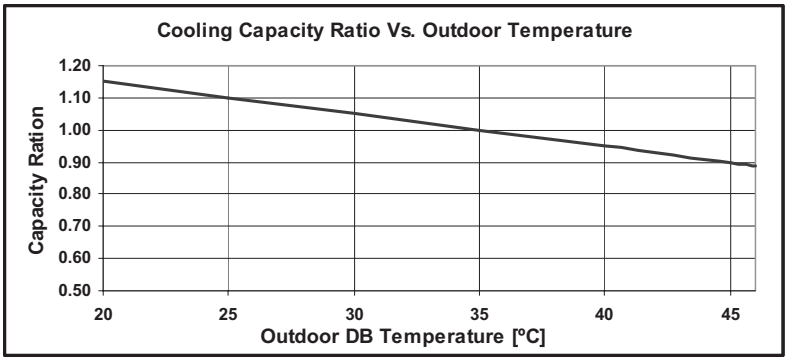
230[V] : Indoor Fan at High Speed.

OD COIL ENTERING AIR DB TEMPERATURE [°C]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [°C] 22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	4.93	5.22	5.51	5.80	6.09
	SC	4.10	4.16	4.22	4.28	4.34
	PI	1.04	1.06	1.08	1.11	1.13
30	TC	4.67	4.96	5.25	5.54	5.83
	SC	3.94	4.00	4.06	4.12	4.18
	PI	1.18	1.20	1.23	1.25	1.27
35	TC	4.42	4.71	**5.00**	5.29	5.58
	SC	3.78	3.84	**3.90**	3.96	4.02
	PI	1.32	1.35	**1.37**	1.39	1.42
40	TC	4.17	4.46	4.75	5.04	5.53
	SC	3.62	3.68	3.74	3.80	3.86
	PI	1.47	1.49	1.51	1.54	1.56
46	TC	3.86	4.15	4.44	4.73	5.02
	SC	3.43	3.49	3.55	3.61	3.67
	PI	1.64	1.66	1.69	1.71	1.73

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
OD – Outdoor

5.5.2 Capacity Correction Factors



5.5.3 Heating Capacity (kW) - Run Mode)

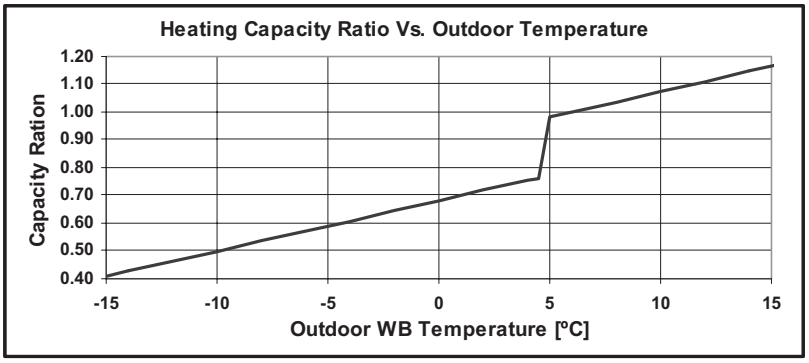
230[V] : Indoor Fan at High Speed.

		ID COIL ENTERING AIR DB TEMPERATURE [°C]		
OD COIL ENTERING AIR DB/WB TEMPERATURE [°C]	**DATA**	**15**	**20**	**25**
-15/-16	TC	2.55	2.18	1.81
	PI	1.02	1.09	1.17
-10/-12	TC	3.36	3.00	2.63
	PI	1.15	1.23	1.30
-7/-8	TC	3.98	3.61	3.24
	PI	1.25	1.33	1.40
-1/-2	TC	4.28	3.91	3.55
	PI	1.30	1.38	1.45
2/1	TC	4.49	4.12	3.75
	PI	1.34	1.41	1.48
7/6	TC	5.97	**5.60**	5.23
	PI	1.39	**1.46**	1.53
10/9	TC	6.28	5.91	5.54
	PI	1.41	1.49	1.56
15/12	TC	6.59	6.22	5.85
	PI	1.44	1.51	1.59
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

LEGEND

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

5.5.4 Capacity Correction Factors



5.6 PNXA 21 / YBD 022

5.6.1 Cooling Capacity (kW) - Run Mode

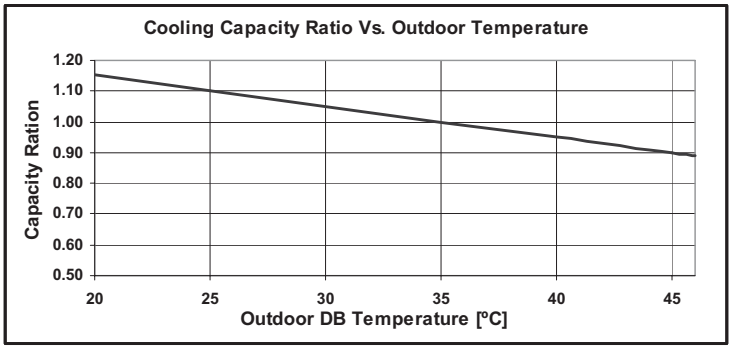
230[V] : Indoor Fan at High Speed.

OD COIL ENTERING AIR DB TEMPERATURE [^{0}C]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [^{0}C] 22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	5.91	6.26	6.61	6.95	7.30
	SC	4.64	4.71	4.78	4.85	4.92
	PI	1.38	1.41	1.44	1.47	1.50
30	TC	5.61	5.96	6.30	6.65	7.00
	SC	4.46	4.53	4.60	4.67	4.74
	PI	1.57	1.60	1.63	1.66	1.69
35	TC	5.30	5.65	**6.00**	6.35	6.70
	SC	4.28	4.35	**4.42**	4.49	4.56
	PI	1.76	1.79	**1.82**	1.85	1.88
40 (Protection Range)	TC	5.00	5.35	5.70	6.05	6.39
	SC	4.10	4.17	4.24	4.31	4.38
	PI	1.95	1.98	2.01	2.04	2.07
46 (Protection Range)	TC	4.64	4.99	5.33	5.68	6.03
	SC	3.88	3.95	4.02	4.09	4.16
	PI	2.18	2.21	2.24	2.27	2.30

LEGEND

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

5.6.2 Capacity Correction Factors



5.6.3 Heating Capacity (kW) - Run Mode

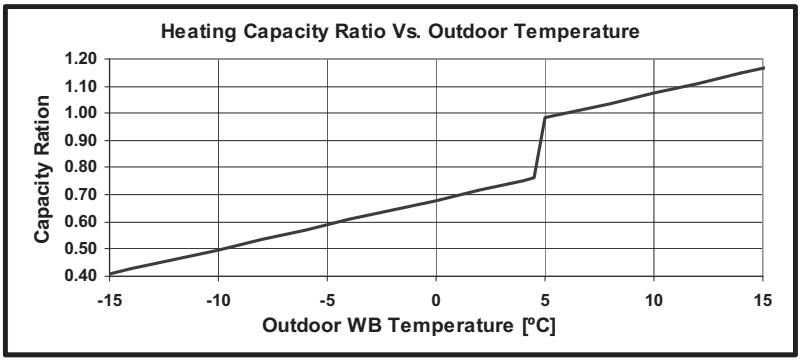
230[V] : Indoor Fan at High Speed.

		ID COIL ENTERING AIR DB TEMPERATURE [°C]		
OD COIL ENTERING AIR DB/WB TEMPERATURE [°C]	**DATA**	**15**	**20**	**25**
-15/-16	TC	2.87	2.45	2.04
	PI	1.19	1.27	1.36
-10/-12	TC	3.78	3.37	2.96
	PI	1.34	1.43	1.51
-7/-8	TC	4.47	4.06	3.65
	PI	1.46	1.54	1.63
-1/-2	TC	4.82	4.40	3.99
	PI	1.52	1.60	1.69
2/1	TC	5.05	4.63	4.22
	PI	1.56	1.64	1.73
7/6	TC	6.71	**6.30**	5.89
	PI	1.62	**1.70**	1.79
10/9	TC	7.06	6.65	6.24
	PI	1.65	1.73	1.82
15/12	TC	7.41	7.00	6.58
	PI	1.68	1.76	1.85
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

LEGEND

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

5.6.4 Capacity Correction Factors



5.7 PNXA 24 / YBD 024

5.7.1 Cooling Capacity (kW) - Run Mode

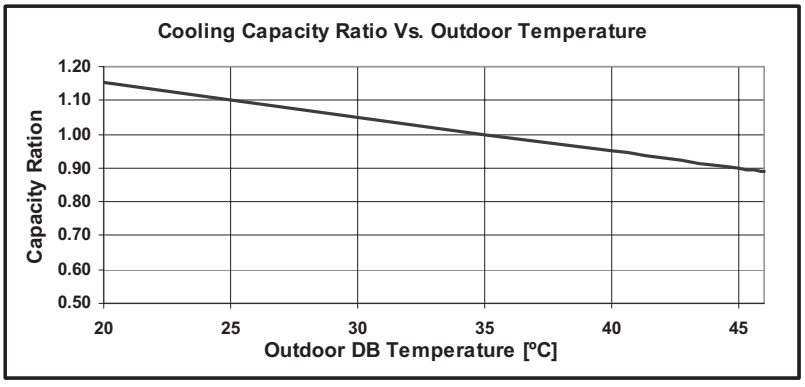
230[V] : Indoor Fan at High Speed.

OD COIL ENTERING AIR DB TEMPERATURE [°C]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [°C]				
		22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	6.70	7.09	7.49	7.88	8.28
	SC	5.04	5.12	5.19	5.27	5.34
	PI	1.70	1.74	1.78	1.82	1.85
30	TC	6.35	6.75	7.14	7.54	7.93
	SC	4.85	4.92	5.00	5.07	5.15
	PI	1.94	1.98	2.01	2.05	2.09
35	TC	6.01	6.41	**6.80**	7.19	7.59
	SC	4.65	4.73	**4.80**	4.87	4.95
	PI	2.17	2.21	**2.25**	2.29	2.33
40 (Protection Range)	TC	5.67	6.06	6.46	6.85	7.25
	SC	4.45	4.53	4.60	4.68	4.75
	PI	2.41	2.45	2.49	2.52	2.56
46 (Protection Range)	TC	5.26	5.65	6.04	6.44	6.83
	SC	4.22	4.29	4.37	4.44	4.52
	PI	2.69	2.73	2.77	2.81	2.85

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
OD – Outdoor

5.7.2 Capacity Correction Factors



5.7.3 Heating Capacity (kW) - Run Mode

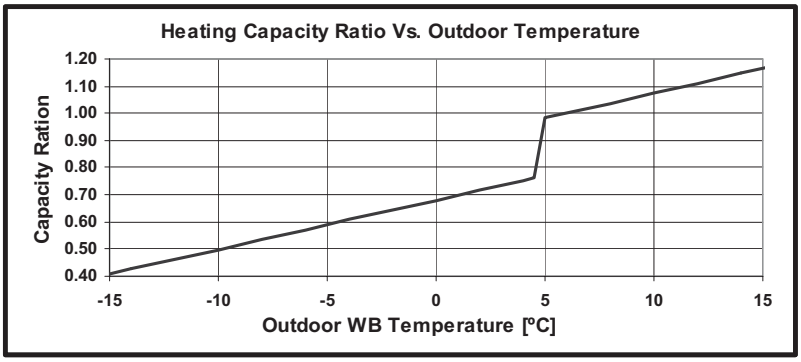
230[V] : Indoor Fan at High Speed.

OD COIL ENTERING AIR DB/WB TEMPERATURE [°C]	DATA	ID COIL ENTERING AIR DB TEMPERATURE [°C]		
		15	20	25
-15/-16	TC	3.46	2.96	2.46
	PI	1.64	1.76	1.88
-10/-12	TC	4.57	4.07	3.57
	PI	1.86	1.97	2.09
-7/-8	TC	5.40	4.90	4.40
	PI	2.02	2.14	2.25
-1/-2	TC	5.81	5.31	4.81
	PI	2.10	2.22	2.33
2/1	TC	6.09	5.59	5.09
	PI	2.15	2.27	2.39
7/6	TC	8.10	**7.60**	7.10
	PI	2.23	**2.35**	2.47
10/9	TC	8.52	8.02	7.52
	PI	2.28	2.39	2.51
15/12	TC	8.94	8.44	7.94
	PI	2.32	2.44	2.55
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

LEGEND

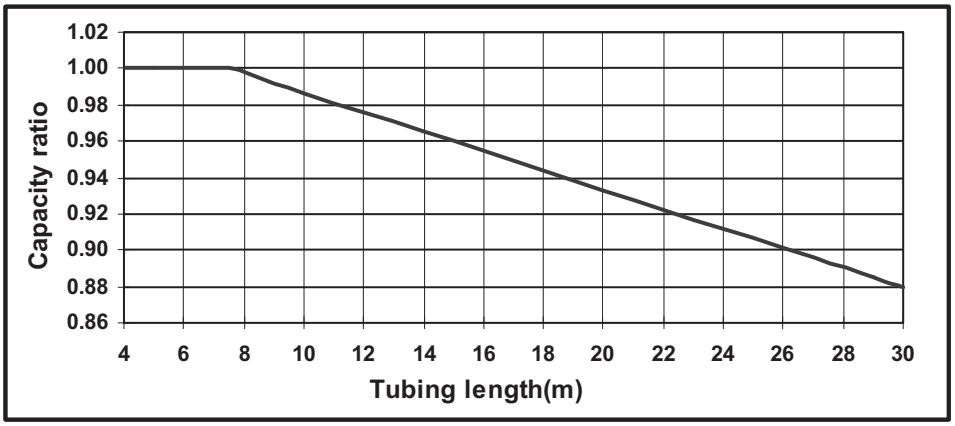
TC – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OD – Outdoor

5.7.4 Capacity Correction Factors

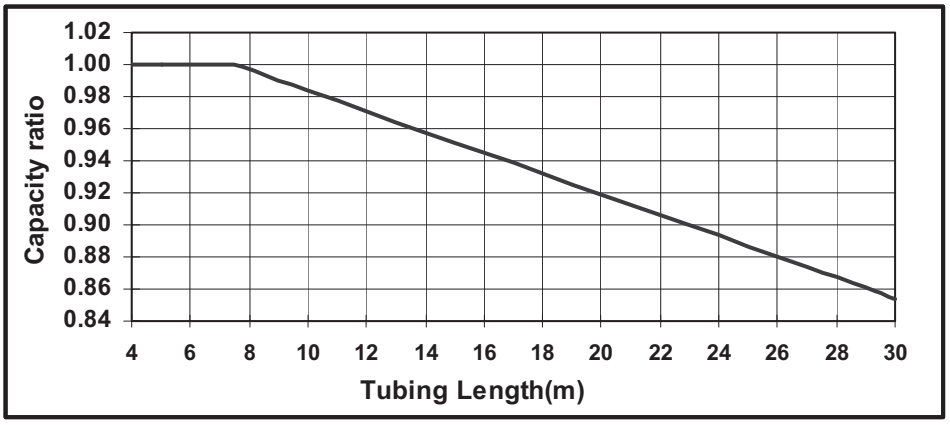


5.8 Capacity Correction Factor Due to Tubing Length

5.8.1 Cooling

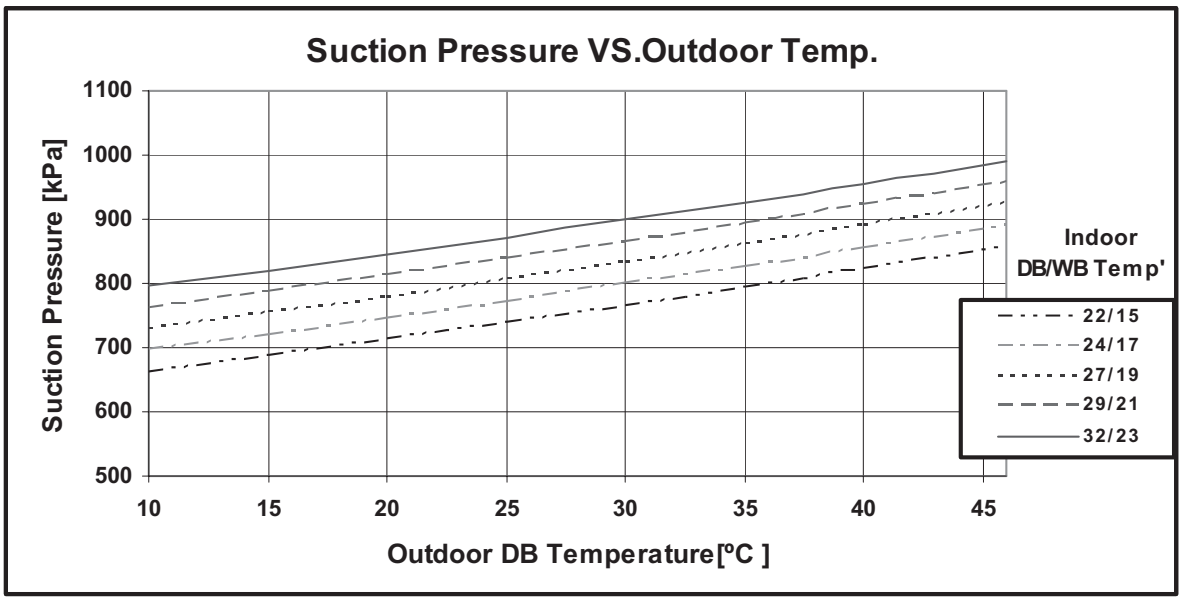


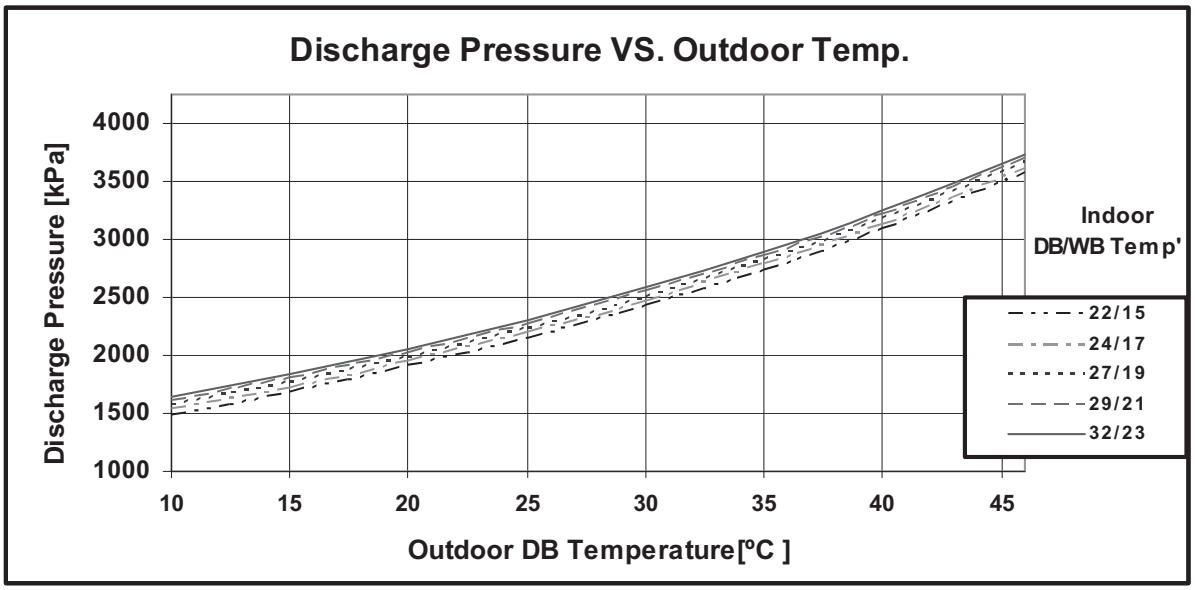
5.8.2 Heating



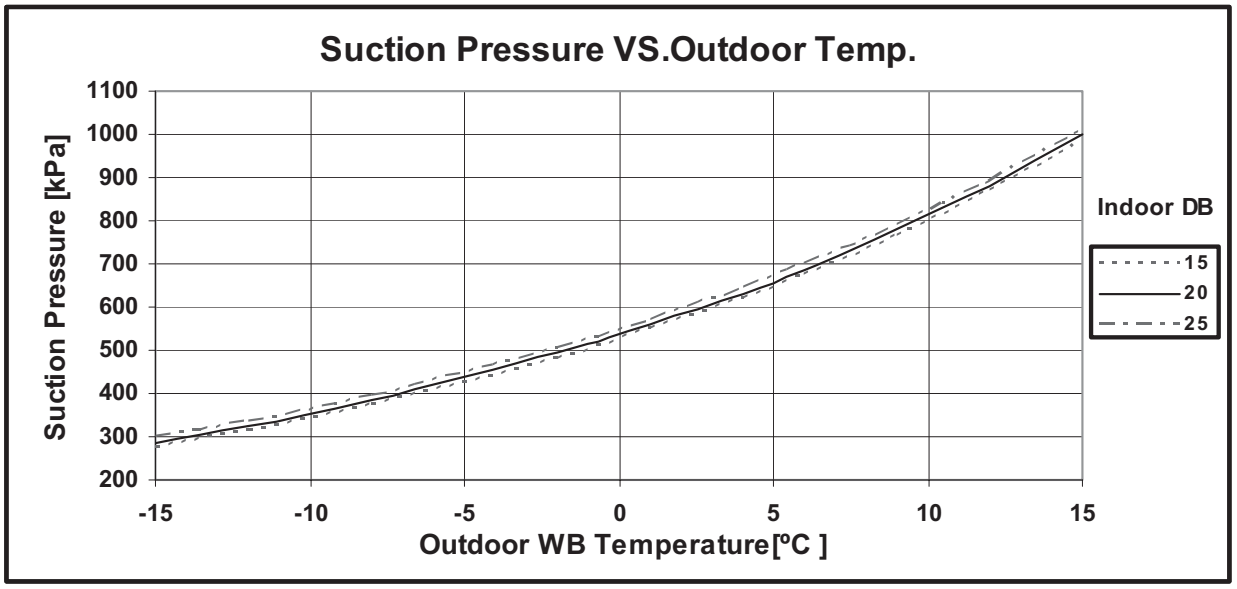
5.9 Pressure Curves

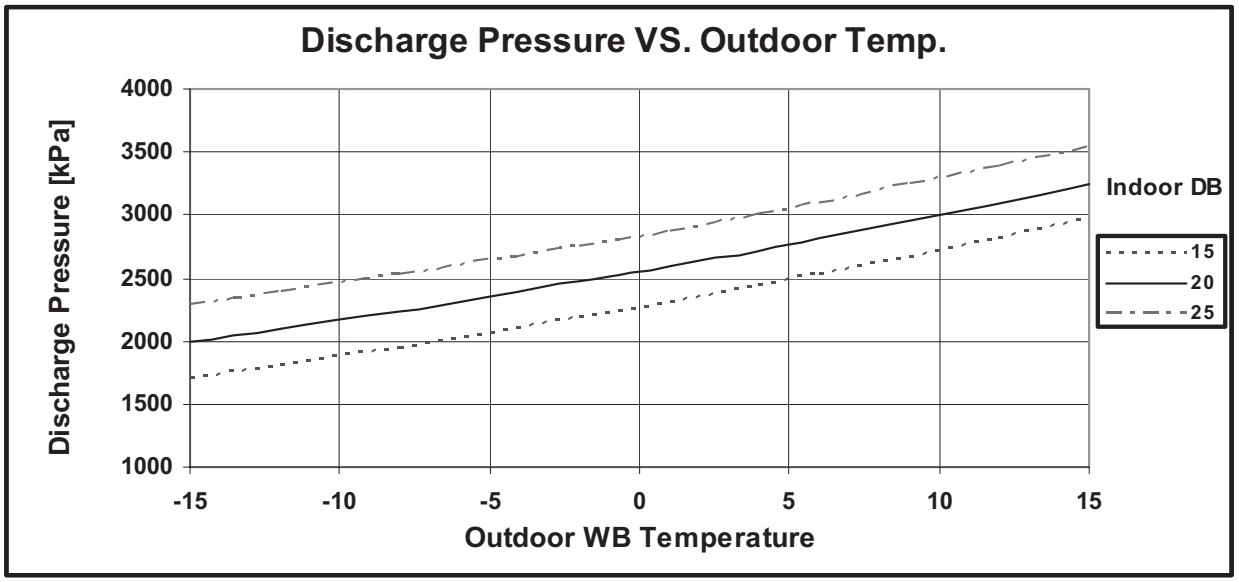
5.9.1. Model: PNXA 18 / YBD 018 Cooling — Test Mode



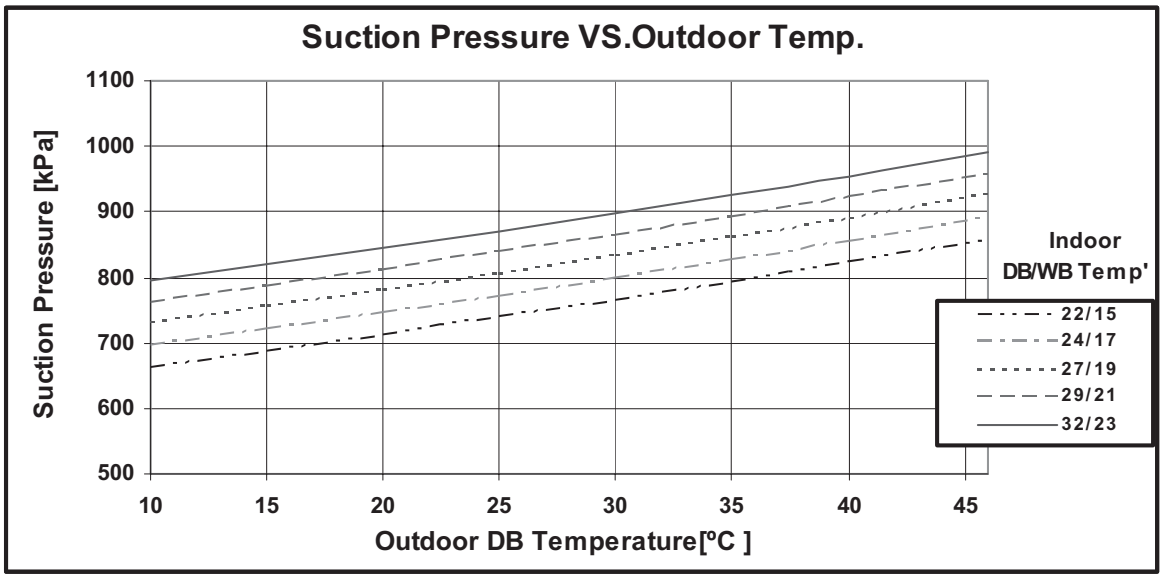


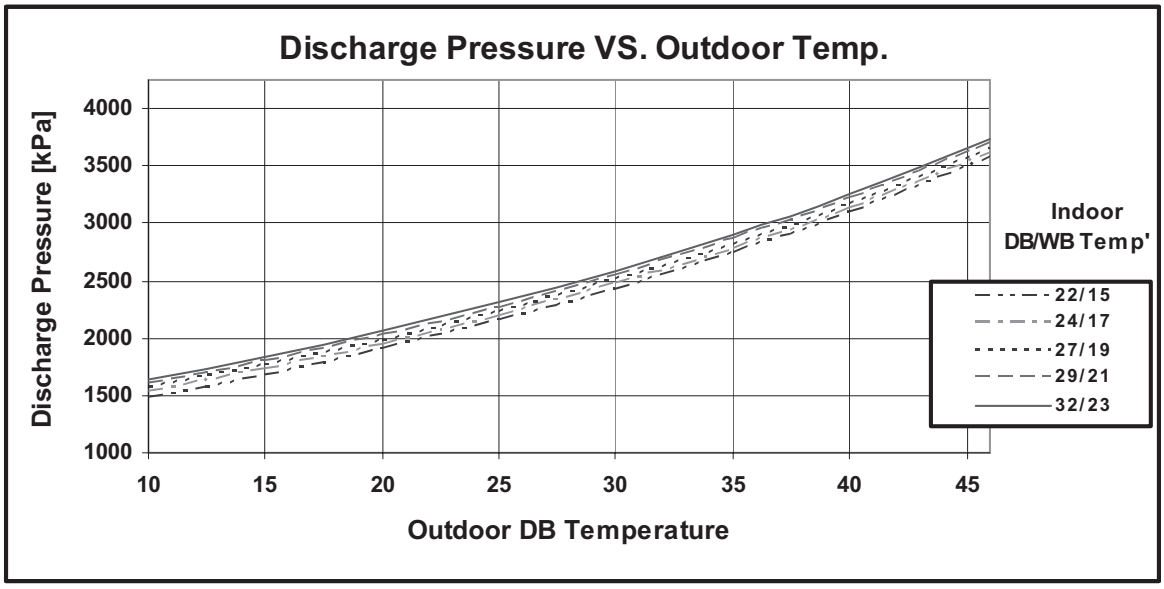
5.9.2. Heating — Test Mode



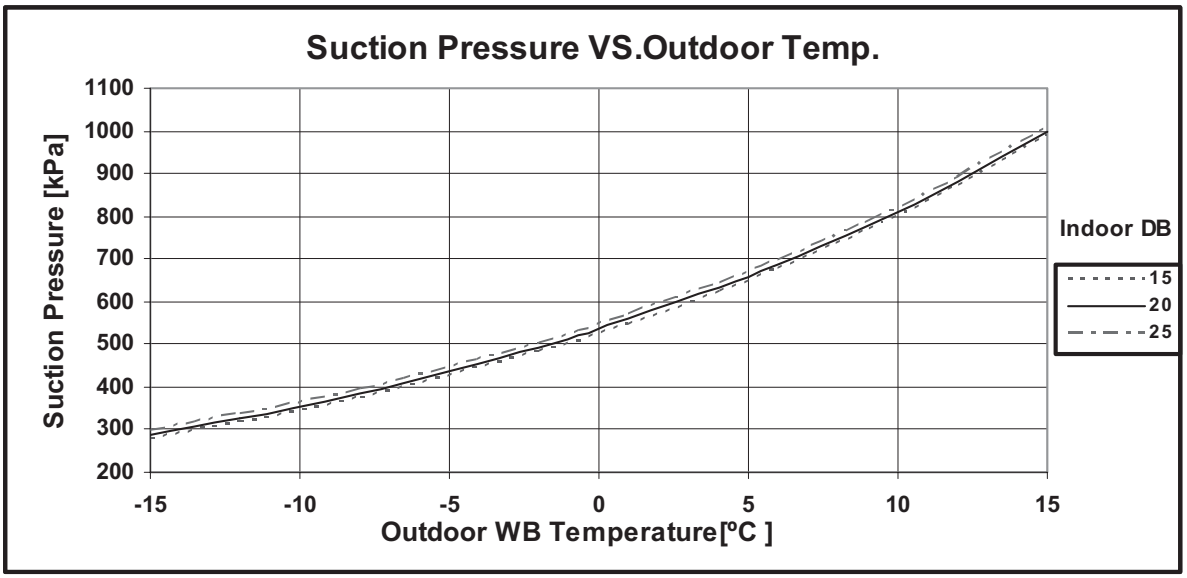


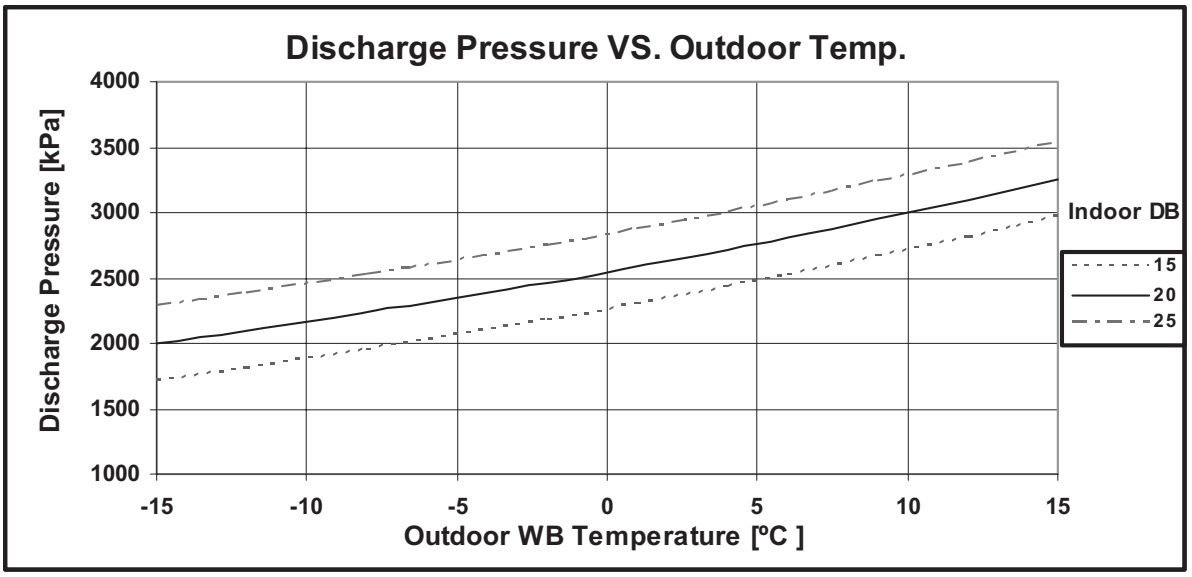
5.9.3 Model: PNXA 21 / YBD 022 Cooling — Test Mode.



