

Airwell

Service Manual

YBD 022

Indoor Units	Outdoor Units
<i>LEX 60 DCI</i>	YBD 022
<i>HAD 60 DCI</i>	
<i>PXD 60 DCI</i>	
<i>CN 60 DCI</i>	
<i>LSN 60 DCI</i>	
<i>DNG 60 DCI</i>	



REFRIGERANT

R410A

HEAT PUMP

SM YBD 022 1-A.1 GB

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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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1. INTRODUCTION

1.1 General

The ODU YBD 022 product is based on finished DCI 60. By using advanced variable AC fan control technology and DC compressor sine wave control technology, this product are very suitable for most residential and comercial uses. The indoors can be Airwell wall mounted type and duct type and floor type DCI indoor units of 6.0kW cooling capacity:

- **LEX 60 DCI**
- **HAD 60 DCI**
- **PXD 60 DCI**
- **CN 60 DCI**
- **LSN 60 DCI**
- **DNG 60 DCI**

1.2 Main Features

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

- DC inverter technology.
- R410A models
- High COP, Energy efficiency class A in cooling/heating mode
- DC sine wave drive for compressor running in lower Frequency but with low vibration and little sound.
- Precharged refrigerant up to the max allowing tubing distance of 20m.
- Up to 10 m vertical high between indoor and outdoor units
- Motorized flaps(Wall mounted indoor units)
- Cooling operation at outdoor temperature down to -10°C.
- Heating operation at outdoor temperature down to -15°C.
- Easy installation and service.
- HMI- 3*7 Segments and IR receiver on outdoor controller can realize following functions controlled by RC-8
 - Technician Test
 - Diagnostics
 - Setup
 - Review the status of unit
 - Set capacity test mode parameters

1.3 Indoor Unit

The indoor unit is wall mounted ducted and floor ceiling, and can be easily fitted to many types of residential and commercial applications.

Feature	LEX/HAD	PXD	CN	LSN	DNG
Display	LED/LCD	LED	LED	LED	LED
Ionizer	YES	NO	NO	NO	NO
ESF	YES	NO	YES	NO	NO
Indoor fan motor	Variable speed (PG)	Variable speed (PG)	DC	DC	Variable speed (PG)
Horizontal motorized louver	YES	YES	YES	NO	NO
Vertical motorized louver	YES	NO	NO	NO	NO
Heating element	NO	NO	NO	NO	NO
M2L Cable port	YES	YES	YES	YES	YES
Dry contact	Presence detector or (jumper selected) power shedding				

1.4 Control

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

Remote control RC7

For further details please refer to the Operation Manual, Appendix A.

Remote control RC 8:

Except the same nominal function as RC7, it also can be used to realize the function of diagnostics tests for the technician convenient use. (Both select SPT+ and SPT- to enter or escape the diagnostic mode)

For further details please refer to the Control system.

1.5 Outdoor Unit

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

It includes :

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







1.6 Tubing Connections

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

1.7 Inbox Documentation

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

1.8 Matching Table

OUTDOOR UNITS	INDOOR UNITS				
					
	LEX/HAD 60 DCI	PXD 60 DCI	CN 60 DCI	LSN 60 DCI	DNG 60 DCI
	√	√	√	√	√

2. PRODUCT DATA SHEET

2.1 LEX 60 DCI

Model Indoor Unit		LEX 60 DCI	
Model Outdoor Unit		YBD 022	
Installation Method of Pipe		Flared	
Characteristics		Units	Cooling
			Heating
Capacity (4)		Btu/hr	20470(6140-23200)
		kW	6.0(1.8-6.8)
Power input (4)		kW	1.82(0.5-2.4)
EER (Cooling) or COP(Heating) (4)		W/W	3.30
Energy efficiency class			A
Power supply		V	220-240
		Ph	1
		Hz	50/60
Rated current		A	8.2
Power factor			0.97
Prated (IDU)		W	56
Prated (IDU+ODU)		W	2600
Starting current		A	15
Circuit breaker rating		A	20
INDOOR	Fan type & quantity		Crossflow x 1
	Fan speeds	H/M/L	RPM
	Air flow (1)	H/M/L	m3/hr
	External static pressure	Min	Pa
	Sound power level (2)	L/M/H	dB(A)
	Sound pressure level(3)	L/M/H	dB(A)
	Moisture removal		l/hr
	Condensate drain tube I.D		mm
	Dimensions	WxHxD	mm
	Net Weight		kg
	Package dimensions	WxHxD	mm
	Packaged weight		kg
	Units per pallet		units
	Stacking height		units
OUTDOOR	Refrigerant control		EEV
	Compressor type,model		Rotary,GMCC DA150SIC-20FZ
	Fan type & quantity		Propeller(direct) x 1
	Fan speeds	H	RPM
	Air flow	H	m3/hr
	Sound power level	H	dB(A)
	Sound pressure level(3)	H	dB(A)
	Dimensions	WxHxD	mm
	Net Weight		kg
	Package dimensions	WxHxD	mm
	Packaged weight		kg
	Units per pallet		Units
	Stacking height		units
	Refrigerant type		R410A
	Standard charge		kg(7.5m)
	Additional charge		No need
	Connections between units	Liquid line	In.(mm)
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 (Option)		kW	
Others			

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

2.2 HAD 60 DCI

Model Indoor Unit			HAD 60 DCI		
Model Outdoor Unit			YBD 022		
Installation Method of Pipe			Flared		
Characteristics		Units	Cooling	Heating	
Capacity (4)			20470(6140-23200)	21500(5460-26950)	
			6.0(1.8-6.8)	6.3(1.6-7.9)	
Power input (4)			1.82(0.5-2.4)	1.74(0.5-2.4)	
EER (Cooling) or COP(Heating) (4)			3.30	3.62	
Energy efficiency class			A	A	
Power supply			220-240		
			1		
			50/60		
Rated current			8.2	7.8	
Power factor			0.97	0.97	
Prated (IDU)	W		56		
Prated (IDU+ODU)	W		2600		
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 (1)	H/M/L	m3/hr	900/760/620	
	External static pressure	Min	Pa	0	
	Sound power level (2)	H/M/L	dB(A)	48/53/56	
	Sound pressure level(3)	H/M/L	dB(A)	34/40/45	
	Moisture removal			l/hr	2.4
	Condensate drain tube I.D			mm	16
	Dimensions	WxHxD	mm	1060x295x221	
	Net Weight			kg	15
	Package dimensions	WxHxD	mm	1125x360x295	
	Packaged weight			kg	18
	Units per pallet			units	14 units per pallet
	Stacking height			units	7 levels
OUTDOOR	Refrigerant control		EEV		
	Compressor type,model		Rotary,GMCC DA150SIC-20FZ		
	Fan type & quantity		Propeller(direct) x 1		
	Fan speeds	H	RPM	800	
	Air flow	H	m3/hr	2860	
	Sound power level	H	dB(A)	66	
	Sound pressure level(3)	H	dB(A)	56	
	Dimensions	WxHxD	mm	846X690X302	
	Net 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	
	Standard charge			kg(7.5m)	1.6
	Additional charge			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	m.	Max. 10		
Operation control type			Remote control		
Heating elements (Option)			kW		
Others					

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

2.3 PXD 60 DCI

Model Indoor Unit			PXD 60 DCI	
Model Outdoor Unit			YBD 022	
Installation Method of Pipe			Flared	
Characteristics		Units	Cooling	Heating
Capacity (4)			19450(5120-21840)	21500(5460-25590)
			kW 5.7(1.5-6.4)	6.3(1.6-7.5)
Power input (4)			kW 1.78(0.5-2.3)	1.75(0.5-2.3)
EER (Cooling) or COP(Heating) (4)			W/W 3.20	3.60
Energy efficiency class			A	A
Power supply			V 220-240	
			Ph 1	
			Hz 50/60	
Rated current			A 8.0	7.8
Power factor			0.97	0.97
Prated (IDU)			W 104	
Prated (IDU+ODU)			W 2600	
Starting current			A 15	
Circuit breaker rating			A 20	
INDOOR	Fan type & quantity		Centrifugal x 2	
	Fan speeds	H/M/L	RPM	1100/1000/900
	Air flow (1)	H/M/L	m3/hr	920/780/650
	External static pressure	Min	Pa	0
	Sound power level (2)	H/M/L	dB(A)	55/59/63
	Sound pressure level(3)	H/M/L	dB(A)	43/47/51
	Moisture removal			l/hr 2
	Condensate drain tube I.D			mm 16
	Dimensions	WxHxD	mm	1200x630x190
	Net Weight			kg 31
	Package dimensions	WxHxD	mm	1300x726x273
	Packaged weight			kg 35
	Units per pallet			units 7 units per pallet
	Stacking height			units 7 levels
OUTDOOR	Refrigerant control		EEV	
	Compressor type,model		Rotary,GMCC DA150SIC-20FZ	
	Fan type & quantity		Propeller(direct) x 1	
	Fan speeds	H	RPM	800
	Air flow	H	m3/hr	2860
	Sound power level	H	dB(A)	66
	Sound pressure level(3)	H	dB(A)	56
	Dimensions	WxHxD	mm	846X690X302
	Net 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
	Standard charge			kg(7.5m) 1.6
	Additional charge			No need
Connections between units	Liquid line	ln.(mm)	1/4"(6.35)	
	Suction line	ln.(mm)	1/2"(12.7)	
	Max.tubing length	m.	Max. 20	
	Max.height difference	m.	Max. 10	
Operation control type			Remote control	
Heating elements (Option)			kW	
Others				

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

2.4 CN 60 DCI

Model Indoor Unit			CN 60 DCI	
Model Outdoor Unit			YBD 022	
Installation Method of Pipe			Flared	
Characteristics		Units	Cooling	Heating
Capacity (4)			20470(6140-22520)	19110(4440-23200)
			kW 6.0(1.8-6.6)	6.6(1.6-8.0)
Power input (4)			kW 1.90(0.5-2.3)	1.94(0.5-2.55)
EER (Cooling) or COP(Heating) (4)			W/W 3.15	3.40
Energy efficiency class			B	B
Power supply			V 220-240	
			Ph 1	
			Hz 50/60	
Rated current			A 8.5	8.7
Power factor			0.97	0.97
Prated (IDU)			W 80	
Prated (IDU+ODU)			W 2600	
Starting current			A 15	
Circuit breaker rating			A 20	
INDOOR	Fan type & quantity		Centrifugal x 1	
	Fan speeds	H/M/L	RPM	720/660/600
	Air flow (1)	H/M/L	m3/hr	660/600/540
	External static pressure	Min	Pa	0
	Sound power level (2)	H/M/L	dB(A)	58
	Sound pressure level(3)	H/M/L	dB(A)	34/36/38
	Moisture removal			l/hr 2.4
	Condensate drain tube I.D			mm 20
	Dimensions	WxHxD	mm	575X575X270(625X625X40/725X725X40)
	Net Weight			kg 15.2(2.2/2.7)
	Package dimensions	WxHxD	mm	681X681X348(700X700X103/800X800X103)
	Packaged weight			kg 18.7(3.4/4.2)
	Units per pallet			units 12 units per pallet
	Stacking height			units 6 levels
OUTDOOR	Refrigerant control		EEV	
	Compressor type,model		Rotary,GMCC DA150SIC-20FZ	
	Fan type & quantity		Propeller(direct) x 1	
	Fan speeds	H	RPM	800
	Air flow	H	m3/hr	2860
	Sound power level	H	dB(A)	66
	Sound pressure level(3)	H	dB(A)	56
	Dimensions	WxHxD	mm	846X690X302
	Net 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
	Standard charge			kg(7.5m) 1.6
	Additional charge			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 (Option)			kW	
Others				

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

2.5 LSN 60 DCI

Model Indoor Unit			LSN 60 DCI		
Model Outdoor Unit			YBD 022		
Installation Method of Pipe			Ducted		
Characteristics		Units	Cooling	Heating	
Capacity (4)	Btu/hr		20470(6140-23200)	21500(5460-26950)	
	kW		6.0(1.8-6.8)	6.3(1.6-7.9)	
Power input (4)	kW		1.76(0.5-2.3)	1.73(0.5-2.2)	
EER (Cooling) or COP(Heating) (4)	W/W		3.41	3.82	
Energy efficiency class			A	A	
Power supply	V		220-240		
	Ph		1		
	Hz		50/60		
Rated current	A		7.9	7.8	
Power factor			0.97	0.97	
Prated (IDU)	W				
Prated (IDU+ODU)	W		2600		
Starting current	A		15		
Circuit breaker rating	A		20		
INDOOR	Fan type & quantity		Centrifugal x 2		
	Fan speeds	H/M/L	RPM	1170/1070/960	
	Air flow (1)	H/M/L	m3/hr	110/950/880	
	External static pressure	Min	Pa	0-40	
	Sound power level (2)	H/M/L	dB(A)	53/55/59	
	Sound pressure level(3)	H/M/L	dB(A)	38/34/32	
	Moisture removal			l/hr	1.7
	Condensate drain tube I.D			mm	19
	Dimensions	WxHxD	mm	750x630x200	
	Net Weight			kg	25
	Package dimensions	WxHxD	mm	885x695x226	
	Packaged weight			kg	28
	Units per pallet			units	14 units per pallet
	Stacking height			units	7 levels
OUTDOOR	Refrigerant control		EEV		
	Compressor type,model		Rotary,GMCC DA150SIC-20FZ		
	Fan type & quantity		Propeller(direct) x 1		
	Fan speeds	H	RPM	800	
	Air flow	H	m3/hr	2860	
	Sound power level	H	dB(A)	66	
	Sound pressure level(3)	H	dB(A)	56	
	Dimensions	WxHxD	mm	846X690X302	
	Net 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	
	Standard charge	kg(7.5m)		1.6	
	Additional charge			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 (Option)	kW				
Others					

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

2.6 DNG 60 DCI

Model Indoor Unit		DNG 60 DCI		
Model Outdoor Unit		YBD 022		
Installation Method of Pipe		Ducted		
Characteristics	Units	Cooling	Heating	
Capacity (4)	Btu/hr	20470(5120-23880)	23200(5460-27980)	
	kW	6.0(1.5-7.0)	6.8(1.6-8.2)	
Power input (4)	kW	1.90(0.5-2.5)	1.82(0.5-2.45)	
EER (Cooling) or COP(Heating) (4)	W/W	3.15	3.74	
Energy efficiency class		B	A	
Power supply	V	220-240		
	Ph	1		
	Hz	50/60		
Rated current	A	8.5	8.2	
Power factor		0.97	0.97	
Prated (IDU)	W			
Prated (IDU+ODU)	W	2600		
Starting current	A	15		
Circuit breaker rating	A	20		
INDOOR	Fan type & quantity		Centrifugal x 1	
	Fan speeds	H/M/L	RPM	680/530/425
	Air flow (1)	H/M/L	m ³ /hr	1225/875/710
	External static pressure	Min	Pa	25-70
	Sound power level (2)	H/M/L	dB(A)	60/53/50
	Sound pressure level(3)	H/M/L	dB(A)	43/37/34
	Moisture removal		l/hr	1.6
	Condensate drain tube I.D		mm	19
	Dimensions	WxHxD	mm	790x250x749
	Net Weight		kg	29
	Package dimensions	WxHxD	mm	959x315x854
	Packaged weight		kg	31
	Units per pallet		units	6 units per pallet
	Stacking height		units	6 levels
OUTDOOR	Refrigerant control		EEV	
	Compressor type,model		Rotary,GMCC DA150SIC-20FZ	
	Fan type & quantity		Propeller(direct) x 1	
	Fan speeds	H	RPM	800
	Air flow	H	m ³ /hr	2860
	Sound power level	H	dB(A)	66
	Sound pressure level(3)	H	dB(A)	56
	Dimensions	WxHxD	mm	846X690X302
	Net 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
	Standard charge		kg(7.5m)	1.6
	Additional charge			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 (Option)		kW		
Others				

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

3. RATING CONDITIONS

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

Cooling:

Indoor: 27°C DB 19°C WB

Outdoor: 35°C DB

Heating:

Indoor: 20°C DB

Outdoor: 7°C DB 6°C WB

3.1 Operating Limits

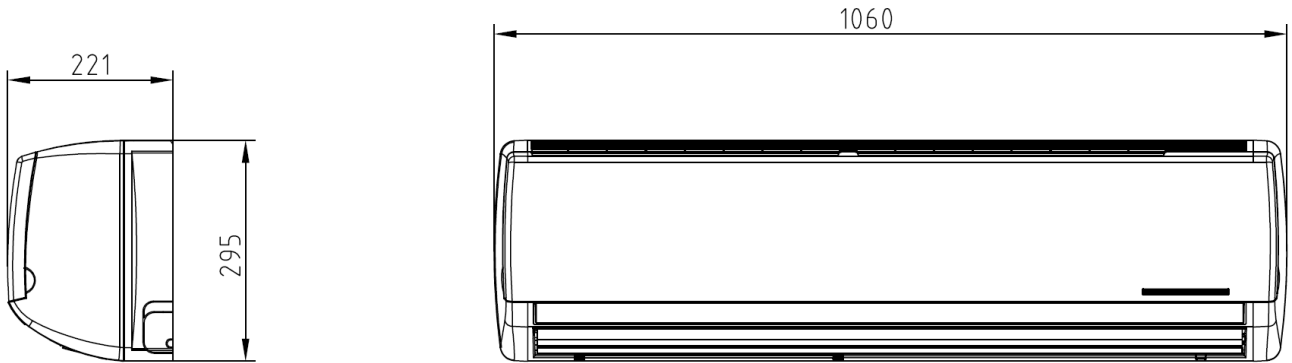
R410A

		Indoor	Outdoor
Cooling	Upper limit	32°C DB 23°C WB	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		1-PH 50/60Hz 198 – 264 V	