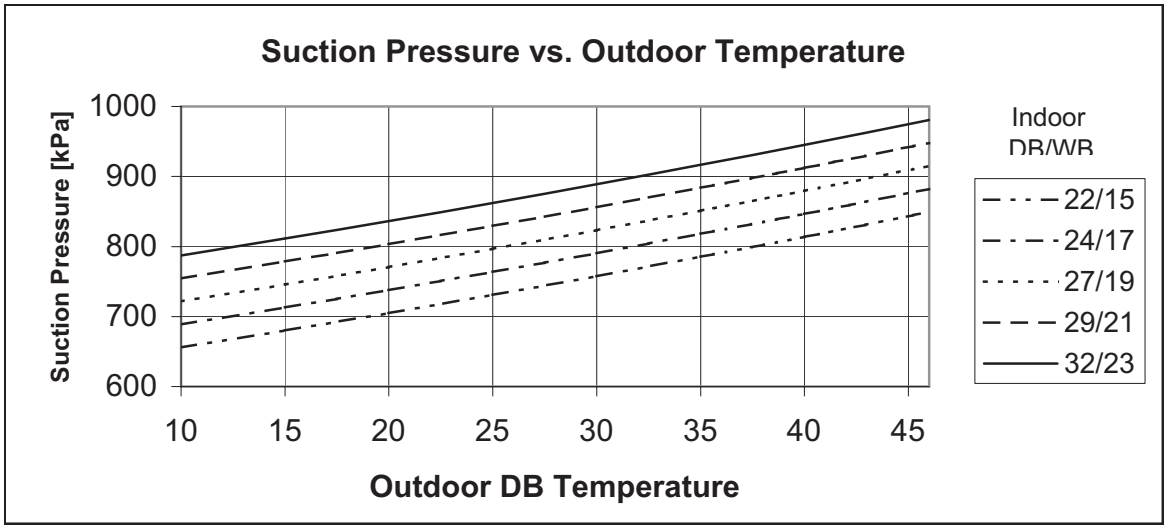


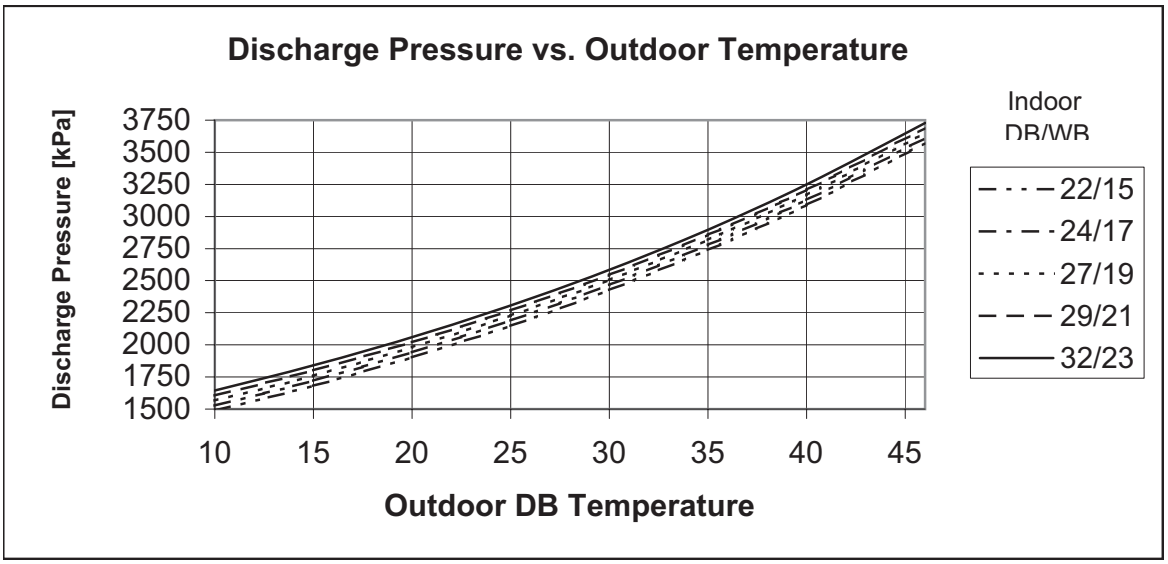
5.9.4 Heating — Test Mode



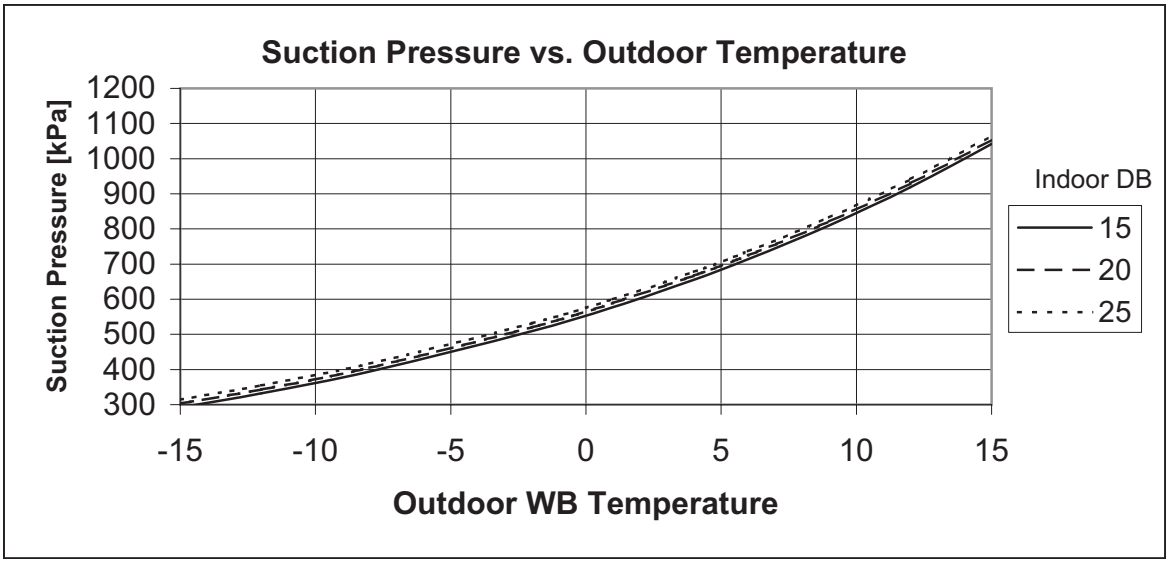


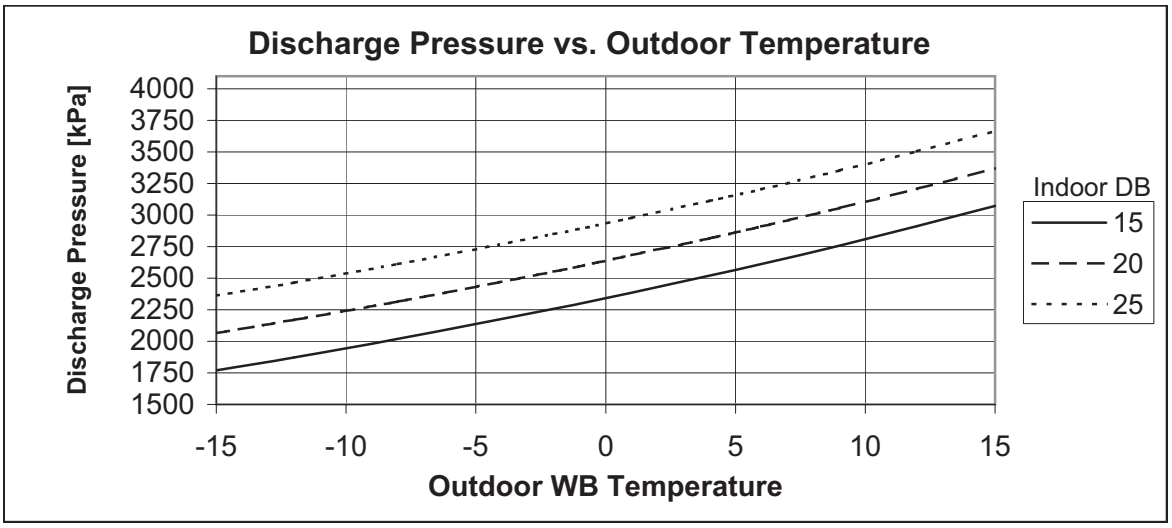
5.9.5 Model: PNXA 24 / YBD 024 Cooling — Test Mode.



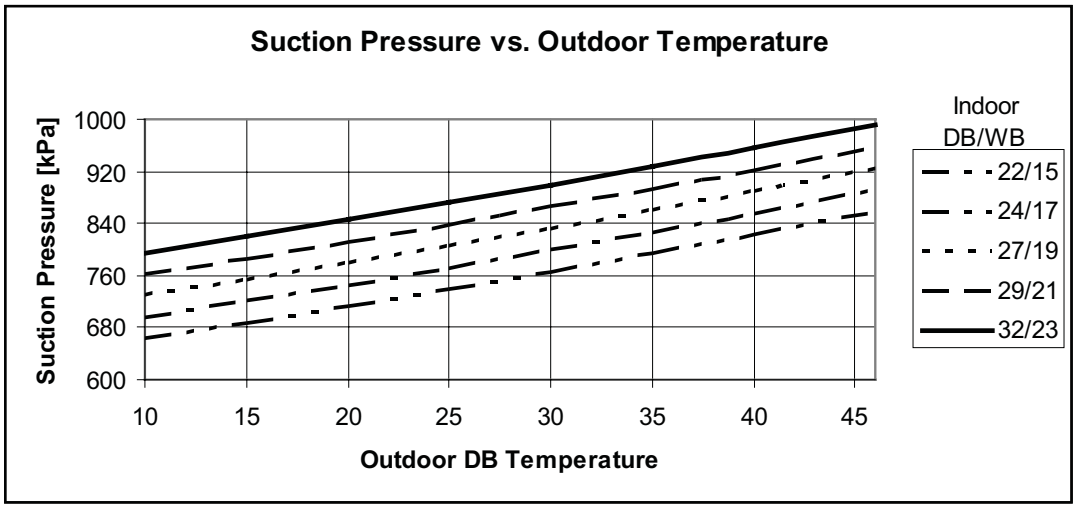


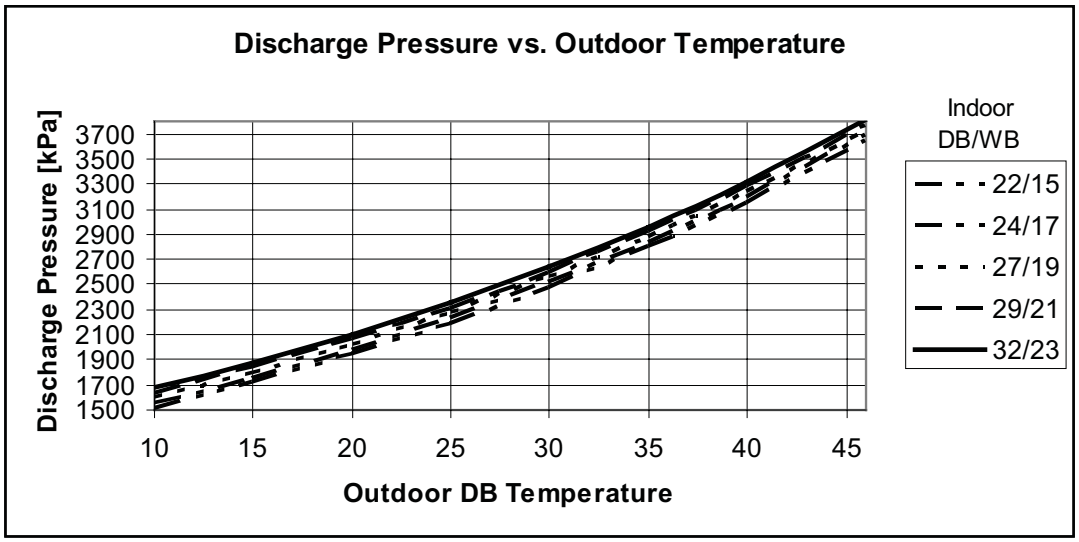
5.9.6 Heating — Test Mode



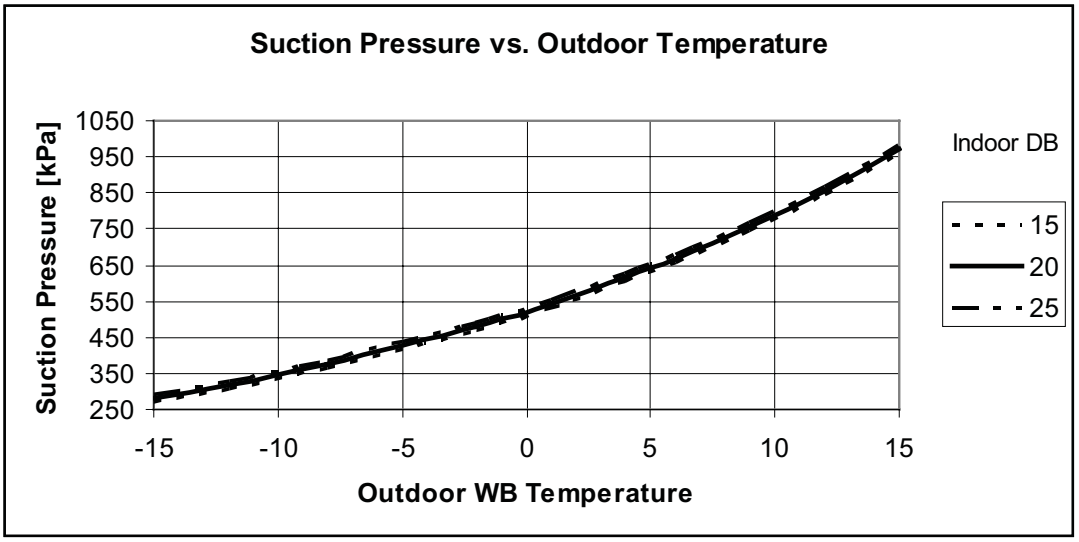


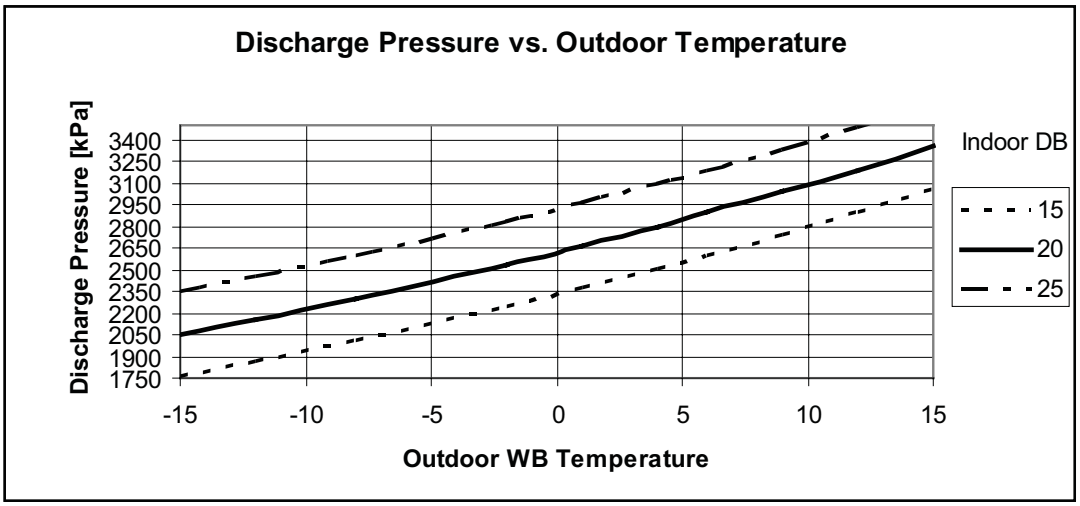
5.9.7 Model: PNXA 9 / GC 9 DCI Cooling—Test Mode.



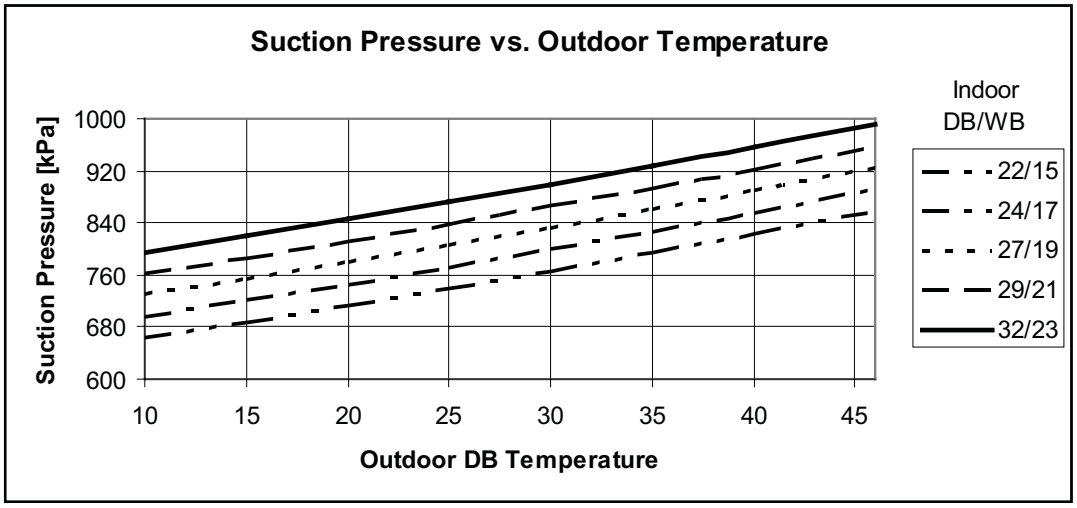


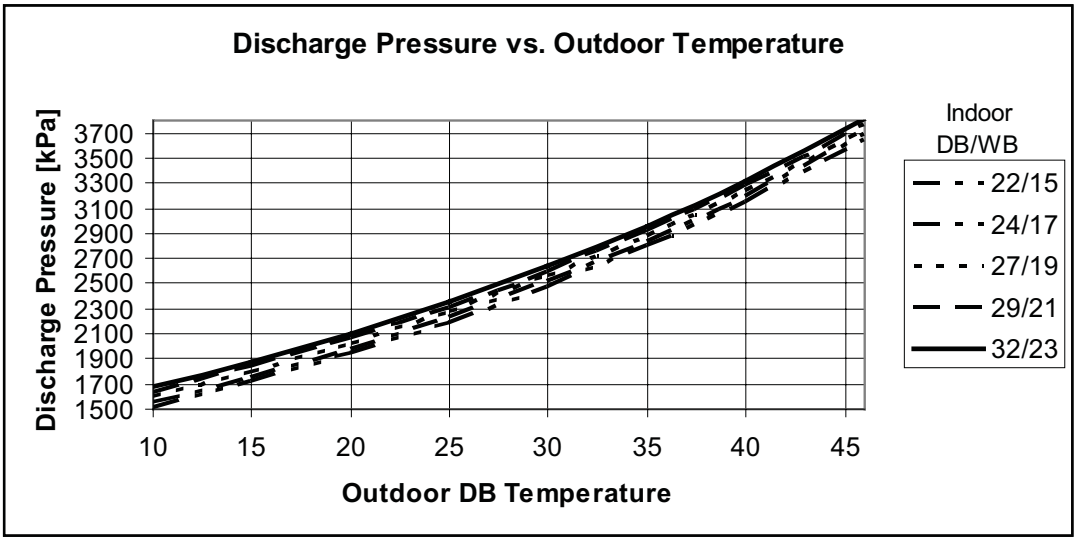
5.9.8 Heating — Test Mode



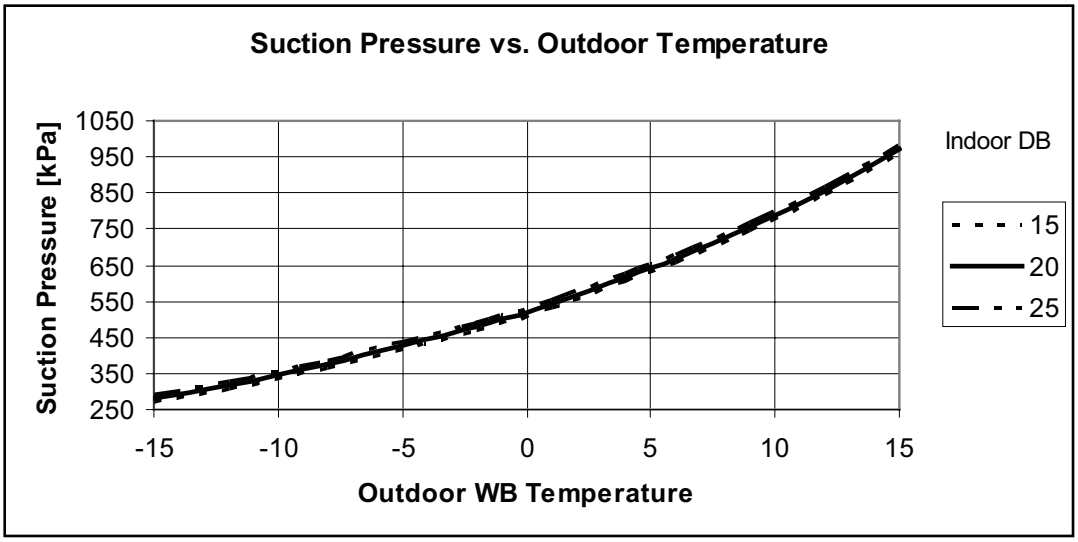


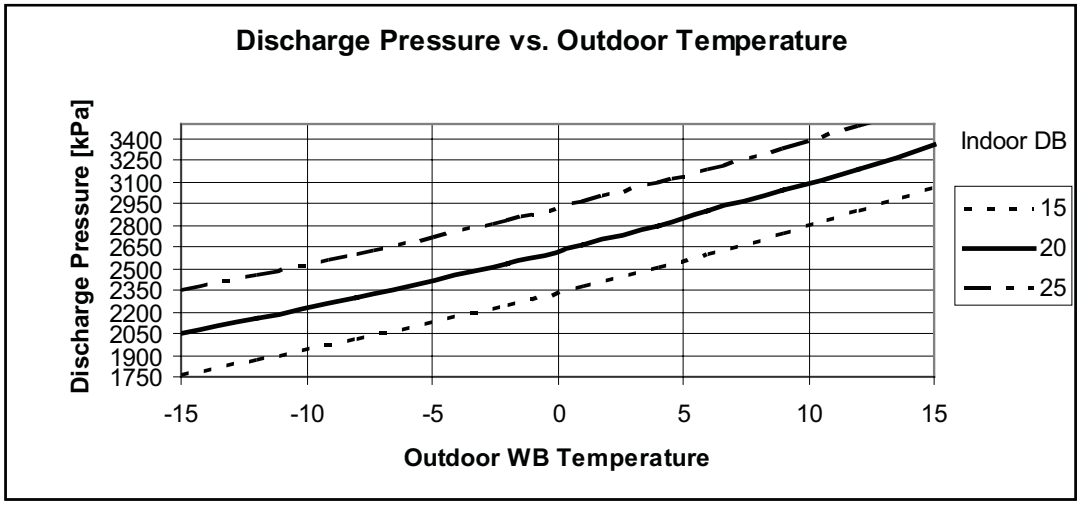
5.9.9 Model: PNXA 12 / GC 12 DCI Cooling — Test Mode.