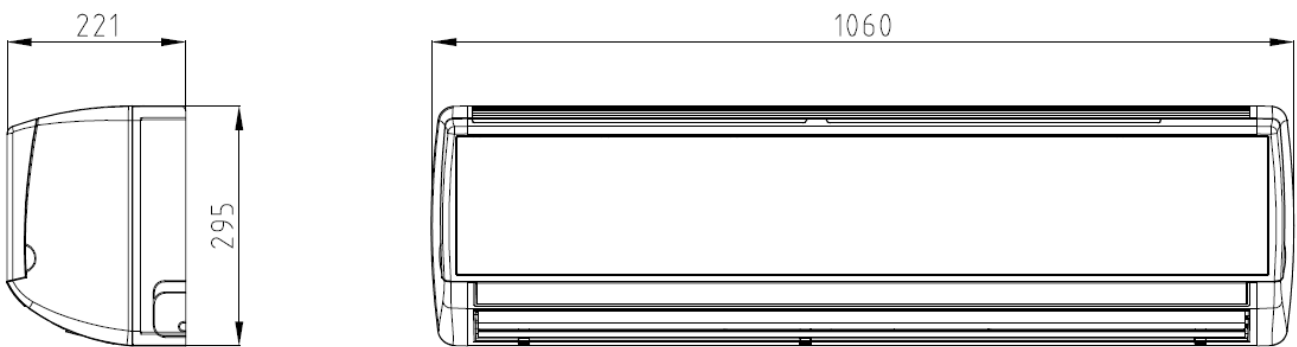
4. OUTLINE DIMENSION

4.1 Indoor units:

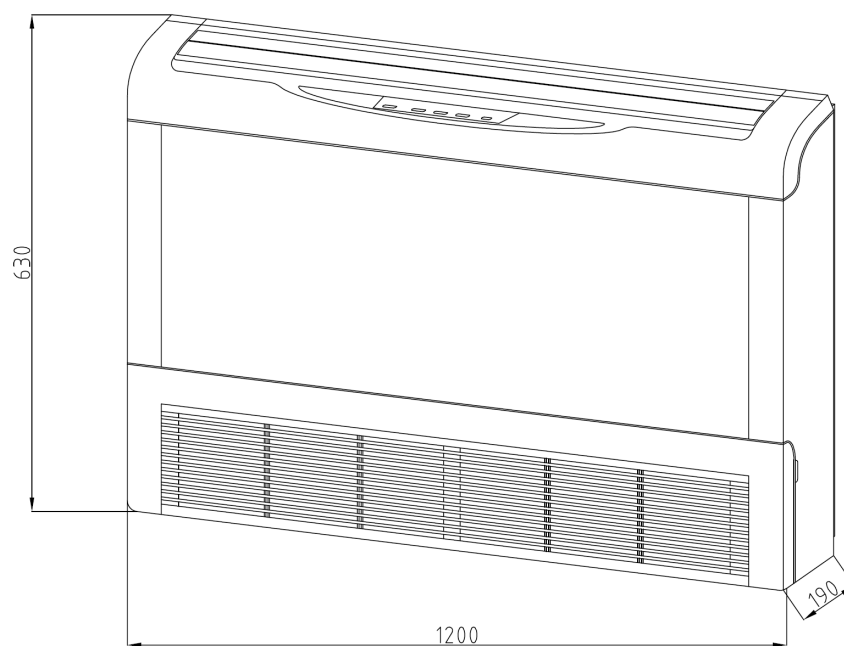
LEX 60 DCI



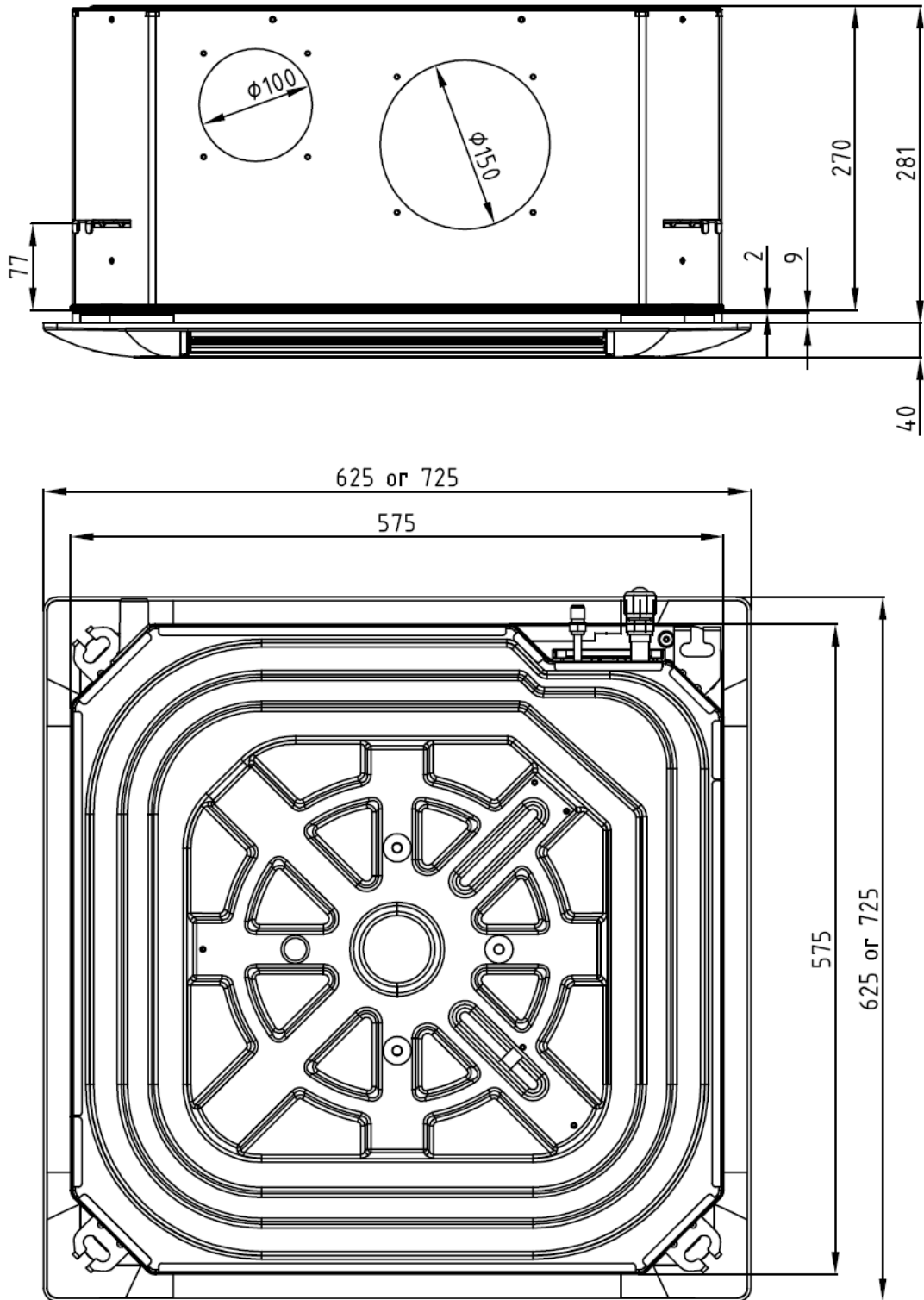
HAD 60 DCI



PXD 60 DCI

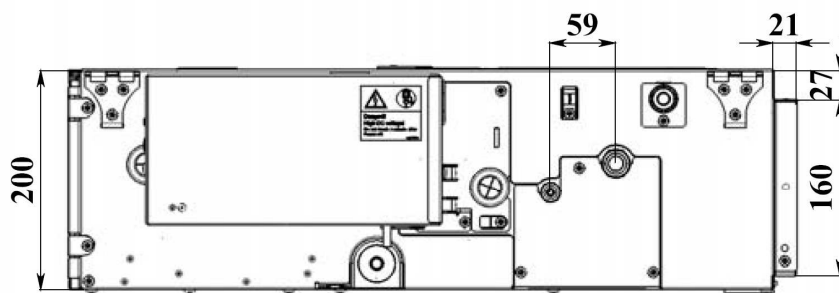
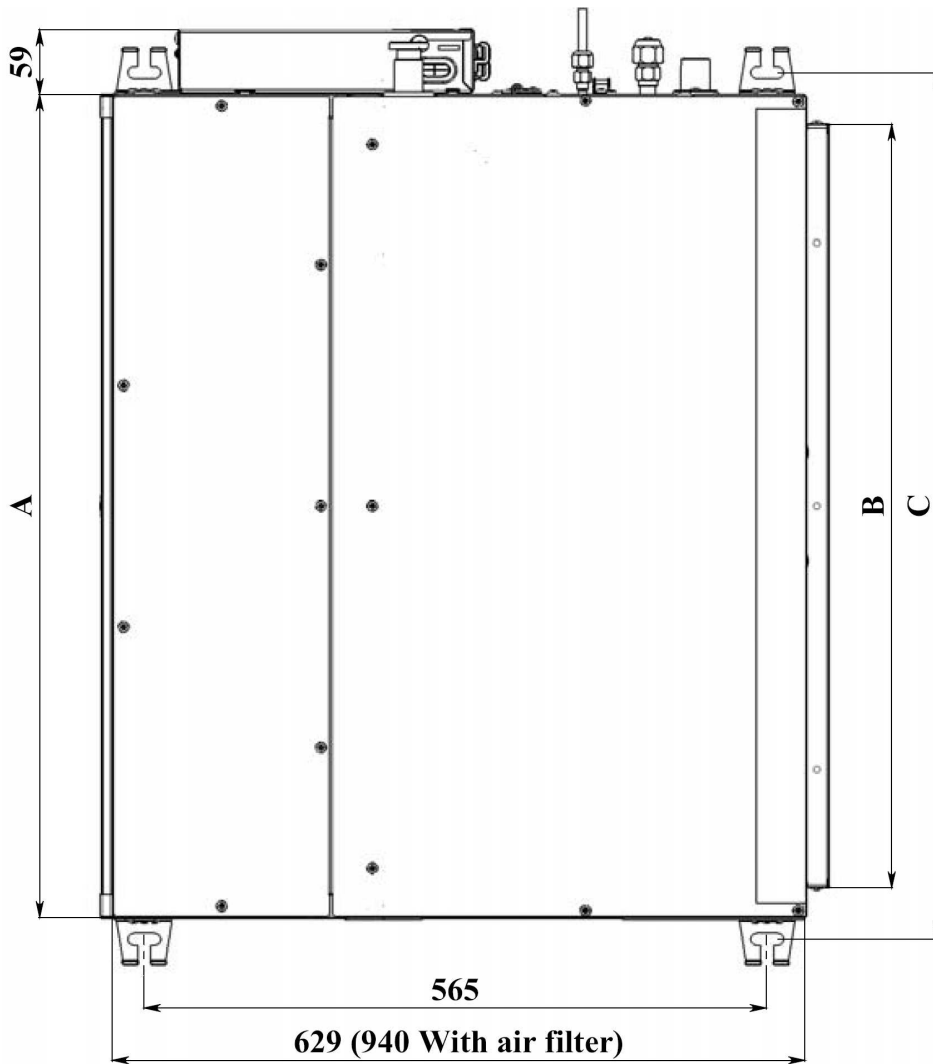


CN 60 DCI



OUTLINE DIMENSION

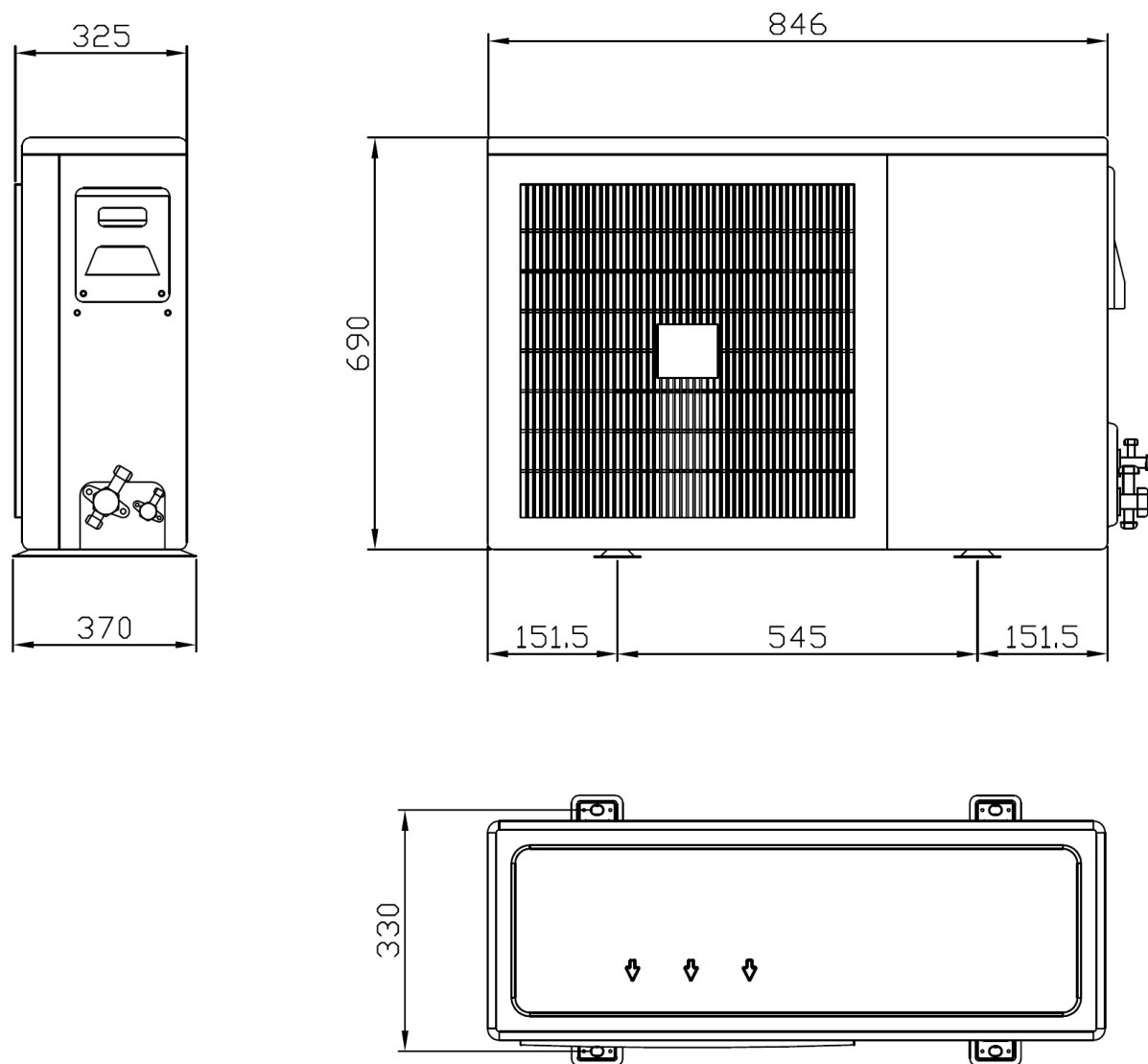
LSN 60 DCI



mm

A	B	C
1050	996	1090

4.2 Outdoor units:



5. PERFORMANCE DATA

5.1 LEX 60 DCI/HAD 60 DCI

5.1.1 Cooling Capacity (kW)

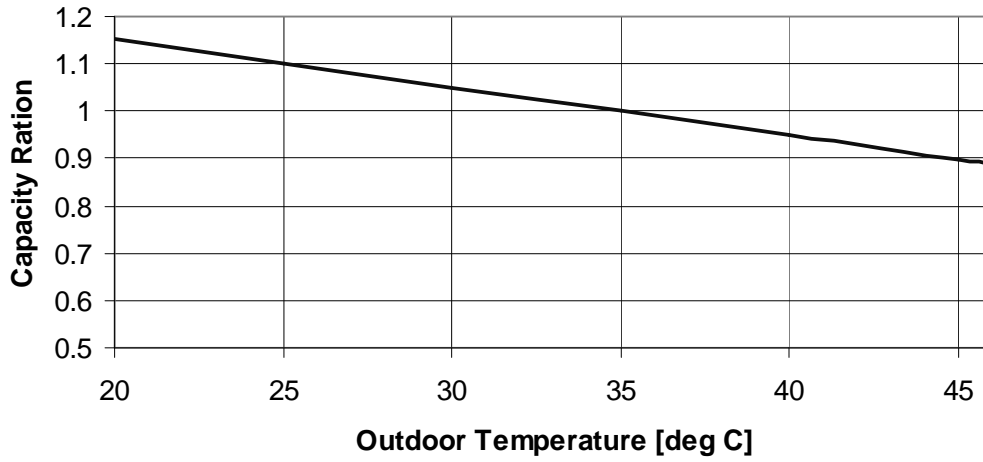
OD COIL ENTERING AIR DB TEMPERATURE [C°]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [C°]				
		22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	5.91	6.26	6.61	6.95	7.30
	SC	4.50	4.56	4.63	4.70	4.76
	PI	1.38	1.41	1.44	1.47	1.50
30	TC	5.61	5.96	6.30	6.65	7.00
	SC	4.32	4.39	4.46	4.52	4.59
	PI	1.57	1.60	1.63	1.66	1.69
35	TC	5.30	5.65	6.00	6.35	6.70
	SC	4.15	4.21	4.28	4.35	4.41
	PI	1.76	1.79	1.82	1.85	1.88
40	TC	5.00	5.35	5.70	6.05	6.39
	SC	3.97	4.04	4.10	4.17	4.24
	PI	1.95	1.98	2.01	2.04	2.07
46	TC	4.64	4.99	5.33	5.68	6.03
	SC	3.76	3.83	3.89	3.96	4.03
	PI	2.18	2.21	2.24	2.27	2.30

LEGEND

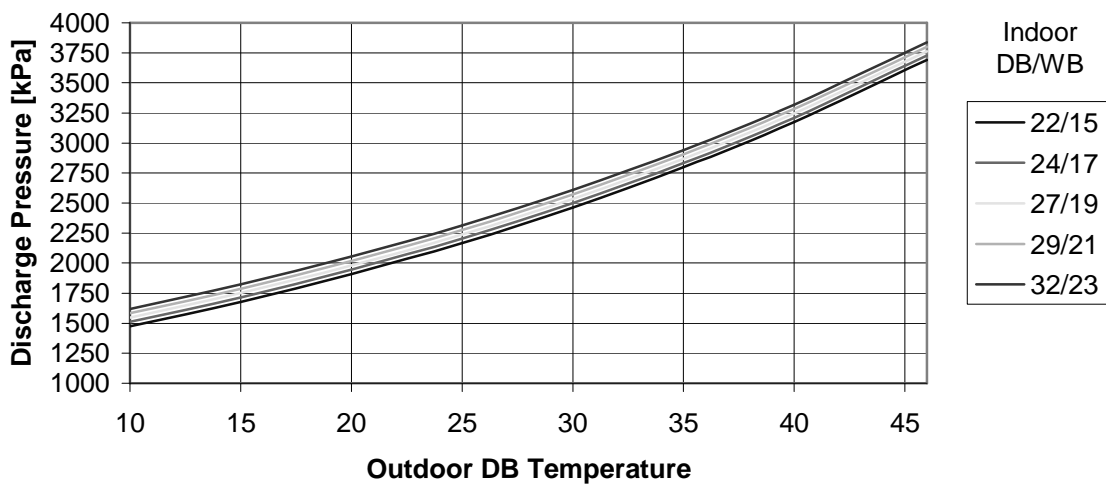
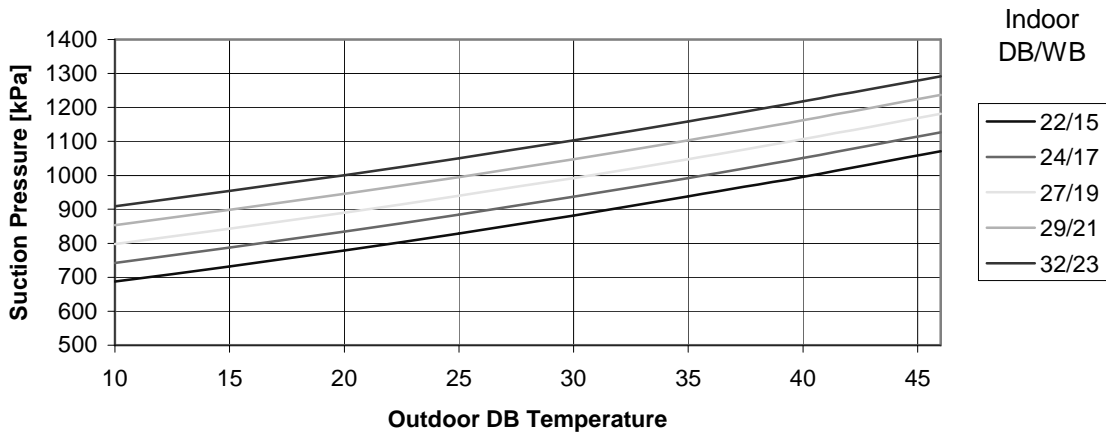
- TC – Total Cooling Capacity, kW
- SC – Sensible Capacity, kW
- PI – Power Input, kW
- WB – Wet Bulb Temp., (°C)
- DB – Dry Bulb Temp., (°C)
- ID – Indoor
- OU – Outdoor

5.1.2 Capacity Correction Factors

Cooling Capacity Ratio Vs. Outdoor Temperature



5.1.3 Cooling curves



5.1.4 Heating Capacity (kW)

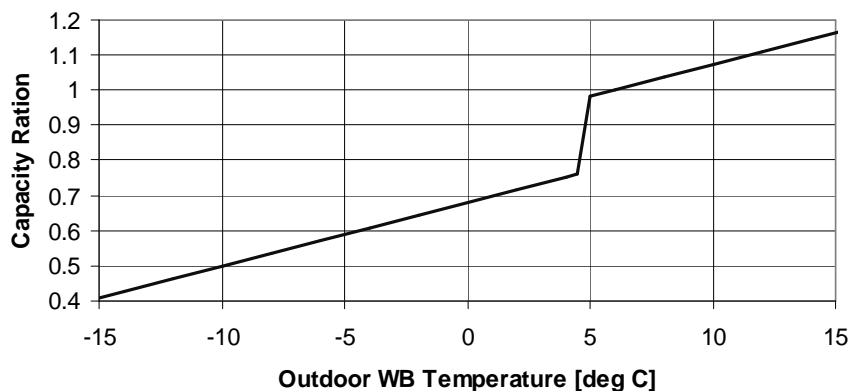
OD COIL ENTERING AIR DB/WB TEMPERATURE [C°]	DATA	ID COIL ENTERING AIR DB TEMPERATURE [C°]		
		15	20	25
-15/-16	TC	2.87	2.45	2.04
	PI	1.22	1.30	1.39
-10/-12	TC	3.78	3.37	2.96
	PI	1.38	1.46	1.55
-7/-8	TC	4.47	4.06	3.65
	PI	1.49	1.58	1.67
-1/-2	TC	4.82	4.40	3.99
	PI	1.55	1.64	1.73
2/1	TC	5.05	4.63	4.22
	PI	1.59	1.68	1.77
7/6	TC	6.71	6.30	5.89
	PI	1.65	1.74	1.83
10/9	TC	7.06	6.65	6.24
	PI	1.68	1.77	1.86
15/12	TC	7.41	7.00	6.58
	PI	1.72	1.80	1.89
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

LEGEND

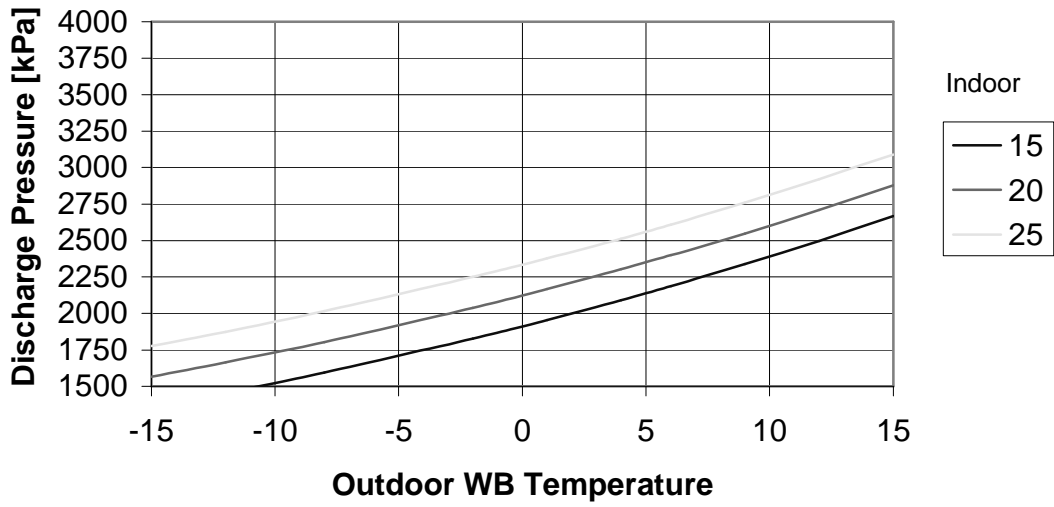
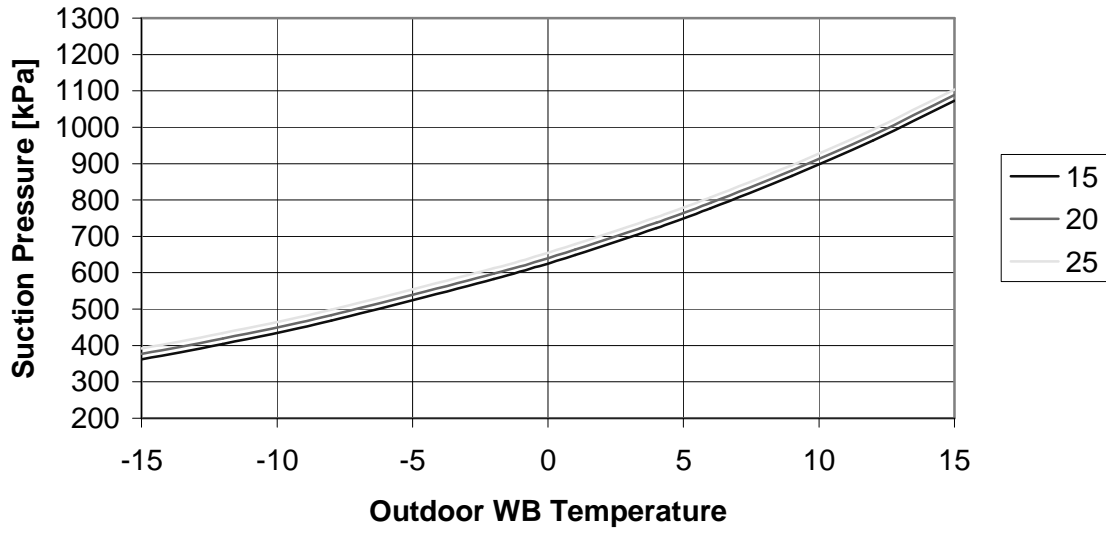
- TH – Total Heating Capacity, kW
- PI – Power Input, kW
- WB – Wet Bulb Temp., (°C)
- DB – Dry Bulb Temp., (°C)
- ID – Indoor
- OU – Outdoor