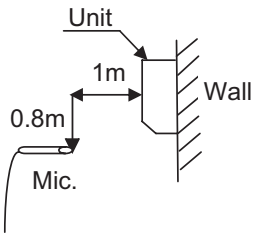
5.9.10 Heating — Test Mode





6. SOUND LEVEL CHARACTERISTICS

6.1 Sound Pressure Level

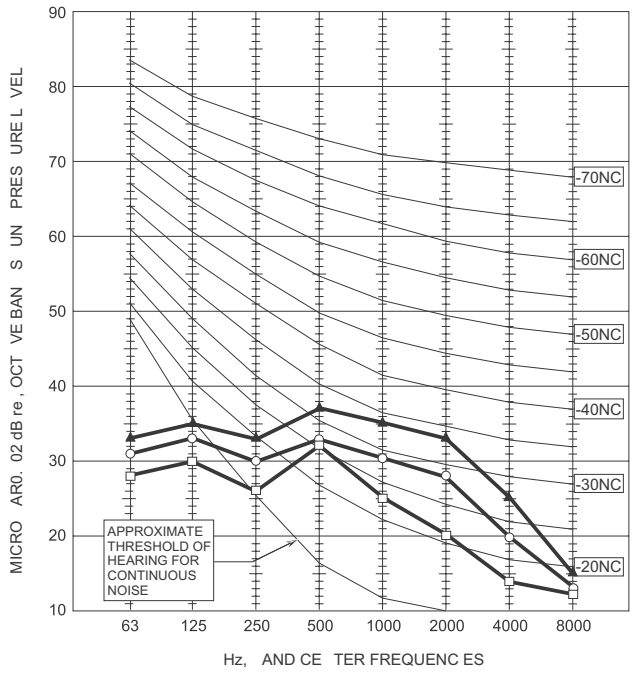


FAN SPEED	LINE
HI	▲
ME	○
LO	□

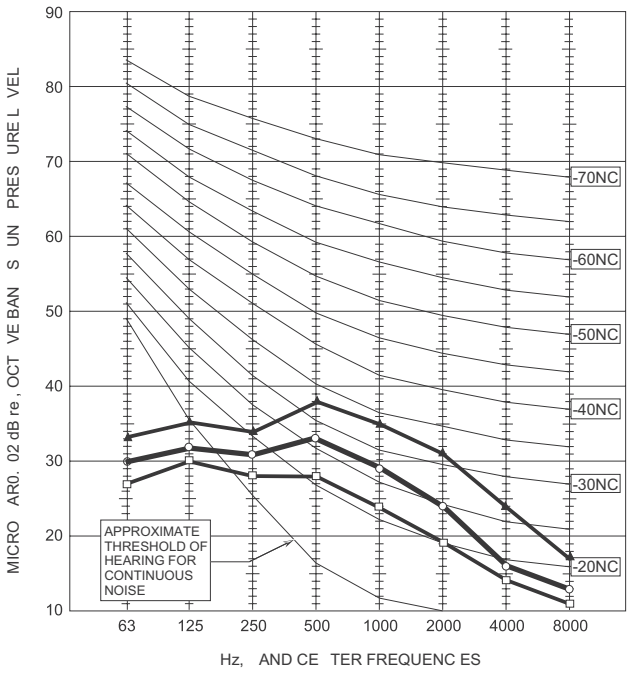
Figure 1

6.2 Sound Pressure Level Spectrum (Measured as Figure 1)

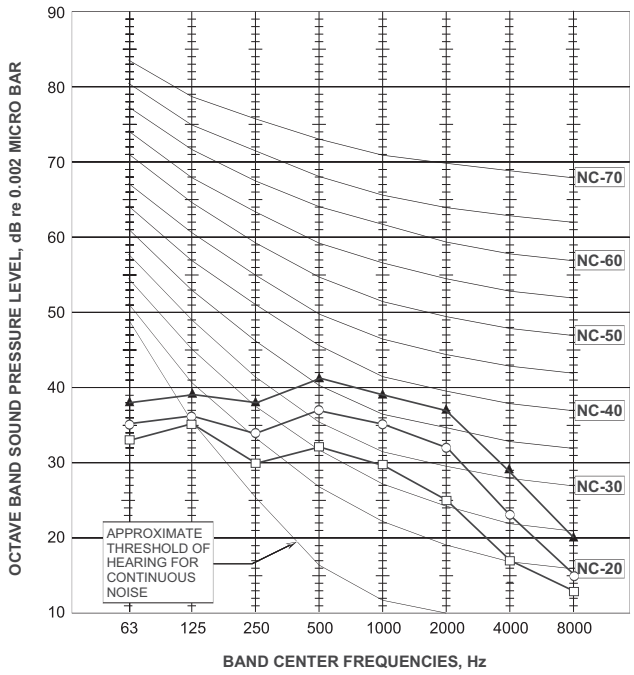
PNXA 9



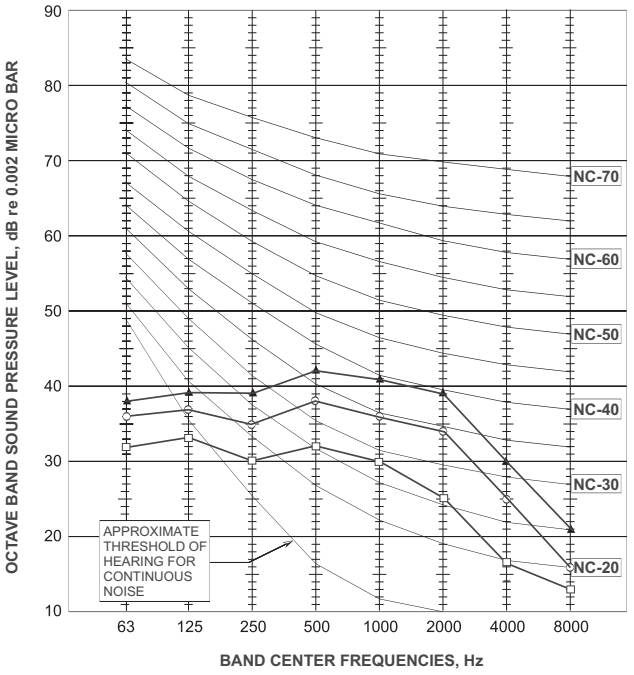
PNXA 12



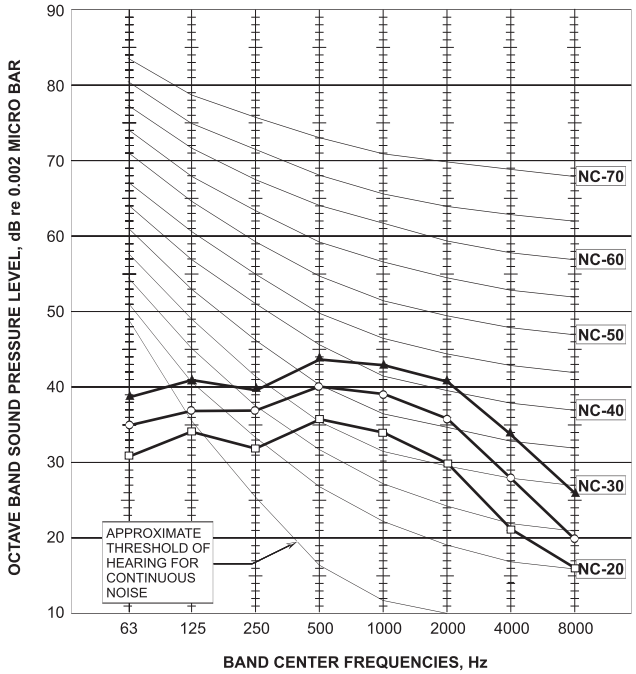
PNXA 18



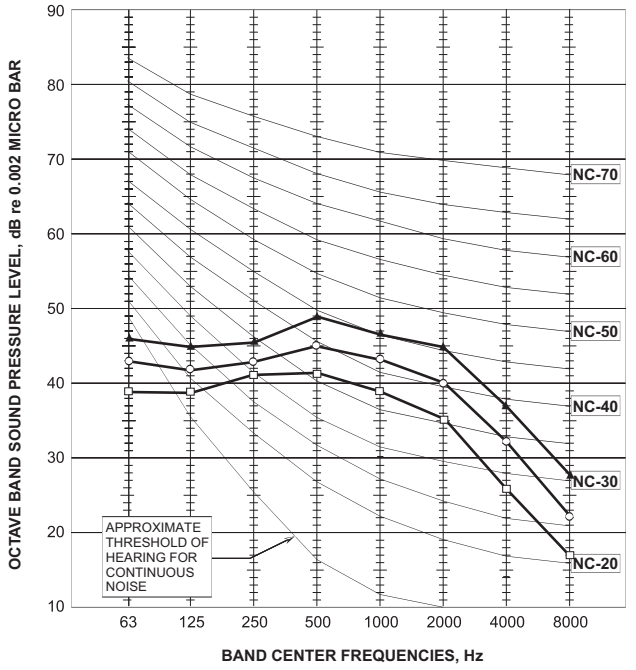
PNXA 21



PNXA 24



FLO 30



6.3 Outdoor units

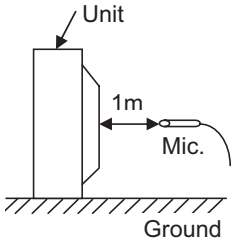
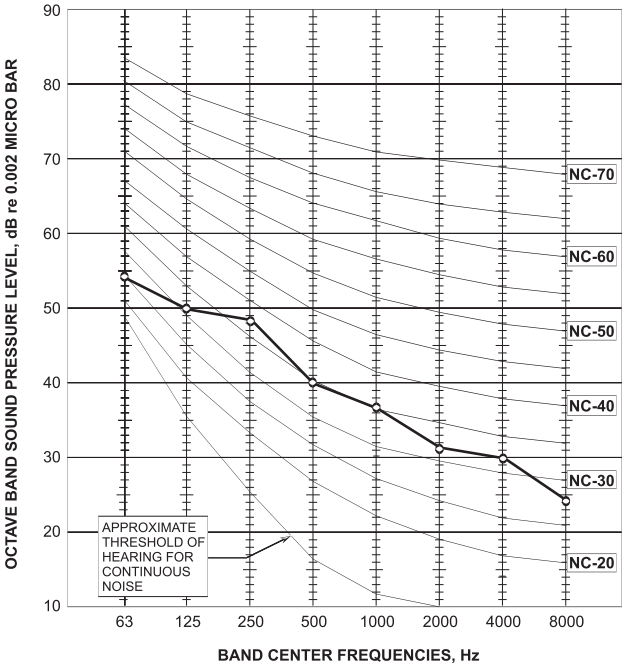


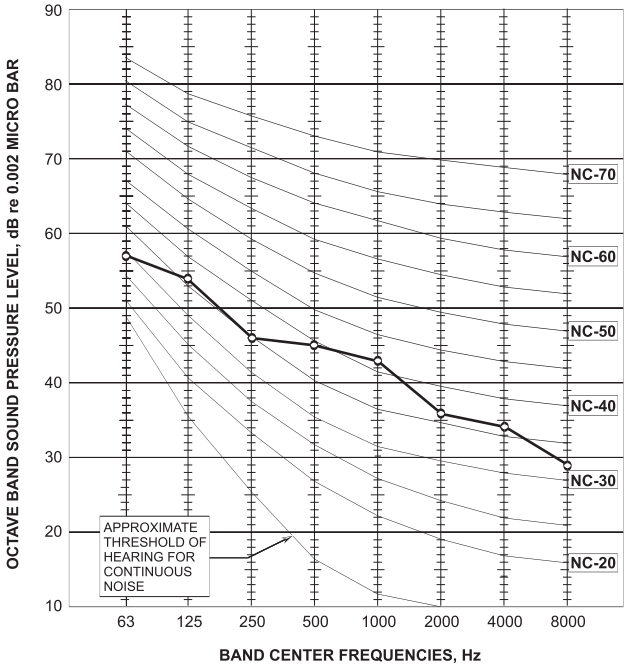
Figure 2

6.4 Sound Pressure Level Spectrum (Measured as Figure 2)

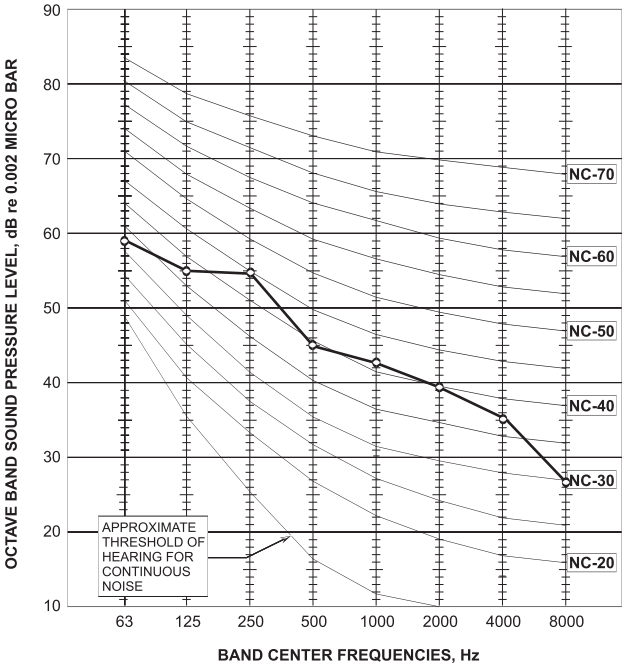
GC 9 DCI Cooling



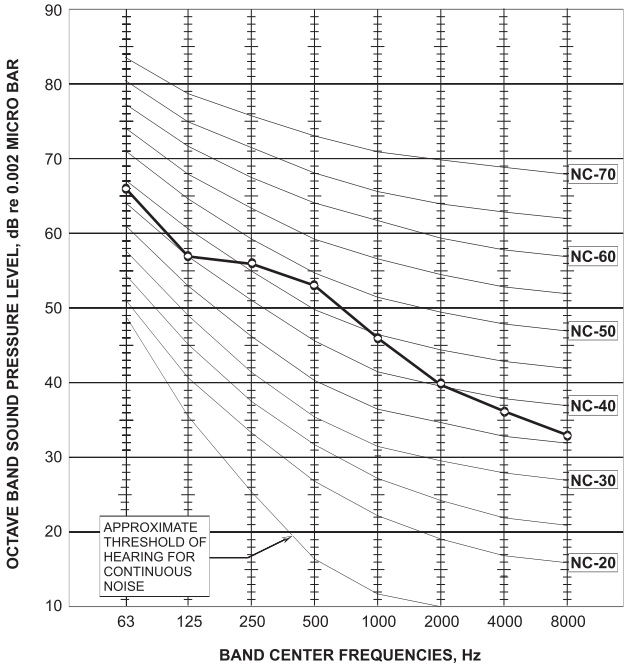
GC 9 DCI Heating



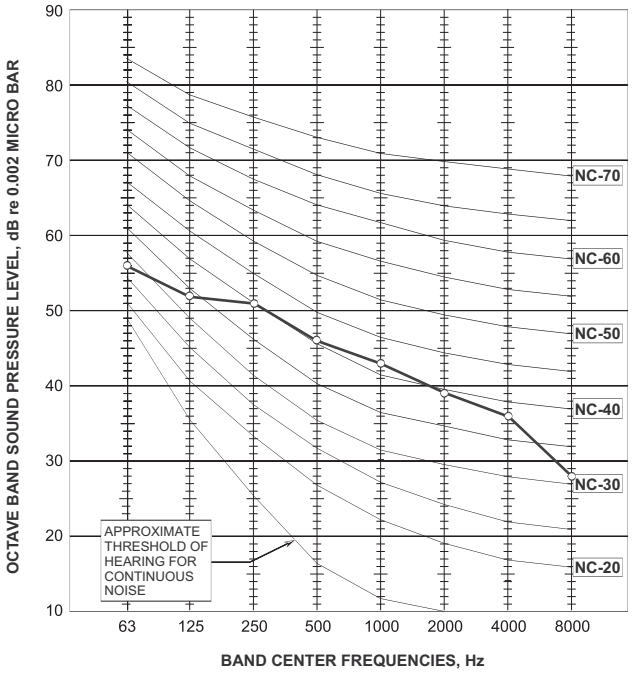
GC 12 DCI Cooling



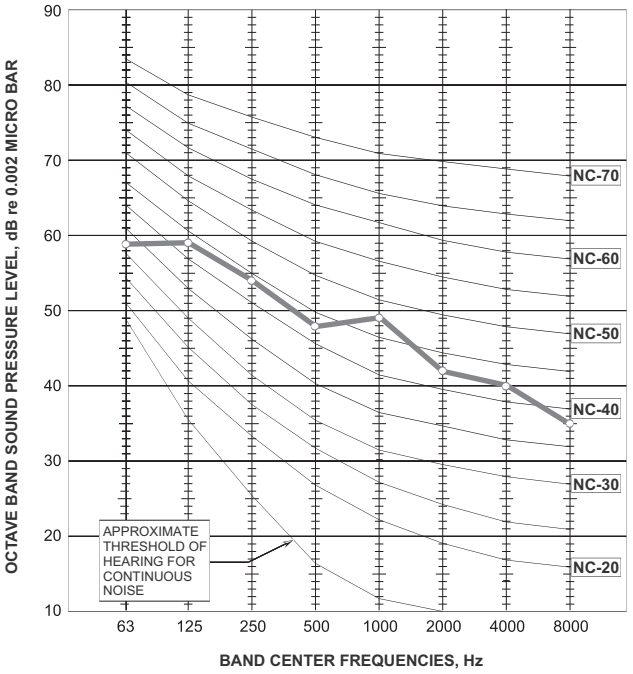
GC 12 DCI Heating



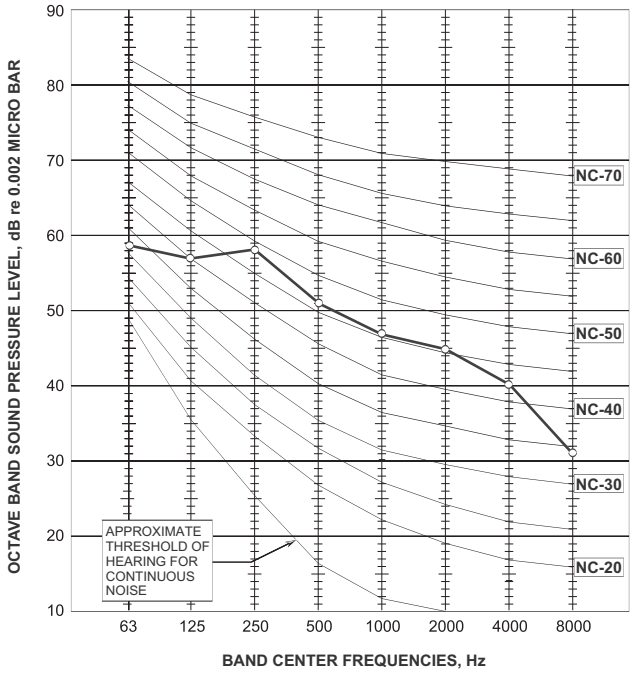
YBD 018 DCI Cooling



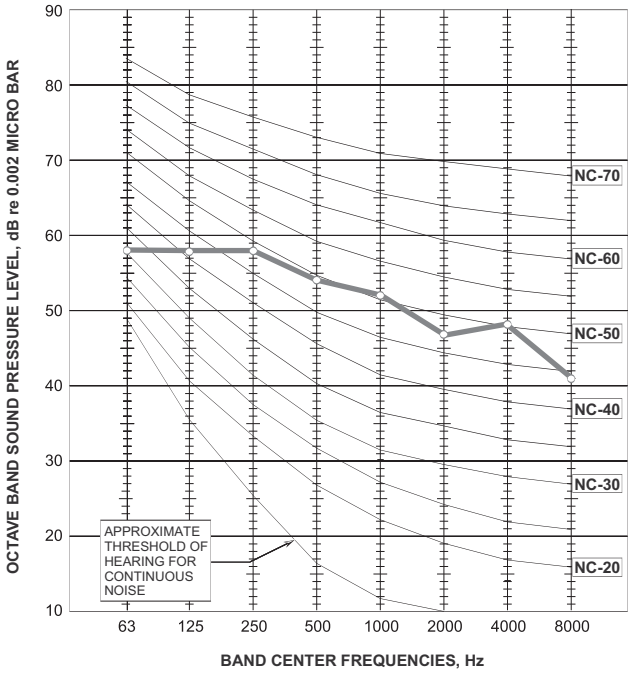
YBD 018 DCI Heating



YBD 022 DCI Cooling

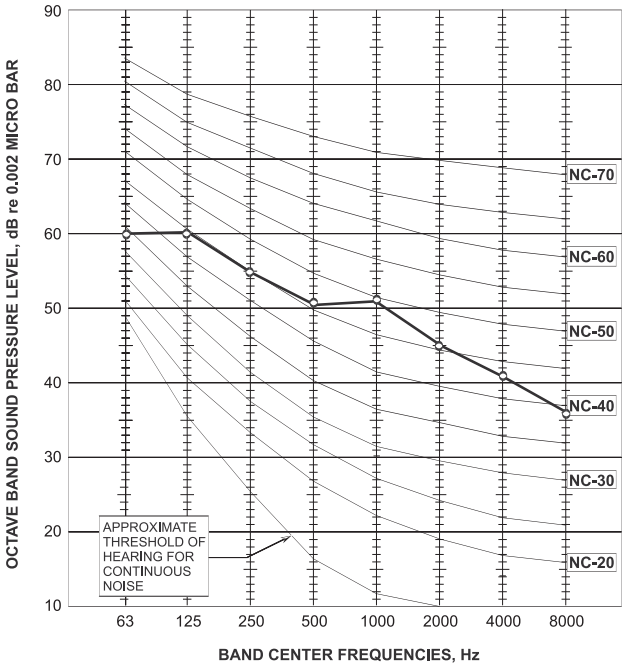


YBD 022 DCI Heating

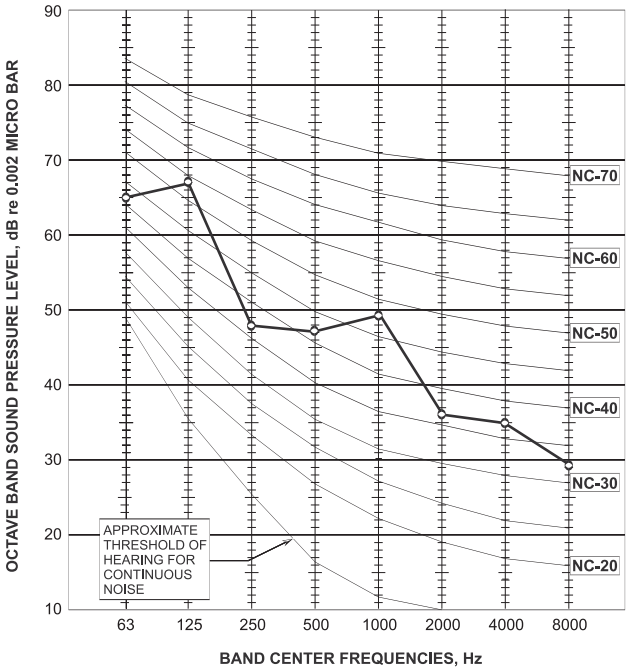


Sound Pressure Level Spectrum (Measured as Figure 2)

YBD 024 Cooling



YBD 024 Heating



7. ELECTRICAL DATA

7.1 Single Phase Unit

Model	PNXA 9 DCI	PNXA 12 DCI	PNXA 18 DCI	PNXA 21 DCI	PNXA 24 DCI
Power Supply	1 PH ,220-240VAC ,50HZ				
Connected to	To indoor				To outdoor
Maximum Current	10A		13.5A	15A	15.7A
Inrush Current \(a)	35A		45 A		<35A
Starting Current\(b)	10A		13.5 A	15A	15.7A
Circuit Breaker	16A		20 A		
Power Supply	3 X 1.5 mm²		3 X 2.5 mm²		
Interconnecting cable	4 X 1.5 mm²		4 X 2.5 mm²		

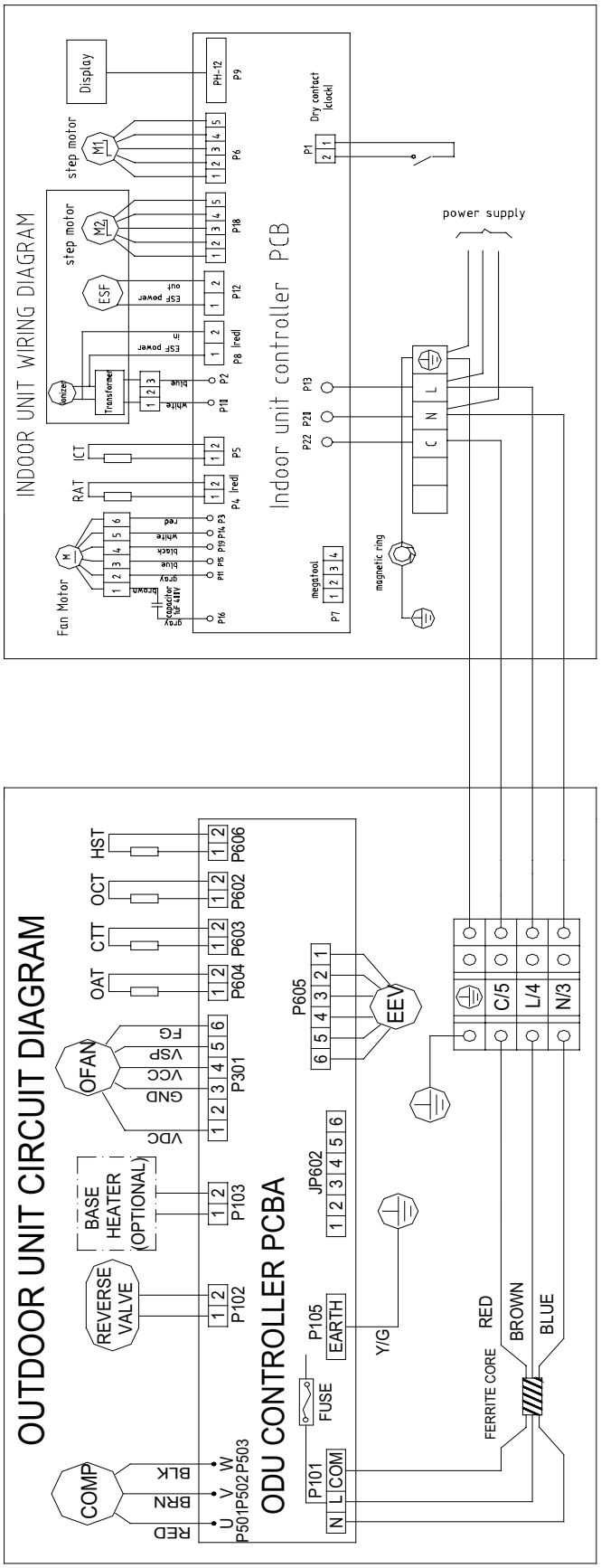
(a) Inrush current is the current when power is up (charging the DC capacitors at outdoor unit controller).
(b) Starting current is the current at compressor start up.

NOTE

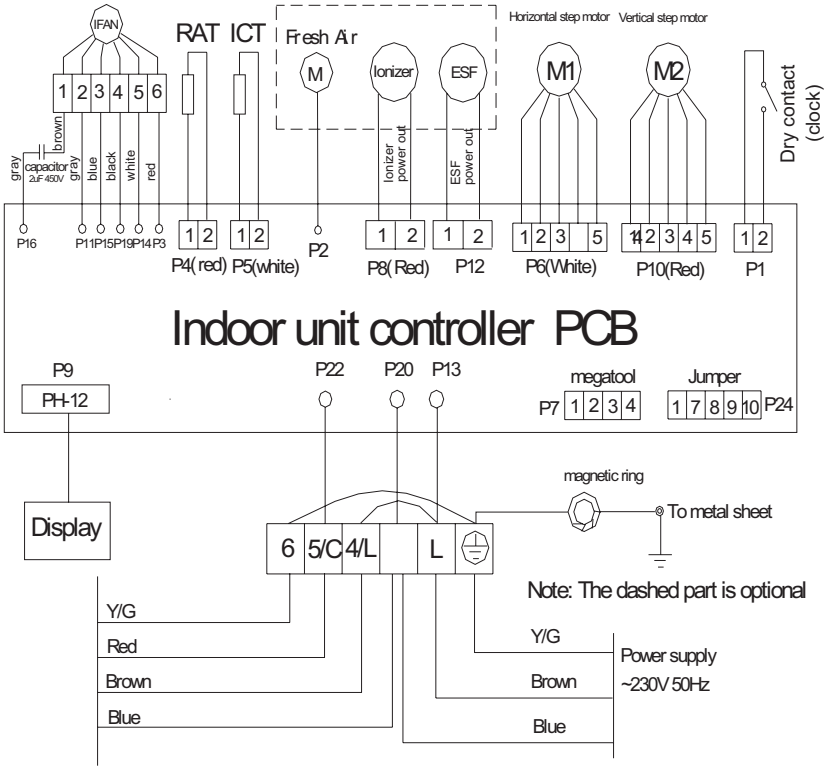
Power wiring cord should comply with local lows and electrical regulations requirements.

8. WIRING DIAGRAMS

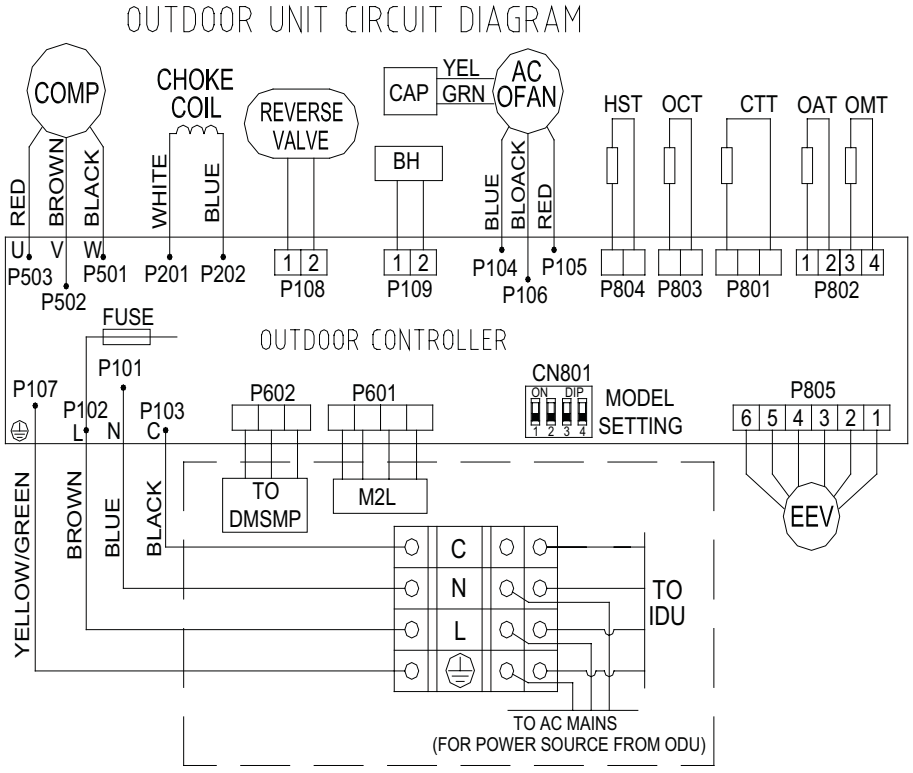
8.1 Indoor & Outdoor Units: PNXA9, 12 / GC 9, 12 DCI



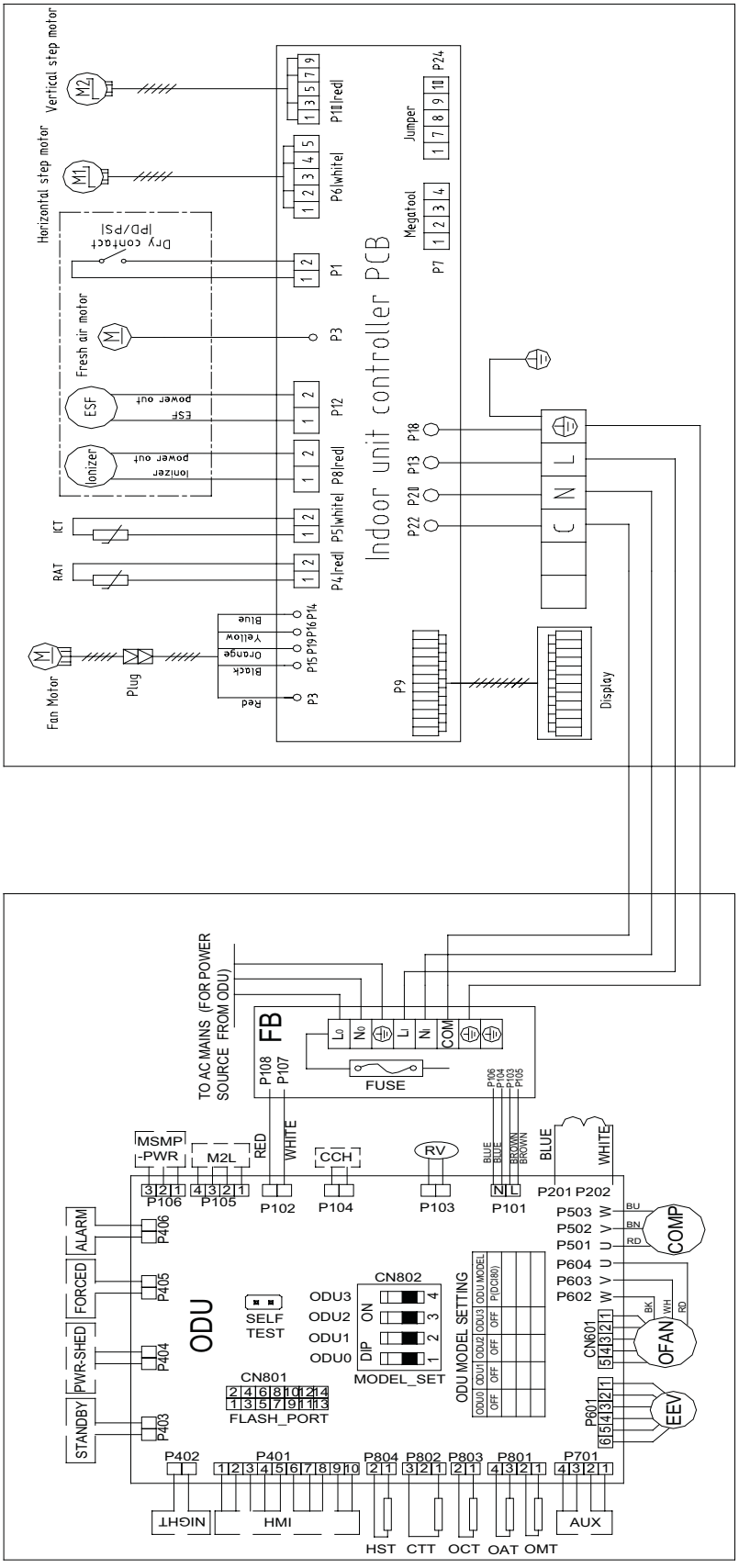
8.2 Indoor Unit: PNXA 18 / PNXA 22 DCI



8.3 Outdoor Unit: YBD 018 / YBD 022



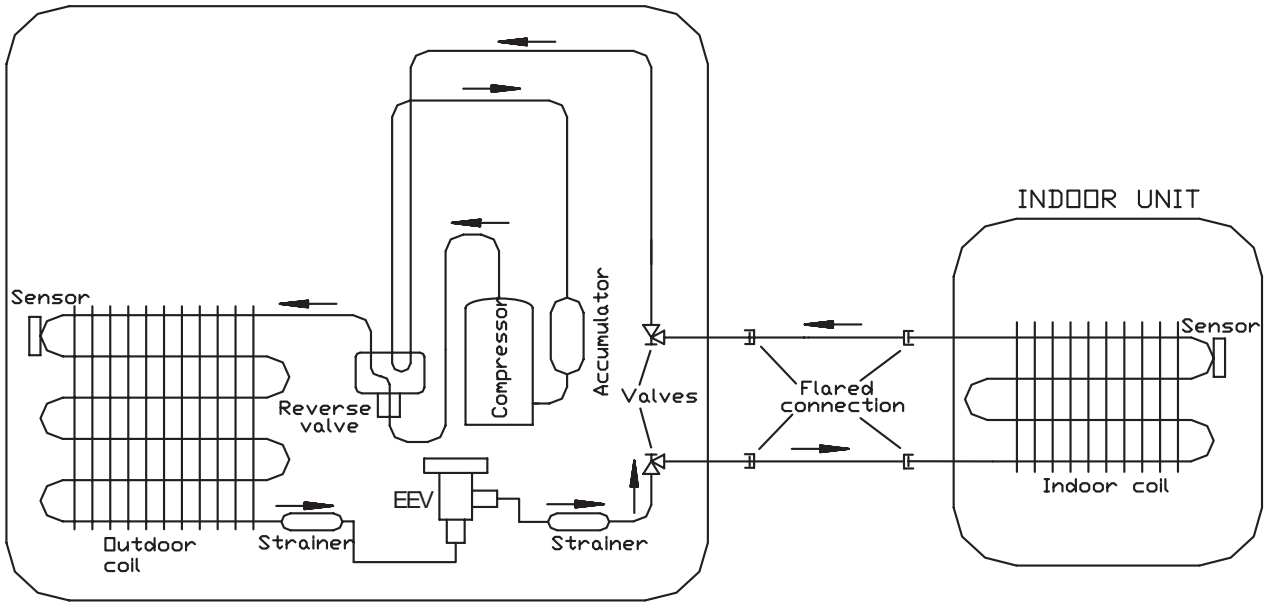
8.4 Indoor & Outdoor Units: PNXA 24 DCI / YBD 024



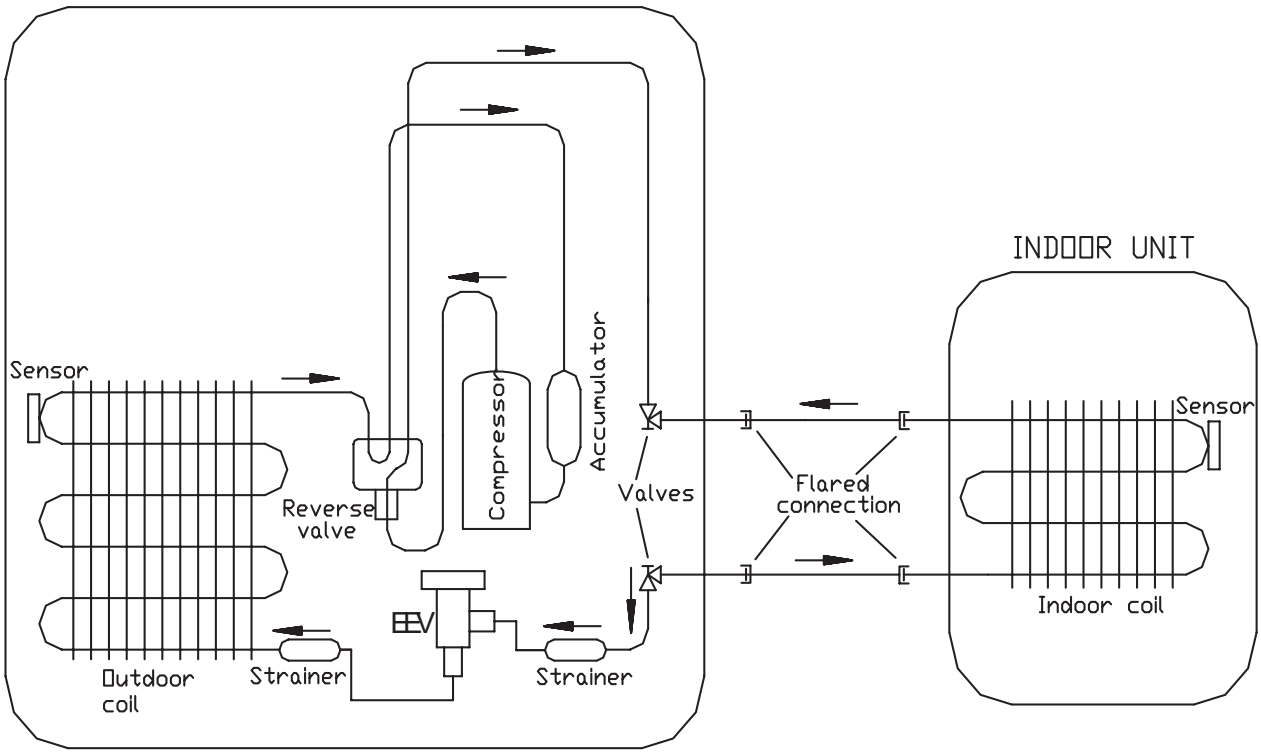
9. REFRIGERATION DIAGRAMS

9.1 Heat Pump Models

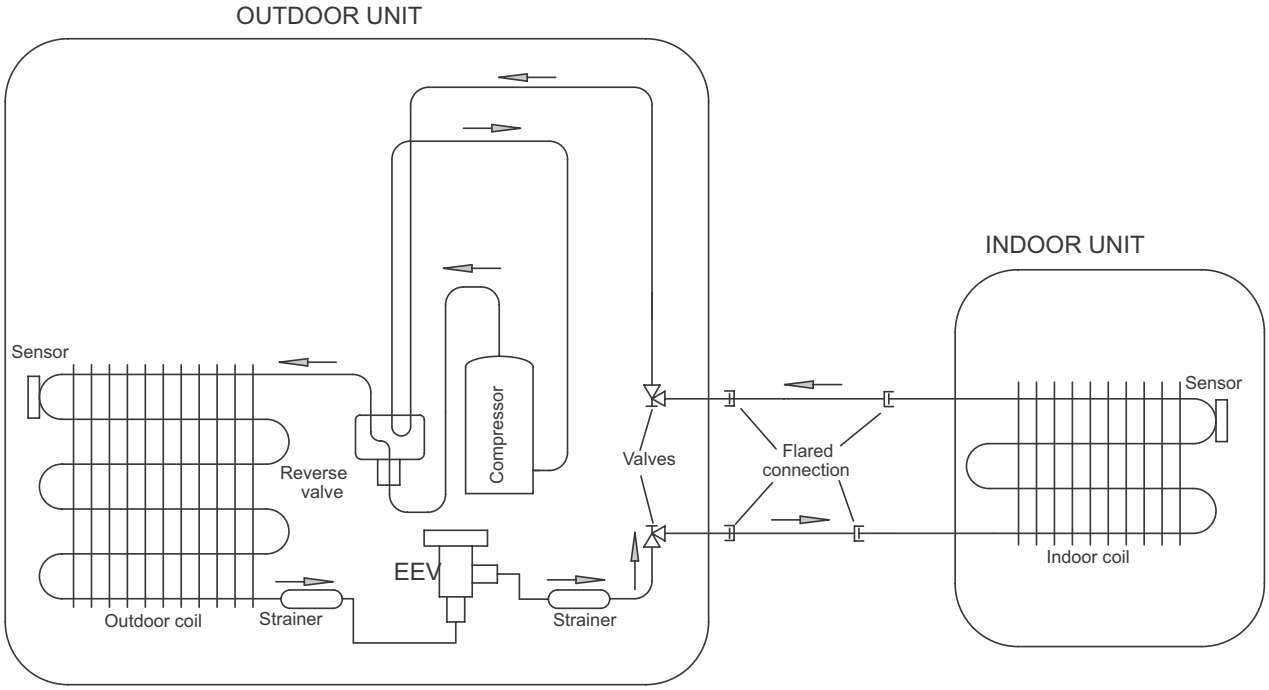
9.1.1 PNXA 9, 12, 18, 21 / GC 9, 12, YBD018/022 Cooling Mode



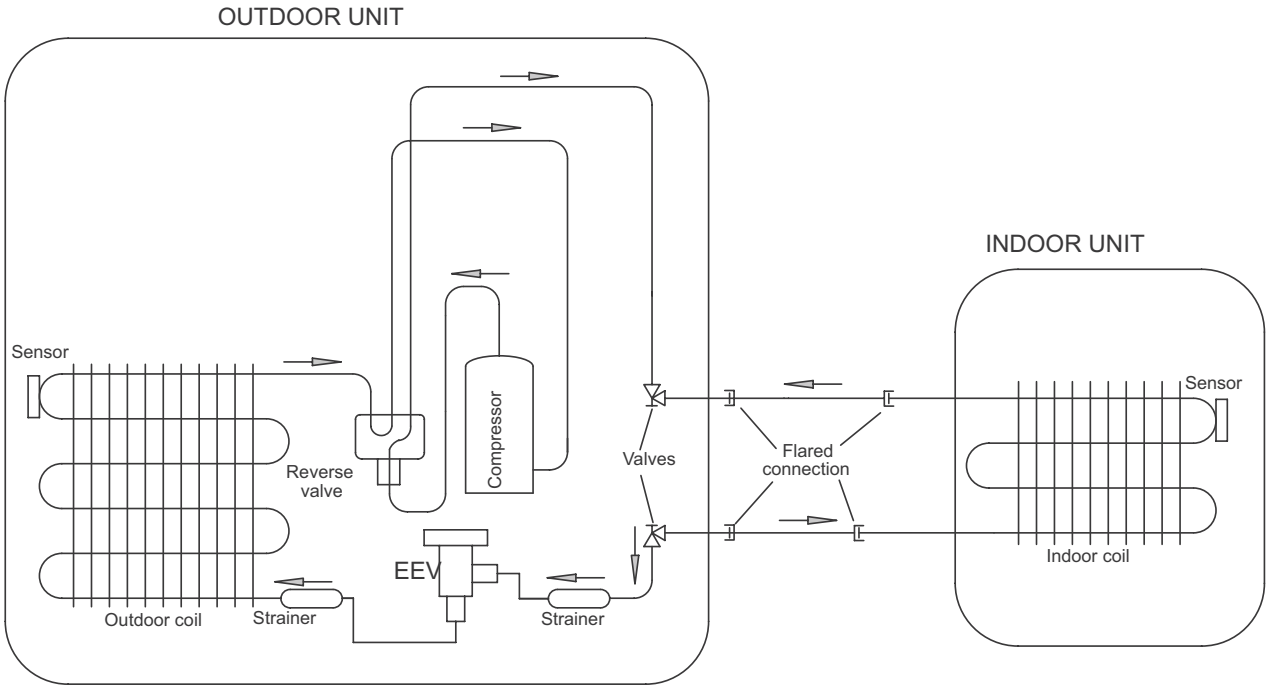
9.1.2 PNXA 9, 12, 18, 21 / GC 9, 12, YBD 018/22 Heating Mode



9.1.3 PNXA 24 / YBD 024



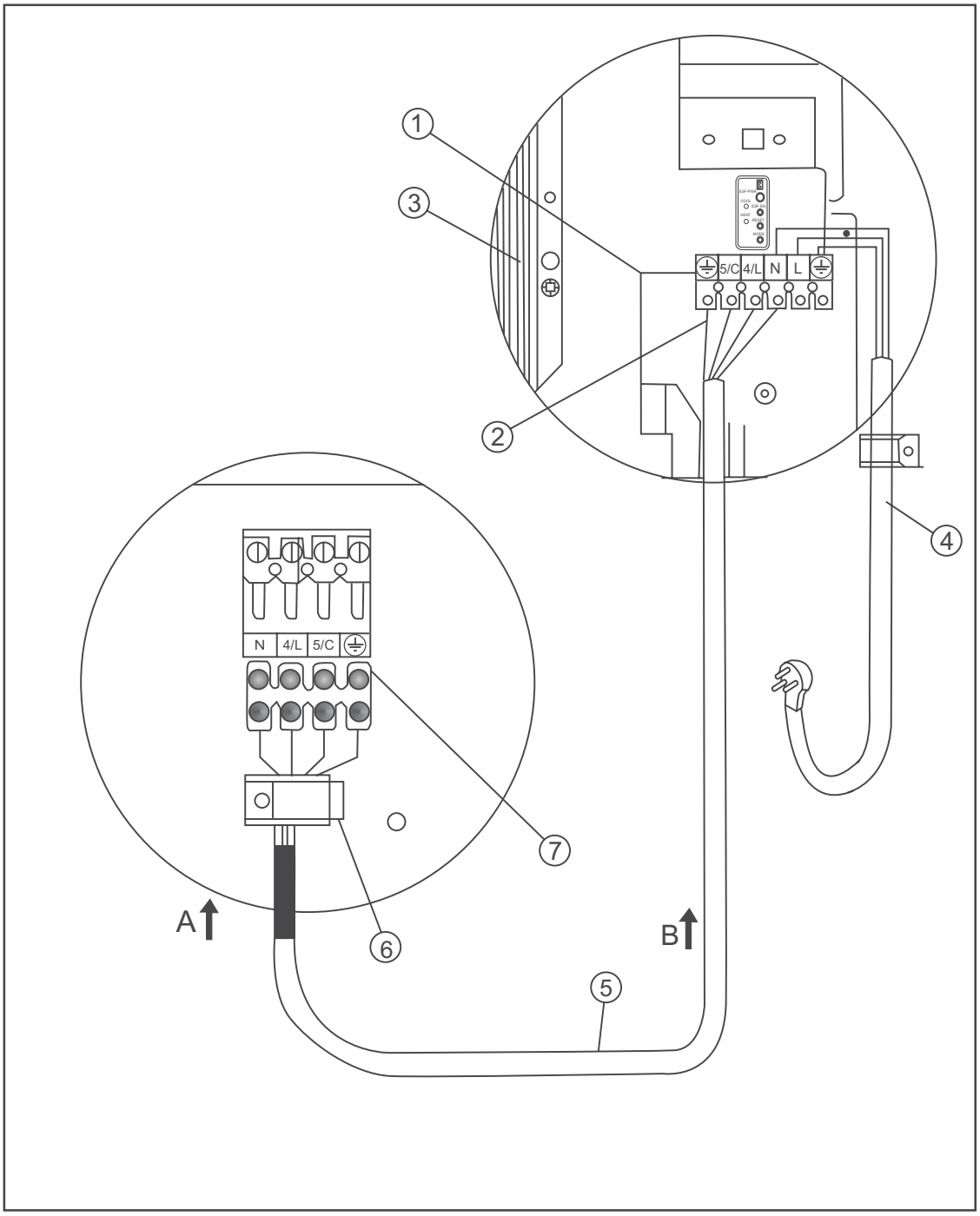
COOLING & DRY MODE



HEATING MODE

10. ELECTRICAL CONNECTIONS

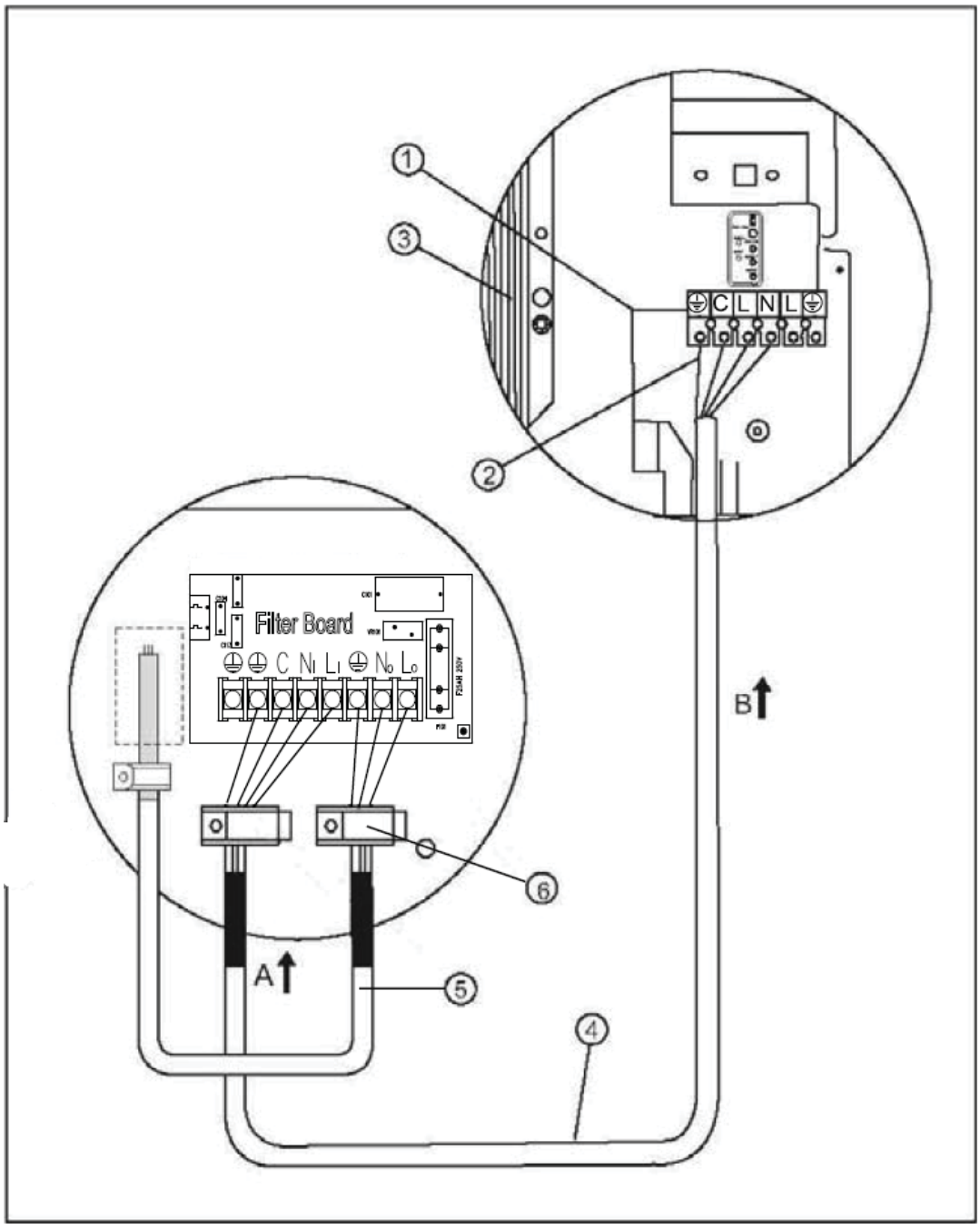
10.1 PNXA 9, 12, 18, 21 DCI



1. Indoor unit terminal
2. Ground wire.
3. Indoor coil.
4. Power cable in the indoor side.
5. Multiple wire cable.
6. Cable clamp.
7. Outdoor unit wire terminal.

A. OUTDOOR B. INDOOR

10.2 PNXA 24 DCI



1. Indoor unit terminal
2. Ground wire.
3. Indoor coil.
4. Multiple wire cable.

A. OUTDOOR B. INDOOR

5. Cable clamp.
6. Outdoor unit wire terminal.
7. Power cable in the outdoor side (only for outdoor unit power supply)

11. CONTROL SYSTEM for PNXA 9 / 12

11.1 General Functions and Operating Rules

The DCI software is fully parametric.
All the model dependent parameters are shown in Blue color and with Italic style [parameter].
The parameters values are given in the last section of this control logic chapter of the service manual.

11.1.1 System Operation Concept

The control function is divided between indoor and outdoor unit controllers. Indoor unit is the System 'Master', requesting the outdoor unit for cooling/heating capacity supply. The outdoor unit is the system 'Slave' and it must supply the required capacity nless it enters into a protection mode avoiding it from supplying the requested capacity.
The capacity request is transferred via indoor to outdoor communication, and is represented by a parameter called 'NLOAD'. NLOAD is an integer number with values between 0 and 127, and it represents the heat or cool load felt by the indoor unit.

11.1.2 Compressor Frequency Control

11.1.2.1 NLOAD setting

The NLOAD setting is done by the indoor unit controller, based on a PI control scheme.
The actual NLOAD to be sent to the outdoor unit controller is based on the preliminary LOAD calculation, the indoor fan speed, and the power shedding function.

NLOAD limits as a function of indoor fan speed:

Indoor Fan Speed	Maximum NLOAD Cooling	Maximum NLOAD Heating
Low	Max NLOADIF1C	127
Medium	Max NLOADIF2C	127
High	Max NLOADIF3C	127
Turbo	Max NLOADIF4C	127
Auto	Max NLOADIF5C	127

NLOAD limits as a function of power shedding:

Mode	Power Shedding OFF	Power Shedding ON
Cool	No limit	Nominal Cooling
Heat	No limit	Nominal Heating

11.1.3 Target Frequency Setting

The compressor target frequency is a function of the NLOAD number sent from the indoor controller and the outdoor air temperature.
Basic Target Frequency Setting:

NLOAD	Target Frequency
127	Maximum frequency
10 < NLOAD < 127	Interpolated value between minimum and maximum frequency
10	Minimum frequency
0	Compressor is stopped

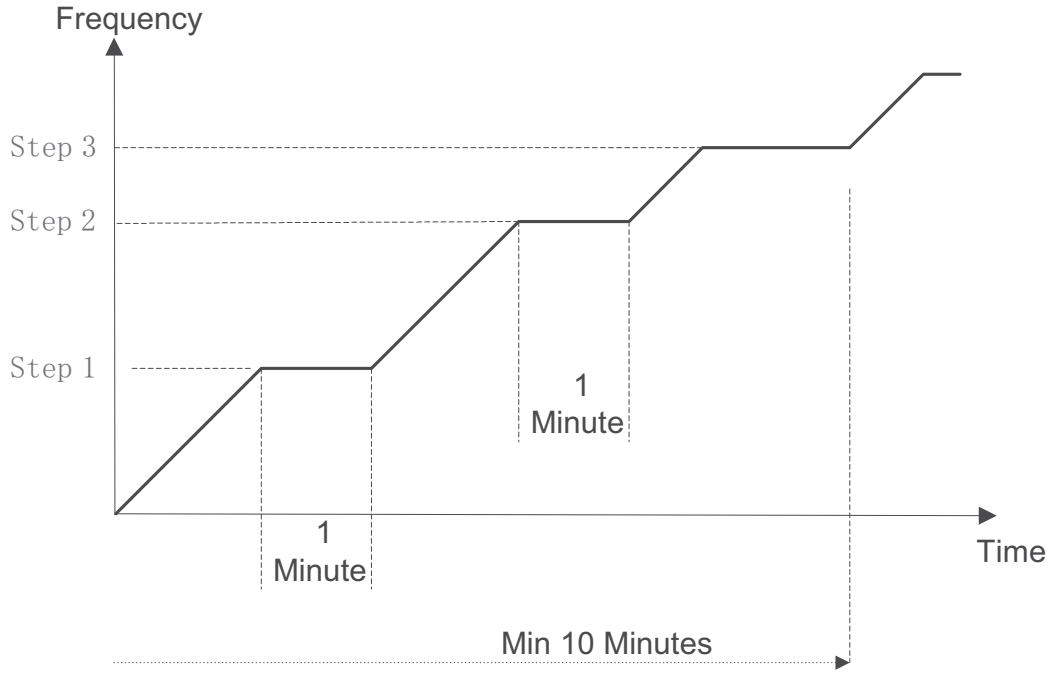
Target frequency limits as a function of outdoor air temperature)OAT(:

OAT Range	Cool mode limits	Heat mode limits
OAT < 6	MaxFreqAsOATC	No limit
6 ≤ OAT < 15		MaxFreqAsOAT1H
15 ≤ OAT < 24		MaxFreqAsOAT2H
24 ≤ OAT	No limit	

11.1.4 Frequency Changes Control

Frequency change rate is 1 Hz/sec.

11.1.5 Compressor Starting Control



11.1.6 Minimum On and Off Time

3 minutes.

11.1.7 Indoor Fan Control

10 Indoor fan speeds are determined for each model. 5 speeds for cool/dry/fan modes and 5 speeds for heat mode.
When user sets the indoor fan speed to a fixed speed)Low/ Medium/ High(, unit will operate constantly at set speed.
When Auto Fan is selected, indoor unit controller can operate in all speeds. The actual speed is set according to the cool/heat load.

11.1.7.1 Turbo Speed

The Turbo speed is activated during the first 30 minutes of unit operation when auto fan speed is selected and under the following conditions:
Difference between set point and actual room temperature is bigger then 3 degrees.
Room temperature > 22 for cooling, or < 25 for heating.

11.1.8 Heating Element Control

Heating element can be started if LOAD > 0.8* MaximumNLOAD AND Indoor Coil temperature <45.
The heating element will be stopped when LOAD < 0.5* MaximumNLOAD OR if Indoor Coil Temperature > 50.

11.1.9 Outdoor Fan Control

7 outdoor fan speeds are determined for each model. 3 speeds for cool and dry modes, and 3 speeds for heat mode, and a very low speed.
Outdoor fan speed is a function of compressor frequency and outdoor air temperature (OAT).
4 routines for fan control are determined. The control routine selection depends on operation mode, compressor speed, outdoor air temperature (OAT) and heat sink temperature (HST).

Routine	Conditions
A	Heating with OAT < 15^0C or Cooling with OAT > 20^0C, or HST > 50^0C or Faulty OAT
B	Cooling with 20^0C > OAT > 50^0C
C	Cooling with 7^0C > OAT
D	Heating with OAT > 15^0C

	Outdoor Fan Speed			
Compressor Frequency (CF)	Routine A	Routine B	Routine C	Routine D
CF= 0	OFF	OFF	OFF	OFF
10 ≤ CF < OFLowFreq	Low	Low	Very Low	Low
10 ≤ CF < OFMedFreq	Medium	Low	Very Low	Low
OFMedFreq ≤ CF	High	Low	Low	Medium

When compressor is switched to OFF and the heat sink temperature is above 55 degrees, the outdoor fan will remain ON in low speed for up to 3 minutes.

11.1.10 EEV (electronic Expansion valve) Control

EEV opening is defined as EEV = EEV_{OL} + EEV_{CV}
EEV_{OL} is the initial EEV opening as a function of the compressor frequency, operation mode, unit model and capacity.
EEV_{CV} is a correction value for the EEV opening that is based on the compressor temperature.
During the first 10 minutes of compressor operation EEV_{CV} = 0.
Once the first 10 minutes are over, the correction value is calculated as follow: $EEV_{CV}(n)$ = $EEV_{CV}(N-1)$ + EEV_{CTT}
EEV_{CTT} is the correction based on the compressor temperature. A target compressor temperature is set depending on frequency and outdoor air temperature, and the actual compressor temperature is compared to the target temperature to set the required correction to the EEV opening.

11.1.11 Reversing Valve (RV) Control

Reversing valve is on in heat mode.
Switching of RV state is done only after compressor is off for over 3 minutes.

11.1.12 Ioniser Control

Ioniser is on when unit is on AND indoor fan is on AND Ioniser power switch (on Ioniser) is on.

11.1.13 Electro Static Filter)ESF(Control

ESF is on when ESF switch is on, Safety switch is pressed, unit is on, AND indoor fan is on.

11.1.14 Base Heater Control

When OAT is connected, Base Heater will be on when unit is in heating and OAT<2^{0}C.
When OAT is disconnected, Base Heater will be on when unit is in heating.

11.2 Fan Mode

In high/ medium/ low indoor fan user setting, unit will operate fan in selected speed.
In AutoFan user setting, fan speed will be adjusting automatically according to the difference between actual room temperature and user set point temperature.

11.3 Cool Mode

NLOAD is calculated according to the difference between actual room temperature and user set point temperature by PI control.
In high/ medium/ low indoor fan user setting, unit will operate fan in selected speed.
In AutoFan user setting, fan speed will be ad8usted automatically according to the calculated NLOAD.

11.4 Heat Mode

NLOAD is calculated according to the difference between actual room temperature and user set point temperature by PI control.
In high/ medium/ low indoor fan user setting, unit will operate fan in selected speed.
In AutoFan user setting, fan speed will be adng to the calculated
NLOAD.

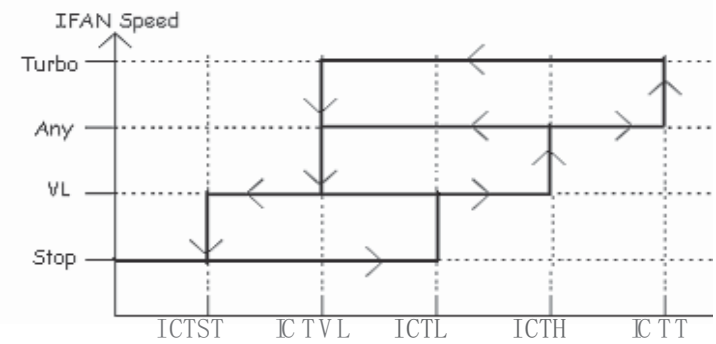
11.4.1 Temperature Compensation

In wall mounted, ducted, and cassette models, 3 degrees are reduced from room temperature reading (except when in I-Feel mode), to compensate for temperature difference between high and low areas in the heated room, and for coil heat radiation on room thermistor.
The temperature compensation can be enabled/disabled by shortening of J2 on the indoor unit controller.

Model	J2 Shorted	J2 Opened
Wall mounted	Compensation Disabled	Compensation Enabled
Cassette	Compensation Enabled	Compensation Disabled
Ducted	Compensation Enabled	Compensation Disabled
Floor/Ceiling	Compensation Disabled	Compensation Enabled

11.4.2 Indoor Fan Control in Heat Mode

Indoor fan speed depends on the indoor coil temperature:



11.5 Auto Cool/Heat Mode

When in auto cool heat mode unit will automatically select between cool and heat mode according to the difference between actual room temperature and user set point temperature)ΔT(.
Unit will switch from cool to heat when compressor is off for 3 minutes, and ΔT < -3.
Unit will switch from heat to cool when compressor is off for 5 minutes, and ΔT < -3.

11.6 Dry Mode

As long as room temperature is higher then the set point, indoor fan will work in low speed and compressor will work between 0 and MaxNLOADIF1C Hz.
When the room temperature is lower than the set point, compressor will be switched OFF and indoor fan will cycle 3 minutes OFF, 1 minute ON.

11.7 Protections

There are 5 protection codes.
Normal (Norm) – unit operate normally.
Stop Rise (SR) – compressor frequency can not be raised but does not have to be decreased.
HzDown1 (D1) – Compressor frequency is reduced by 2 to 5 Hz per minute.
HzDown2 (D2) – Compressor frequency is reduced by 5 to 10 Hz per minute.
Stop Compressor (SC) – Compressor is stopped.