5.1.5 Capacity Correction Factors

Heating Capacity Ratio Vs. Outdoor Temperature



5.1.6 Heating curves



5.2 PXD 60 DCI

5.2.1 Cooling Capacity (kW)

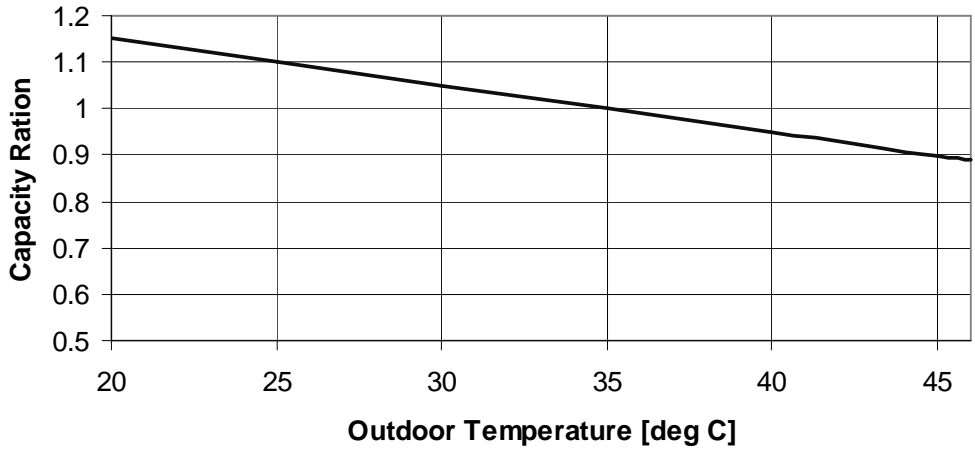
OD COIL ENTERING AIR DB TEMPERATURE [C°]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [C°]				
		22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	5.61	5.95	6.28	6.61	6.94
	SC	4.55	4.62	4.69	4.75	4.82
	PI	1.35	1.38	1.41	1.44	1.47
30	TC	5.33	5.66	5.99	6.32	6.65
	SC	4.37	4.44	4.51	4.58	4.64
	PI	1.53	1.56	1.59	1.62	1.65
35	TC	5.04	5.37	5.70	6.03	6.36
	SC	4.19	4.26	4.33	4.40	4.47
	PI	1.72	1.75	1.78	1.81	1.84
40	TC	4.75	5.08	5.41	5.74	6.07
	SC	4.02	4.08	4.15	4.22	4.29
	PI	1.91	1.94	1.97	2.00	2.03
46	TC	4.41	4.74	5.07	5.40	5.73
	SC	3.80	3.87	3.94	4.01	4.07
	PI	2.13	2.16	2.19	2.22	2.25

LEGEND

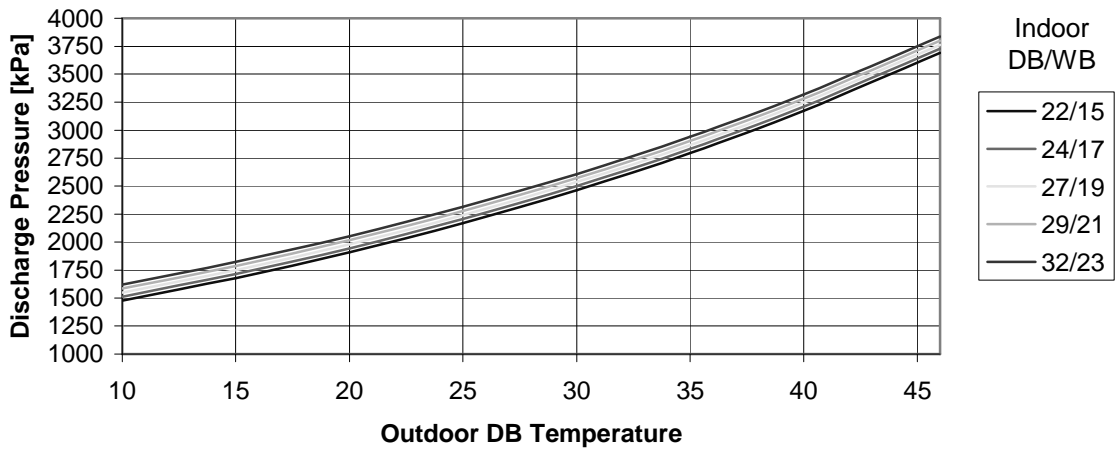
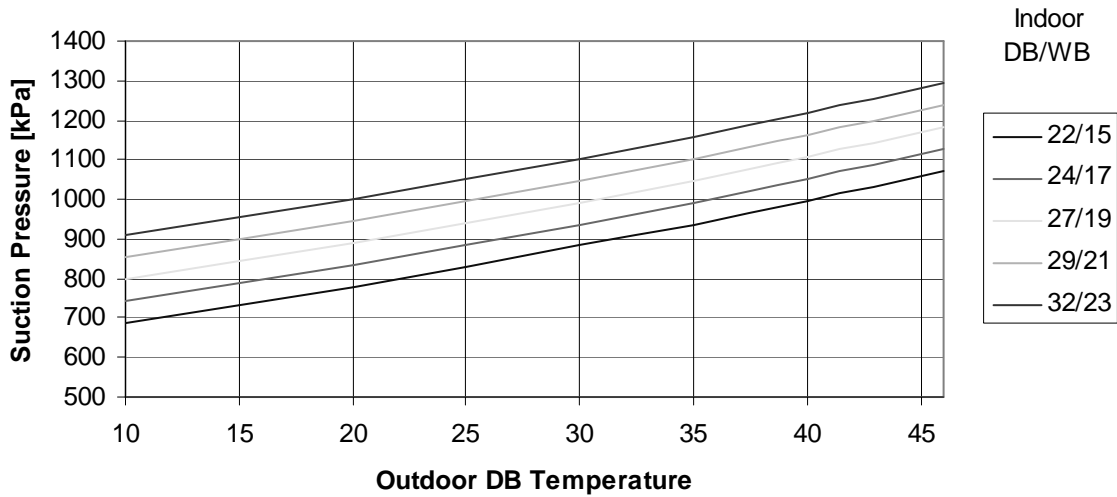
- TC – Total Cooling Capacity, kW
- SC – Sensible Capacity, kW
- PI – Power Input, kW
- WB – Wet Bulb Temp., (°C)
- DB – Dry Bulb Temp., (°C)
- ID – Indoor
- OU – Outdoor

5.2.2 Capacity Correction Factors

Cooling Capacity Ratio Vs. Outdoor Temperature



5.2.3 Cooling curves



5.2.4 Heating Capacity (kW)

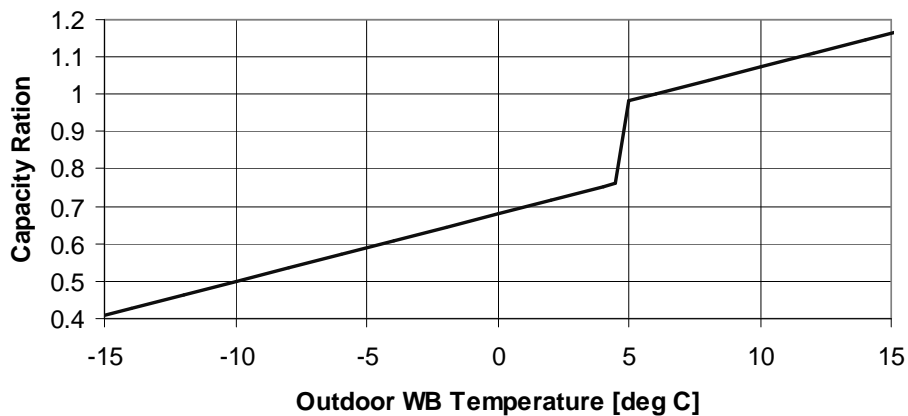
OD COIL ENTERING AIR DB/WB TEMPERATURE [C°]	DATA	15	20	25
-15/-16	TC	2.87	2.45	2.04
	PI	1.22	1.31	1.40
-10/-12	TC	3.78	3.37	2.96
	PI	1.38	1.47	1.56
-7/-8	TC	4.47	4.06	3.65
	PI	1.50	1.59	1.68
-1/-2	TC	4.82	4.40	3.99
	PI	1.56	1.65	1.74
2/1	TC	5.05	4.63	4.22
	PI	1.60	1.69	1.78
7/6	TC	6.71	6.30	5.89
	PI	1.66	1.75	1.84
10/9	TC	7.06	6.65	6.24
	PI	1.69	1.78	1.87
15/12	TC	7.41	7.00	6.58
	PI	1.73	1.81	1.90
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

LEGEND

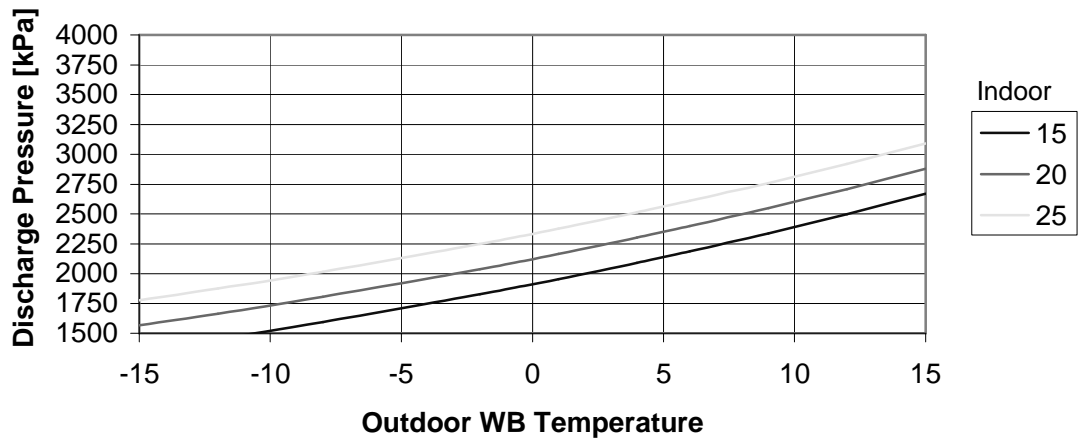
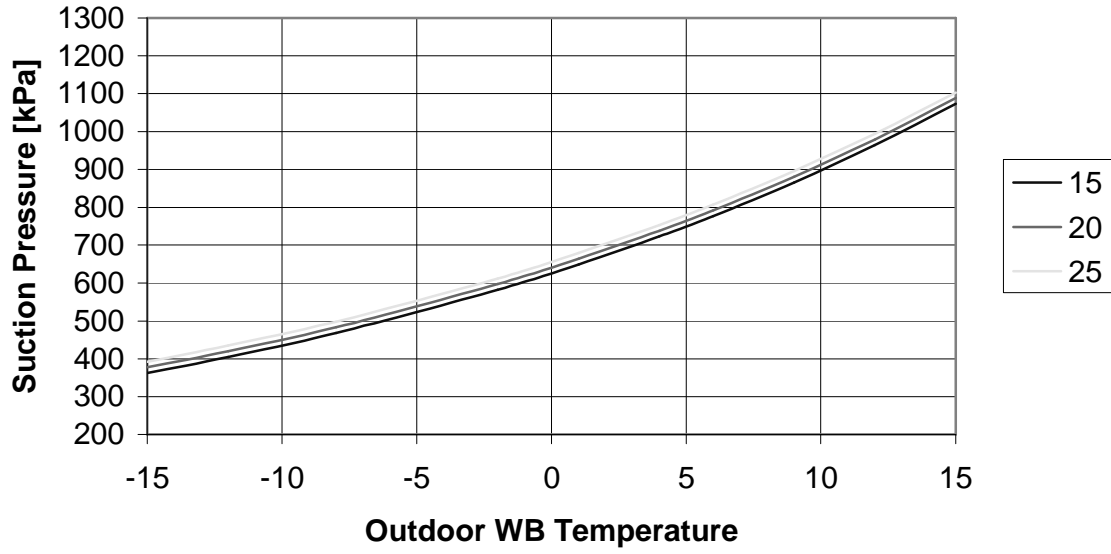
- TH – Total Heating Capacity, kW
- PI – Power Input, kW
- WB – Wet Bulb Temp., (°C)
- DB – Dry Bulb Temp., (°C)
- ID – Indoor
- OU – Outdoor

5.2.5 Capacity Correction Factors

Heating Capacity Ratio Vs. Outdoor Temperature



5.2.6 Heating curves



5.3 CN 60 DCI

5.3.1 Cooling Capacity (kW)

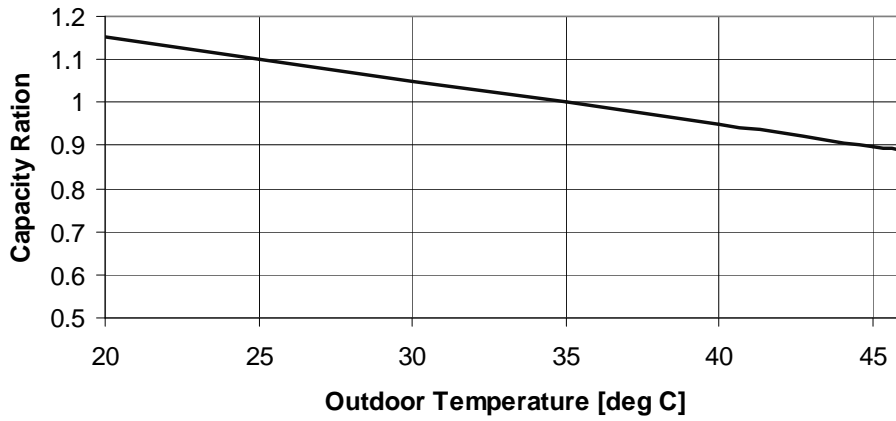
OD COIL ENTERING AIR DB TEMPERATURE [C°]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [C°]				
		22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	5.91	6.26	6.61	6.95	7.30
	SC	4.25	4.31	4.37	4.43	4.50
	PI	1.44	1.47	1.50	1.53	1.57
30	TC	5.61	5.96	6.30	6.65	7.00
	SC	4.08	4.14	4.21	4.27	4.33
	PI	1.64	1.67	1.70	1.73	1.77
35	TC	5.30	5.65	6.00	6.35	6.70
	SC	3.91	3.98	4.04	4.10	4.17
	PI	1.84	1.87	1.90	1.93	1.96
40	TC	5.00	5.35	5.70	6.05	6.39
	SC	3.75	3.81	3.87	3.94	4.00
	PI	2.03	2.07	2.10	2.13	2.16
46	TC	4.64	4.99	5.33	5.68	6.03
	SC	3.55	3.61	3.68	3.74	3.80
	PI	2.27	2.31	2.34	2.37	2.40

LEGEND

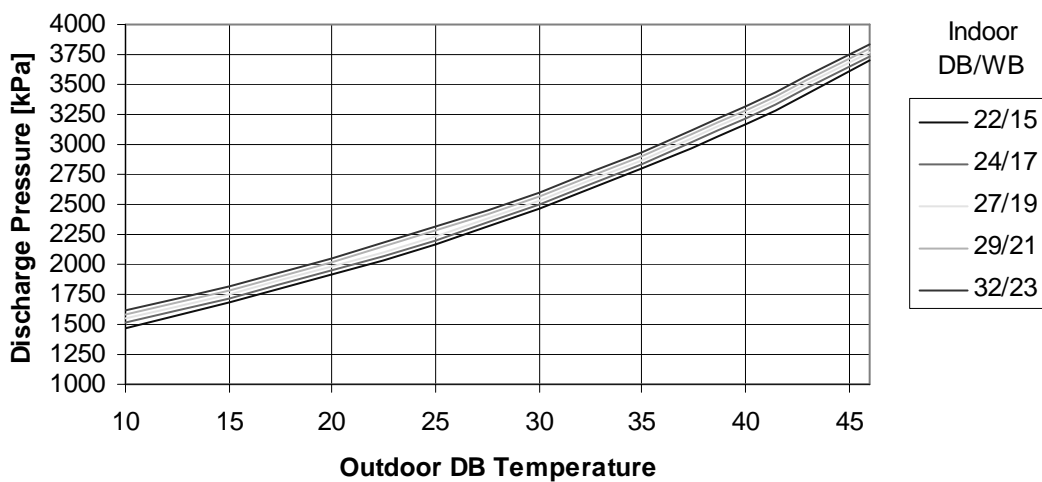
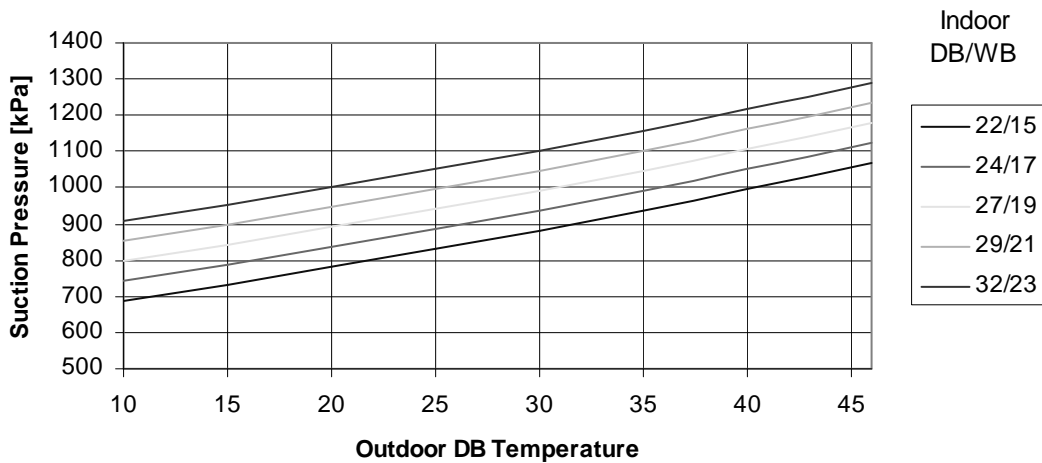
- TC – Total Cooling Capacity, kW
- SC – Sensible Capacity, kW
- PI – Power Input, kW
- WB – Wet Bulb Temp., (°C)
- DB – Dry Bulb Temp., (°C)
- ID – Indoor
- OU – Outdoor

5.3.2 Capacity Correction Factors

Cooling Capacity Ratio Vs. Outdoor Temperature



5.3.3 Cooling Curves



5.3.4 Heating Capacity (kW)

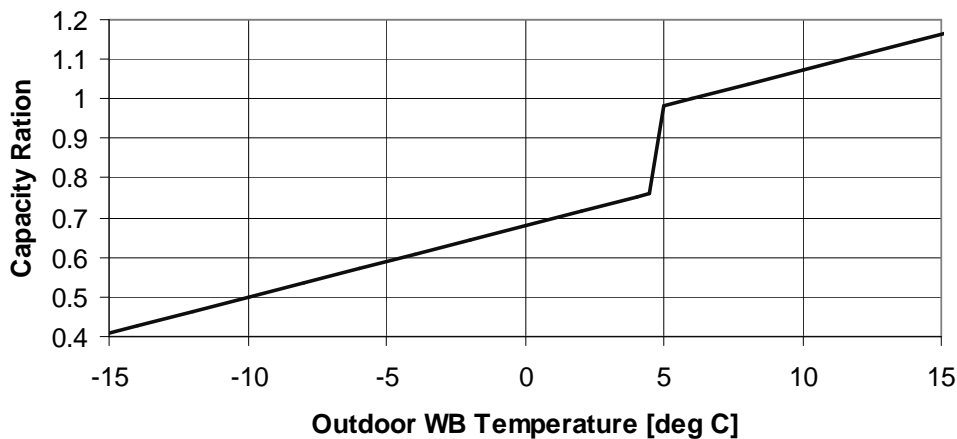
OD COIL ENTERING AIR DB/WB TEMPERATURE [C°]	DATA	ID COIL ENTERING AIR DB TEMPERATURE [C°]		
		15	20	25
-15/-16	TC	3.00	2.57	2.14
	PI	1.36	1.45	1.55
-10/-12	TC	3.96	3.53	3.10
	PI	1.53	1.63	1.73
-7/-8	TC	4.69	4.25	3.82
	PI	1.67	1.76	1.86
-1/-2	TC	5.05	4.61	4.18
	PI	1.73	1.83	1.93
2/1	TC	5.29	4.85	4.42
	PI	1.78	1.87	1.97
7/6	TC	7.03	6.60	6.17
	PI	1.84	1.94	2.04
10/9	TC	7.40	6.96	6.53
	PI	1.88	1.98	2.07
15/12	TC	7.76	7.33	6.90
	PI	1.91	2.01	2.11
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

LEGEND

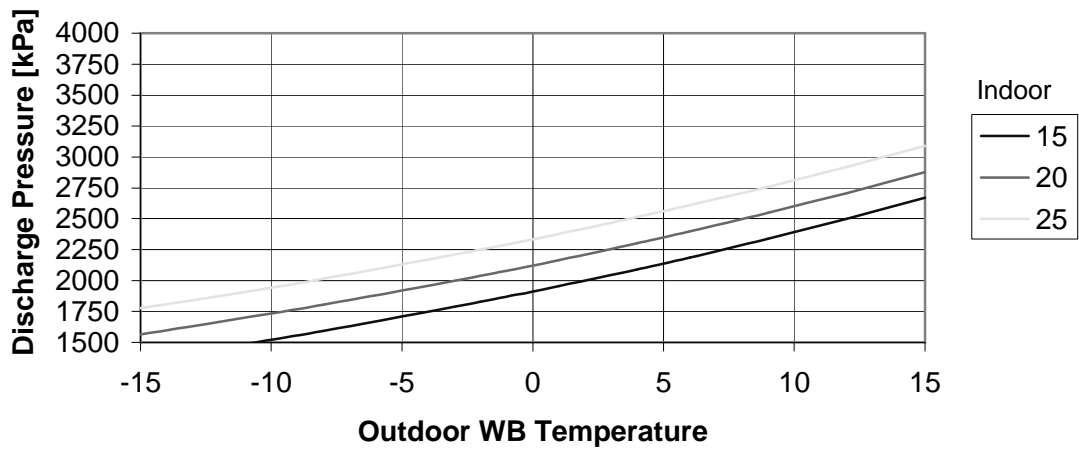
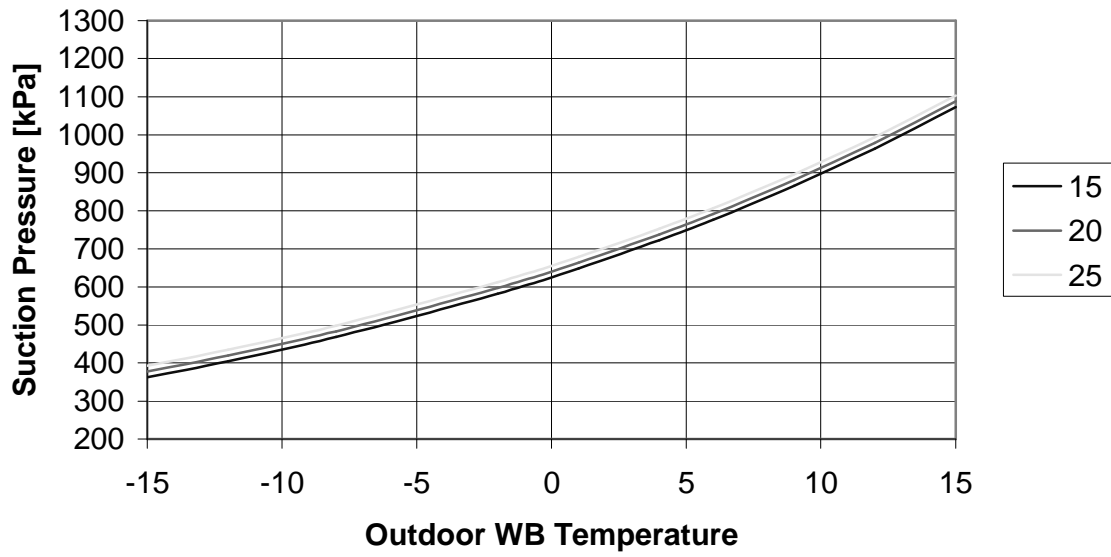
- TH – Total Heating Capacity, kW
- PI – Power Input, kW
- WB – Wet Bulb Temp., (°C)
- DB – Dry Bulb Temp., (°C)
- ID – Indoor
- OU – Outdoor

5.3.5 Capacity Correction Factors

Heating Capacity Ratio Vs. Outdoor Temperature



5.3.6 Heating Curves



5.4 LSN 60 DCI

5.4.1 Cooling Capacity (kW)

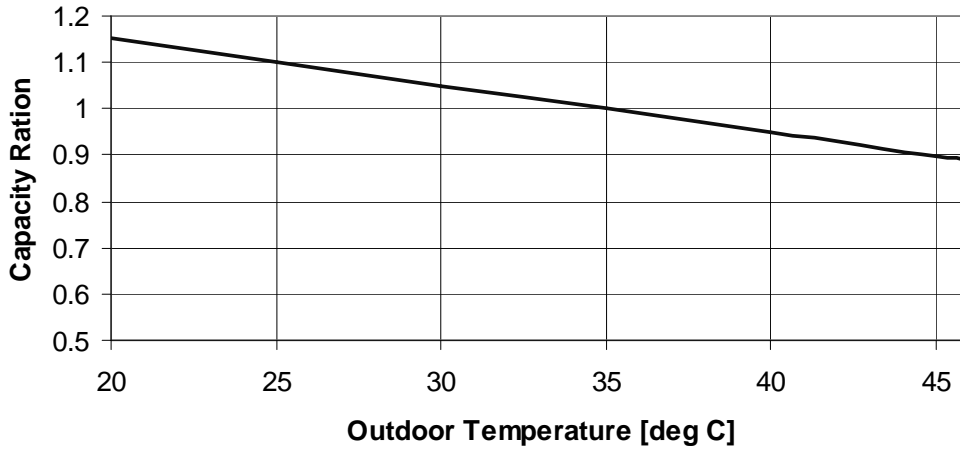
OD COIL ENTERING AIR DB TEMPERATURE [C°]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [C°]				
		22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	5.91	6.26	6.61	6.95	7.30
	SC	4.94	5.01	5.09	5.16	5.23
	PI	1.33	1.36	1.39	1.42	1.45
30	TC	5.61	5.96	6.30	6.65	7.00
	SC	4.75	4.82	4.89	4.97	5.04
	PI	1.52	1.55	1.58	1.61	1.64
35	TC	5.30	5.65	6.00	6.35	6.70
	SC	4.55	4.63	4.70	4.77	4.85
	PI	1.70	1.73	1.76	1.79	1.82
40	TC	5.00	5.35	5.70	6.05	6.39
	SC	4.36	4.43	4.51	4.58	4.65
	PI	1.88	1.91	1.94	1.97	2.00
46	TC	4.64	4.99	5.33	5.68	6.03
	SC	4.13	4.20	4.28	4.35	4.42
	PI	2.11	2.14	2.17	2.20	2.23

LEGEND

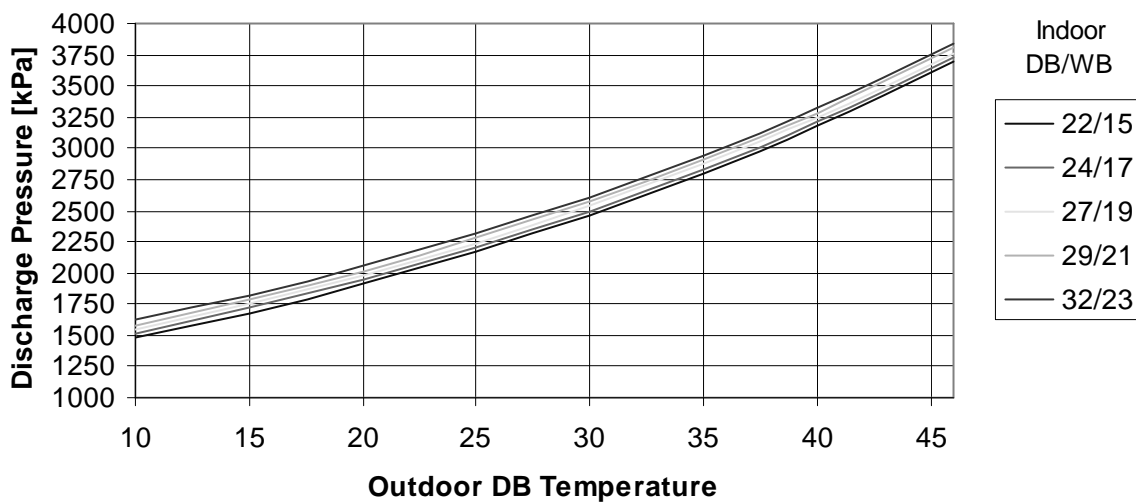
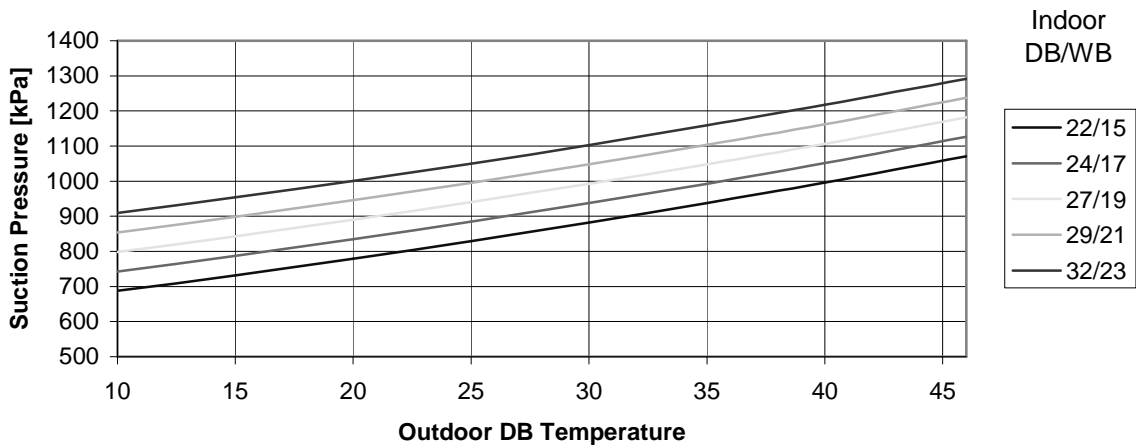
- TC – Total Cooling Capacity, kW
- SC – Sensible Capacity, kW
- PI – Power Input, kW
- WB – Wet Bulb Temp., (°C)
- DB – Dry Bulb Temp., (°C)
- ID – Indoor
- OU – Outdoor

5.4.2 Capacity Correction Factors

Cooling Capacity Ratio Vs. Outdoor Temperature



5.4.3 Cooling Curves



5.4.4 Heating Capacity (kW)

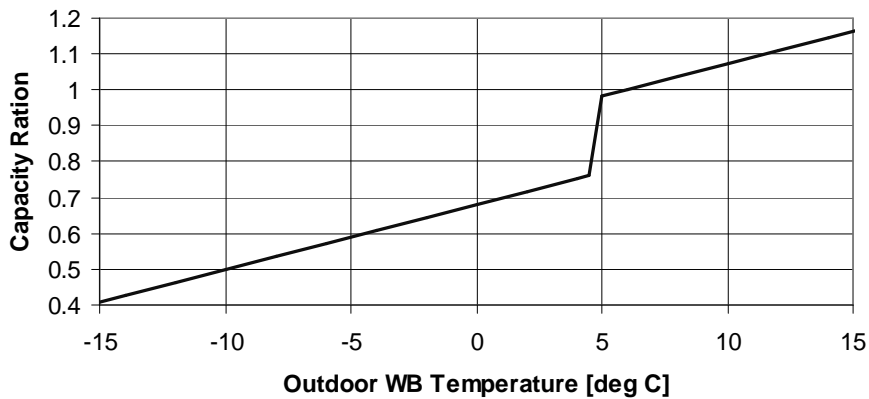
OD COIL ENTERING AIR DB/WB TEMPERATURE [C°]	DATA	ID COIL ENTERING AIR DB TEMPERATURE [C°]		
		15	20	25
-15/-16	TC	3.00	2.57	2.14
	PI	1.21	1.30	1.38
-10/-12	TC	3.96	3.53	3.10
	PI	1.37	1.45	1.54
-7/-8	TC	4.69	4.25	3.82
	PI	1.49	1.57	1.66
-1/-2	TC	5.05	4.61	4.18
	PI	1.54	1.63	1.72
2/1	TC	5.29	4.85	4.42
	PI	1.58	1.67	1.76
7/6	TC	7.03	6.60	6.17
	PI	1.64	1.73	1.82
10/9	TC	7.40	6.96	6.53
	PI	1.68	1.76	1.85
15/12	TC	7.76	7.33	6.90
	PI	1.71	1.79	1.88
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

LEGEND

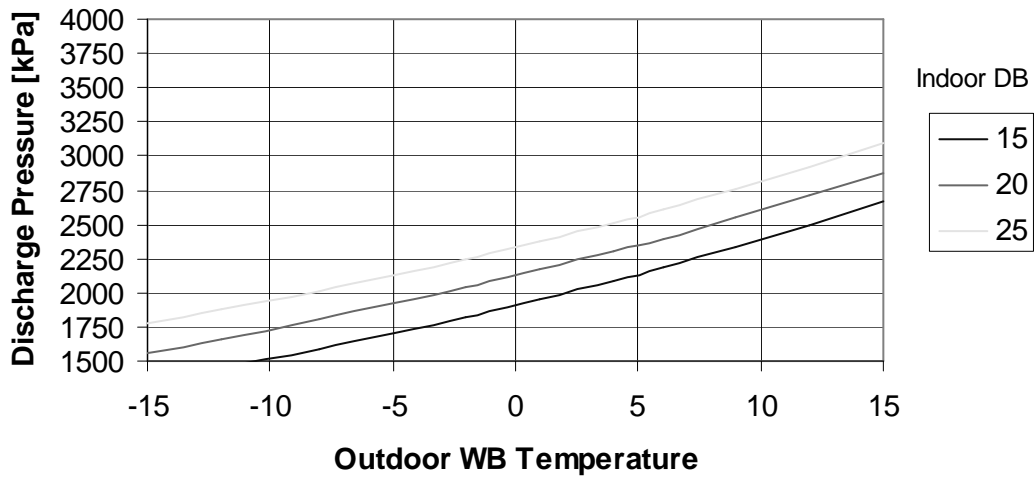
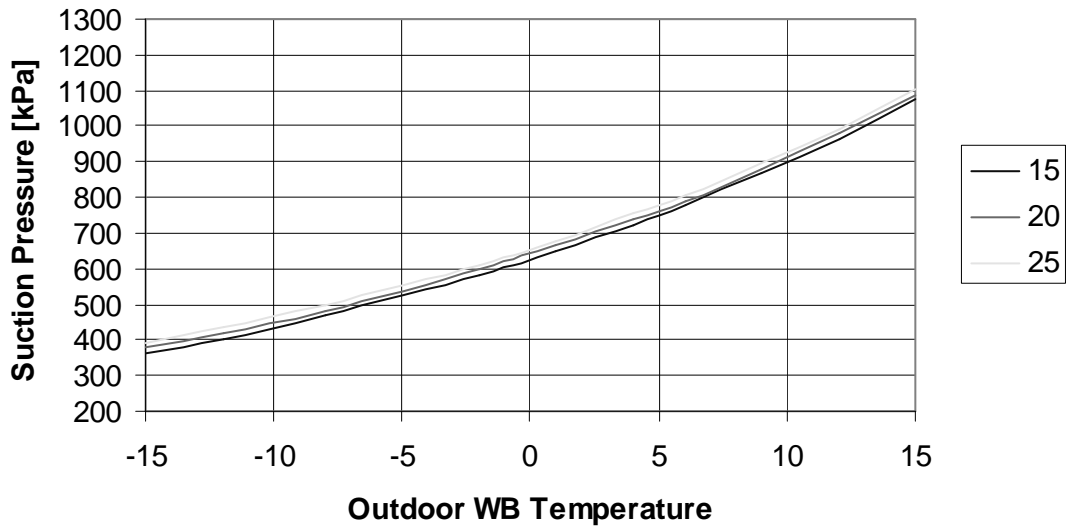
- TH – Total Heating Capacity, kW
- PI – Power Input, kW
- WB – Wet Bulb Temp., (°C)
- DB – Dry Bulb Temp., (°C)
- ID – Indoor
- OU – Outdoor

5.4.5 Capacity Correction Factors

Heating Capacity Ratio Vs. Outdoor Temperature



5.4.6 Heating Curves



5.5 DNG 60 DCI

5.5.1 Cooling Capacity (kW)

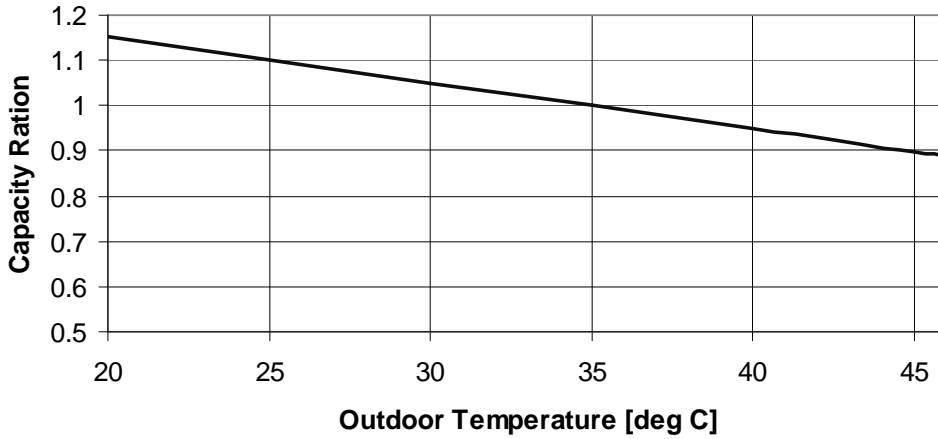
OD COIL ENTERING AIR DB TEMPERATURE [C°]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [C°]				
		22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	5.91	6.26	6.61	6.95	7.30
	SC	4.10	4.16	4.22	4.28	4.34
	PI	1.44	1.47	1.50	1.53	1.57
30	TC	5.61	5.96	6.30	6.65	7.00
	SC	3.94	4.00	4.06	4.12	4.18
	PI	1.64	1.67	1.70	1.73	1.77
35	TC	5.30	5.65	6.00	6.35	6.70
	SC	3.78	3.84	3.90	3.96	4.02
	PI	1.84	1.87	1.90	1.93	1.96
40	TC	5.00	5.35	5.70	6.05	6.39
	SC	3.62	3.68	3.74	3.80	3.86
	PI	2.03	2.07	2.10	2.13	2.16
46	TC	4.64	4.99	5.33	5.68	6.03
	SC	3.43	3.49	3.55	3.61	3.67
	PI	2.27	2.31	2.34	2.37	2.40

LEGEND

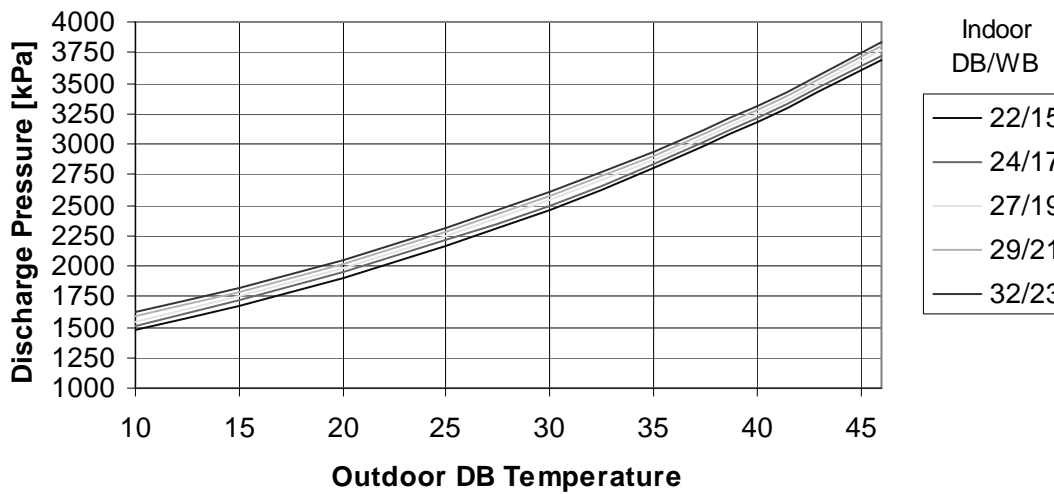
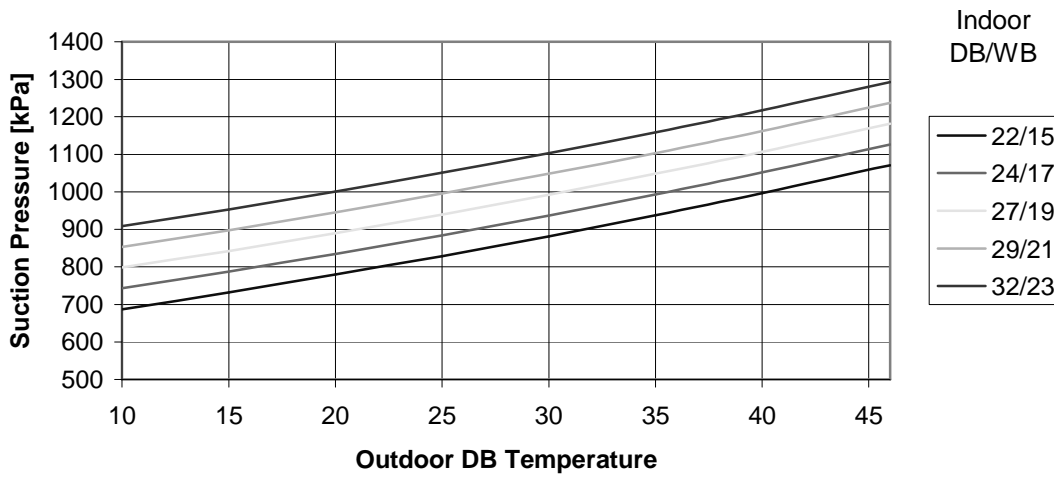
- TC – Total Cooling Capacity, kW
- SC – Sensible Capacity, kW
- PI – Power Input, kW
- WB – Wet Bulb Temp., (°C)
- DB – Dry Bulb Temp., (°C)
- ID – Indoor
- OU – Outdoor

5.5.2 Capacity Correction Factors

Cooling Capacity Ratio Vs. Outdoor Temperature



5.5.3 Cooling Curves



5.5.4 Heating Capacity (kW)

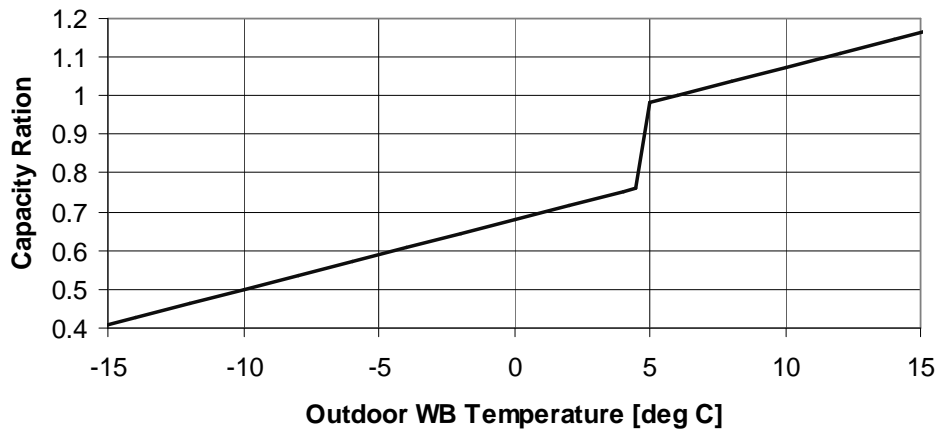
OD COIL ENTERING AIR DB/WB TEMPERATURE [C°]	DATA	ID COIL ENTERING AIR DB TEMPERATURE [C°]		
		15	20	25
-15/-16	TC	3.09	2.65	2.20
	PI	1.27	1.36	1.45
-10/-12	TC	4.08	3.64	3.19
	PI	1.44	1.53	1.62
-7/-8	TC	4.83	4.38	3.94
	PI	1.56	1.65	1.75
-1/-2	TC	5.20	4.75	4.31
	PI	1.63	1.72	1.81
2/1	TC	5.45	5.00	4.56
	PI	1.67	1.76	1.85
7/6	TC	7.25	6.80	6.35
	PI	1.73	1.82	1.91
10/9	TC	7.62	7.18	6.73
	PI	1.76	1.85	1.94
15/12	TC	8.00	7.55	7.11
	PI	1.80	1.89	1.98
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

LEGEND

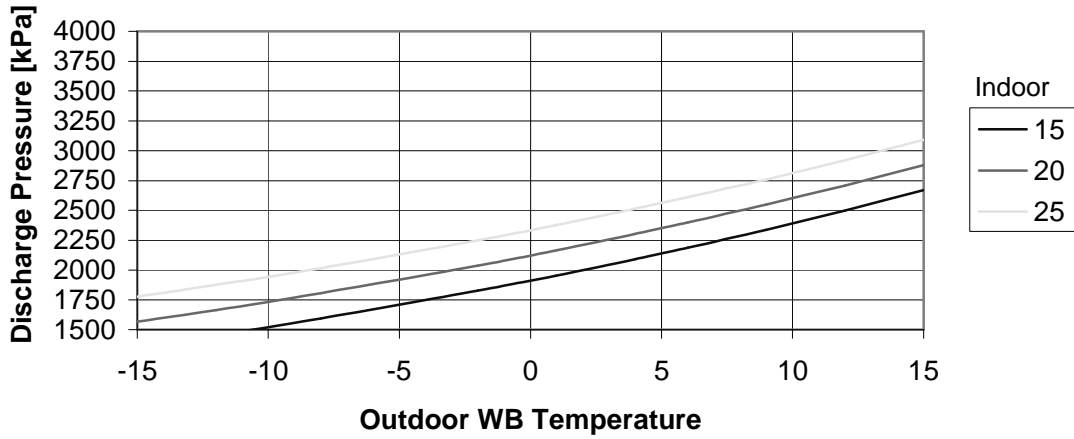
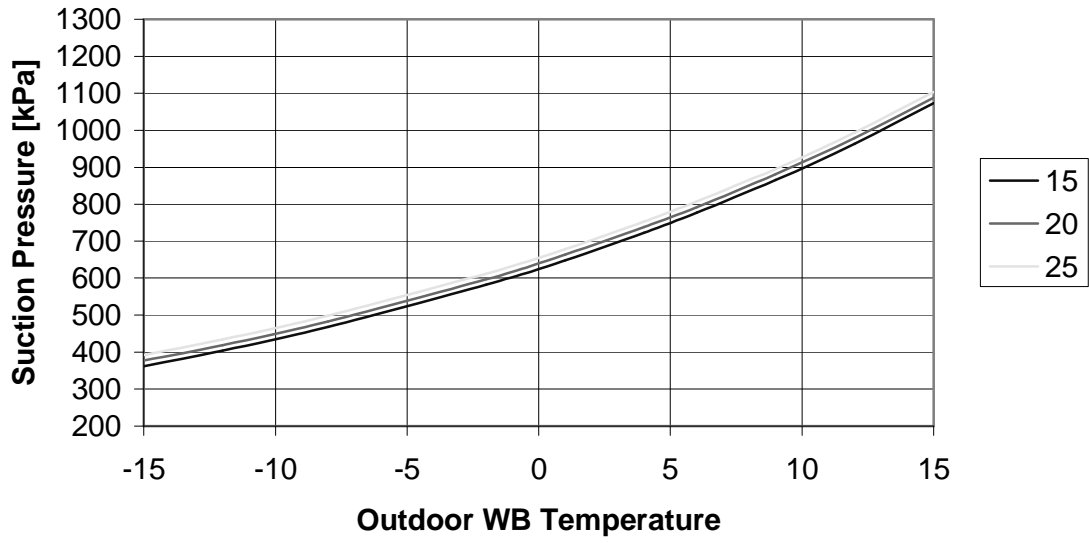
- TH – Total Heating Capacity, kW
- PI – Power Input, kW
- WB – Wet Bulb Temp., (°C)
- DB – Dry Bulb Temp., (°C)
- ID – Indoor
- OU – Outdoor