11.7.1 Indoor Coil Defrost Protection

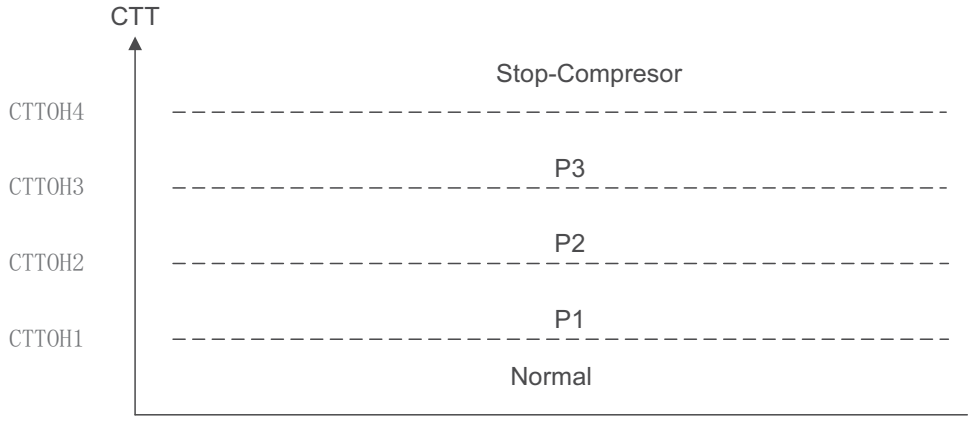
ICT	ICT Trend				
	Fast Increasing	Increasing	No change	Decreasing	Fast Decreasing
ICT < -2	SC	SC	SC	SC	SC
-2 ≤ ICT < 0	D1	D1	D2	D2	D2
0 ≤ ICT < 2	SR	SR	D1	D2	D2
2 ≤ ICT < 4	SR	SR	SR	D1	D2
4 ≤ ICT < 6	Norm	Norm	SR	SR	D1
6 ≤ ICT < 8	Norm	Norm	Norm	SR	SR
8 ≤ ICT	Normal				

11.7.2 Indoor Coil over Heating Protection

ICT	ICT Trend				
	Fast Decreasing	Decreasing	No Change	Increasing	Fast Increasing
ICT> 55	SC	SC	SC	SC	SC
53 <ICT ≤ 55	D1	D1	D2	D2	D2
49 < ICT ≤ 53	SR	SR	D1	D2	D2
47 < ICT ≤ 49	SR	SR	SR	D1	D2
45 < ICT ≤ 47	Norm	Norm	SR	SR	D1
43 < ICT ≤ 45	Norm	Norm	Norm	SR	SR
ICT ≤ 43	Normal				

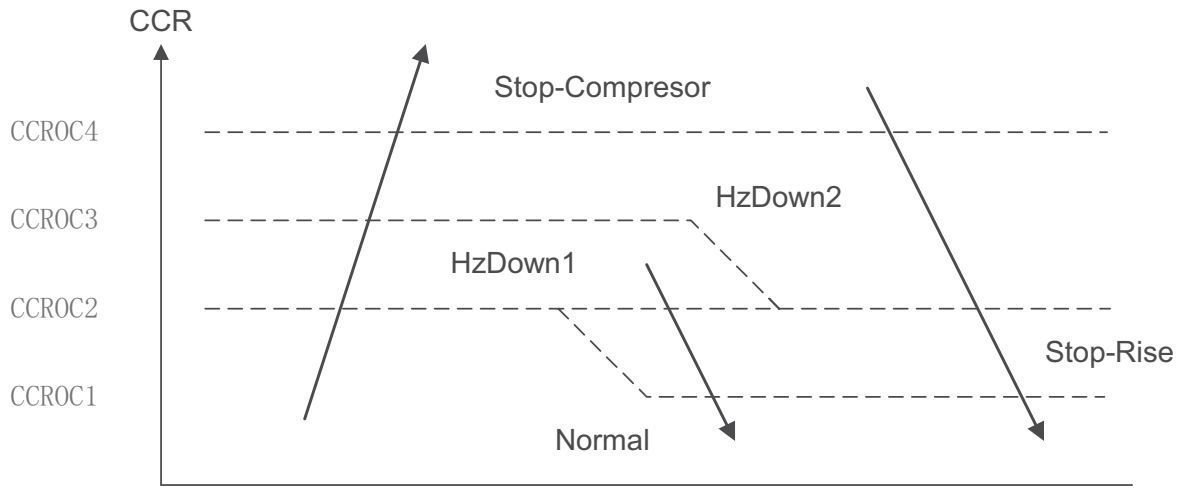
11.7.3 Compressor over Heating Protection

Compressor temperature can be in one of 5 control zones)4 in protection, and 1 normal(, according to the following chart.



Control Status	Compressor Temperature Increases	Else
P1	Norm	SR
P2	D1	SR
P3	D2	D1
Stop Compressor	SC	

11.7.4 Compressor over Current Protection



11.7.5 Heat Sink Over Heating Protection (**(NA for GC 9 and GC 12 DCI)**

HST	HST Trend		
	Decreasing	No Change	Increasing
HST > 90	SC	SC	SC
85 < HST ≤ 90	D1	D2	D2
82 < HST ≤ 85	SR	D1	D2
80 < HST ≤ 82	SR	SR	D1
78 < HST ≤ 80	Norm	Norm	SR
HST ≤ 78	Normal		

11.7.6 Outdoor Coil Deicing Protection

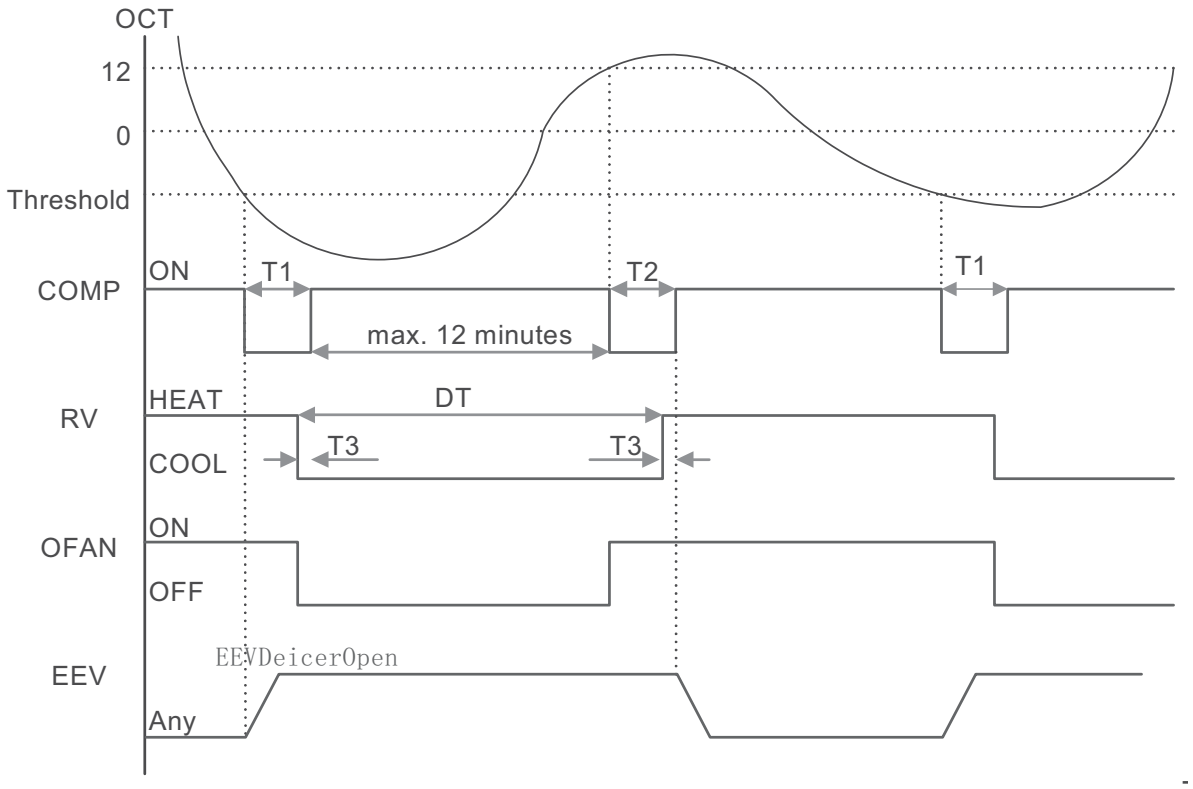
11.7.6.1 Deicing Starting Conditions

Deicing operation will start when either one of the following conditions exist:
Case 1: OCT < OAT – 8 AND TLD > DI
Case 2: OCT < OAT – 12 AND TLD > 30 minutes.
Case 3: OCT is Invalid AND TLD > DI
Case 4: Unit is just switched to STBY AND OCT < OAT - 8
Case 5: NLOAD = 0 AND OCT < OAT -8

OCT – Outdoor Coil Temperature
OAT – Outdoor Air Temperature
TLD – Time from Last Deicing
DI – Deicing Interval (Time Interval Between Two Deicing)

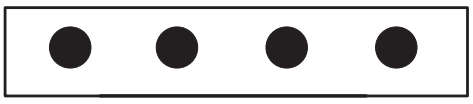
Deicing interval time when compressor is first started in heat mode, is 10 minutes if OCT < -2, and is 40 minutes in other cases.
Deicing interval time is changed (increased/ decreased in 10 minutes steps) as a function of deicing time. If deicing time is shorter then former deicing time, the deicing interval time will be increased. If deicing time is longer then former deicing time, the deicing interval time will be decreased.

11.7.6.2 Deicing Protection Procedure



36 seconds, T3 = 6 seconds

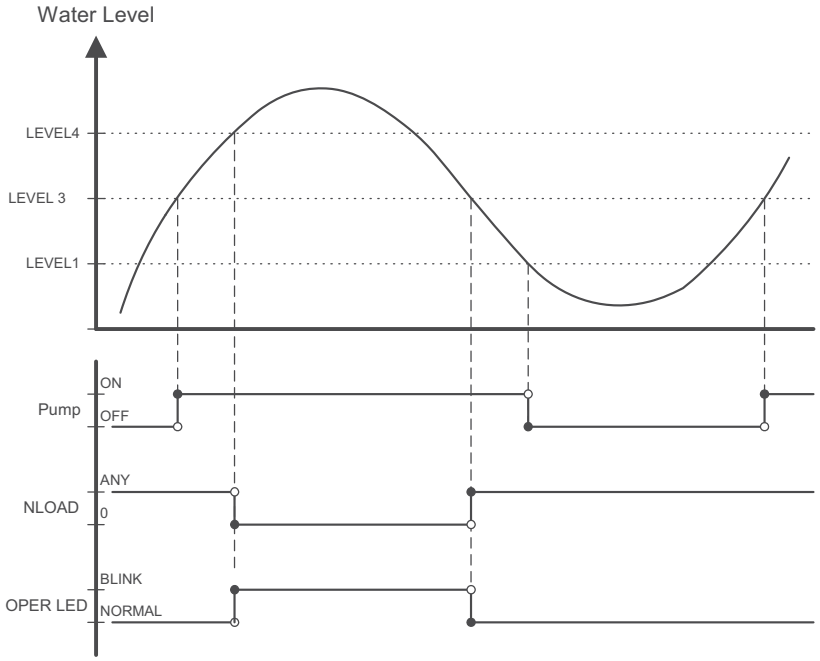
11.8 Condensate Water Over Flow Protection



Each of the pins P1, P2, P3 can have two options:
1 – When it is shorted with P4
0 – When it is not shorted to P4

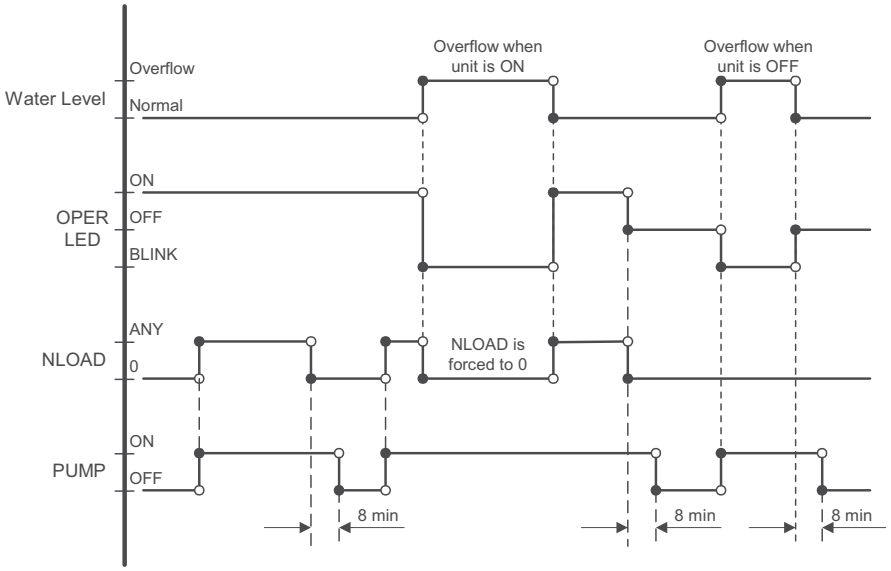
11.8.1 3 Levels Logic (used in floor/ceiling models)

P2	P3	Level
0	0	L0
1	0	L1
1	1	L2&3
0	1	L4



11.8.2 1 Level Logic (used in all models except for floor/ceiling models)

P2	P3	Level
Don`t care	1	Normal
Don`t care	0	Overflow



11.9 Indoor Unit Dry Contact

Indoor unit Dry contact has two alternative functions that are selected by J8.

	Function	Contact = Open	Contact = Short
J8 = Open	Presence Detector Connection	No Limit	Forced to STBY
J8 = Open	Power Shedding Function	No Limit	Limit NLOAD

11.10 Operating the Unit from the Mode Button

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

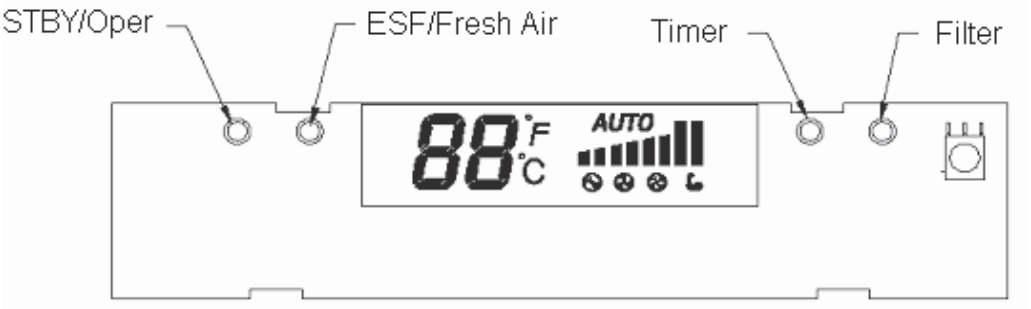
Forced operation Mode	Pre-set Temperature
Cooling	20^0C
Heating	28^0C

11.11 On Unit Controls and Indicators

11.11.1 Indoor Unit Controller Controls and Indicators For All Models Except for Floor/Ceiling model

STAND BY INDICATOR	Lights up when the Air Conditioner is connected to power and ready to receive the R/C commands
OPERATION INDICATOR	Lights up during operation. Blinks for 300 msec., to announce that a R/C infrared signal has been received and stored. Blinks continuously during protections (according to the relevant spec section).
TIMER INDICATOR	Lights up during Timer and Sleep operation.
FILTER INDICATOR	Lights up when Air Filter needs to be cleaned.
COOLING INDICATOR	Lights up when system is switched to Cool Mode by using the Mode Switch on the unit.
HEATING INDICATOR	Lights up when system is switched Heat Mode by using the Mode Switch on the unit.
Mode SWITCH (COOL/HEAT/OFF)	Every short pressing , the next operation mode is selected, in this order : SB → Cool Mode → Heat Mode → SB → In long pressing system enters diagnostic mode.
RESET / FILTER SWITCH	For short pressing: When Filter LED is on - turn off the FILTER INDICATOR after a clean filter has been reinstalled. When Filter LED is off able/disable the buzzer announcer, if selected.

11.11.2 Indoor Unit Controls and Indicators for LCD Display



	STBY	Cool	Heat	Auto	Fan	Dry
88	OFF	SPT(1*)	SPT(1*)	SPT(1*)	SPT(1*)	SPT(1*)
C	OFF(2*)	ON(2*)	ON(2*)	ON(2*)	ON(2*)	ON(2*)
F	OFF(2*)	OFF(2*)	OFF(2*)	OFF(2*)	OFF(2*)	OFF(2*)
(Low)	OFF	User setting IFAN speed	User setting IFAN speed	User setting IFAN speed	User setting IFAN speed	User setting IFAN speed
(Med)	OFF					
(High)	OFF					
(Turbo)	OFF					
AUTO (Auto)	OFF					
Backlight(red)	OFF	OFF	ON(3*)	ON(3*)	ON(3*)	OFF
Backlight(green)	OFF	ON(3*)	OFF	ON(3*)	ON(3*)	ON(3*)

11.11.3 Indoor Unit Controller Controls and Indicators for Floor/Ceiling Model

STANDBY INDICATOR	Lights up when the Air Conditioner is connected to power and is ready for operation
OPERATE INDICATOR (4)	1. Lights up during operation. 2. Blinks for 300 msec., to announce that a R/C infrared signal has been received and stored. 3. Blinks continuously during protections (according to the relevant spec section).
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 PXD models. (Cf. Sect. 7.3)
COOLING INDICATOR	Lights up when system is switched to Cool Mode by using the Mode Switch on the unit.
HEATING INDICATOR	Lights up when system is switched Heat Mode by using the Mode Switch on the unit.
FAN MODE INDICATOR (4)	Lights up in Fan Mode activated by local switches.
FAN SPEED INDICATORS	L -- Lights up when IFAN setting is Low. M -- Lights up when IFAN setting is Medium. H -- Lights up when IFAN setting is High. A -- Lights up when IFAN setting is Auto.
TEMP. SETTING INDICATORS	Each one of the seven indicators indicates the following SPT: 18, 20, 22, 24, 26, 28, 30]°c[. The odd number temperatures are indicated by turning on the two adcent indicators.
FAN SPEED BUTTON	Press this button to change the speed of the IFAN. Each pressing change the speed in the sequence of: ..... L → M → H → Auto → L → ...
TEMP. SETTING UP BUTTON	Pressing this button increases the SPT by 1°C. Note: The Max SPT is 30°C.
TEMP. SETTING DOWN BUTTON	Pressing this button decreases the SPT by 1°C. Note: The Min SPT is 18°C.
MODE BUTTON	Every short pressing , the next operation mode is selected, in this order : SB → Cool Mode → Heat Mode → SB → In long pressing system enters diagnostic mode.
POWER BUTTON	Toggle the unit between OPER & STBY modes.
RESET / FILTER BUTTON	For short pressing: When Filter LED is on - turn off the FILTER INDICATOR after a clean filter has been reinstalled. When Filter LED is off able/disable the buzzer announcer, if selected. In long pressing system enters set up mode (if in SB).

11.11.4 Outdoor Unit Controller Indicators

Unit has three LED
SB LED is ON when power is ON (230 VAC, even when no communication).
STATUS LED is ON when COMP is ON, and Blinks according to diagnostics mode definitions when either fault or protection occurs.
FAULT LED Blinks according to diagnostics mode definitions when either fault or protection occurs.

11.12 Jumper Setting

11.12.1 Indoor Unit Controller

0 = Open Jumper (disconnect jumper).
1 = Close Jumper (connect jumper).

Self test Jumper – J1

OPERATION	J1
SELF-TEST	1
NORMAL	0

Compensation Jumper – J2

Model	J2 (Default)	Compensation
Wall Mounted	0	Activated
Floor/Ceiling	1	Deactivated
Ducted/cassette	1	Activated

Family selection Jumper – J3, J4 and J5

Family	J5	J4	J3
Reserved	0	0	0
Reserved	0	0	1
Reserved	0	1	0
Wall Mounted (WNG/FLO)	0	1	1
Floor/Ceiling (PXD)	1	0	0
Reserved	1	0	1
Ducted (LS)	1	1	0
Cassette (K)	1	1	1

IDU Model	Jumper Setting					
	J8	J7	J6	J5	J4	J3
FLO 9	0	0	0	0	1	1
FLO 12	0	1	0	0	1	1
FLO 18	0	0	1	0	0	0
FLO 28	0	0	1	0	0	1
SX 9	0	0	0	1	0	0
SX 12	0	1	0	1	0	0
SX 18	1	0	0	1	0	0
K 9	0	0	0	1	1	1
K 12	0	1	0	1	1	1
K 18	1	0	0	1	1	1
LS12	0	1	0	1	1	0

For wall mounted units Jumpers j7, j8 can be configured by service. All other jumpers on the above table are factory default (cannot be changed by service).
For unit types as Cassettes, floor ceiling, and ducted, jumpers are set by a model plug.

Model selection Jumper – J7, J8

Model	J8	J7
A	0	0
B	0	1
C	1	0
D	1	1

J9- Presence Detector/Power Shedding

OPERATION	J9
Presence Detector	0
Power Shedding	1

Jumper – J10

OPERATION	J10
WNG DCI LCD	0
LED	1

11.12.2 Outdoor Unit Controller

JP9 JUMPER LAYOUT

Reserved (PIN 9)	ODU3 (PIN 7)	ODU2 (PIN 5)	ODU1 (PIN 3)	ODU0 (PIN 1)
GND (PIN 10)	GND (PIN 8)	GND (PIN 6)	GND (PIN 4)	GND (PIN 2)

ODU MODEL SELECTION

ODU3	ODU2	ODU1	ODU0	ODU Model
OFF	OFF	OFF	OFF	Reserved
OFF	OFF	OFF	ON (PIN1 & PIN2)	A (DCI 25)
OFF	OFF	ON (PIN3 & PIN4)	OFF	B (DCI 35)
OFF	OFF	ON (PIN3 & PIN4)	ON (PIN1 & PIN2)	C (DCI 50)
OFF	ON (PIN5 & PIN6)	OFF	OFF	D
OFF	ON (PIN5 & PIN6)	OFF	ON (PIN1 & PIN2)	E (Duo)
OFF	ON (PIN5 & PIN6)	ON (PIN3 & PIN4)	OFF	F
OFF	ON (PIN5 & PIN6)	ON (PIN3 & PIN4)	ON (PIN1 & PIN2)	G
ON (PIN7 & PIN8)	OFF	OFF	OFF	H
ON (PIN7 & PIN8)	OFF	OFF	ON (PIN1 & PIN2)	I
ON (PIN7 & PIN8)	OFF	ON (PIN3 & PIN4)	OFF	J
ON (PIN7 & PIN8)	OFF	ON (PIN3 & PIN4)	ON (PIN1 & PIN2)	K
ON (PIN7 & PIN8)	ON (PIN5 & PIN6)	OFF	OFF	L
ON (PIN7 & PIN8)	ON (PIN5 & PIN6)	OFF	ON (PIN1 & PIN2)	M
ON (PIN7 & PIN8)	ON (PIN5 & PIN6)	ON (PIN3 & PIN4)	OFF	N
ON (PIN7 & PIN8)	ON (PIN5 & PIN6)	ON (PIN3 ? PIN4)	ON (PIN1 & PIN2)	O

11.13 Test Mode

11.13.1 Entering Test Mode

System can enter Test mode in two ways:
Automatically when the following conditions exists for 30 minutes continuously:
Mode = Cool, Set point =16, Room temperature = 27±1, Outdoor temperature = 35±1
Or
Mode = Heat, Set point = 30, Room temperature = 20±1, Outdoor temperature = 7±1
Manually when entering diagnostics with the following settings:
Mode = Cool, Set point = 16
Mode = Heat, Set point = 30

11.13.2 Unit Operation in Test Mode

In test mode, the unit will operate in fixed settings according to the indoor fan speed setting:

Indoor Fan Speed Setting	Unit Setting
Low	Minimum Capacity Setting
High	Nominal Capacity Setting
Auto	Maximum Capacity Setting

During test mode, protections are disabled, except for stop compressor status.

11.14 SW Parameters

11.14.1 Indoor Units SW Parameters

General Parameters for All Models:

Parameters defining the indoor fan speed as a function of Indoor Coil temperature in heat mode (ICT):

ICTST Speed	ICT to stop indoor fan	25
ICTVLSpeed	ICT to go down to very low speed	28
ICTLSpeed	ICT to start in very low speed	30
ICTHSpeed	ICT to start in increase speed from very low	32
ICTTSpeed	ICT to enable Turbo fan speed	40

Model Depended Parameters:

Parameter name	Wall Mounted Models	
	DCI 9	DCI 12
NLOAD limits as a function of selected indoor fan speed		
MaxNLOADIF1C	40	40
MaxNLOADIF2C	53	53
MaxNLOADIF3C	120	120
MaxNLOADIF4C	127	127
MaxNLOADIF5C	127	127
Indoor Fan speeds		
IFVLOWC	700	700
IFLOWC	800	800
IFMEDC	900	950
IFHIGHC	1050	1100
IFTURBOC	1150	1200
IFVLOWH	700	700
IFLOWH	800	850
IFMEDH	950	1000
IFHIGHH	1100	1150
IFTURBOH	1200	1250
Nominal Compressor Frequency		
NomLoadC	40	62
NomLoadH	55	67

Parameter Name	Cassette Models			
	K 9	K 12	K 12S	K18
NLOAD limits as a function of selected indoor fan speed				
MaxNLOADIF1C	40	40	40	40
MaxNLOADIF2C	53	56	56	60
MaxNLOADIF3C	120	90	90	90
MaxNLOADIF4C	127	90	90	90
MaxNLOADIF5C	127	90	90	90
Nominal Compressor Frequency				
NomLoadC	40	60	56	63
NomLoadH	55	69	73	80

11.14.2 Outdoor Units SW Parameters

Parameter Name	DCI 9	DCI 12	DCI 18	DCI 50 DUO
Compressor Parameters				
MinFreqC	30	33	20	20
MaxFreqC	64	80	85	97
MinFreqH	30	35	20	26
MaxFreqH	81	93	99	106
Step1Freq	60	60	60	60
Step2Freq	70	70	70	80
Step3Freq	90	90	90	90
Frequency limits as a function of outdoor air temperature				
MaxFreqAsOATC	50	50	64	62
MaxFreqAsOAT1H	65	75	85	85
MaxFreqAsOAT2H	60	60	60	60
Compressor Over Heating Protection				
CTTOH1	94	94	94	90
CTTOH2	98	98	98	95
CTTOH3	102	102	102	102
CTTOH4	105	105	105	105
Compressor Over Current Protection [A]				
CCR01	7.1	7.1	10	10
CCR02	7.5	7.5	10.5	10.5
CCR03	7.9	7.9	10.8	10.8
CCR04	8.3	8.3	11.2	11.2
Outdoor Fan Speed (RPM)				
VL	200	200	200	200
OFLOWC	550	550	600	600
OFMEDC	700	700	760	830
OFMAXC	830	830	920	920
OFLOWH	550	550	600	600
OFMEDH	700	700	830	920
OFMAXH	830	830	1000	1000
Outdoor Fan Limit Control				
OFLowFreq	45	45	40	40
OFMedFreq	57	57	70	70

12. CONTROL SYSTEM FOR PNXA 18/21/24

12.1 Electronic Control

12.1.1 General Functions and Operating Rules (for single split models)

The DCI software is fully parametric.
All the model dependent parameters are shown in Blue color and with Italic style [*parameter*].
The parameters values are given in the last section of this control logic chapter of the service manual.

12.1.2 System Operation Concept

The control function is divided between indoor and outdoor unit controllers. Indoor unit is the system 'Master', requesting the outdoor unit for cooling/heating capacity supply. The outdoor unit is the system 'Slave' and it must supply the required capacity unless it enters into a protection mode avoiding it from supplying the requested capacity.
The capacity request is transferred via indoor to outdoor communication, and is represented by a parameter called 'NLOAD'. NLOAD is an integer number with values between 0 and 127, and it represents the heat or cool load felt by the indoor unit.

12.1.3 Compressor Frequency Control

12.1.3.1 NLOAD setting

The NLOAD setting is done by the indoor unit controller, based on a PI control scheme.
The actual NLOAD to be sent to the outdoor unit controller is based on the preliminary LOAD calculation, the indoor fan speed, and the power shedding function.
NLOAD limits as a function of indoor fan speed:

Indoor Fan Speed	Maximum NLOAD Cooling	Maximum NLOAD Heating
Low	*Max NLOADIF1C*	127
Medium	*Max NLOADIF2C*	127
High	*Max NLOADIF3C*	127
Turbo	*Max NLOADIF4C*	127
Auto	*Max NLOADIF5C*	127

12.1.3.2 Target Frequency Setting

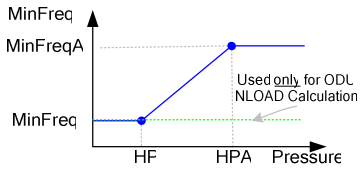
The compressor target frequency is set by the following table, according to the NLOAD number received from the indoor unit.

NLOAD	Target Frequency [Hz]	
0	**0**	
0 < NLOAD ≤ MinFreq	**MinFreq**	
>MinFreq	$\frac{\text{MaxFreq} - \text{MinFreq}}{\text{LoadDeadZone} - \text{MinFreq}} \cdot \{\min(\text{NLOAD}, \text{LoadDeadZone}) - \text{MinFreq}\} + \text{MinFreq}$	
Definitions		
	Cool	**Heat**
MinFreq	*MinFreqC*	*MinFreqH*
MaxFreq	*MaxFreqC*	*MaxFreqH*

LoadDeadZone	*LoadDeadZoneC*	*LoadDeadZoneH*

During running time (unlike starting) Compressor can operate only in its allowed frequency range.

The lower allowed frequency is extracted from the following:



Mode	MinFreq	MinFreqA	HP	HPA
Cool	***MinFreqC***	***MinFreqCA***	***HPAtMinFreqC***	***HPAtMinFreqCA***
Heat	***MinFreqH***	***MinFreqHA***	***HPAtMinFreqH***	***HPAtMinFreqHA***

Notes:

1. **HP stands for High Pressure.**
2. **Pressure is represented by the following:**
   - Cooling: **max {OMT, OCT} in cooling mode,**
   - Heating (Multi split): **maximum ICT among all active and available inactive IDUs in heating mode.**
   - Heating (Single Split): **ICT**
3. **The above parameters are determined from the compressor specifications.**

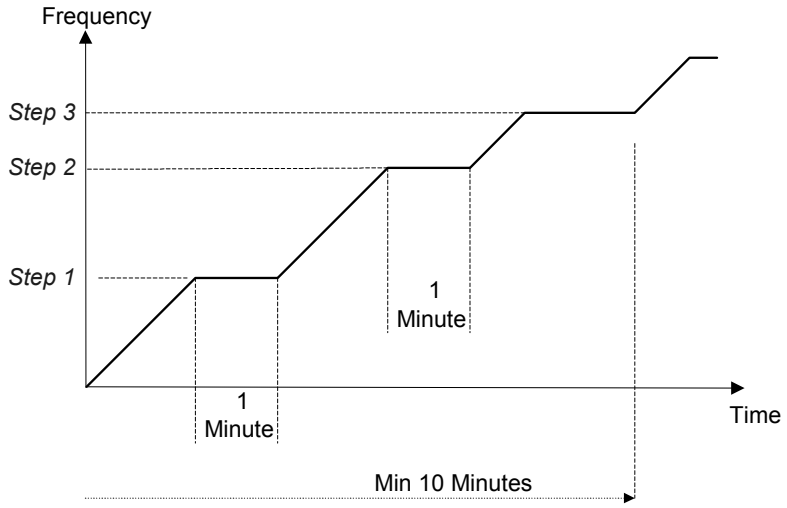
The higher allowed frequency is extracted from the following:

Mode	'Unit Night Mode'	Maximum Frequency (MaxFreq)
Cool	**On**	***MaxFreqC**0.75**
	Off	***MaxFreqC***
Heat	**On**	***MaxFreqH**0.75**
	Off	***MaxFreqH***

12.1.3.3 Frequency Changes Control

Frequency change rate is 1 Hz/sec.