5.5.5 Capacity Correction Factors

Heating Capacity Ratio Vs. Outdoor Temperature

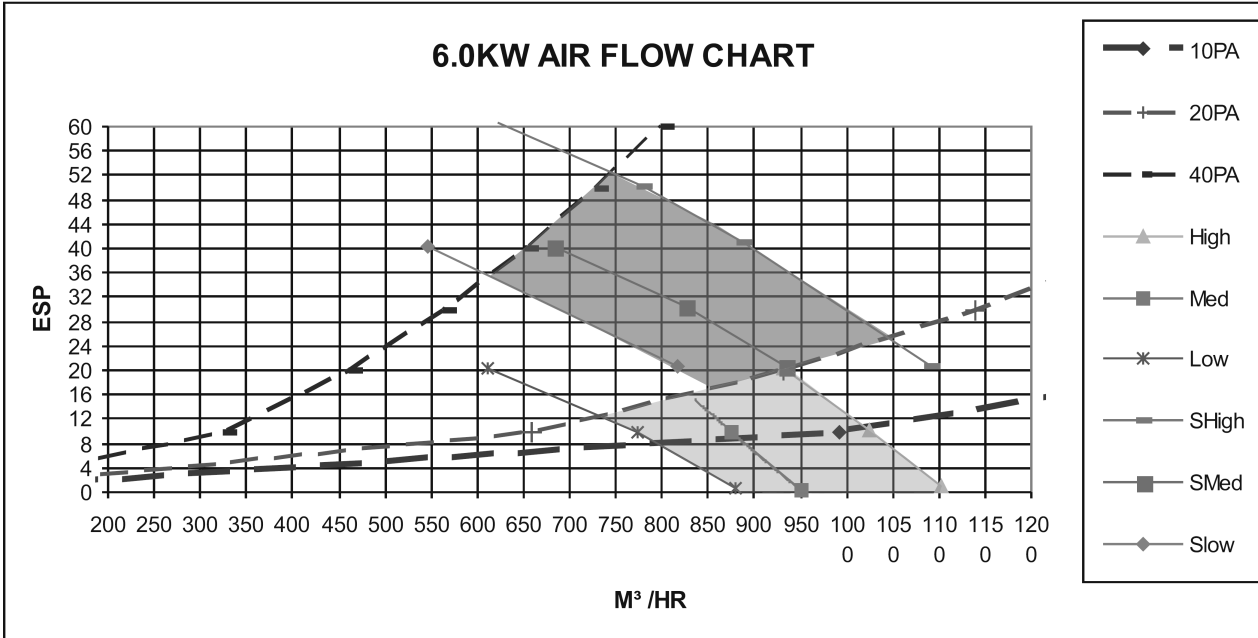


5.5.6 Heating Curves

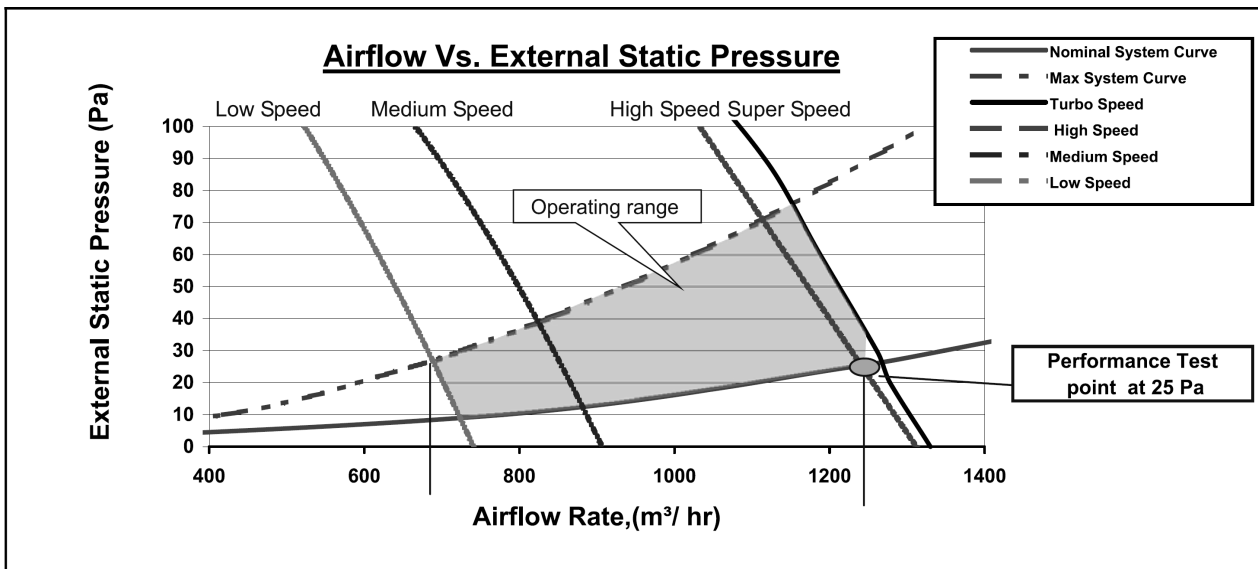


6. AIRFLOW CURVES

6.1 Model: LSN 60 DCI



6.2 Model: DNG 60 DCI



7. SOUND LEVEL CHARACTERISTICS

7.1 Sound Pressure Level

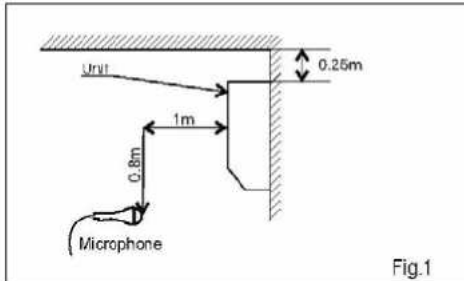


Figure 1. Wall Mounted

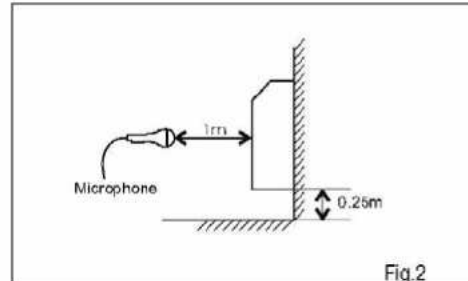


Figure 2. Floor Mounted

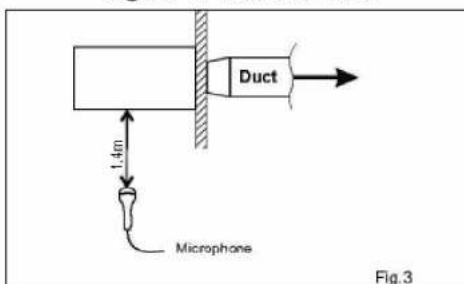


Figure 3. Ducted

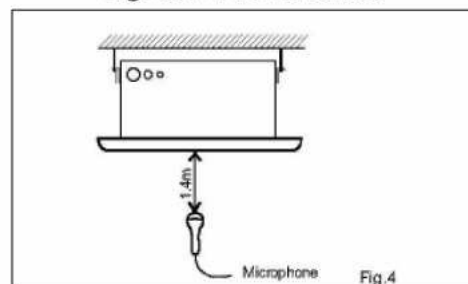
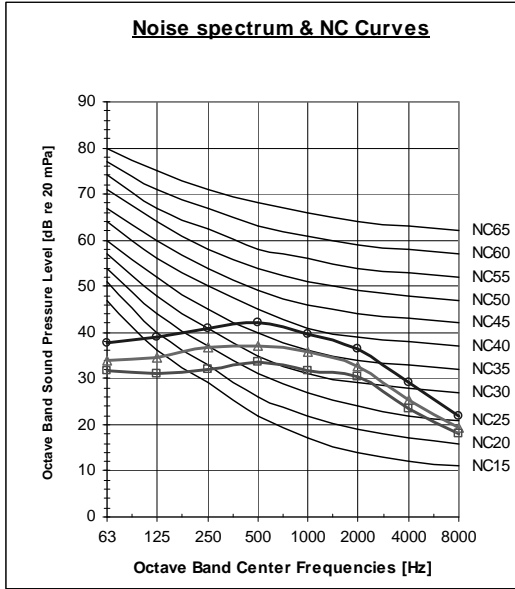


Figure 4. Cassette

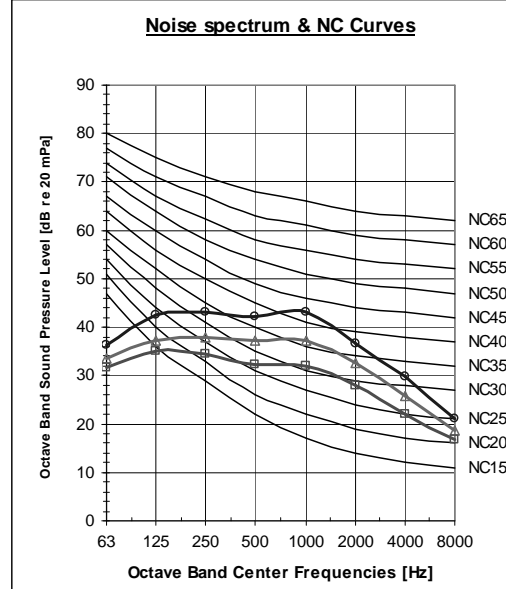
7.2 IDU Sound Pressure Level

Measured as Figure 1

LEX/HAD 60 DCI - Cooling



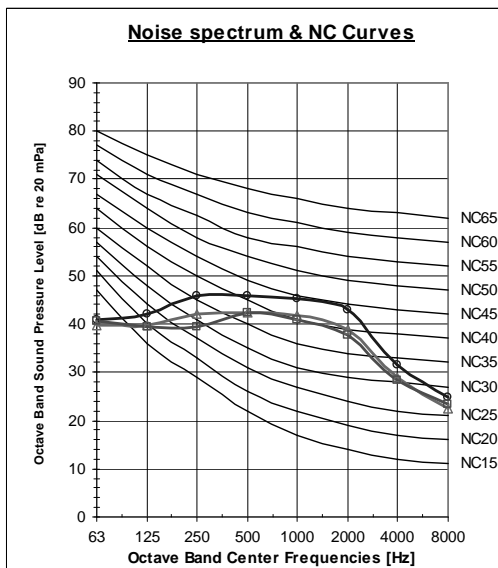
LEX/HAD 60 DCI - Heating



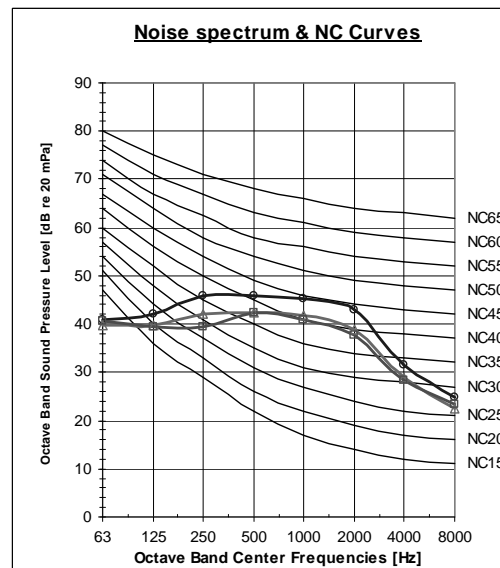
FAN SPEED	LINE
HI	—○—
ME	—△—
LO	—□—

Measured as Figure 2

PXD 60 DCI - Cooling



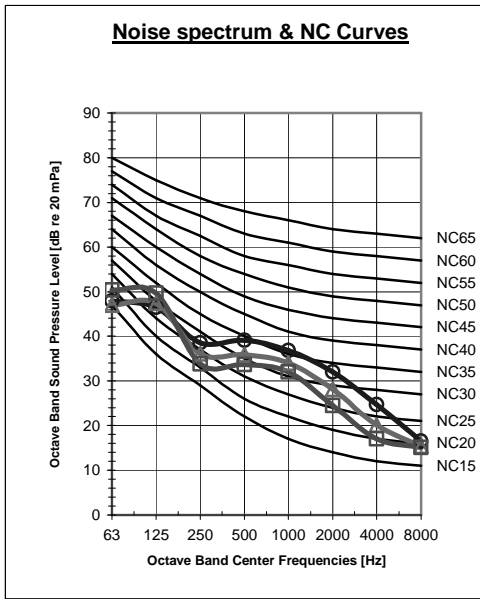
PXD 60 DCI - Heating



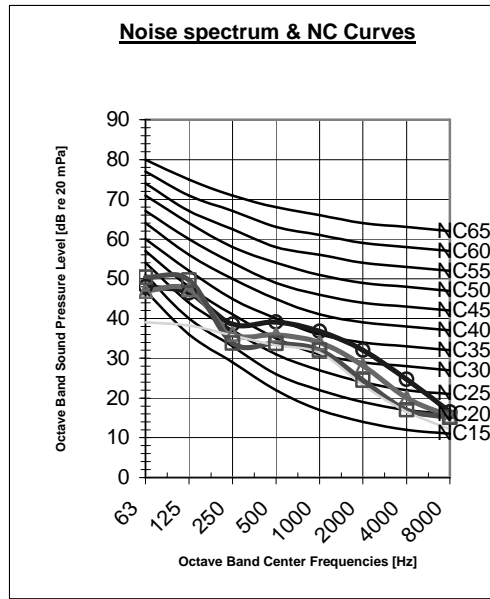
FAN SPEED	LINE
HI	—○—
ME	—△—
LO	—□—

Measured as Figure 4

CN 60 DCI - Cooling



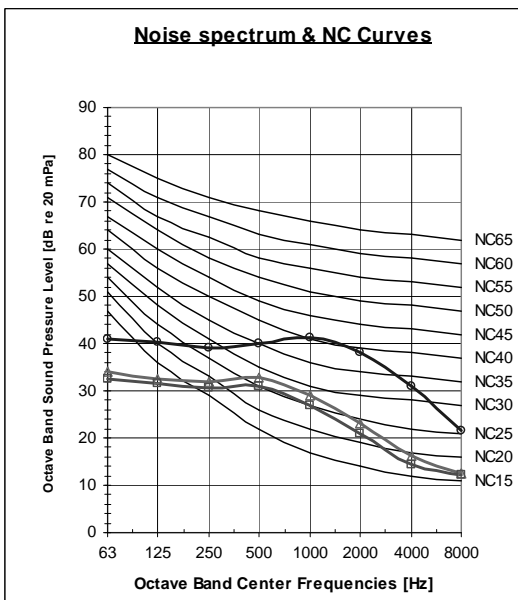
CN 60 DCI - Heating



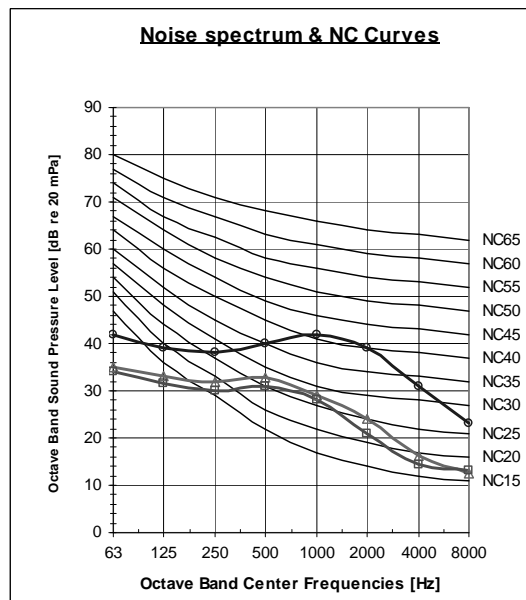
FAN SPEED	LINE
HI	—○—
ME	—△—
LO	—□—

Measured as Figure 3

LSN 60 DCI - Cooling



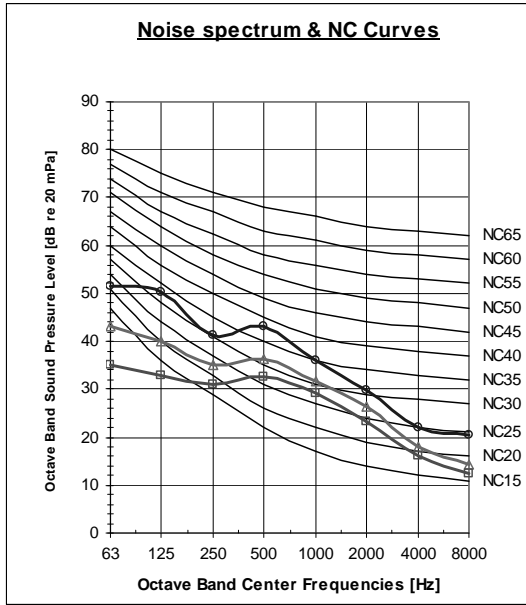
LSN 60 DCI - Heating



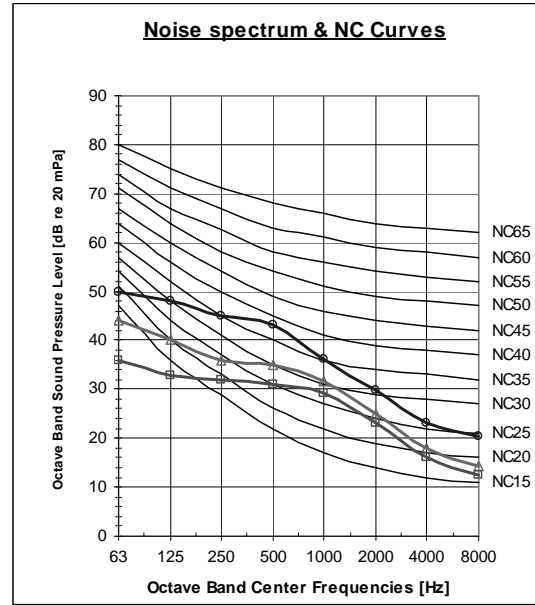
FAN SPEED	LINE
HI	—○—
ME	—△—
LO	—□—

Measured as Figure 3

DNG 60 DCI - Cooling



DNG 60 DCI - Heating



FAN SPEED	LINE
HI	— ○ —
ME	— △ —
LO	— □ —

7.3 ODU Sound Pressure Level Spectrum (Measured as Figure 5)

MODEL		SPL dB(A)	SPW dB(A)
Indoor	Outdoor	Cooling/Heating	Cooling/Heating
LEX 60 DCI	YBD 022	56/66	56/66

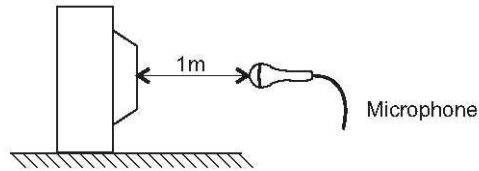
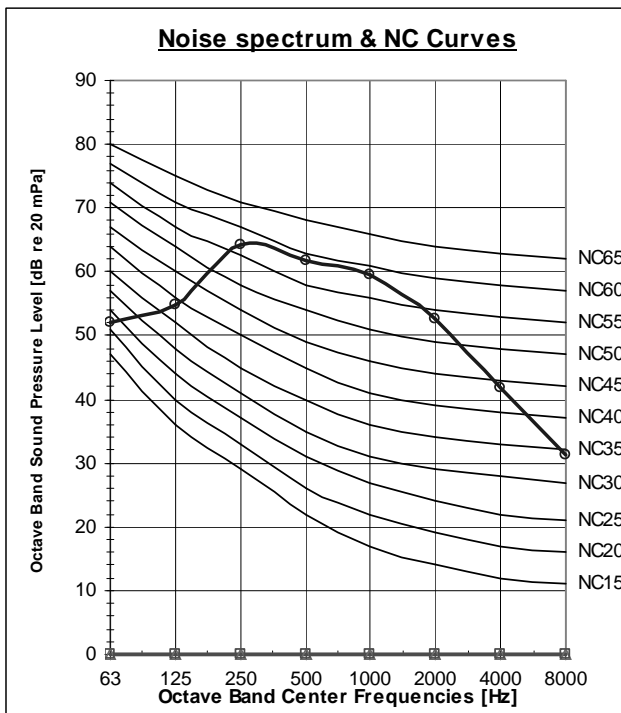


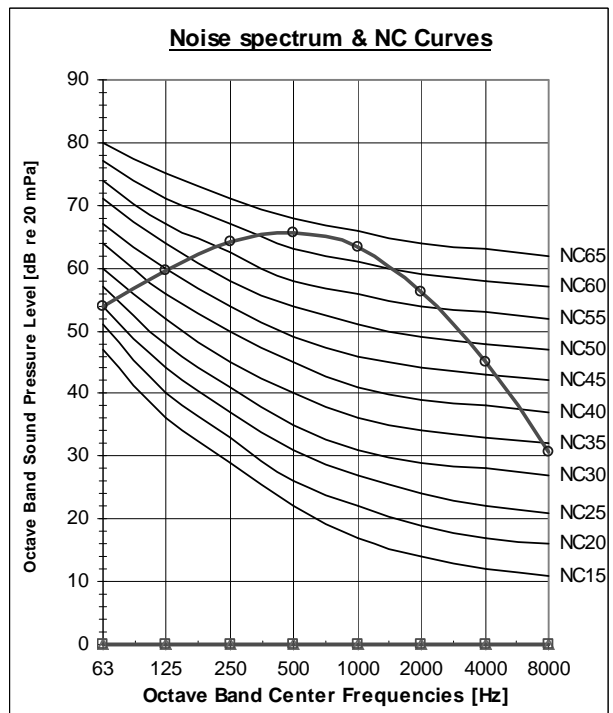
Fig.5

Figure 5. Microphone Distance from Unit

YBD 022 - Cooling



YBD 022 - Heating



8. ELECTRICAL DATA

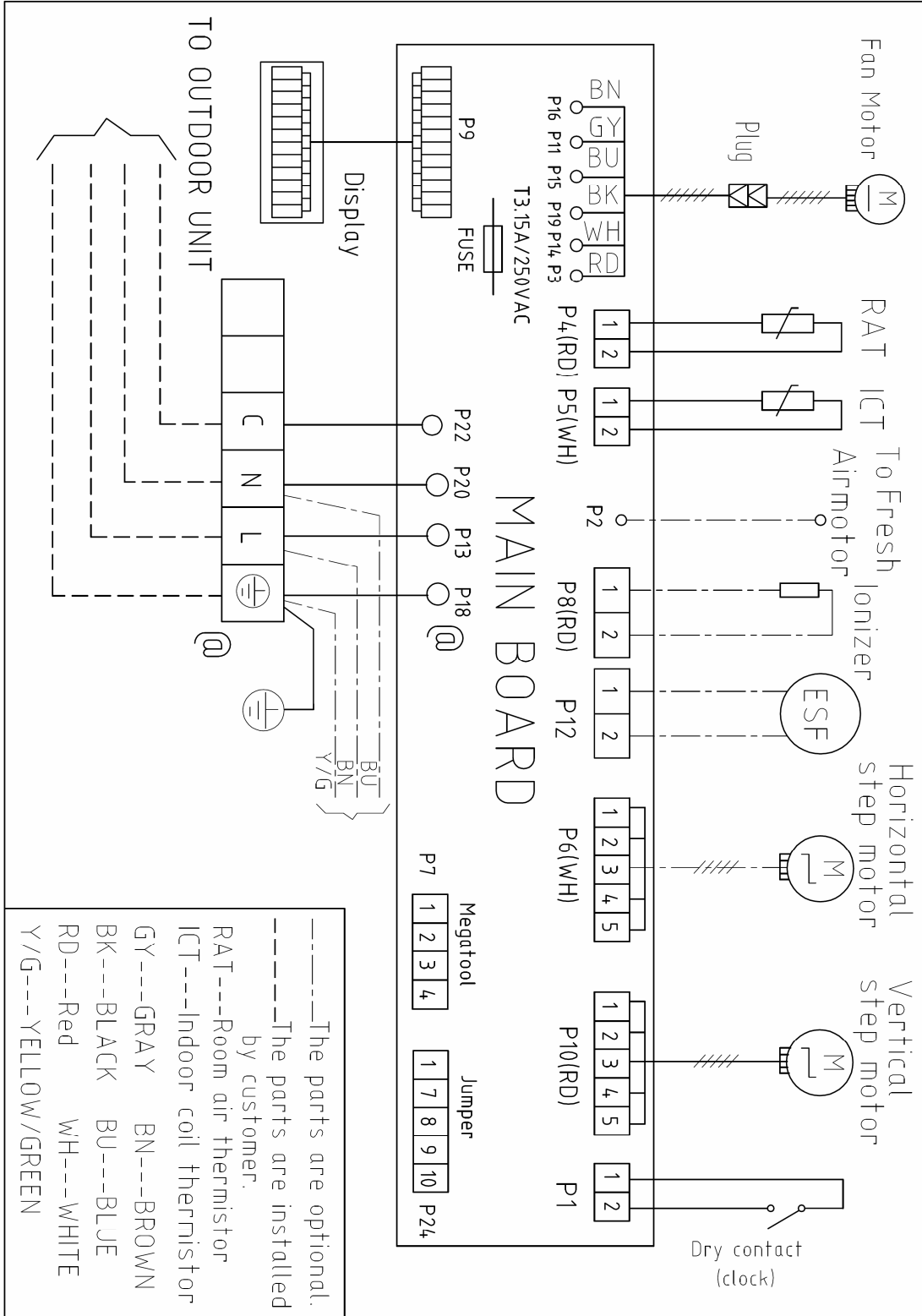
MODEL	YBD022
Power Supply	To indoor
	1PH-230V-50/60Hz
Max Current, A	15
Circuit Breaker,A	20
Power Supply Wiring No. X Cross Section mm ²	3x2.5 mm ²
Interconnecting Cable Model No. X Cross Section mm ²	4x2.5 mm ²

NOTE

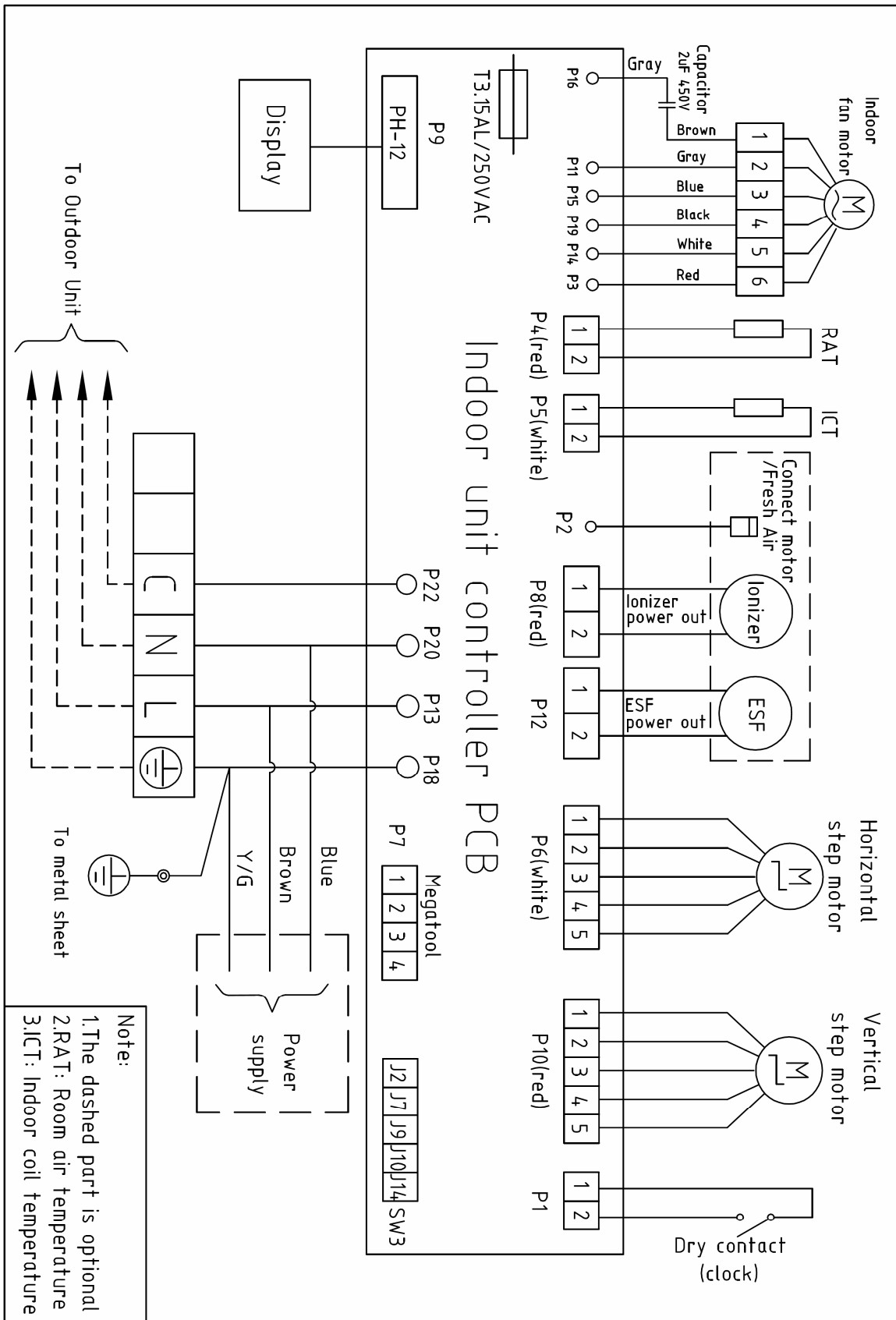
Power wiring cord should comply with local laws and electrical regulations requirements.

9. WIRING DIAGRAM

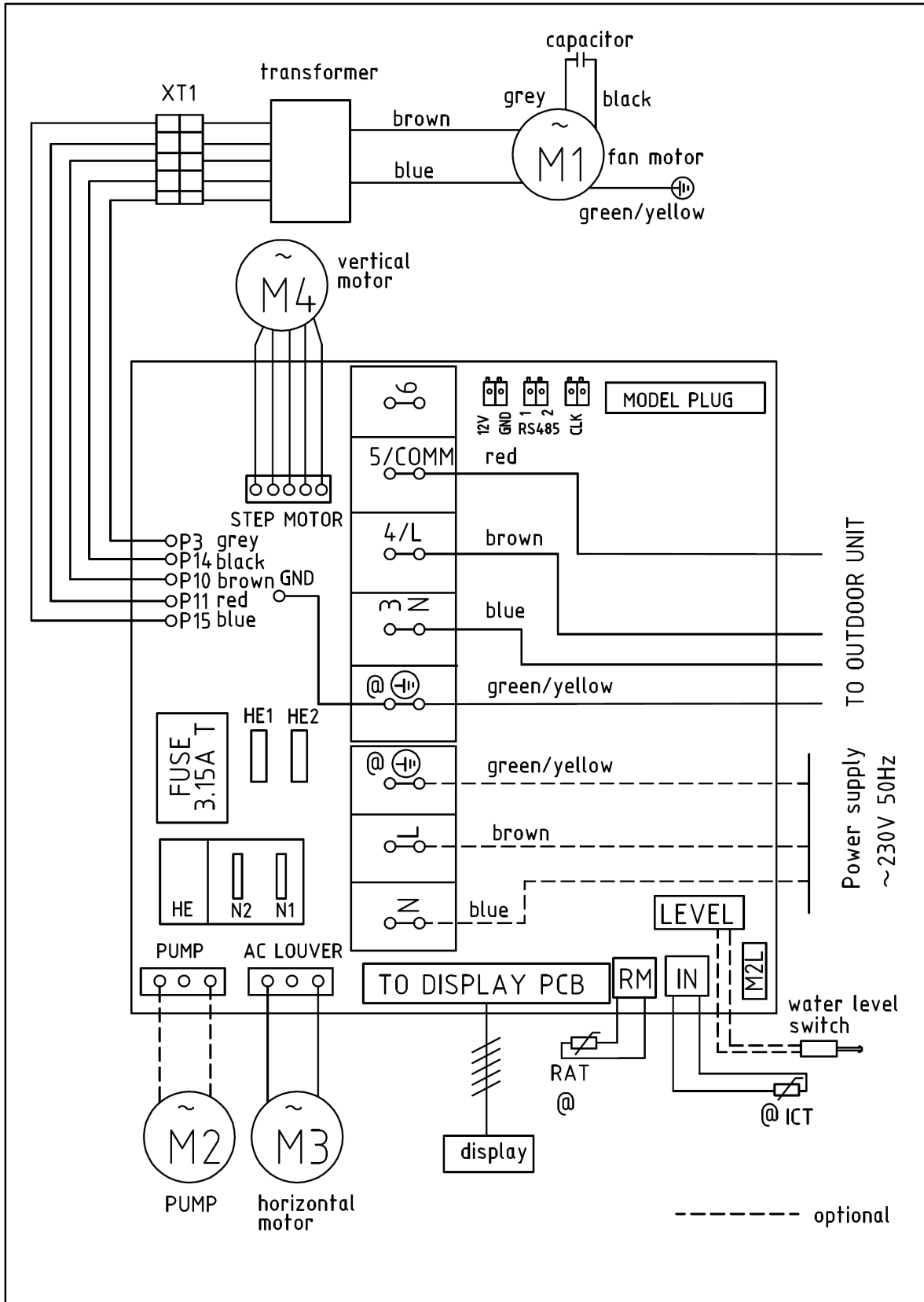
9.1 Indoor unit: LEX 60 DCI



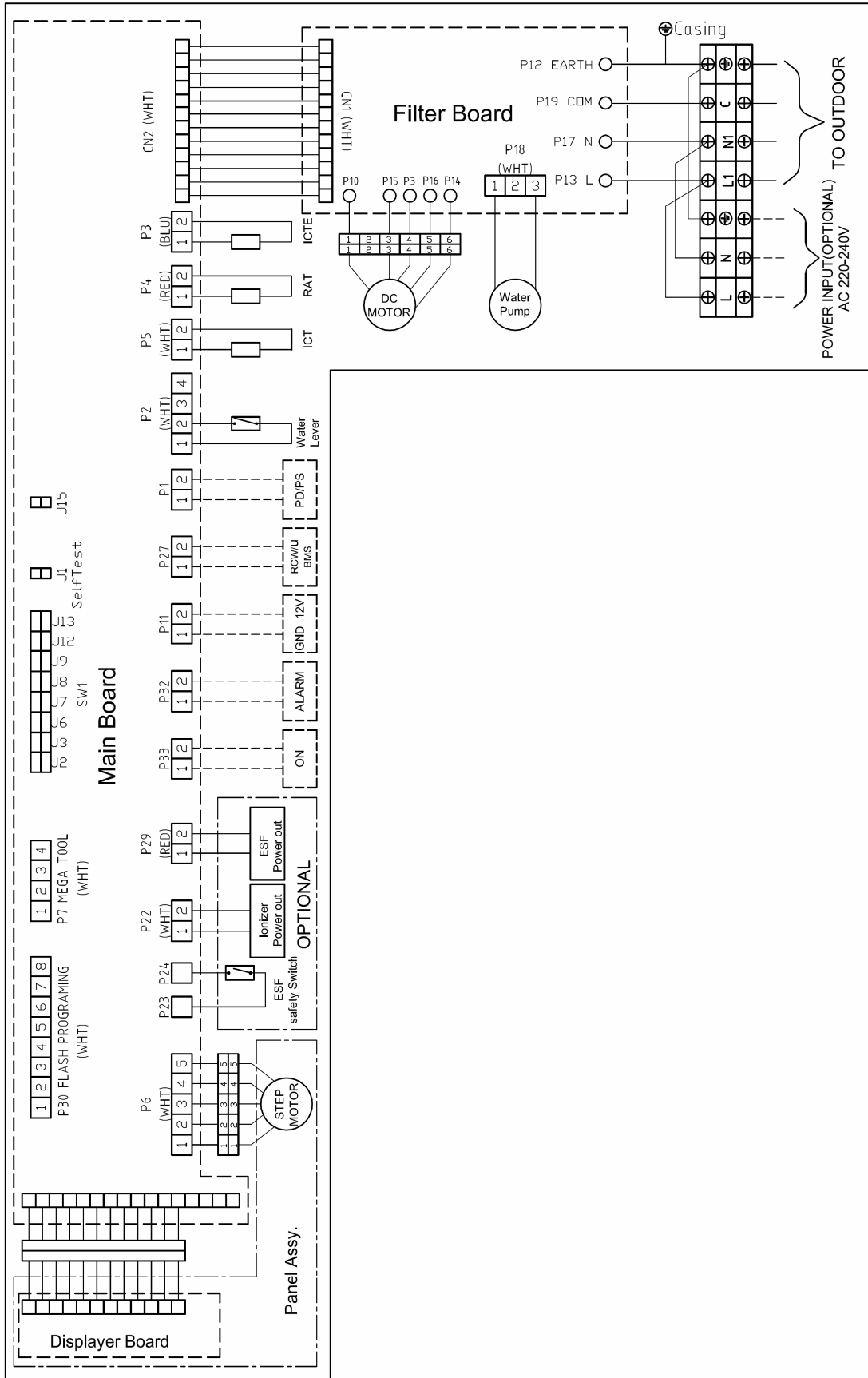
9.2 Indoor unit: HAD 60 DCI



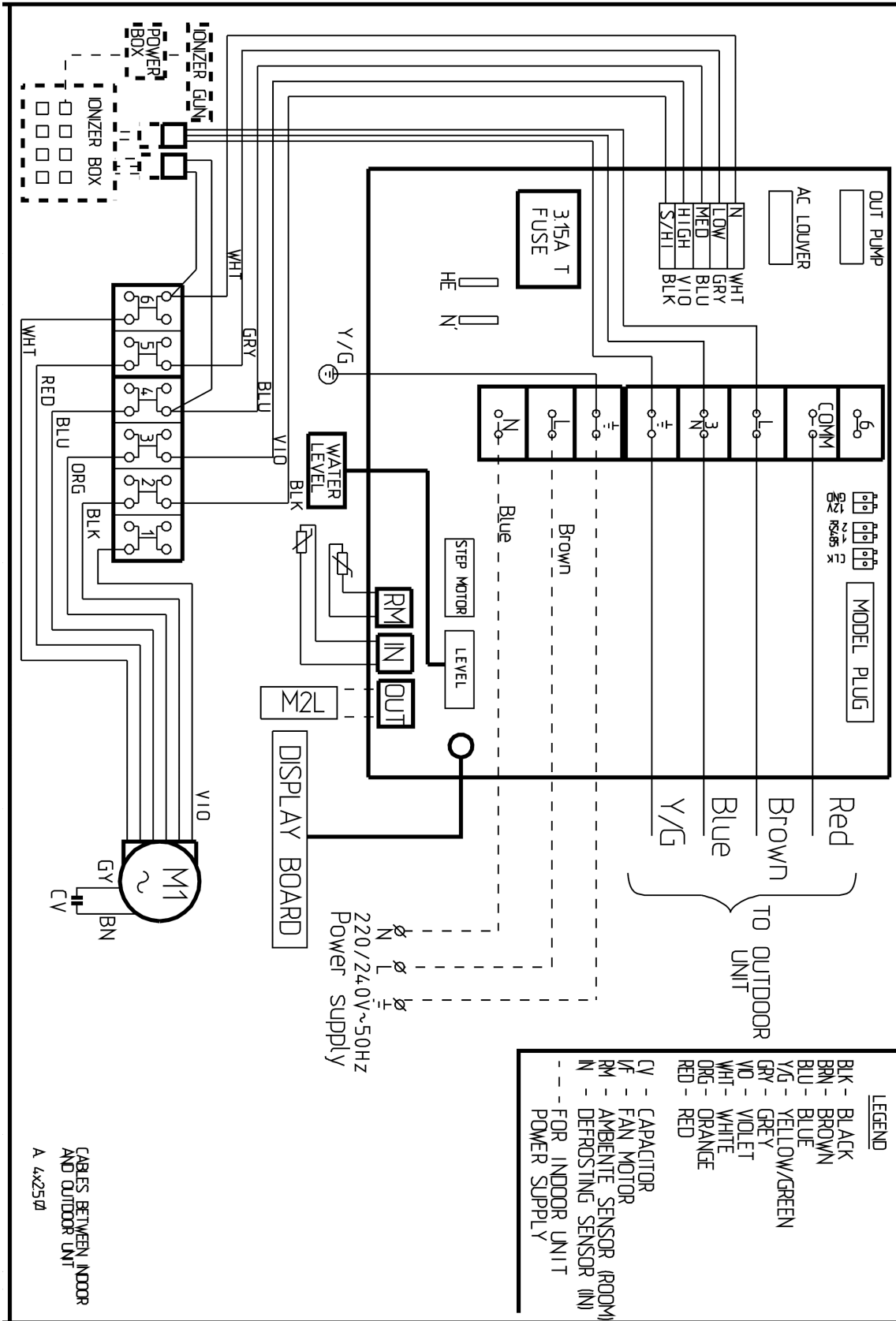
9.3 Indoor unit: PXD 60 DCI



9.4 Indoor unit: CN 60 DCI

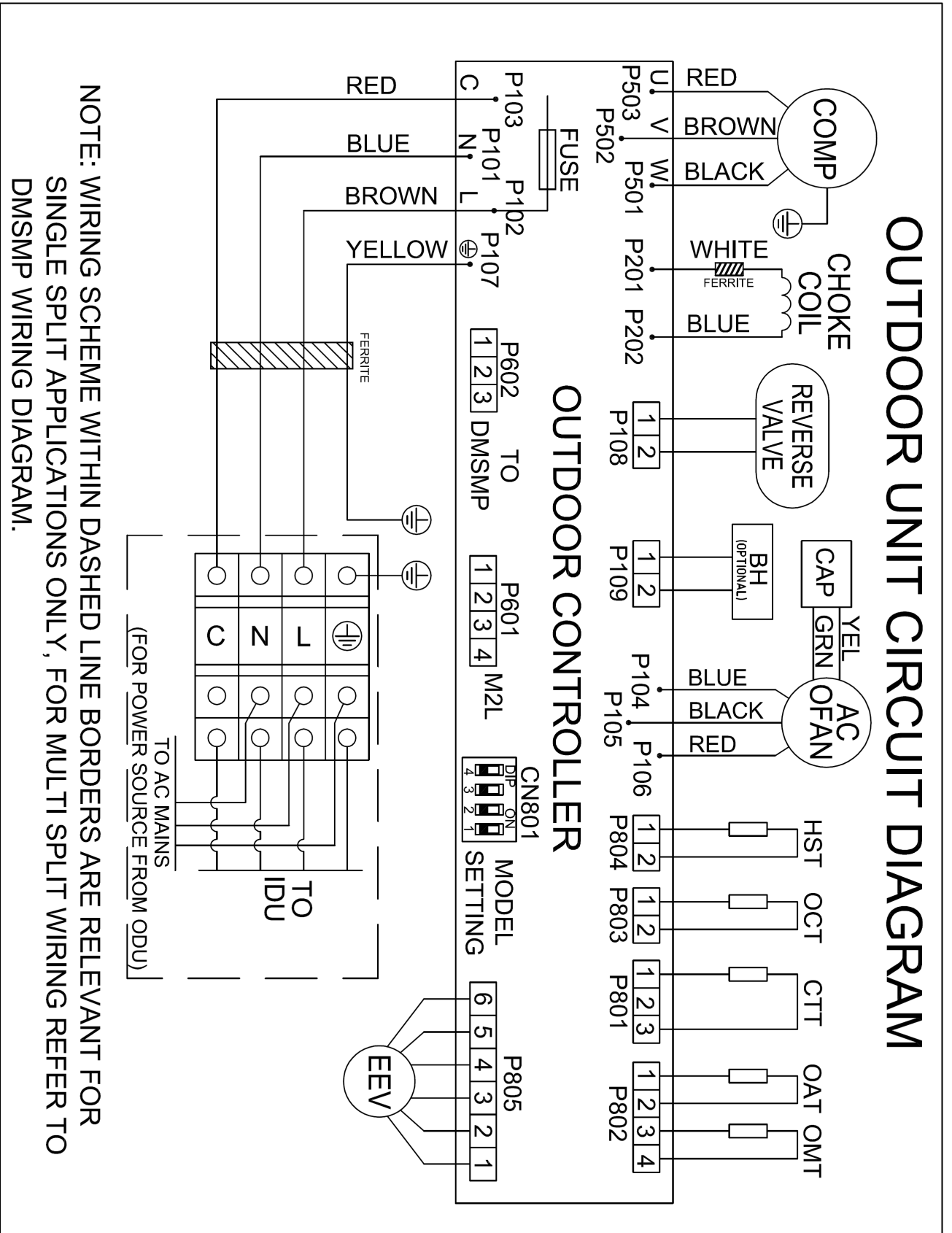


9.5 Indoor unit: DNG 60 DCI



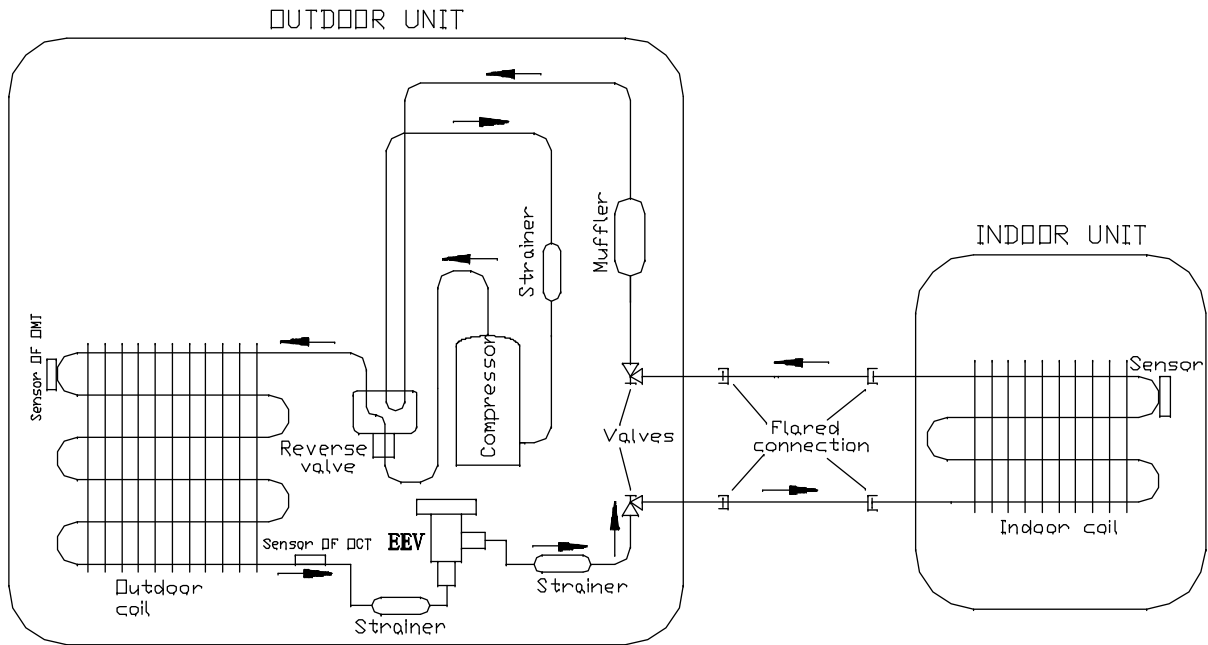
CABLES BETWEEN INDOOR AND OUTDOOR UNIT A 4x25^Ø