12.1.3.4 Compressor Starting Control



12.1.3.5 Minimum On and Off Time

3 minutes.

12.1.4 Indoor Fan Control

10 Indoor fan speeds are determined for each model. 5 speeds for cool/dry/fan modes and 5 speeds for heat mode.
When user sets the indoor fan speed to a fixed speed (Low/ Medium/ High), unit will operate constantly at set speed.
When Auto Fan is selected, indoor unit controller can operate in all speeds. The actual speed is set according to the cool/heat load.

12.1.4.1 Turbo Speed

The Turbo speed is activated during the first 30 minutes of unit operation when auto fan speed is selected and under the following conditions:

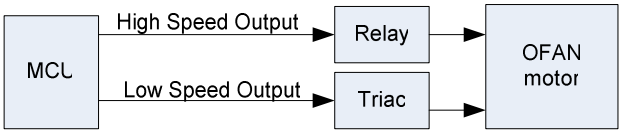
- Difference between set point and actual room temperature is bigger then 3 degrees.
- Room temperature > 22 for cooling, or < 25 for heating.

12.1.5 Heating Element Control

Heating element can be started if LOAD > 0.8 * MaximumNLOAD AND Indoor Coil temperature < 45.
The heating element will be stopped when LOAD < 0.5 * MaximumNLOAD OR if Indoor Coil temperature > 50.

12.1.6 Outdoor Fan Control

12.1.6.1 The following are the speeds types(General Rules):



Speed	Controlled by
High	Relay
Low	Triac (27% to 85% effective voltage)

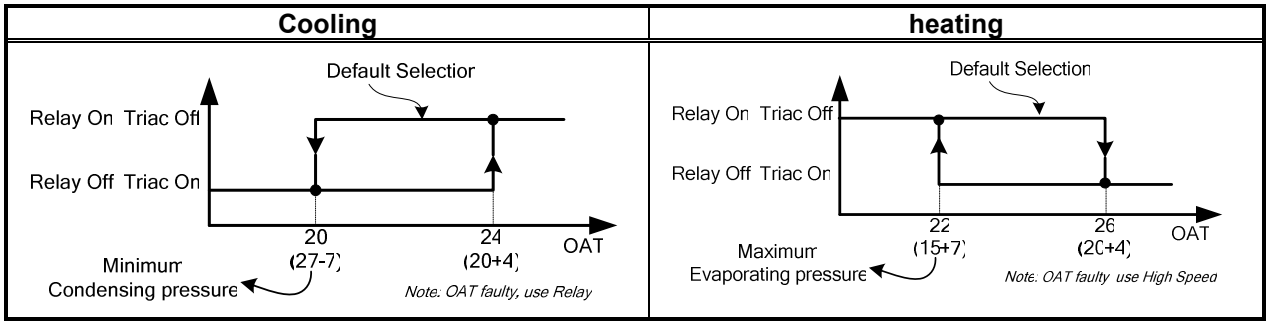
12.1.6.2 OFAN Speed Type

			AC Motor (*OFANType*=2)	
			Triac	Relay
Metric			Effective voltage R.M.S (V%)	
Speed Variable	'A': - Lower Speed	Cool	*OFMinPercentC*	NA
		Heat	*OFMinPercentH*	NA
	'B': - Higher Speed		*OFNNoiseMaxPercent*	NA
	'C': - Protection Speed		*OFNNoiseMaxPercent*	NA

	'D': (Night Mode Speed)	*NightPercent*	NA
	'E': - End of Deicer - When Compressor changes to off (Ventilation) - OMT and OCT fault in heat mode	Off	On
	'F': - Test Mode	Off	On

12.1.6.3 OFAN Operation

With keeping the OFAN general rules above in the highest priority, the operation of the OFAN will be operating as the following:



- The Triac and the Relay can never be activated at the same time

12.1.7 EEV (electronic Expansion valve) Control

EEV opening is defined as EEV = EEV_{OL} + EEV_{CV}

- EEV_{OL} is the initial EEV opening as a function of the compressor frequency, operation mode, unit model and capacity.
- EEV_{CV} is a correction value for the EEV opening that is based on the Target CTT and discharge superhea.
- During the first 5 minutes of compressor operation EEV_{CV} = 0.
- Once the first 5 minutes are over, the correction value is calculated as follow: EEV_{CV} = $EEV_{SH\ Discharge}$ + $EEV_{Target\ CTT}$
- $EEV_{SH\ Discharge}$
  For cooling, $SH_{DischargeC}$ = CTT- OMT
  For Heating, $SH_{DischargeH}$= CTT- ICT
- $EEV_{Target\ CTT}$
  For cooling, Target CTT = *Target_CTT_Alpha_C* *OMT
  - *Target_CTT_Beta_C* *ICT
  +*Target_CTT_Gamma_C* *Actual Compressor Frequency
  +*Target_CTT_Delta_C*
  For Heating, Target CTT = *Target_CTT_Alpha_H**ICT
  - *Target_CTT_Beta_H**OCT

+*Target_CTT_Gamma_H**Actual Compressor Frequency
+*Target_CTT_Delta_H*

12.1.8 Reversing Valve (RV) Control

Reversing valve is on in heat mode.
Switching of RV state is done only after compressor is off for over 3 minutes.

12.2 Fan Mode

In high/ medium/ low indoor fan user setting, unit will operate fan in selected speed.
In AutoFan user setting, fan speed will be adjusted automatically according to the difference between actual room temperature and user set point temperature.

12.3 Cool Mode

NLOAD is calculated according to the difference between actual room temperature and user set point temperature by PI control.
In high/ medium/ low indoor fan user setting, unit will operate fan in selected speed.
In AutoFan user setting, fan speed will be adjusted automatically according to the calculated NLOAD.

12.4 Heat Mode

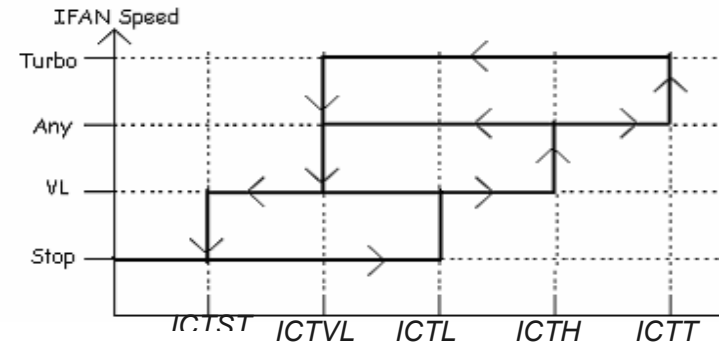
NLOAD is calculated according to the difference between actual room temperature and user set point temperature by PI control.
In high/ medium/ low indoor fan user setting, unit will operate fan in selected speed.
In AutoFan user setting, fan speed will be adjusted automatically according to the calculated NLOAD.

12.4.1 Temperature Compensation

4 degrees are reduced from room temperature reading (except when in I-Feel mode), to compensate for temperature difference between high and low areas in the heated room, and for coil heat radiation on room thermistor.

12.4.2 Indoor Fan Control in Heat Mode

Indoor fan speed depends on the indoor coil temperature:



12.5 Auto Cool/Heat Mode

When in auto cool heat mode unit will automatically select between cool and heat mode according to the difference between actual room temperature and user set point temperature (ΔT).
Unit will switch from cool to heat when compressor is off for 3 minutes, and ΔT < -3.
Unit will switch from heat to cool when compressor is off for 5 minutes, and ΔT < -3.

12.6 Dry Mode

As long as room temperature is higher then the set point, indoor fan will work in low speed and compressor will work between 0 and *MaxNLOADIF1C* Hz.
When the room temperature is lower than the set point, compressor will be switched OFF and indoor fan will cycle 3 minutes OFF, 1 minute ON.

12.7 Protections

There are 5 protection codes.
Normal (Norm) – unit operate normally.
Stop Rise (SR) – compressor frequency can not be raised but does not have to be decreased.
HzDown1 (D1) – Compressor frequency is reduced by *Down1* Hz/min.
HzDown2 (D2) – Compressor frequency is reduced by *Down2* Hz/min.
Stop Compressor (SC) – Compressor is stopped.

12.7.1 Indoor Coil Defrost Protection

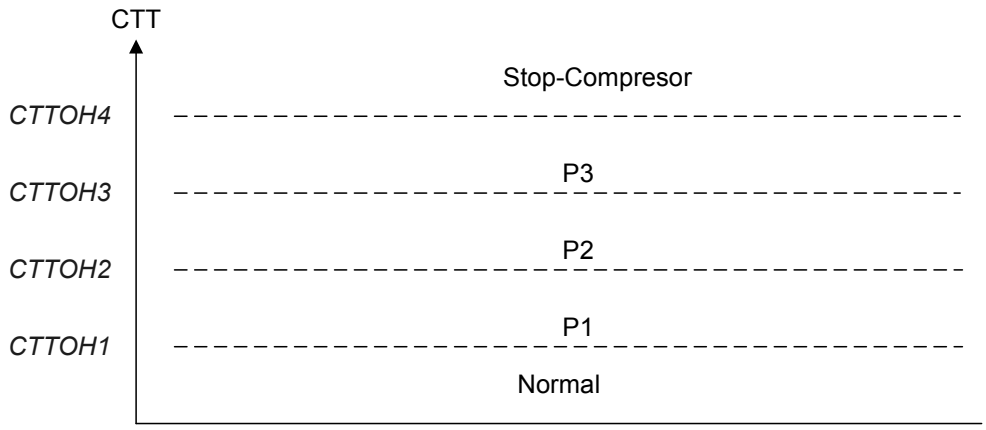
ICT	ICT Trend				
	Fast Increasing	Increasing	No change	Decreasing	Fast Decreasing
ICT < -2	SC	SC	SC	SC	SC
-2 ≤ ICT < 0	D1	D1	D2	D2	D2
0 ≤ ICT < 2	SR	SR	D1	D2	D2
2 ≤ ICT < 4	SR	SR	SR	D1	D2
4 ≤ ICT < 6	Norm	Norm	SR	SR	D1
6 ≤ ICT < 8	Norm	Norm	Norm	SR	SR
8 ≤ ICT	Normal				

12.7.2 Indoor Coil over Heating Protection

ICT	ICT Trend				
	Fast Decreasing	Decreasing	No Change	Increasing	Fast Increasing
ICT > 55	SC	SC	SC	SC	SC
53 < ICT ≤ 55	D1	D1	D2	D2	D2
49 < ICT ≤ 53	SR	SR	D1	D2	D2
47 < ICT ≤ 49	SR	SR	SR	D1	D2
45 < ICT ≤ 47	Norm	Norm	SR	SR	D1
43 < ICT ≤ 45	Norm	Norm	Norm	SR	SR
ICT ≤ 43	Normal				

12.7.3 Compressor over Heating Protection

Compressor temperature can be in one of 5 control zones (4 in protection, and 1 normal), according to the following chart.

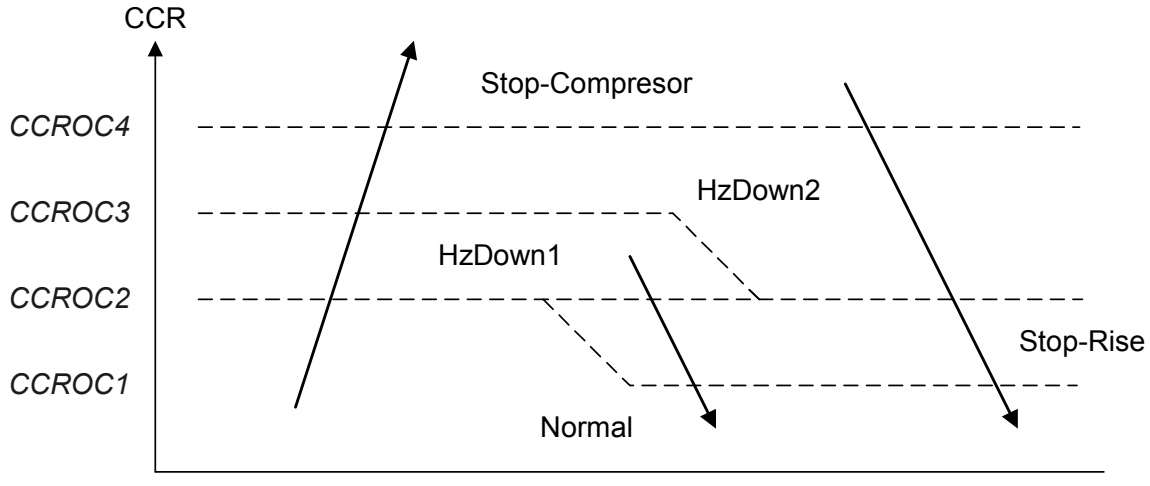


Control Status	Compressor Temperature Increases	Else
P1	Norm	SR
P2	D1	SR
P3	D2	D1
Stop Compressor	SC	

12.7.4 Outdoor Coil Overheating Protection

OMT_n	OMT_n-OMT_{n-1}				
	<-1	-1	0	1	>1
$OMT_n \geq HPC5$	SC	SC	SC	SC	SC
$HPC4 \leq OMT_n < HPC5$	D2	D2	D2	D2	D2
$HPC3 \leq OMT_n < HPC4$	D1	D1	D1	D1	D1
$HPC2 \leq OMT_n < HPC3$	SR	SR	SR	SR	SR
$HPC1 \leq OMT_n < HPC2$	Norm	Norm	Norm	Norm	Norm
$OMT_n < HPC1$	Norm				

12.7.5 Compressor over Current Protection



12.7.6 Heat Sink Over Heating Protection

A new control status will be set according to the following graph every one-minute or whenever when going up by the rows.

HST_n is the current reading of HST and HST_{n-1} is the last reading of HST.

HST_n	HST_n-HST_{n-1}				
	<-1	-1	0	1	>1
HST_n > *HSTOH5*	SC	SC	SC	SC	SC
HSTOH4 ≤ HST_n < *HSTOH5*	D1	D1	D2	D2	D2
HSTOH3 ≤ HST_n < *HSTOH4*	SR	SR	D1	D2	D2
HSTOH2 ≤ HST_n < *HSTOH3*	SR	SR	SR	D1	D1
HSTOH1 ≤ HST_n < *HSTOH2*	Norm	Norm	Norm	SR	SR
HST_n < *HSTOH1*	Norm				

(*) Normal (Norm) – No protection status is ON.

Stop-Rise (SR) – System is in protection.

HzDown1 (D1) - System is in protection.

HzDown2 (D2) - System is in protection.

12.7.7 System Over Power Protection

$Power_n$	$Power_n$-$Power_{n-1}$				
	<-50	[-50,-1]	0	[1,50]	>50
$Power_n$ > OVRPWR5	SC	SC	SC	SC	SC
OVRPWR4 ≤ $Power_n$ < OVRPWR5	D1	D1	D2	D2	D2
OVRPWR3 ≤ $Power_n$ < OVRPWR4	SR	SR	D1	D2	D2
OVRPWR2 ≤ $Power_n$ < OVRPWR3	SR	SR	SR	D1	D1
OVRPWR1 ≤ $Power_n$ < OVRPWR2	Norm	Norm	Norm	SR	SR
$Power_n$ < OVRPWR1	Norm				

12.7.8 Outdoor Coil Deicing Protection

In the deicing protection, IFAN is forced OFF.

12.7.8.1 Deicing Starting Conditions

Deicing operation will start when either one of the following conditions exist:

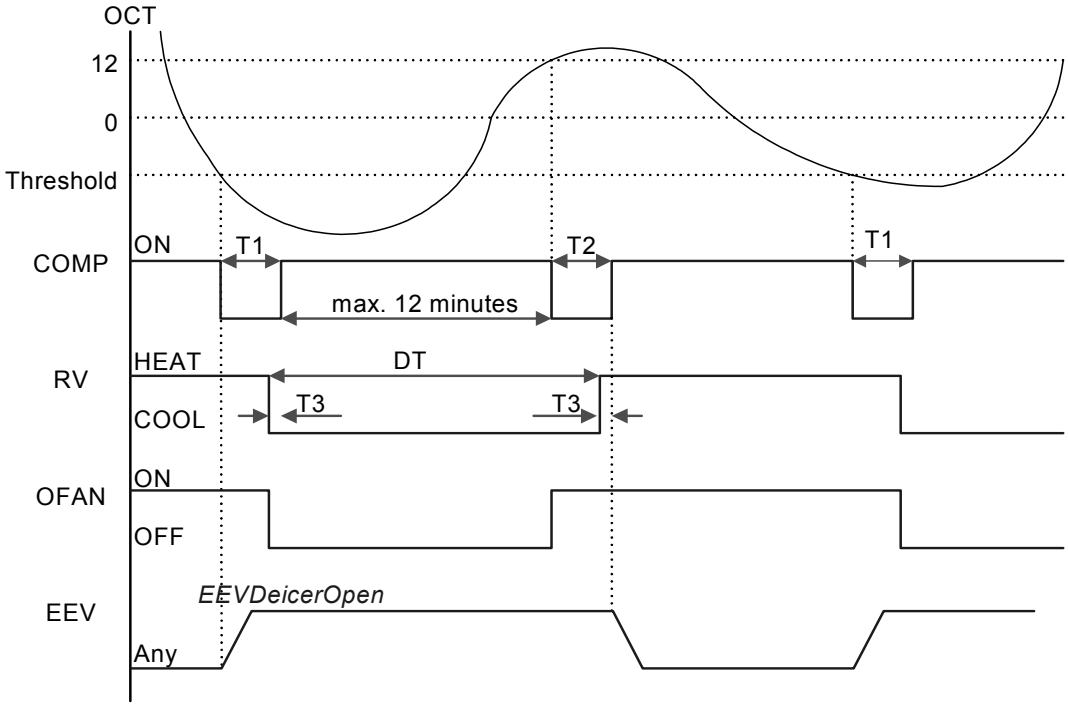
- Case 1: OCT<–DST AND TLD > DI
- Case 2: OCT<-4 AND TLD>*100* minutes
- Case 3: OCT is Invalid AND TLD > DI
- Case 4: Unit is just switched to STBY AND OCT<-DST
- Case 5: compressor is stopped during heating operation, OCT<-DST AND TLD>DI,

OCT – Outdoor Coil Temperature
OAT – Outdoor Air Temperature
TLD – Time from Last Deicing
DI – Deicing Interval (Time Interval Between Two Deicing)
DT- Deicing Time

DST is defined as:
When OAT>0 or OAT is invalid; then DST=8
When OAT≤0; then DST= round down (-*DeicerCoef* * OAT) + 8

Deicing interval time when compressor is first started in heat mode is 30 minutes.
Deicing interval time is changed (increased/ decreased in 10 minutes steps) as a function of deicing time. If deicing time is shorter than former deicing time, the deicing interval time will be increased. If deicing time is longer than former deicing time, the deicing interval time will be decreased.

12.7.8.2 Deicing Protection Procedure



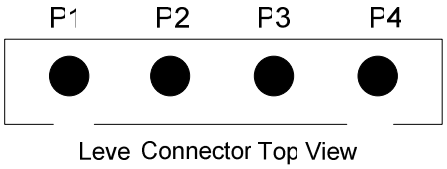
T1 = *DEICT1* seconds, T2 = *DEICT2* seconds, T3 = *DEICT3* seconds

12.7.8.3 Exiting Deicing

OCT > *OCTExitDeicer or* Deicer current time is over *MaxDeicerTime* minutes.

12.7.9 Condensate Water Over Flow Protection

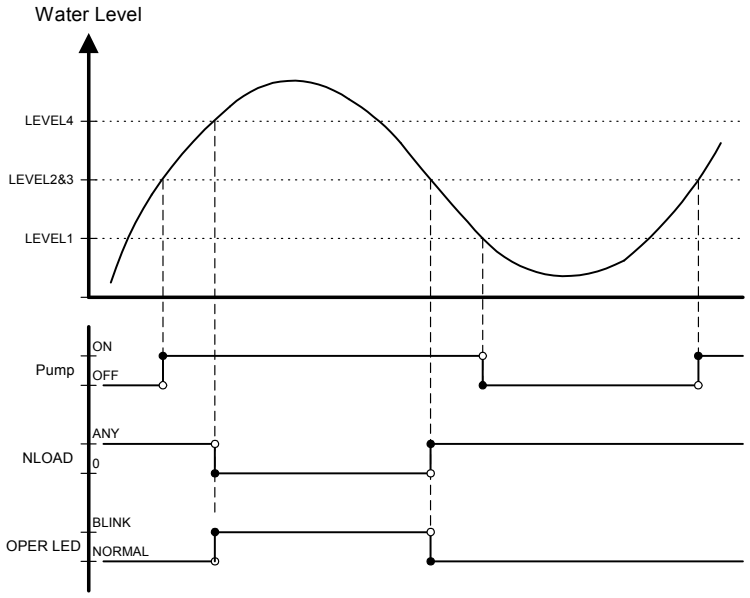
Outdoor unit receives “overflow’ signal from the indoor side.



Each of the pins P1, P2, P3 can have two options:
1 – When it is shorted with P4
0 – When it is not shorted to P4

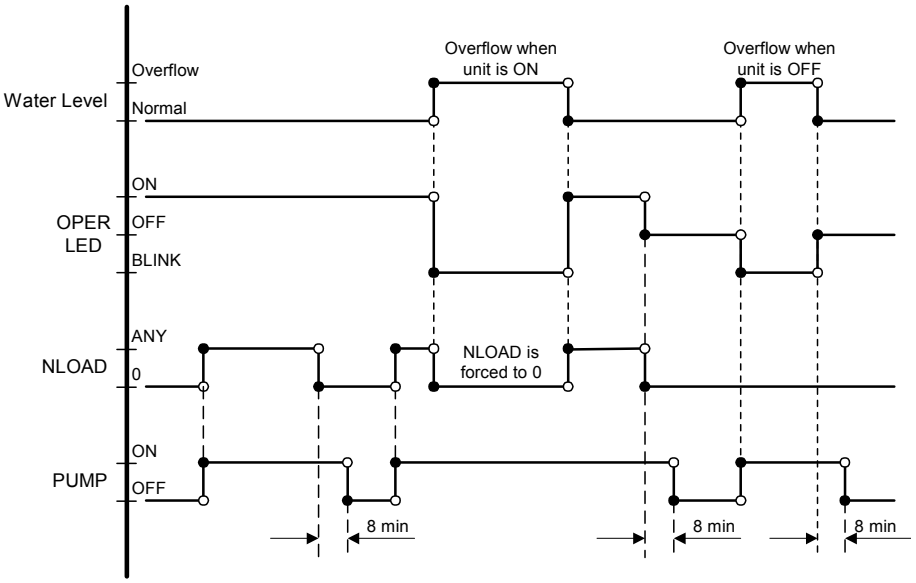
12.7.9.1 3 Levels Logic (used in floor/ceiling models)

P2	P3	Level
0	0	L0
1	0	L1
1	1	L2&3
0	1	L4



12.7.9.2 1 Level Logic (used in all models except for floor/ceiling models)

P2	P3	Level
Don't care	1	Normal
Don't care	0	Overflow



12.7.10 Exceeding operation conditions

Indoor Mode request	Exceeding limits state				Normal state (**default**)
	Outdoor conditions		*EnableExceedCond*		Outdoor mode
	Indoor Hydro (Family 31)	Indoor Non Hydro (Family is not 31)	1	0 (or OAT faulty)	
Cooling	A=47	A=47	Idle	Cooling	Cool
Cooling	B=-11	B=-11	Idle	Cooling	Cool
Heating	B=-18	B=-18	Idle	Heating	Heat
Heating	A=+40	A=+30	Idle	Heating	Heat

12.8 Indoor Unit Dry Contact

Indoor unit Dry contact has two alternative functions that are selected by J8.

	Function	Contact = Open	Contact = Short
J8 = Open	Presence Detector Connection	No Limit	Forced to STBY
J8 = Short	Power Shedding Function	No Limit	Limit NLOAD

12.9 Operating the Unit from the Mode Button

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

Forced operation Mode	Pre-set Temperature
Cooling	20^0C
Heating	28^0C

12.10 Indoor Unit Controllers and Indicators

STAND BY INDICATOR	1. Lights up when the Air Conditioner is connected to power and ready to receive the R/C commands
OPERATION INDICATOR	1. Lights up during operation. 2. Blinks for 300 msec., to announce that a R/C infrared signal has been received and stored. 3. Blinks continuously during protections (according to the relevant spec section).
TIMER INDICATOR	Lights up during Timer and Sleep operation.
FILTER INDICATOR	Lights up when Air Filter needs to be cleaned.
COOLING INDICATOR	Lights up when system is switched to Cool Mode by using the Mode Switch on the unit.

HEATING INDICATOR	Lights up when system is switched Heat Mode by using the Mode Switch on the unit.
Mode SWITCH (COOL/HEAT/OFF)	Every short pressing , the next operation mode is selected, in this order : SB → Cool Mode → Heat Mode → SB → … In long pressing system enters diagnostic mode.
RESET / FILTER SWITCH	For short pressing: When Filter LED is on - turn off the FILTER INDICATOR after a clean filter has been reinstalled. When Filter LED is off – enable/disable the buzzer announcer, if selected. In long pressing system enters set up mode (if in SB).

Note:

1. Pressing time is defined as the time between press and release.
2. If pressing time is one second or less – press is consider as short pressing.
3. If pressing time is three seconds or longer – pressing is considered as long pressing. In between, pressing is undetermined and system will not respond to pressing.
4. PXD units are always forced to enter either Cool, Heat or Fan Mode whenever its setting is changed by using the local buttons (i.e. items H - L). The other modes (Dry & Auto) can be selected only by using a R/C.
5. If the unit's operating mode is selected by using a R/C, the Cool and Heat indicators will not be turned ON even if the current mode is Cool or Heat.
6. In ST group units, the Heat Mode is skipped. That is Cool Mode → Fan Mode directly.

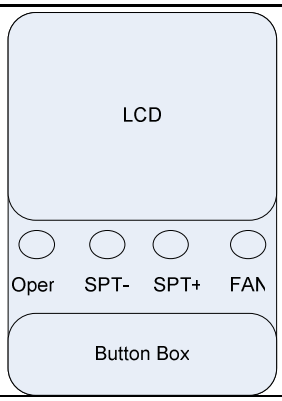
12.11 Outdoor Unit Controllers and Indicators

12.11.1 The user display uses three 7 segments.

12.11.1.1 The user interface concept is Tree menus.

12.11.1.2 The navigation through the menu can be performed by either the key pad or RC8 remote controller (through infra red receiver).

Command Type	Function	Keypad	Remote controller	RC8 sketch:
Up or Down command	Scrolling among options (up and down).	Up or Down key button.	**Up:** Set Point '+' **Down:** Set Point '-'	

Selection command	Go down one level in the menu or select an option.	Select button	FAN mode	
Escaping command	Go up one level in the menu	Escape button	Oper/STBY	
Note: the buttons above are selected according to RC8 design (refer to RC8 specifications) for the technician convenient use.				

1. The navigation type selection, remote controller or keypad, is set through software parameter: *HMIType*=0 (keypad), *HMIType*=1 (remote controller)
2. The following table summarizes the remote controller commands:

Command Type	Pressed Button	Values on the IR protocol						
		SPT	**Oper**	**FAN**	**Sleep**	**Horizontal Louver**	**I-FEEL**	**Other bits**
Up	'+'	30	0	0	0	0	0	0
Down	'-'	16	0	0	0	0	0	0
Escape	Oper	Don't care	1	0	0	0	0	0
Enter	FAN	Don't care	0	01	0	0	0	0
Reserved	Sleep	Don't care	0	0	1	0	0	0
Reserved	Horizontal Louver	Don't care	0	0	0	1	0	0
Reserved	I-FEEL	Don't care	0	0	0	0	1	0
-	Other	20	0	0	0	0	0	0

Notes:
1. The zeros stated above must be checked in order to judge for proper message.
2. Proper checksum has to be performed according to the RC7 specifications.

3. For any remote controller command, the most right 'dot' will blink for 1 second in order to acknowledge the command is received.

12.11.1.3 Active selection or status will be indicated by blinking the display.

12.11.2 Keys functionality

- Scrolling will be done whenever the button is pressed.
- When scrolling alpha values, if the scroll button is held in, the selection will change at the rate of one step per second.
- The display will not roll over during selection (for example stop/Ode/Dia/Stp/Par/stop)

12.11.3 Menus

12.11.3.1 General

All the green colored items will be deactivated for single split units.

12.11.3.2 Main Menu

Technician Test (tt)

Installation Test (it)

Diagnostics (dia)
Set Up (Stp)
Status (Stt)

Notes:

1. The default presentation will be alternation among:
    - the mode of the unit (Cl/Ht/Sb) shown for 2 sec.
    - ID + the detected IDUs number shown for 2 sec.
    - Active fault (among ODU or IDUs), each to be shown for 2 sec.
2. In diagnostics menu:
    - xx means failure code.
    - Maximum 5 faults are presented for each unit (each IDUs/ODU). When no faults "-- " sign will be shown.
    - The active faults have higher priority for presentation than non active ones.
    - Non active faults are presented according to their chronological order, starting from the latest one.
    - Whenever a new active fault occurs, it will be presented immediately.
    - Active faults are blinking, where non active ones do not.
3. Exiting 'Status' menu and its sub-menus back to the main menu is done by either pressing escape or after continuous 60 minutes out of any press.
4. Technician Test mode, once is selected, it cannot last more than predefined time. Refer to technician test for details, Sect..
5. All the menus, except Status and its sub-menu, Technician Test once selected, are automatically exited to the main menu after 10 continuous minute out of any press.
6. When Technician test cool or heat menus are selected (operative), it will be blinking constantly until, this menu is escaped.
7. When the installation test begins, the system will show up count down based (refer to the installation test sect. At the end of the installation test, the result will be presented.
8. For the indoor diagnostics, whenever there is no-communication with indoor unit or indoor unit is not detected, 'no-communication' will be shown under the relevant indoor unit diagnostics. In addition to the indoor diagnostics, these faults will be also shown as well under the default show.
9. When Alpha and numeric values are combined, they will be separated by dot.
10. For technician mode presentation, the active setting target compressor frequency will be presented directly upon entry. The active selected value will be blinking. The set target compressor frequency will be enabled to be scrolled up and down within the minimum and maximum operating frequency values (the values do depend on the outdoor model setting as well as the operation mode- cool or heat)

11. For technician mode presentation, whenever the system exit technician mode due any of the faults listed under Sect., the HMI will show the fault in the same way to Diagnostics sub menu.

Fault Code:

No	Problem	5	4	3	2	1
1	OCT is shorted/disconnected	0	0	0	0	1
2	CTT is shorted/disconnected	0	0	0	1	0
3	HST is shorted/disconnected	0	0	0	1	1
4	OAT is shorted/disconnected	0	0	1	0	0
5	OMT is shorted/disconnected	0	0	1	0	1
6	RGT is shorted/disconnected	0	0	1	1	0
7	RLT is shorted/disconnected	0	0	1	1	1
8	Reserved	0	1	0	0	0
9	Reserved	0	1	0	0	1
10	Reserved	0	1	0	1	0
11	Compressor IPM Fault / IPM Driver Pin / Compressor Current Sensor Fault	0	1	0	1	1
12	Bad EEPROM	0	1	1	0	0
13	DC under voltage	0	1	1	0	1
14	DC over voltage	0	1	1	1	0
15	AC under voltage/AC over Voltage/Zero Crossing detection	0	1	1	1	1
16	Mismatch between IDU & ODU models	1	0	0	0	0
17	No Communication	1	0	0	0	1
18	System Over Power	1	0	0	1	0
19	PFC Current sensor	1	0	0	1	1
20	Heat sink Over Heating	1	0	1	0	0
21	Deicing	1	0	1	0	1
22	Compressor Over Heating	1	0	1	1	0
23	Compressor Over Current	1	0	1	1	1
24	No OFAN Feedback	1	1	0	0	0
25	OFAN IPM fault / OFAN IPM Driver Pin	1	1	0	0	1
26	Compressor Lock	1	1	0	1	0
27	Bad Communication	1	1	0	1	1
28	Missing ODU configuration	1	1	1	0	0
29	Undefined ODU Model	1	1	1	0	1
30	Outdoor/Indoor Coil Overheating	1	1	1	1	0
31	Operation conditions are exceeded	1	1	1	1	1

12.12 Jumper Settings

12.12.1 Indoor Unit Controller

12.12.1.1 Hardware Jumpers

0 = Open Jumper (disconnect jumper).

1 = Close Jumper (connect jumper).

Self test Jumper – J1

OPERATION	J1
SELF-TEST	1
NORMAL	0

Compensation Jumper – J2

Model	J2 (Default)	Compensation
WNG/WNG18/WNG30/WSA	0	Activated
PXD/AC/NPXD	1	Deactivated
LS/K/KS/AS/AD/DNG/KN	1	Activated

Family selection Jumper – J3, J4 ,J5and J6

Family	J6	J5	J 4	J3
AS	0	0	0	0
AC	0	0	0	1
AD	0	0	1	0
WNG	0	0	1	1
PXD	0	1	0	0
KS	0	1	0	1
LS	0	1	1	0
K	0	1	1	1
WNG18	1	0	0	0
WNG30	1	0	0	1
Delta 50	NA			
WSA	1	0	1	1
DNG	NA			
KN	1	1	0	1
NPXD	NA			
Reserved	1	1	1	1

Note: 1. Delta 50 is used for Delta Product. This family occupies family No. 10 on the communication level.

Model selection Jumper – J7, J8

Model	J8	J7
A	0	0
B	0	1
C	1	0
D	1	1

12.12.1.2 ***Software Jumpers***

Property	0	1	2
EEPROM DATA (J1)	Use ROM*	Use EEPROM	NA
'Thermostatic Stop- Heat' (J2)	Deactivated	Activated	NA
'Heat to STBY' (J3)	Deactivated	Activated	NA
Water Level Protection (J4)	1 Level	3 Levels	No Water Protection- ignore
Enable Test Mode (J5)	Deactivated	Activated*	NA

** Default values (used in the ROM)*

Default SW jumpers according to the family (used in the ROM)

Property	AS	AC	AD	WNG	PXD	KS	LS	K	WNG18	WNG30	Reserved	WSA	DNG	KN	NPXD	Reserved
'Thermostatic Stop- Heat' (J2)	*1*	*1*	*1*	*1*	*0*	*0*	*0*	*1*	*1*	*1*	*0*	*0*	*1*	***0***	*0*	*0*
'Heat to STBY' (J3)	*1*	*1*	*1*	*1*	***1***	*0*	*0*	*1*	*1*	*1*	*0*	*0*	*1*	*1*	***1***	*0*
Water Level Protection (J4)	*0*	*2*	*0*	*2*	*1*	*0*	*2*	*0*	*2*	*2*	*0*	*2*	*0*	*0*	*1*	*0*

J1 – EEPROM/ROM setting

When J1 is 1, IDU will use model/family/general parameters from EEPROM. If EEPROM is invalid, IDU will ignore J1 and use/copy the ROM pointed by the selected jumpers (will also set an according fault).

12.12.2 Outdoor Unit Controller

12.12.2.1 Hardware Jumpers

JP9 JUMPER LAYOUT

ODU4 *(PIN 9)*	**ODU3** *(PIN 7)*	**ODU2** *(PIN 5)*	**ODU1** *(PIN 3)*	**ODU0** *(PIN 1)*
GND *(PIN 10)*	**GND** *(PIN 8)*	**GND** *(PIN 6)*	**GND** *(PIN 4)*	**GND** *(PIN 2)*

ODU MODEL SELECTION

ODU4	**ODU3**	**ODU2**	**ODU1**	**ODU0**	**ODU Model**	**Compressor Type (Manufacturer/Model/# poles)**	
						Single Split	**Multi Split**
ON	OFF	OFF	ON	ON	S (DCR60)	Panasonic, 4 poles, DA150	

12.12.2.2 Software Jumpers

Property	0	1
EEPROM DATA (J1)	Use ROM*	Use EEPROM

** Default values (used in the ROM)*

J1 – EEPROM/ROM setting

When J1 is 1, ODU will use model/general parameters from EEPROM. If EEPROM is invalid, ODU will ignore J1 and use/copy the ROM pointed by the selected jumpers (will also set an according fault).

12.13 Test Mode

12.13.1 Entering Test Mode

System can enter Test mode in two ways:

- Automatically when the following conditions exists for 30 minutes continuously:
  - Mode = Cool, Set point = 16, Room temperature = 27±1, Outdoor temperature = 35±1

  Or
  - Mode = Heat, Set point = 30, Room temperature = 20±1, Outdoor temperature = 7±1
- Manually when entering diagnostics with the following settings:
  - Mode = Cool, Set point = 16
  - Mode = Heat, Set point = 30
- Enteringthrough the outdoor unit (initialted by the outdoor unit)

12.13.2 Unit Operation in Test Mode

When entering through indoor:

- IFAN speed and NLOAD will be set in the following ways.

User Setting IFAN Speed	IFAN variable speed		Fixed Speed	NLOAD
Low/Med	Cool	*IFAN_TEST_COOL_MIN*	Low	10
	Heat	*IFAN_TEST_HEAT_MIN*		
High	Cool	*IFAN_TEST_COOL_NOM*	Turbo	*NomLoadC* (at Cool)
	Heat	*IFAN_TEST_HEAT_NOM*		*NomLoadH* (at heat)
Turbo/Auto	Cool	*IFAN_TEST_COOL_MAX*	Turbo	127
	Heat	*IFAN_TEST_HEAT_MAX*		

When entering through outdoor:

ODU mode	**IDU mode**	**IFAN Variable Speed**	**IFAN fix speed**	**NLOAD**
Cooling	Cooling	*IFAN_TEST_COOL_NOM*	Turbo	*NomLoadC*
Heating	Heating	*IFAN_TEST_HEAT_NOM*	Turbo	*NomLoadH*

Notes:
1. For deicer, the relevant deicer logic should be followed.
2. the operation led blinks ON/OFF cycles with 2 seconds cycle time when entering by outdoor.

Note:

1. For the protections, except for water level protections, only the “Stop-Compressor” status will be operative. For other protection statuses, the system will behave as in normal one.
2. The vertical louver should be Test_Mode_ Angle ,it should be vertical.Louvers angles will be set according to the IDU family and Mode:

13. TROUBLESHOOTING

13.1 ELECTRICAL & CONTROL TROUBLESHOOTING

WARNING!!!

When Power Up – the whole outdoor unit controller, including the wiring, is under HIGH VOLTAGE!!!
Never open the Outdoor unit before turning off the Power!!!
When turned off, the system is still charged (400V)!!!
It takes about 4 Min. to discharge the system.
Touching the controller before discharging may cause an electrical shock!!!

13.1.1 Single Split system failures and corrective actions

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 controller.
2	Unit does not respond to remote control message	Remote control message not reached the indoor unit	Check remote control batteries, if batteries are OK, check display and display wiring, if OK, replace display PCB. If still not OK replace controller.
3	Unit responds to remote control message but Operate indicator (Green LED) does not light up	Problem with display PCB	Replace display PCB. If still not OK replace controller.
4	Indoor fan does not start (louvers are opened and Green LED does light 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 130VAC (for triack controlled motor) or higher than 220VAC for fixed speed motors, 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 (See 13.1.3 below), and follow the actions described.
7	Compressor stops during operation and Green LED remains on	Electronic control or power supply problem	Perform diagnostics (See 13.1.3 below), and follow the actions described.

No	SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
8	Compressor is on but outdoor fan does not work	Problem with outdoor electronics or outdoor fan	Check outdoor fan motor according to the procedure in section 13.2.3 below, 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 230VAC power supply, if OK, Replace outdoor controller.
10	All components are operating properly but no cooling or no heating	Refrigerant leak	Check refrigeration system.
11	Compressor is over heated and unit does not generate capacity	EEV problem	Check EEV
12	Units goes into protections and compressor is stopped with no clear reason	Control problem or refrigeration system problem	Perform diagnostics (See 13.1.3 below), and follow the actions described.
13	Compressor motor is generating noise and no suction occurs	Phase order to compressor is wrong	Check compressor phase order.
14	Water leakage from indoor unit	Indoor unit drainage tube is blocked	Check and open drainage tube.
15	Freezing of outdoor unit in heat mode and outdoor unit base is blocked with ice		Connect base heater.
16	Unit operates with wrong fan speeds or wrong frequency	Wrong jumper settings	Perform diagnostics (See 13.1.3 below), and check if units is operating by EEPROM parameters.

13.1.2 Checking the refrigeration system

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

Entering test mode:

Set unit to Cool/16 degrees/High indoor fan speed, or Heat/30 degrees/High indoor fan speed, and enter diagnostics.

13.1.3 Judgment by Indoor/Outdoor Unit Diagnostics

Enter diagnostics mode - press for five seconds Mode/Reset button in any operation mode. Acknowledgment is by 3 short beeps and lights of all Display LED's. Then, The units will enter into Indoor and Outdoor unit diagnostic modes.

During the Outdoor unit diagnostics all three Indoor LED's (STBY/Operate, Filter and Timer) are blinking. When Indoor diagnostics is displayed, all three LED's (STBY/Operate, Filter and Timer) are ON.

When system enters diagnostics mode, only one fault code is shown. Order of priority is from the lower to the higher number. Diagnostics is continuously ON as long as power is ON. The current system operation mode will not be changed.
If no fault occurred in the system, no fault code will be displayed during normal operation mode. The last fault code will be displayed even if the system has recovered from that fault. The last fault will be deleted from the EEPROM after the system has exit diagnostics mode.

In diagnostics mode, system fault / status will be indicated by blinking of Filter & Timer LEDs. The coding method will be as follows:
Filter LED will blink 5 times in 5 seconds, and then will be shut off for the next 5 seconds. Timer LED will blink during the same 5 seconds according to the following Indoor / Outdoor unit tables:
Note: 0 – OFF, 1-ON

13.1.3.1 Indoor unit Diagnostics

No	Problem	5	4	3	2	1
1	RT-1 is disconnected	✐	✐	✐	✐	☞
2	RT-1 is shorted	✐	✐	✐	☞	✐
3	RT-2 is disconnected	✐	✐	✐	☞	☞
4	RT-2 is shorted	✐	✐	☞	✐	✐
5	Reserved	✐	✐	☞	✐	☞
7	Communication mismatch	✐	✐	☞	☞	☞
8	No Communication	✐	☞	✐	✐	✐
9	No Encoder	✐	☞	✐	✐	☞
10	Reserved	✐	☞	✐	☞	✐
11	Outdoor Unit Fault	✐	☞	✐	☞	☞
…	Reserved					
17	Defrost protection	☞	✐	✐	✐	☞
18	Deicing Protection	☞	✐	✐	☞	✐
19	Outdoor Unit Protection	☞	✐	✐	☞	☞
20	Indoor Coil HP Protection	☞	✐	☞	✐	✐
21	Reserved	☞	✐	☞	✐	☞
22	Reserved	☞	✐	☞	☞	☞
24	EEPROM Not Updated	☞	☞	✐	✐	✐
25	Bad EEPROM	☞	☞	✐	✐	☞
26	Bad Communication	☞	☞	✐	☞	✐
27	Using EEPROM data	☞	☞	✐	☞	☞

No	Problem	5	4	3	2	1
28	Model A	☞	☞	☞	✐	✐
29	Model B	☞	☞	☞	✐	☞
30	Model C	☞	☞	☞	☞	✐
31	Model D	☞	☞	☞	☞	☞

13.1.3.2 Indoor unit diagnosis and corrective actions

No.	Fault	Probable Cause	Corrective Action
1	Sensor failures of all types		Check sensor connections or replace sensor
2	Communication mismatch	Indoor and Outdoor controllers are with different versions	Replace Indoor controller
3	No Communication	Communication or grounding wiring is not good.	Check Indoor to Outdoor wiring and grounding
4	No Encoder	Indoor electronics or motor	Check motor wiring, if ok, replace motor, if still not ok, replace Indoor controller.
5	Outdoor Unit Fault	Outdoor controller problem	Switch to Outdoor diagnostics.
6	EEPROM Not Updated	System is using ROM parameters and not EEPROM parameters	No action, unless special parameters are required for unit operation.
7	Bad EEPROM		No action, unless special parameters are required for unit operation.
8	Bad Communication	Communication quality is low reliability	Check Indoor to Outdoor wiring and grounding
9	Using EEPROM data	No problem. System is using EEPRRRROM parameters	

13.1.3.3 Outdoor unit Diagnostics

For GC 9/12 DCI

No	Problem	5	4	3	2	1
1	OCT is disconnected	0	0	0	0	1
2	OCT is shorted	0	0	0	1	0
3	CTT is disconnected	0	0	0	1	1
4	CTT is shorted	0	0	1	0	0
5	HST is disconnected (when enabled)	0	0	1	0	1
6	HST is shorted (when enabled)	0	0	1	1	0
7	OAT is disconnected (when enabled)	0	0	1	1	1
8	OAT is shorted (when enabled)	0	1	0	0	0
9	TSUC is disconnected (when enabled)	0	1	0	0	1
10	TSUC is shorted (when enabled)	0	1	0	1	0

No	Problem	5	4	3	2	1
11	IPM Fault	0	1	0	1	1
12	Bad EEPROM	0	1	1	0	0
13	DC under voltage	0	1	1	0	1
14	DC over voltage	0	1	1	1	0
15	AC under voltage	0	1	1	1	1
16	Indoor / Outdoor unit Communication mismatch	1	0	0	0	0
17	No Communication	1	0	0	0	1
18	Reserved	1	0	0	1	0
20	Heat sink Over Heating	1	0	1	0	0
21	Deicing	1	0	1	0	1
22	Compressor Over Heating	1	0	1	1	0
23	Compressor Over Current	1	0	1	1	1
24	No OFAN Feedback	1	1	0	0	0
25	OFAN locked	1	1	0	0	1
26	Compressor Lock	1	1	0	1	0
27	Bad Communication	1	1	0	1	1

For YBD 018/22/24

No	Problem	5	4	3	2	1
1	OCT is shorted/disconnected	0	0	0	0	1
2	CTT is shorted/disconnected	0	0	0	1	0
3	HST is shorted/disconnected	0	0	0	1	1
4	OAT is shorted/disconnected	0	0	1	0	0
5	OMT is shorted/disconnected	0	0	1	0	1
6	RGT is shorted/disconnected	0	0	1	1	0
7	RLT is shorted/disconnected	0	0	1	1	1
8	Reserved	0	1	0	0	0
9	Reserved	0	1	0	0	1
10	Reserved	0	1	0	1	0
11	Compressor IPM Fault / IPM Driver Pin / Compressor Current Sensor Fault	0	1	0	1	1
12	Bad EEPROM	0	1	1	0	0
13	DC under voltage	0	1	1	0	1
14	DC over voltage	0	1	1	1	0
15	AC under voltage/AC over Voltage/ Zero Crossing detection	0	1	1	1	1
16	Mismatch between IDU & ODU models	1	0	0	0	0
17	No Communication	1	0	0	0	1
18	System Over Power	1	0	0	1	0
19	PFC Current sensor	1	0	0	1	1
20	Heat sink Over Heating	1	0	1	0	0
21	Deicing	1	0	1	0	1
22	Compressor Over Heating	1	0	1	1	0
23	Compressor Over Current	1	0	1	1	1
24	No OFAN Feedback	1	1	0	0	0
25	OFAN IPM fault / OFAN IPM Driver Pin	1	1	0	0	1
26	Compressor Lock	1	1	0	1	0

27	Bad Communication	1	1	0	1	1
28	Missing ODU configuration	1	1	1	0	0
29	Undefined ODU Model	1	1	1	0	1
30	Outdoor/Indoor Coil Overheating	1	1	1	1	0
31	Operation conditions are exceeded	1	1	1	1	1

13.1.3.4 Outdoor unit diagnosis and corrective actions

.	Fault	Probable Cause	Corrective Action
	Sensors failures of all types		Check sensors connections or replace sensors.
	IPM Fault	Electronics HW problem	Check all wiring and jumper settings, if OK, replace electronics.
	Bad EEPROM		No action, unless special parameters are required for unit operation.
	DC under/over Voltage	Electronics HW problem	Check outdoor unit power supply voltage
	AC under Voltage		Check outdoor unit power supply voltage
	Indoor / Outdoor unit Communication mismatch	Indoor and Outdoor controllers are with different versions	Replace Indoor controller
	No Communication	Communication or grounding wiring is not good.	Check Indoor to Outdoor wiring and grounding
	Compressor Lock		Switch unit to STBY and restart
	Bad Communication	Communication quality is low reliability	Check Indoor to Outdoor wiring and grounding

13.1.4 Judgement by MegaTool

MegaTool is a special tool to monitor the system states.

Using MegaTool requires:

- A computer with RS232C port.
- A connection wire for MegaTool.
- A special MegaTool software.

Use MegaTool according to following procedure:

- Setup MegaTool software: copy the software to the computer.
- Connect RS232C port in computer with MegaTool port in Indoor/Outdoor unit controller by the connection wire.
- Run the software and choose the COM port, you can monitor the A/C system state in monitor tab.

13.2 Simple procedures for checking the Main Parts

13.2.1 Checking Mains Voltage.

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

13.2.2 Checking Power Input.

If Indoor unit power LED is unlighted, power down the system and check the fuse of the Indoor unit. If the fuse is OK replace the Indoor unit controller. If the fuse has blown, replace the fuse and power up again.

Checking Power Input procedure for the Outdoor unit is the same as with the Indoor unit.

13.2.3 Checking the Outdoor Fan Motor.

Enter Test Mode (where the OFAN speed is high)

check the voltage between two pins(Hi and N) of connector Controller OFAN, normal voltage is 220VAC.

13.2.4 Checking the Compressor.

The compressor is brushless permanence magnetic DC motor. Three coil resistance is same. Check the resistance between three poles. The normal value should be below 0.7 ohm. Pay attention U,V, W are respective to connect to RED,BROWN,BLACK wires.

13.2.5 Checking the Reverse Valve (RV).

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

13.3 Precaution, Advise and Notice Items

13.3.1 High voltage in Outdoor unit controller.

Whole controller, including the wires that are connected to the Outdoor unit controller may have the potential hazard voltage when power is on. Touching the Outdoor unit controller may cause an electrical shock.

Advise: Don't touch the naked lead wire and don't insert finger, conductor or anything else into the controller when power is on.

13.3.2 Charged Capacitors

Three large-capacity electrolytic capacitors are used in the Outdoor unit controller. Therefore, charging voltage (380VDC) remains after power down. Discharging takes about four minutes after power is off. Touching the Outdoor unit controller before discharging may cause an electrical shock.

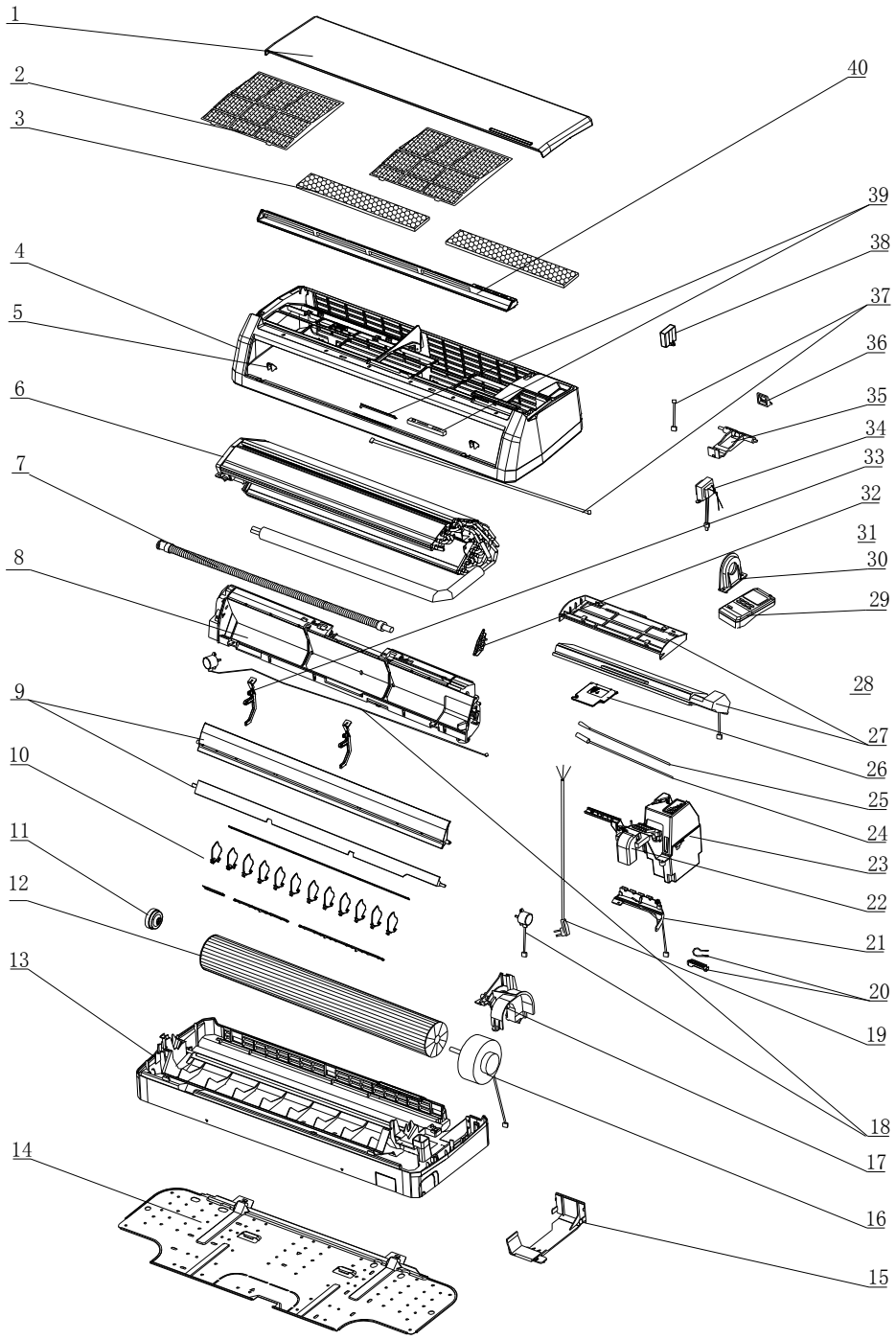
13.3.3 Additional advises

- When disassemble the controller or the front panel, turn off the power supply.
- When connecting or disconnecting the connectors on the PCB, hold the whole housing, don't pull the wire.

There are sharp fringes and sting on shell. Use gloves when disassemble

14. EXPLODED VIEW & SPARE PART LIST

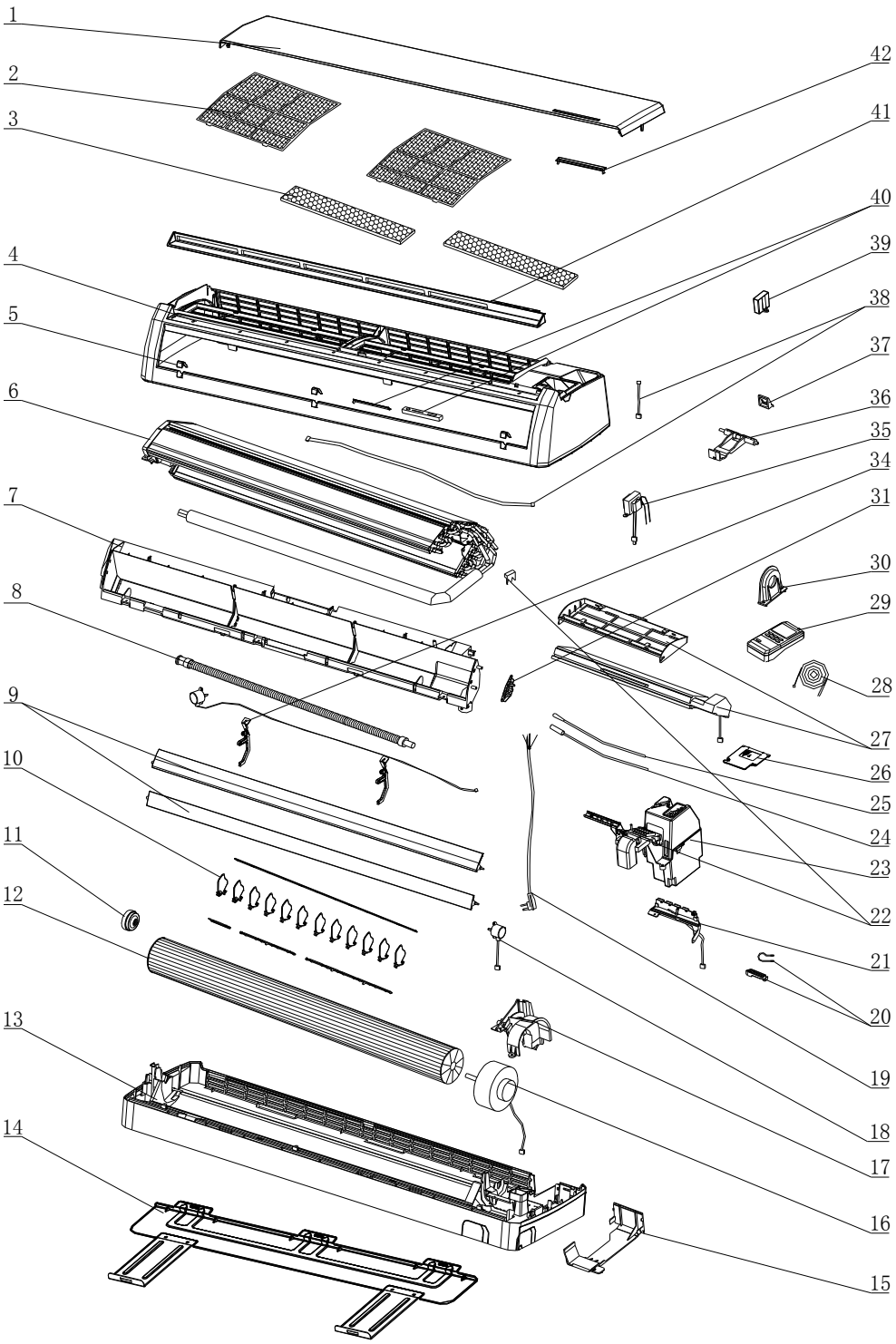
14.1 Exploded view of indoor unit: PNXA 9/12 DCI



14.2 Spare part list of indoor Unit: PNXA 9/12 DCI

No.	PN	Description	Quantity
1	465800009	Grill A Assy./ LEX7/9/12/14 for Airwell	1
	465800016	Grill A Assy./ LEX7/9/12/14 for Electra	1
2	4518655	Air Filter	2
3	4519132	Active Carbon Static Fiber filter	1
	4519744	Low Temperature Catalyst Fiber Filter	1
4	465720059	Front Frame Assy./ LEX7/9/12/14	1
5	4526952	Screw Cover	2
6	4526389	R410A EVAPORATOR ASSY HPI DC WNG9/12	1
7	4518664	Draining Hose(ordinary)	1
	4522754	Draining Hose(For Aust.)	1
8	4527434	Air Outlet Assy	1
9	4518638	Upper Louver	1
9	4526953	Lower Louver	1
10	4518640	Vert. Louver A	2
	4518641	Vert. Louver B	10
11	4518662	Bearing assy fan	1
12	4518661	Fan assy plastic D91	1
13	4518730	Rear panel assy	1
14	4518670	WNG INSTALLATION PLATE	1
15	4518654	Tube Bracket	1
16	4519864R	Motor (LEX DCI25/35 and LEX7/9/12/14 with new function)	1
17	4518650	Motor Cover	1
18	452969400	Step Motor A	1
	452969500	Step Motor B	1
19	4521158R	Power cord cable (Euro.)	1
	4520061R	Power cord cable(Israel)	1
	4520278R	Power cord cable(Without plug)	1
20	4519147	Power Cord Clip	1
	465320006	Wire Fixing Block	1
21	467300079R	Display Board Assy./ LEX25/35DCI（With new function）	1
22	4518666	Sensor Braket	1
23	467300067R	LEX DCI Indoor Controller With Vertical Louver	1
24	438082	Thermistor Indoor coil（BLACK）	1
25	4519813	Thermistor room	1
26	465340012	Terminal Cover	1
27	4518663	ELECTROSTATIC FLITER WNG-1	1
	4519338	FILTER FRAME(Optional)	1
28	none	none	0
29	453042500	Remote controller/RC4-I-1 EHK P/N 974-710-00	1
30	4518651	Cover Side Motor	1
31	none	none	0
32	4518682	Gear BOX ASSY	1
33	4518646	Louver Support	1
34	452867800R	Transformer For LEX DCI25/35 (Optional)	1
35	4518657	Tube Lock	1
36	4518656	Mounting Hook	2
37	4519900	IONIZER CABLE A (Optional)	1
38	467430000	Power Supply Unit /Ionizer(Optional)	1
39	467480001	Ionizer/WNG NWNG SERIES(Optional)	1
	4526951	Ionizer Cover (Optional)	1
40	465800018	Air Inlet Frame A Assy.	1