9.6 Outdoor unit: YBD 022



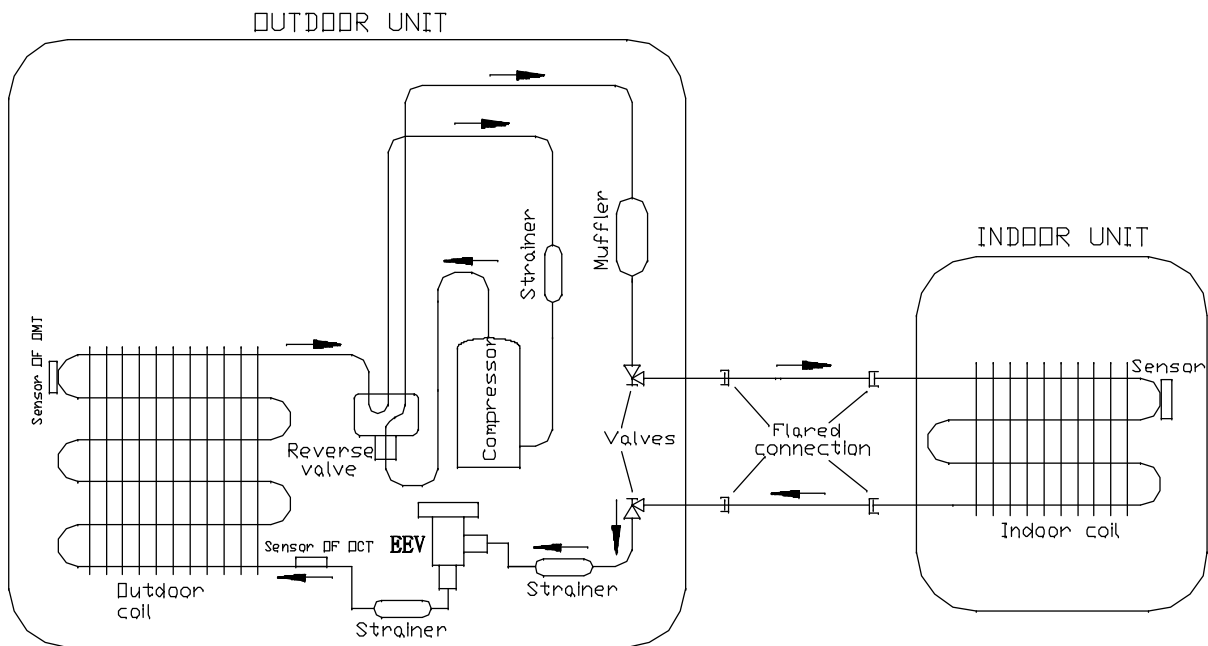
10. REFRIGERATION DIAGRAMS

10.1 Cooling Mode



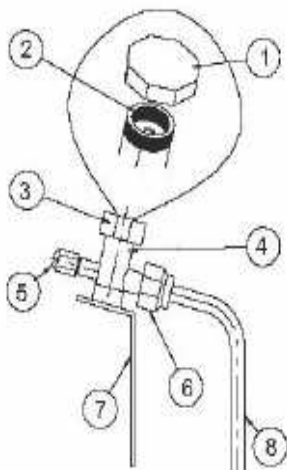
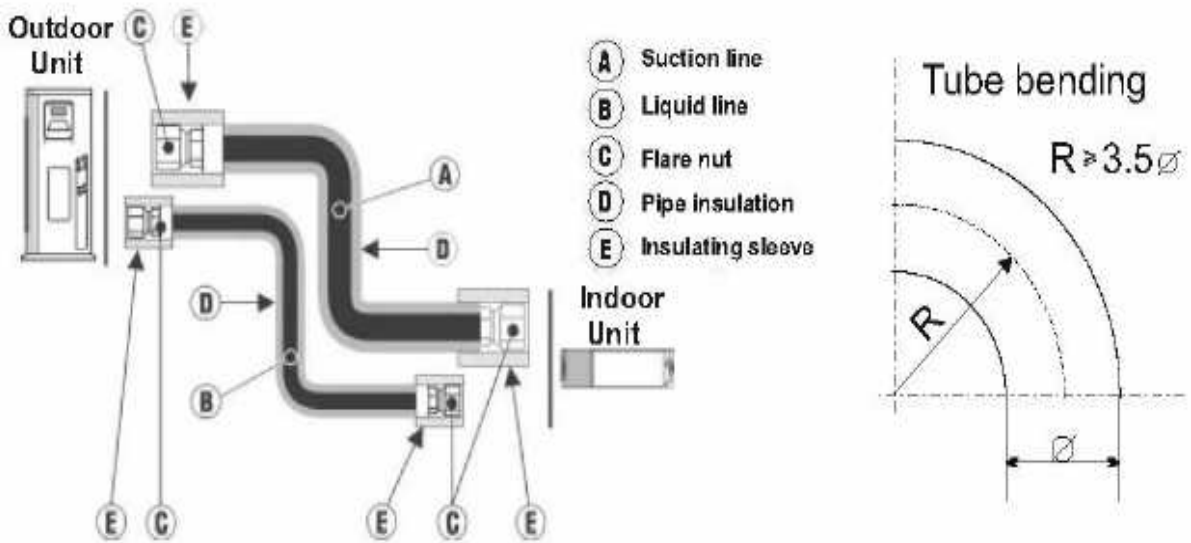
COOLING & DRY MODE

10.2 Heating Mode



HEATING MODE

11. TUBING CONNECTIONS



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

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

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

12. CONTROL SYSTEM

12.1 Electronic Control

12.1.1 Abbreviations

AC	-Alternate Current
A/C	- Air-Conditioner
ANY	- ON or OFF status
COMP	- Compressor
H/W	- Hardware
ICT	- Indoor Coil Temperature sensor
IF, IFAN	- Indoor Fan
IR	- Infra Red
Max	- Maximum
Min	- Minimum
min	- Minute (time)
NA	- Not Applicable
OCT	- Outdoor Coil Temperature sensor
OF, OFAN	- Outdoor Fan OPER - Operate Para. - Paragraph
RAT	- Return Air Temperature (RT1) sensor
RC	- Reverse Cycle (Heat Pump)
R/C	- Remote Control
RCT	- Remote Control Temperature
RH	- Resistance Heater
RV	- Reversing Valve
SB, STBY	- Stand-By
Sec	- Second (time)
Sect	- Section
SH	- Supplementary Heater
SPT	- Set Point Temperature
ST	- Standard (a Model with Cooling Only)
S/W	- Software
TEMP	- Temperature
W/O	- Without

12.1.2 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.

12.1.3 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.

12.1.4 Compressor Frequency Control

12.1.4.1 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

12.1.4.2 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:

CONTROL SYSTEM

- 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.**

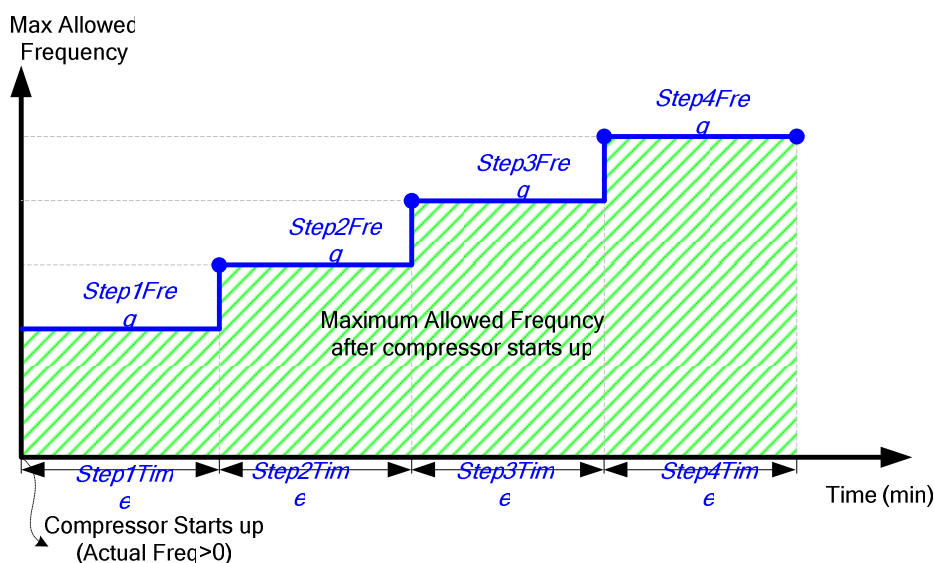
The higher allowed frequency is extracted from the following:

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

12.1.4.3 Frequency Changes Control

Frequency change rate is 1 Hz/sec.

12.1.4.4 Compressor Starting Control



Notes:

1. The limitations occur each time the compressor starts up
2. As long as the compressor is on, the limitations occur one time only

12.1.4.5 Minimum On and Off Time

3 minutes.

12.1.5 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.

12.1.5.1 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.

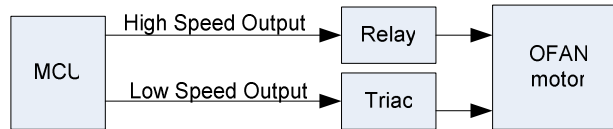
12.1.6 Heating Element Control

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.

12.1.7 Outdoor Fan Control

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



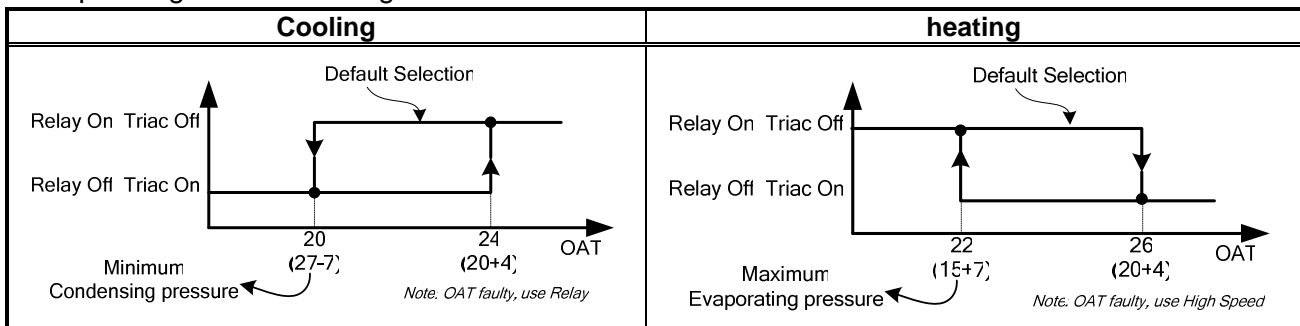
Speed	Controlled by
High	Relay
Low	Triac (27% to 85% effective voltage)

12.1.7.2 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	

12.1.7.3 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

12.1.8 EEV (electronic Expansion valve) Control

EEV control targets to reach some predefined CTT value. If the CTT is high, the EEV will open, if the CTT is low, the EEV will close.

12.1.9 Reversing Valve (RV) Control

Reversing valve is on in heat mode.

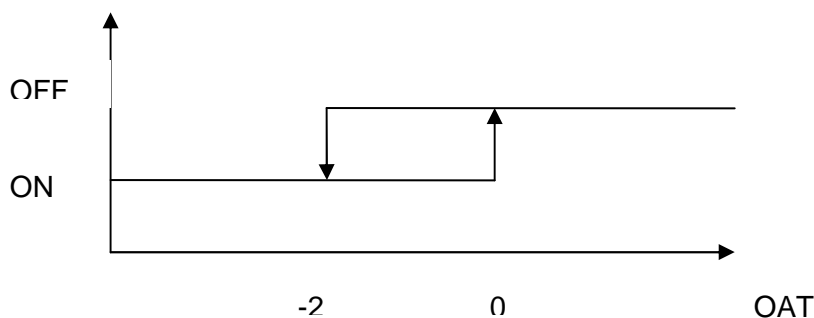
Switching of RV state is done only after compressor is off for over 3 minutes.

12.1.10 Base Heater Control

Base heater should be ON when unit is in heating and according to the below graph.

If OAT is disconnected, Base heater will be ON when unit is in heating.

Base Heater at heating mode



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.

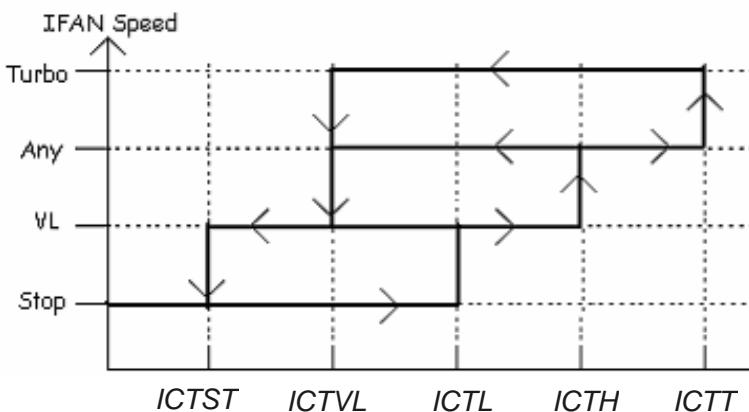
In AutoFan user setting, fan speed will be adjusted automatically according to the calculated NLOAD.

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 $\Delta T < -3$.

Unit will switch from heat to cool when compressor is off for 5 minutes, and $\Delta T < -3$.

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

Protection status	ICT Defrost
Hz Up	10
Stop Rise	8
Hz Down1	6
Hz Down2	3
Stop Compressor	0

12.7.2 Indoor Coil over Heating Protection

Protection status	ICT overheating
Hz Up	45
Stop Rise	49
Hz Down1	53
Hz Down2	57
Stop Compressor	61

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.

Protection status	CTT overheating
Hz Up	85
Stop Rise	90
Hz Down1	95
Hz Down2	100
Stop Compressor	105

12.7.4 Outdoor Coil Overheating Protection

Protection status	OMT overheating
Hz Up	53
Stop Rise	56
Hz Down1	59
Hz Down2	61
Stop Compressor	63

12.7.5 Compressor over Current Protection

Protection status	CCR over current
Hz Up	9.0
Stop Rise	10.5
Hz Down1	11.5
Hz Down2	-
Stop Compressor	13.0

12.7.6 Heat Sink Over Heating Protection

Protection status	HST overheating
Hz Up	71
Stop Rise	74
Hz Down1	77
Hz Down2	80
Stop Compressor	84

12.7.7 System Over Power Protection

Protection status	Over power
Hz Up	2350
Stop Rise	2500
Hz Down1	2650
Hz Down2	-
Stop Compressor	2800

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: $OCT < 0$ AND $TLD > 120$ 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 $DST = 8$

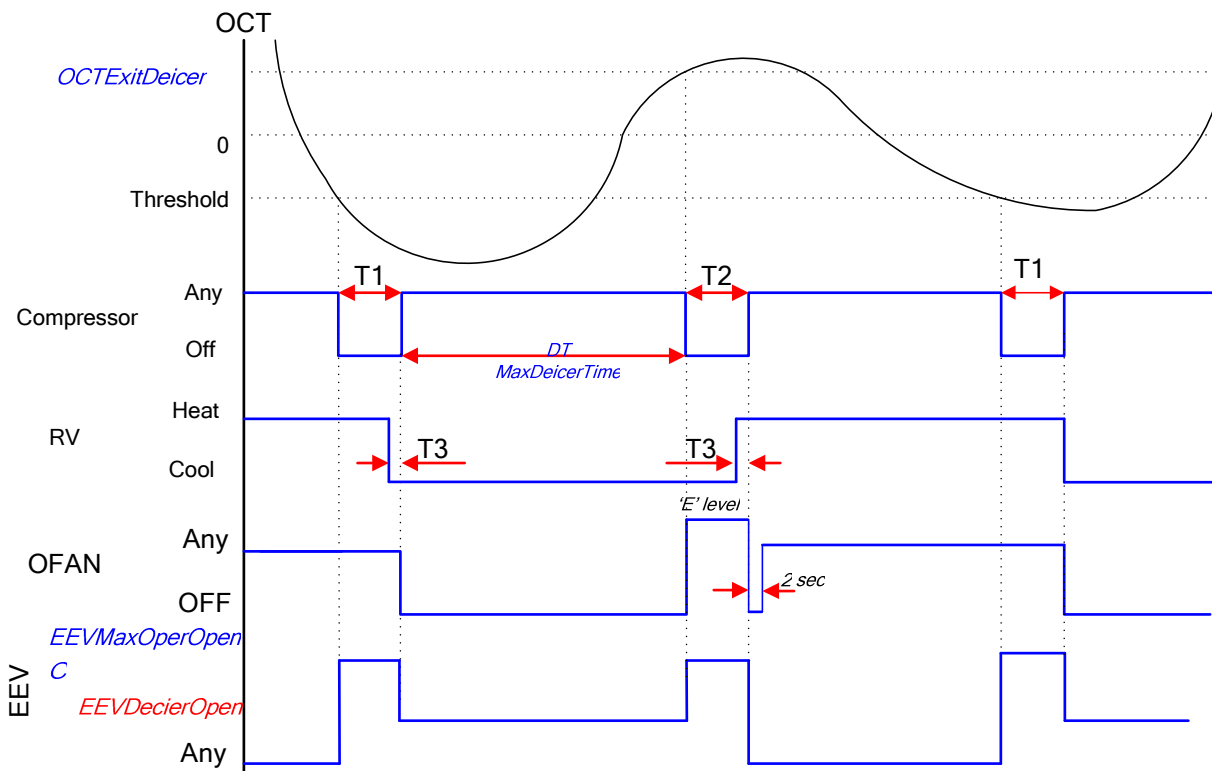
When $OAT \leq 0$; then $DST = \text{round down} (-DeicerCoef * OAT) + 8$

Deicing interval time when compressor is first started in heat mode is 30 minutes.

CONTROL SYSTEM

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

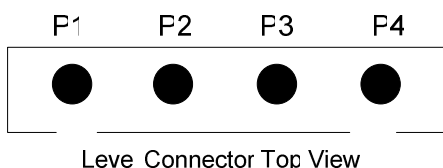
OCT > *OCTExitDeicer* or Deicer current time is over *MaxDeicerTime* minutes.

12.7.8.4 EEV and Frequency setting during deicer

Unit Type	<i>EEVDeicerOpen</i>	Compressor frequency
Single Split	<i>EEVDeicerOpenSingle</i>	<i>DeicerFreq</i>

12.7.9 Condensate Water Over Flow Protection

Outdoor unit receives "overflow" signal from the indoor side.



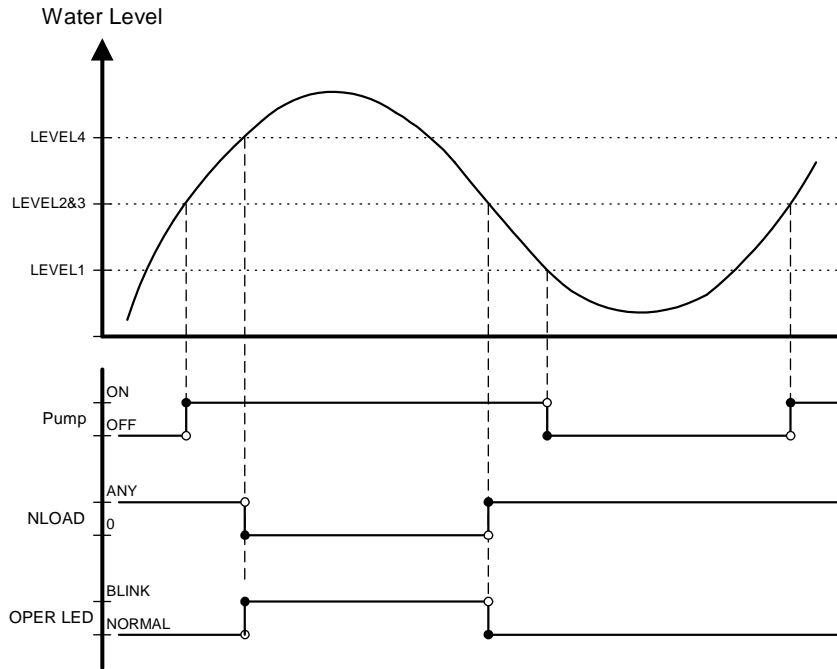
Each of the pins P1, P2, P3 can have two options:

1 – When it is shorted with P4

0 – When it is not shorted to P4

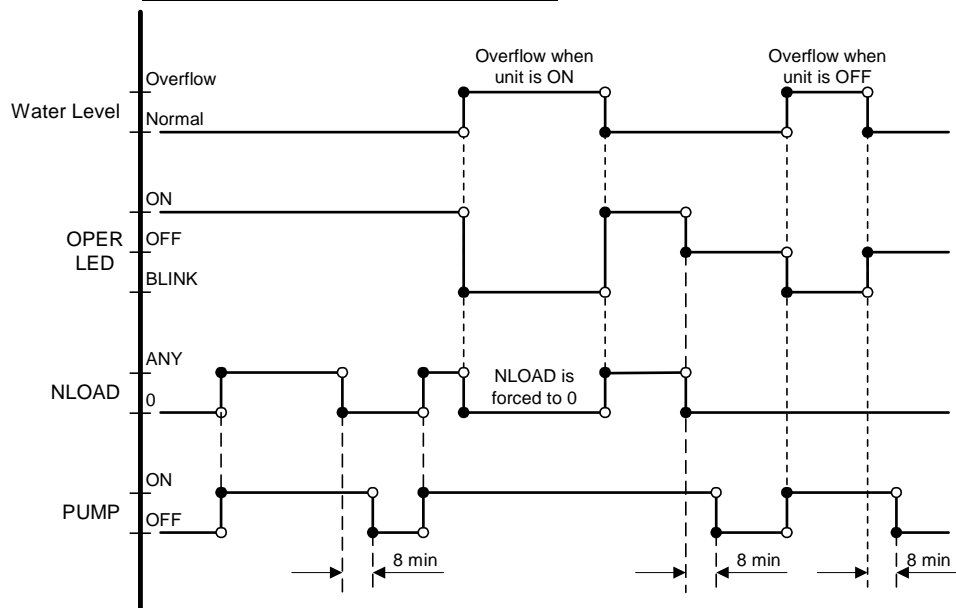
12.7.9.1 3 Levels Logic (used in floor/ceiling models)

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°C
Heating	28°C

12.10 Indoor Unit Controllers and Indicators

12.10.1 IDU excluding PXD

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 <u>on the unit</u> .
HEATING INDICATOR	Lights up when system is switched Heat Mode by using the Mode Switch <u>on the unit</u> .
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).