14.3 Exploded view of indoor unit: PNXA 18/21/24 DCI



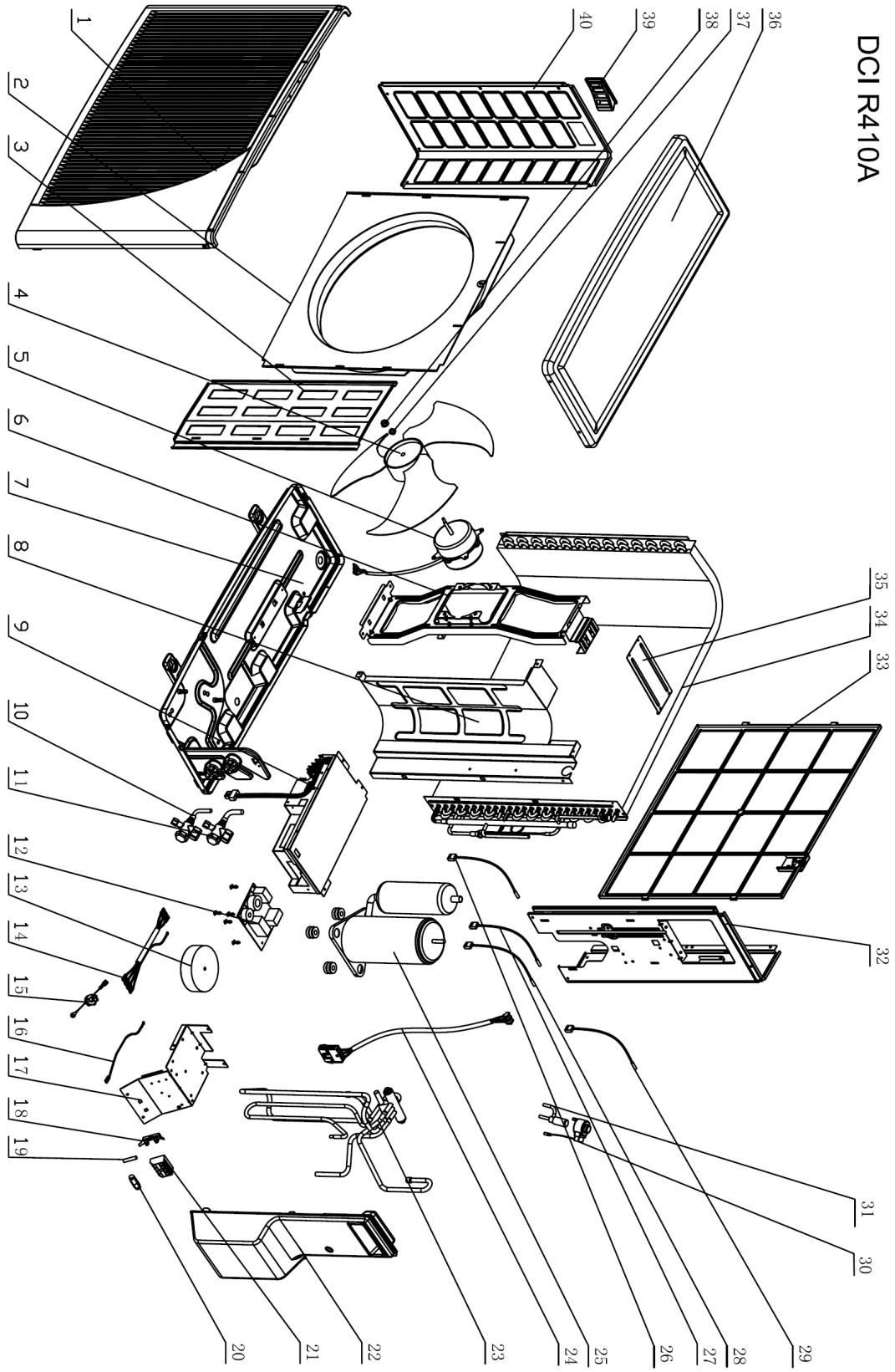
14.4 Spare part list of indoor Unit: PNXA 18/21 DCI

No	PN.	Name	Qua.
1	465100078	Grill A/Lex-18 (RAL9003AW)	1
2	452919800	Filter	2
3	470500012	Nanometer Photocatalysis Deodorant Filter Lex18/24	1
3	470500015	Biological Sterilization Filter Lex18/24	1
4	465720388	Front Frame Assy./Glossy/LEX 50 DCI（VIESSMANN）	1
5	465340085	Screw Cover/Glossy/LEX 50 DCI（VIESSMANN）	3
6	453134600	Evaporator Assy.	1
7	465120023	Air Outlet Frame/LEX 50 DCI（VIESSMANN）	1
8	465210009	Drain Pipe for Europe / WNG18/24/30	1
9	465160023	Horizontal flap A（Viessmann）	1
9	465160024	Horizontal flap B（Viessmann）	1
10	465160017	Vertical flap B（Viessmann）	2
10	465160016	Vertical flap A（Viessmann）	12
11	4518662	Bearing assy fan	1
12	453024900	Impeller fan	1
13	465700011	Unit Housing/Glossy/LEX 50 DCI（VIESSMANN）	1
14	452920100	Mount bracket/WNG-18 （20）	1
15	465320017	Connect Plate/Unit housing/LEX 50 DCI （Viessmann）	1
16	453024500R	PG Motor	1
17	452918800	Cover/motor	1
18	453050200	STEP MOTOR A	1
18	453050300	STEP MOTOR B	1
20	453232000	Clip /Power cord	1
21	467300068R	Display Board /LEX DCI (With New Funtion)	1
22	4516263	SENSOR BASE	1
22	452919100	Support/sensor	1
23	467300258R	Controller / DCI IDU HAD 18	1
24	467400053	ICT Indoor Coil Temperature ¢6	1
25	467400025	(650mm) Indoor Air Inlet Temperature S	1
26	465340051	Terminal Cover (Viessmann)	1
29	467240025	Remote controller Assy.with batteries. RC-7i-1 467200037R	1
30	4518651	Cover Side Motor	1
31	453057900	Gear BOX ASSY	1
34	464250070	Support/Horizontal Flap/ LEX50 DCI（Viessmann）	2
36	465320033	TUBE LOCK (RAL9003AW)	1
40	465360039	Support/Bi Polar Ionizer/LEX 7/9/12/18	1
40	467480009	Ionizer/Bi-Polar ((Optional)	1
41	465160008	Air Inlet Frame A Assy/Lex-18	1

14.5 Spare part list of indoor Unit: PNXA 24 DCI

No	PN.	Name	Qua.
1	465100078	Grill A/Lex-18 (RAL9003AW)	1
2	452919800	Filter	2
3	470500012	Nanometer Photocatalysis Deodorant Filter Lex18/24	1
3	470500015	Biological Sterilization Filter Lex18/24	1
4	465720388	Front Frame Assy./Glossy/LEX 50 DCI（VIESSMANN）	1
5	465340085	Screw Cover/Glossy/LEX 50 DCI（VIESSMANN）	3
6	453260400	Evaporator Assy.	1
7	465120023	Air Outlet Frame/LEX 50 DCI（VIESSMANN）	1
8	465210009	Drain Pipe for Europe / WNG18/24/30	1
9	465160023	Horizontal flap A（Viessmann）	1
9	465160024	Horizontal flap B（Viessmann）	1
10	465160017	Vertical flap B（Viessmann）	2
10	465160016	Vertical flap A（Viessmann）	12
11	4518662	Bearing assy fan	1
12	453024900	Impeller fan	1
13	465700011	Unit Housing/Glossy/LEX 50 DCI（VIESSMANN）	1
14	452920100	Mount bracket/WNG-18 （20）	1
15	465320017	Connect Plate/Unit housing/LEX 50 DCI （Viessmann）	1
16	453206800R	DC Motor	1
17	452918800	Cover/motor	1
18	453050200	STEP MOTOR A	1
18	453050300	STEP MOTOR B	1
20	453232000	Clip /Power cord	1
21	467300068R	Display Board /LEX DCI (With New Funtion)	1
22	4516263	SENSOR BASE	1
22	452919100	Support/sensor	1
23	467300259R	Controller / DCI IDU HAD 24	1
24	467400053	ICT Indoor Coil Temperature ∅6	1
25	467400025	(650mm) Indoor Air Inlet Temperature S	1
26	465340051	Terminal Cover (Viessmann)	1
29	467240025	Remote controller Assy.with batteries. RC-7i-1 467200037R	1
30	4518651	Cover Side Motor	1
31	453057900	Gear BOX ASSY	1
34	464250070	Support/Horizontal Flap/ LEX50 DCI（Viessmann）	2
36	465320033	TUBE LOCK (RAL9003AW)	1
40	465360039	Support/Bi Polar Ionizer/LEX 7/9/12/18	1
40	467480009	Ionizer/Bi-Polar ((Optional)	1
41	465160008	Air Inlet Frame A Assy/Lex-18	1

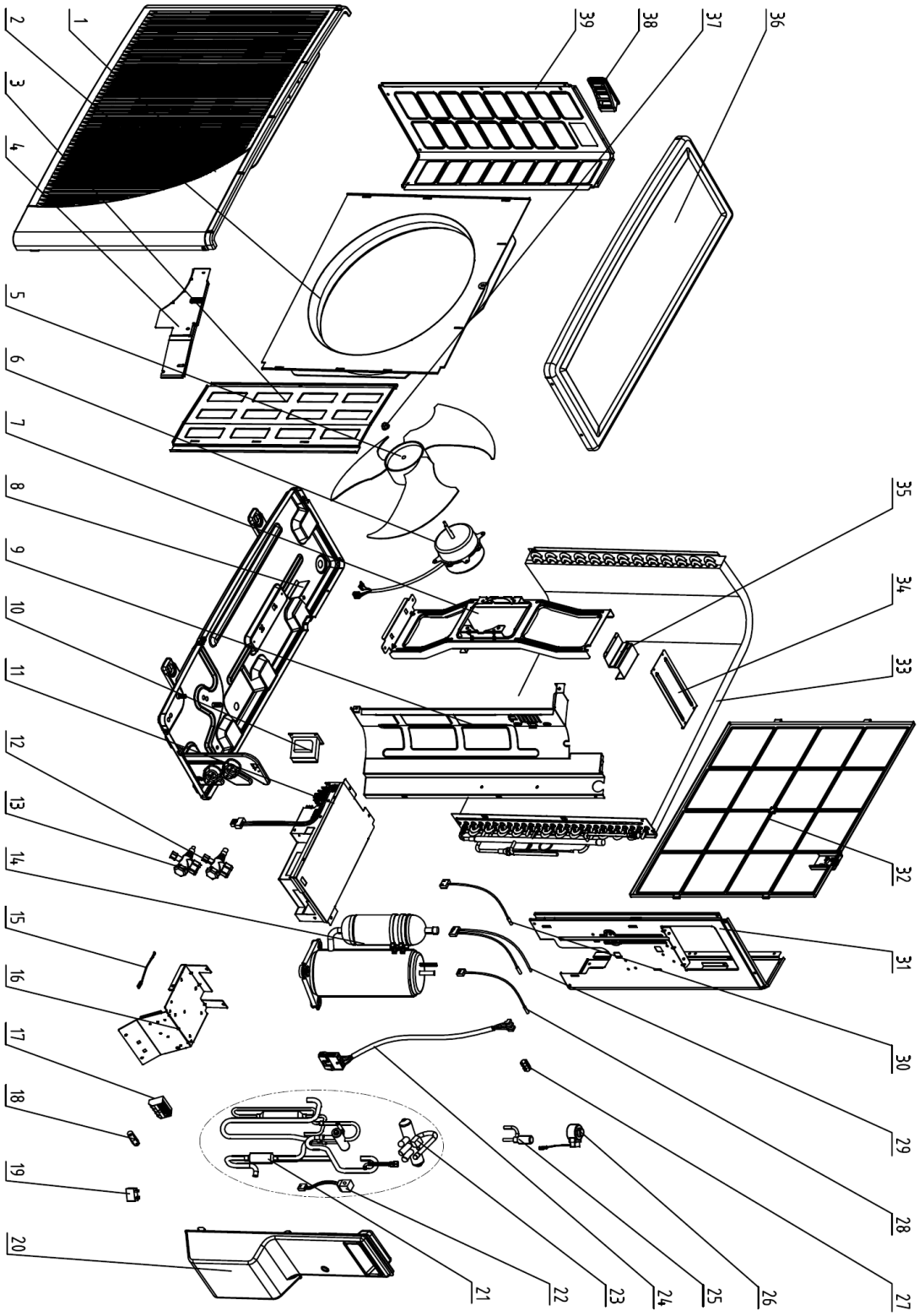
14.6 Exploded view of outdoor Unit: GC 9/12 DCI



14.7 Spare part list of outdoor Unit: GC 9/12 DCI

No	PN.	Name	Qua.
1	433218	Front Panel A	1
2	4526340	Air inlet ring-420	1
3	464860054	Painting Insulation Plate Assy/ONG	1
4	4526476	Axial fan OD=401	1
5	4527092R	DC MOTOR for DCI 25/35	1
6	433215	Motor Support	1
7	4523060	Base Painting Assy.	1
8	4526299	Partition	1
9	467300037R	Controller/Outdoor Units(DCI 1.8kW) EHK:906A099-03	1
10	463300505	Standard Valve Connect Pipe/Gas Valve	1
	461010004	Gas Valve 3/8" R410A	1
11	463300510	Standard Valve Connect Pipe/Liquid Valve	1
	461000004	Liquid Valve 1/4" R410A	1
14	467030020	Wire UL1015 16AWG L=210mm	1
15	455015202	ground wire	1
17	4526300	Therminal sheet	1
20	204107	Cable clip Nylon	1
21	4519188	4 poles terminal block	1
21	467420013	5 Poles Terminal Block/ONG3-12RC DCI35 R410A	1
22	465340080	Valve Cover/PP+UV 5VA/ONG3	1
22	465340081	Valve Cover/With new function fresh air/PP+UV 5VA/ONG3	1
23	461030007	4-W valve coil /SHF(L)-4H/7H(DCI)	1
24	461600059	4-Way Valve Assy./DCI 35	1
25	461020004	4-W valve /SHF(L)-7H-34U	1
26	4526221	Compressor wire	1
27	4526204	DC INVERTER Compressor Assy 5RS102XAB	1
28	467400055	CTT Compressor Top Temperature Sensor	1
29	467400026	OAT Outdoor Air Temperature Sensor	1
30	467400056	OCT Outdoor Coil Temperature Sensor	1
31	452682802	EEV coil CAM-MD12FKS-2	1
32	4526827	Electronical expansion valve CAM-BD15 FKS-1	1
33	4519606	Right side panel (painting plate)	1
34	433228	Back Side Net	1
35	4526368	condensor Soldering assy	1
36	4526298	Bridge	1
37	4519614	Painting Top Cover	1
38	4526480	Gasket for axial fan	1
39	4519300	Nut M5 L	1
40	433225	Handle	1
41	4519607	Left Side Panel Painting Plate	1
33	464630001	Side Plate Painting Assy./right	1
42	4520036	DC Fan Motor Assy	1
43	4520090	Fresh air & pipe assy	1

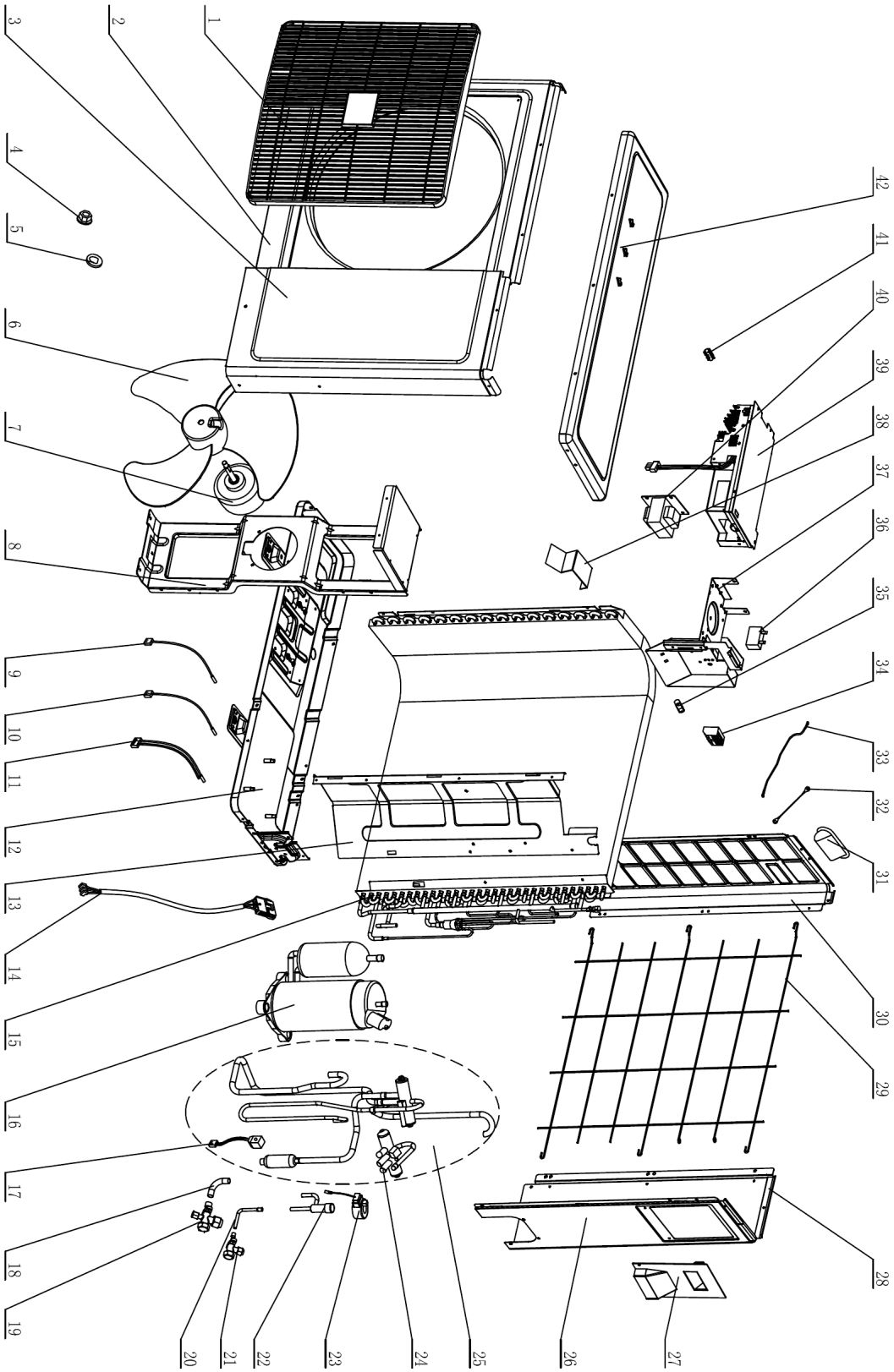
14.8 Exploded view of outdoor Unit: YBD018



14.9 Spare part list of outdoor Unit: YBD018

NO	PN	Name	Qua.
1	433218	Front Panel A	1
2	4526340	Air inlet ring-420	1
3	433223	Painting Insulation Plate	1
4	464250118	Fireproofing plate/ONG3 DIC	1
5	4519251	Axial Fan OD=400	1
6	466100034R	Metal Motor	1
7	4527203	Motor Support	1
8	464600094	Base Painting Assy.	1
9	464160024	Partition Plate	1
10	467550005R	Choke	1
11	467300233R	Controller	1
12	461000004	Liquid Valve 1/4" R410A	1
13	461010005	Gas Valve 1/2" R410A	1
14	460150020R	Compressor Assy./ Panasonic 5RS132ZAD21	1
15	4516540	ground wire	1
16	452823600	Therminal Plate Assy.	1
17	467420025	4 poles terminal block	1
18	204107	Cable clip Nylon	1
19	455000108	Double patch Capacitor for fan motor 2uF	1
20	465340080	Valve Cover	1
21	461600079	4-Way Valve Welding Assy.	1
22	461030007	4-W valve coil /SHF(L)-4H/7H(DCI)	1
23	461020004	4-W valve /SHF(L)-7H-34U	1
24	467000001	Compressor Power Cord	1
25	461040013	Electronic Expansion Valve DPF(Q)1.65C-63	1
26	461050014	EEV Coil QA(Q)12-HX-03	1
27	464210007	Φ7.94 sensor Clip	1
28	467400056	OCT Outdoor Coil Temperature Sensor	1
29	467400040	Sensor of OAT & OMT	1
30	467400200	CTT Compressor Top Temperature Sensor	1
31	4519606	Right side panel (painting plate)	1
32	433228	Back Side Net	1
33	462300127	Condenser Welding Assy.	1
34	4526298	Bridge	1
35	452813200	coil stopper	1
36	4519614	Painting Top Cover	1
37	4519300	Nut M5 L	1
38	433225	Handle	1
39	4519607	Left Side Panel Painting Plate	1

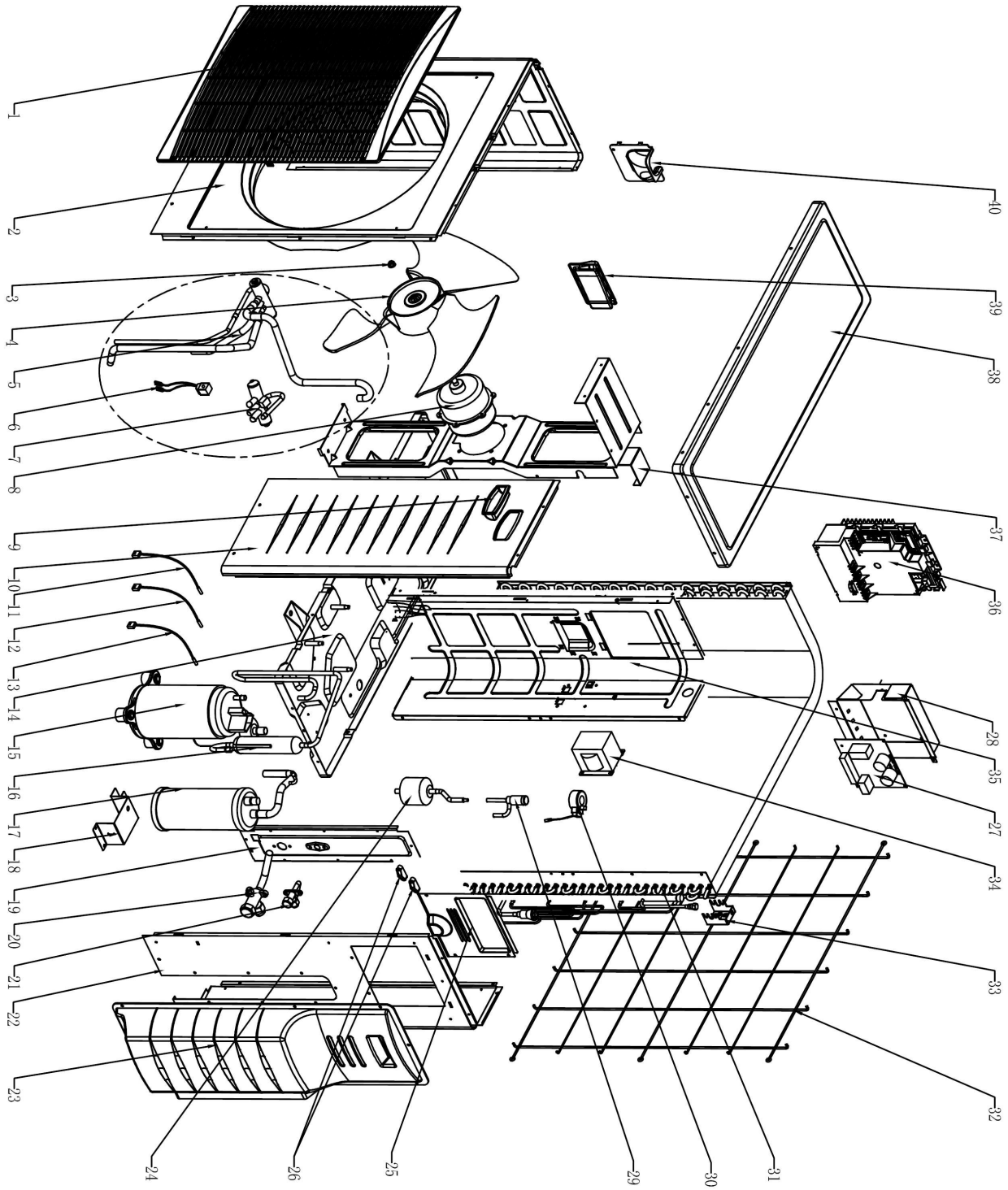
14.10 Exploded view of outdoor Unit: YBD022



14.11 Spare part list of outdoor Unit: YBD022

No	PN	Name	Qua.
1	4517144	Fan Cover PP+UV/Grill A	1
2	452795700	Painted Left Cabinet Assy.	1
3	4516786	Painted Right Cabinet Assy.	1
4	4523141	Hexagon Locked Nut M10	1
5	4526841	Cusion for Fan	1
6	4526510	FAN D=460mm (3 blade)	1
7	466100048R	Metal Motor	1
8	C60095900	Motor Support	1
9	467400200	Compressor Top Temperature Sensor	1
10	467400056	Outdoor Coil Temperature Sensor	1
11	467400040	Condenser Middle Temperature Sensor/OAT & OMT	1
12	464600117	Base Plate Paint Assy.	1
13	464160004	Partition Plate	1
14	467000001	Compressor Power Cord	1
15	462300126	Condenser Welding Assy.	1
16	460170013R	Compressor Assy./ GMCC DA150S1C-20FZ	1
17	461030007	4-W valve Coil /SHF(L)-4H/7H(DCI)	1
18	463300650	Valve Connect Pipe/Gas Valve	1
19	461010005	Gas Valve 1/2" R410A	1
20	463300649	Valve Connect Pipe/Liquid Valve	1
21	461000004	Liquid Valve 1/4" R410A	1
22	461040013	Electronic Expansion Valve DPF(Q)1.65C-63	1
23	461050014	EEV Coil QA(Q)12-HX-03	1
24	461020004	4-W Valve /SHF(L)-7H-34U	1
25	461600097	4-Way Valve Welding Assy.	1
26	464080008	Rear Plate/Right Painting Assy.	1
27	465220012	Right Lifter/PP+UV 5VA	1
28	464080009	Rear Plate/ Left Painting Assy.	1
29	464800019	Guard Net/ODU Painting Assy.	1
30	464080008	Rear Plate/Right Painting Assy.	1
31	4516758	Small Handle	1
32	4516540	Ground Wire	1
33	4513592	Ground Wire for Compressor	1
34	467420025	4 Poles Terminal Block	1
35	204107	Cable Clip Nylon	1
36	455000104	Double patch Capacitor for fan motor 4uF	1
37	453052900	Terminal Plate Assy.	1
38	4526585	Connect for Motor Backet	1
39	467300233R	Controller/ DCRS 2.8KW Sine Wave Main BD	1
40	467550005R	Choke	1
41	464210007	Sensor Clip	1
42	4516788	Painted Top Cover Assy.	1

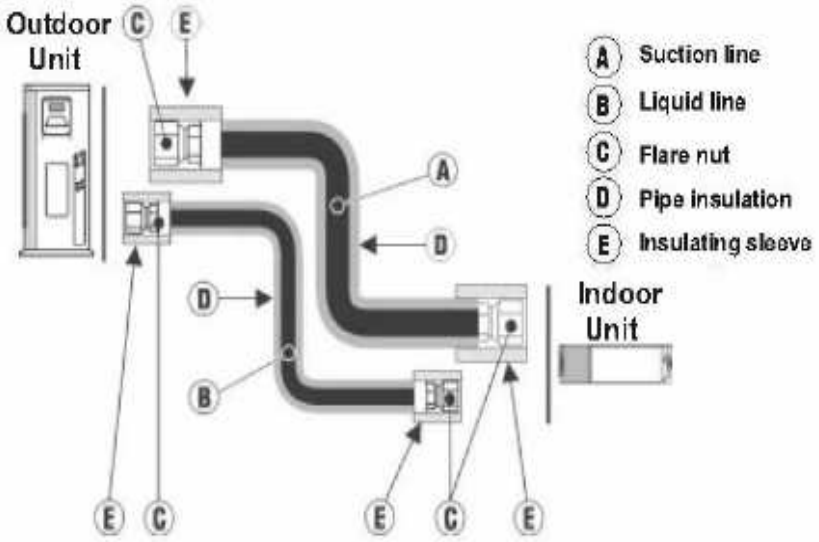
14.12 Exploded view of outdoor Unit: YBD024

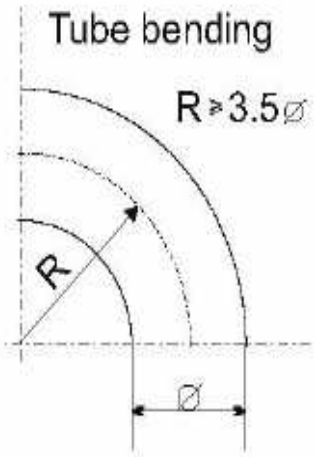


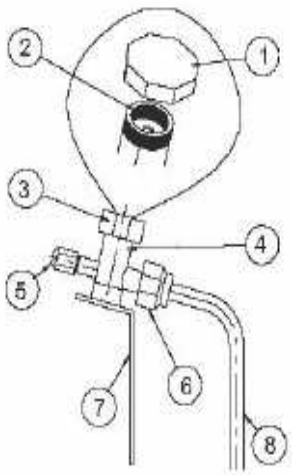
14.13 Spare part list of indoor Unit: YBD024

NO.	Item	Description	Quan.
1	465100000	Grill/ DCI Trio	1
2	4523652	PAINTED LEFT CABINET ASSY	1
3	4523758	Nut M8 left	1
4	452960400	Outdoor Fan	1
5	461600055	4-Way Valve Assy.	1
6	461030003	4-way Valve Coil	1
7	4526522	FOUR-WAY VALVE R410A	1
8	466110008R	DC Resin Motor	1
9	4522601	Right Handle	1
10	4523653	PAINTED RIGHT CABINET ASSY	1
11	467400200	Compressor Top Thermistor(CTT)	1
12	467400040	Condenser Middle Temperature Sensor/OAT & OMT	1
13	467400038	ODU COIL MIDDLE TEMPERATURE SENSOR	1
14	452809900	Base Plate Painting Assy.	1
15	460090007R	Compressor Assy./ C-7RZ233H1A （SANYO ShenYang)	1
16	452783600	Oil Separator Assy.	1
17	452783200	Liquid-gas Separator	1
18	453256100	Support Painting Support Assy./Gas-Liquid Separator	1
19	4526080	Valve plate paint assy	1
20	4526513	LOW PRESS VALVE (R410A)	1
21	4526514	Hight press valve(R410A)	1
22	464080007	Right-Rear Plate/DCI 80 CR	1
23	465340082	Valve Cover/PP+UV 5VA/GC 30	1
24	4518950	Filter Drier BFK-053S	1
25	464250093	Protecting Plate /controller	1
26	204107	Cable clip Nylon	2
27	467300185R	Controller / DCI 80 CR Filter Board	1
28	464280003	Terminal Plate/ DCI 80Z	1
29	461040013	Electronic Expansion Valve DPF(Q)1.65C-63	1
30	461050014	EEV Coil QA(Q)12-HX-03	1
31	462300002	Condenser Assy.	1
32	453175500	Guard Net Painting Assy.	1
33	453083800	Support/OAT	1
34	467550002R	Choke / DCI 80 CR	1
35	464730010	Partition Plate Assy./DCI 80Z	1
36	467300184R	Controller / DCI 80 CR OUTDOOR BOX ASSY	1
37	464200026	Motor Support	1
38	4523657	PAINTED TOP COVER ASSY	1
39	4522600	Left Handle	1
40	465120013	Air Outlet Cover/DCI 80 CR R410a	1

15. 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.

APPENDIX A

INSTALLATION AND OPERATION MANUALS