12.10.2 IDU PXD

STANDBY INDICATOR	1. 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 <u>on the unit</u> .
HEATING INDICATOR	Lights up when system is switched Heat Mode by using the Mode Switch <u>on the unit</u> .
FAN MODE INDICATOR ⁽⁴⁾	Lights up in Fan Mode activated by <u>local switches</u> .
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 adjacent 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.

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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 – 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	
<p>Note: the buttons above are selected according to RC8 design (refer to RC8 specifications) for the technician convenient use.</p>				

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 (CI/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.
 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. 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, the HMI will show the fault in the same way to Diagnostics sub menu.

Fault Code:

No	Problem
1	OCT is shorted/disconnected
2	CTT is shorted/disconnected
3	HST is shorted/disconnected
4	OAT is shorted/disconnected
5	OMT is shorted/disconnected
6	RGT is shorted/disconnected
7	RLT is shorted/disconnected
8	Reserved
9	Low pressure protection
10	Reserved
11	Compressor IPM Fault / IPM Driver Pin / Compressor Current Sensor Fault
12	Bad EEPROM
13	DC under voltage

14	DC over voltage
15	AC under voltage/AC over Voltage/Zero Crossing detection
16	Mismatch between IDU & ODU models
17	No Communication
18	System Over Power
19	PFC Current sensor
20	Heat sink Over Heating
21	Deicing
22	Compressor Over Heating
23	Compressor Over Current
24	No OFAN Feedback
25	OFAN IPM fault / OFAN IPM Driver Pin
26	Compressor Lock
27	Bad Communication
28	Missing ODU configuration
29	Undefined ODU Model
30	Outdoor/Indoor Coil Overheating
31	Operation conditions are exceeded

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	
AC	0	0	0	1
AD	0	0	1	0
WNG	0	0	1	1
PXD	0	1	0	
KS	0	1	0	1
LS	0	1	1	0
K	0	1	1	
WNG18	1	0	0	
WNG30	1	0	0	1

CONTROL SYSTEM

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
- Entering through 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		

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High	Cool	<i>IFAN_TEST_COOL_NOM</i>	Turbo	<i>NomLoadC</i> (at Cool)
	Heat	<i>IFAN_TEST_HEAT_NOM</i>		<i>NomLoadH</i> (at heat)
Turbo/Auto	Cool	<i>IFAN_TEST_COOL_MAX</i>	Turbo	127
	Heat	<i>IFAN_TEST_HEAT_MAX</i>		

When entering through outdoor:

ODU mode	IDU mode	IFAN Variable Speed	IFAN fix speed	NLOAD
Cooling	Cooling	<i>IFAN_TEST_COOL_NOM</i>	Turbo	<i>NomLoadC</i>
Heating	Heating	<i>IFAN_TEST_HEAT_NOM</i>	Turbo	<i>NomLoadH</i>

Notes:

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

Note:

- 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.
- The vertical louver should be Test_Mode_ Angle ,it should be vertical.Louvers angles will be set according to the IDU family and Mode:

12.14 SW Parameters

12.14.1 Indoor Units SW Parameters

12.14.1.1 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

Parameters for defrost protection:

Refer to ODU parameters

Parameters for indoor coil over heating protection:

Refer to ODU parameters

12.14.2 Outdoor Units SW Parameters

#	Name	S YBD 022
1.	<i>MinFreqC</i>	20
2.	<i>MinFreqCA</i>	40
3.	<i>MaxFreqCSingle</i>	90

#	Name	S YBD 022
4.	<i>MinFreqH</i>	20
5.	<i>MinFreqHA</i>	30
6.	<i>MaxFreqHSingle</i>	90
7.	<i>HPAtMinFreqC</i>	42
8.	<i>HPAtMinFreqCA</i>	55
9.	<i>HPAtMinFreqH</i>	42
10.	<i>HPAtMinFreqHA</i>	55
11.	<i>DeicerFreq</i>	90
12.	<i>Step1Freq</i>	40
13.	<i>Step2Freq</i>	55
14.	<i>Step3Freq</i>	65
15.	<i>Step4Freq</i>	75
16.	<i>Step1Time</i>	3
17.	<i>Step2Time</i>	5
18.	<i>Step3Time</i>	1
19.	<i>Step4Time</i>	1
20.	<i>OilLubricationFreq</i>	30
21.	<i>EEVSCProtection</i>	12
22.	<i>EEVMinOperOpenC</i>	50
23.	<i>EEVMaxOperOpenC</i>	480
24.	<i>EEVMinOperOpenH</i>	60
25.	<i>EEVMaxOperOpenH</i>	480
26.	<i>EEVMinOperOpenHInactive</i>	50
27.	<i>EEVMaxOperOpenHInactive</i>	120
28.	<i>InvAccel</i>	3
29.	<i>InvDecel</i>	1
30.	<i>OCTExitDeicer</i>	12
31.	<i>MaxDeicerTime</i>	15
32.	<i>EEVDecierOpenSingle</i>	150
33.	<i>DeicerCoef</i>	0.8
34.	<i>EnableExceedCond</i>	1
35.	<i>InstTestCompSpeed</i>	35
36.	<i>InstTestEEV</i>	180
37.	<i>OCT_OFAN_Noise_Max</i>	8
38.	<i>OMT_OFAN_Noise_Max</i>	38
39.	<i>OFANType</i>	2
40.	<i>OFMinPercentC</i>	27
41.	<i>OFMinPercentH</i>	27
42.	<i>OFNNoiseMaxPercent</i>	85
43.	<i>NightPercent</i>	50
44.	<i>ICTDef0</i>	13
45.	<i>ICTDef1</i>	10
46.	<i>ICTDef2</i>	8
47.	<i>ICTDef3</i>	6
48.	<i>ICTDef4</i>	3
49.	<i>ICTDef5</i>	0
50.	<i>ICTOH0</i>	41

#	Name	S YBD 022
51.	<i>ICTOH1</i>	45
52.	<i>ICTOH2</i>	49
53.	<i>ICTOH3</i>	53
54.	<i>ICTOH4</i>	57
55.	<i>ICTOH5</i>	61

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!!!

For safe handling of the controller please refer to section 13.3 below.

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	0	0	0	0	1
2	RT-1 is shorted	0	0	0	1	0
3	RT-2 is disconnected	0	0	0	1	1
4	RT-2 is shorted	0	0	1	0	0
5	Reserved	0	0	1	0	1
7	Communication mismatch	0	0	1	1	1
8	No Communication	0	1	0	0	0
9	No Encoder	0	1	0	0	1
10	Reserved	0	1	0	1	0
11	Outdoor Unit Fault	0	1	0	1	1
...	Reserved					
17	Defrost protection	1	0	0	0	1
18	Deicing Protection	1	0	0	1	0
19	Outdoor Unit Protection	1	0	0	1	1
20	Indoor Coil HP Protection	1	0	1	0	0
21	Reserved	1	0	1	0	1
22	Reserved					
24	EEPROM Not Updated	1	1	0	0	0
25	Bad EEPROM	1	1	0	0	1
26	Bad Communication	1	1	0	1	0
27	Using EEPROM data	1	1	0	1	1
28	Model A	1	1	1	0	0
29	Model B	1	1	1	0	1
30	Model C	1	1	1	1	0
31	Model D	1	1	1	1	1

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 EEPROM parameters	

13.1.3.3 Outdoor unit Diagnostics

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

25	OFAN IPM fault / OFAN IPM Driver Pin
26	Compressor Lock
27	Bad Communication
28	Missing ODU configuration
29	Undefined ODU Model
30	Outdoor/Indoor Coil Overheating
31	Operation conditions are exceeded

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.

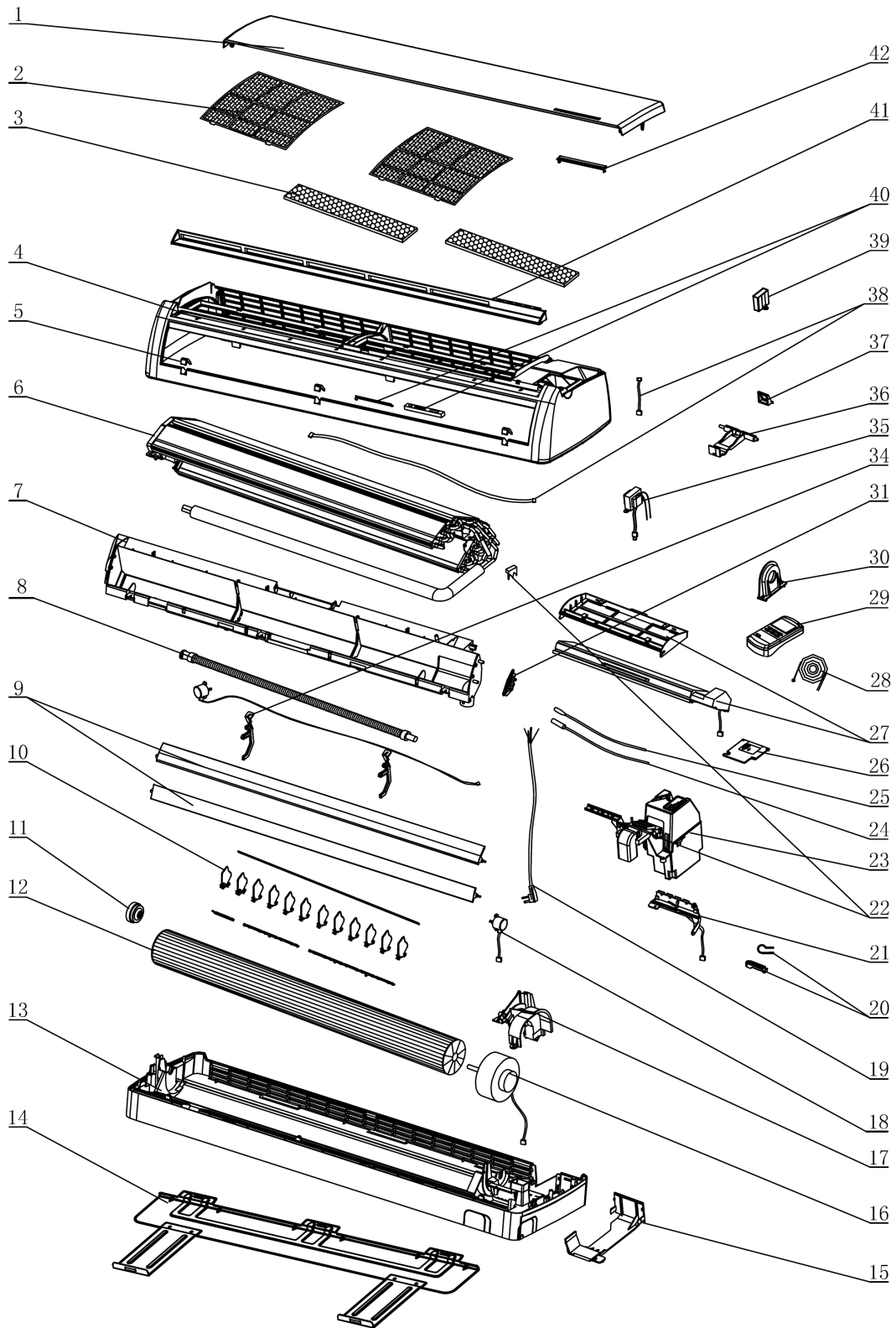
13.3.3 Additional advises

- 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

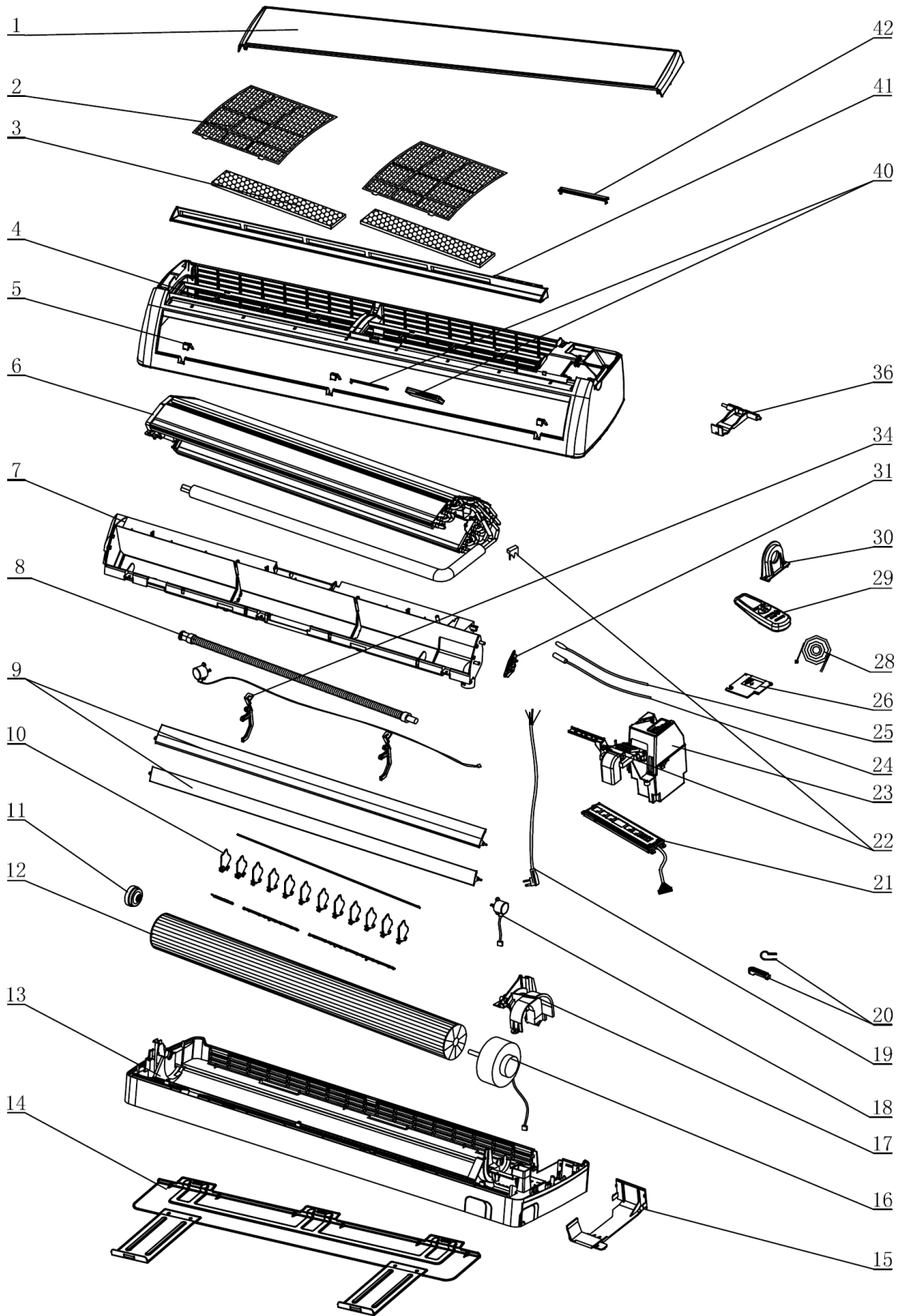
14.1 Exploded view of Indoor unit: LEX 60 DCI



14.2 Spare part list of Indoor unit: LEX 60 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 \varnothing 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

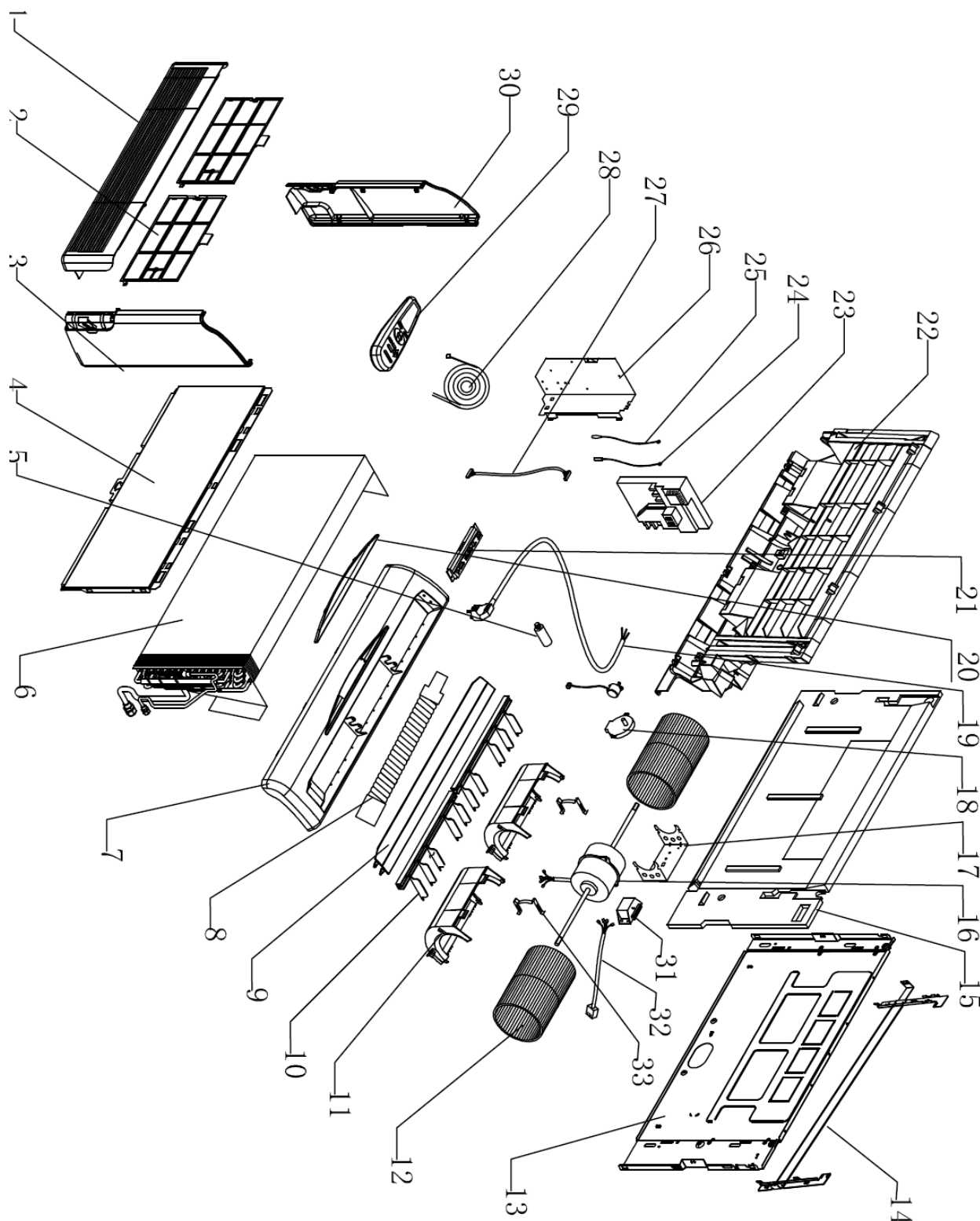
14.3 Exploded view of Indoor unit: HAD 60 DCI



14.4 Spare part list of Indoor unit: HAD 60 DCI

NO.	PN	Name	Qua.
1	465720378	Front panel Assy./ HAD&HAF18/24 Black flat panel ,Airwell	1
1	465720379	Front panel Assy./ HAD&HAF18/24 Black flat panel,electra	1
1	465720381	Front panel Assy./ HAD&HAF18/24 Black flat panel,Johnson	1
1	465720382	Front panel Assy./ HAD&HAF18/24 Silver-white flat	1
1	465720383	Front panel Assy./ HAD&HAF18/24 Silver-white flat	1
1	465720385	Front panel Assy./ HAD&HAF18/24 Silver-white flat	1
1	465720702	Front panel Assy./ HAD18/24,Silver,Equation	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	465800111	Air Outlet Frame Assy./Assemble New Ionizer Bi-polar	1
8	465210009	Drain Pipe for Europe / WNG18/24/30	1
9	465160023	Horizontal flap A/Glossy/LEX 50 DCI (VIESSMANN)	1
9	465160024	Horizontal flap B/Semi-Glossy/LEX 50 DCI (VIESSMANN)	1
10	465160016	Vertical Flap A /LEX50 DCI (Viessmann)	12
10	465160017	Vertical Flap B /LEX50 DCI (Viessmann)	2
11	4518662	Bearing assy fan	1
12	453024900	Impeller fan	1
13	465700011	Unit Housing Assy./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
19	455013707R	Power Cord Without Plug/3G/2.5/2100	1
20	453232000	Clip /Power cord	1
21	467300228R	Display Board / HAD	1
22	452919100	Support/sensor	1
22	4516263	SENSOR BASE	1
23	467300258R	Controller / DCI IDU HAD 18	1
24	467400053	ICT Indoor Coil Temperature (RT2) sensor \varnothing 6	1
25	467400025	(650mm) Indoor Air Inlet Temperature Sensor	1
26	465340051	Terminal Cover /ABS/ LEX50 DCI (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	467480009	Ionizer/Bi-Polar	1
40	465360039	Support/Bi Polar Ionizer/LEX 7/9/12/18	1
40	465340049	Cover/Bi Polar Ionizer/LEX&HAD 50 DCI (Viessmann)	1
41	465160008	Air Inlet Frame A Assy/Lex-18	1
42	465340045	Cover/Front Frame/ LEX 50 DCI (Viessmann)	2

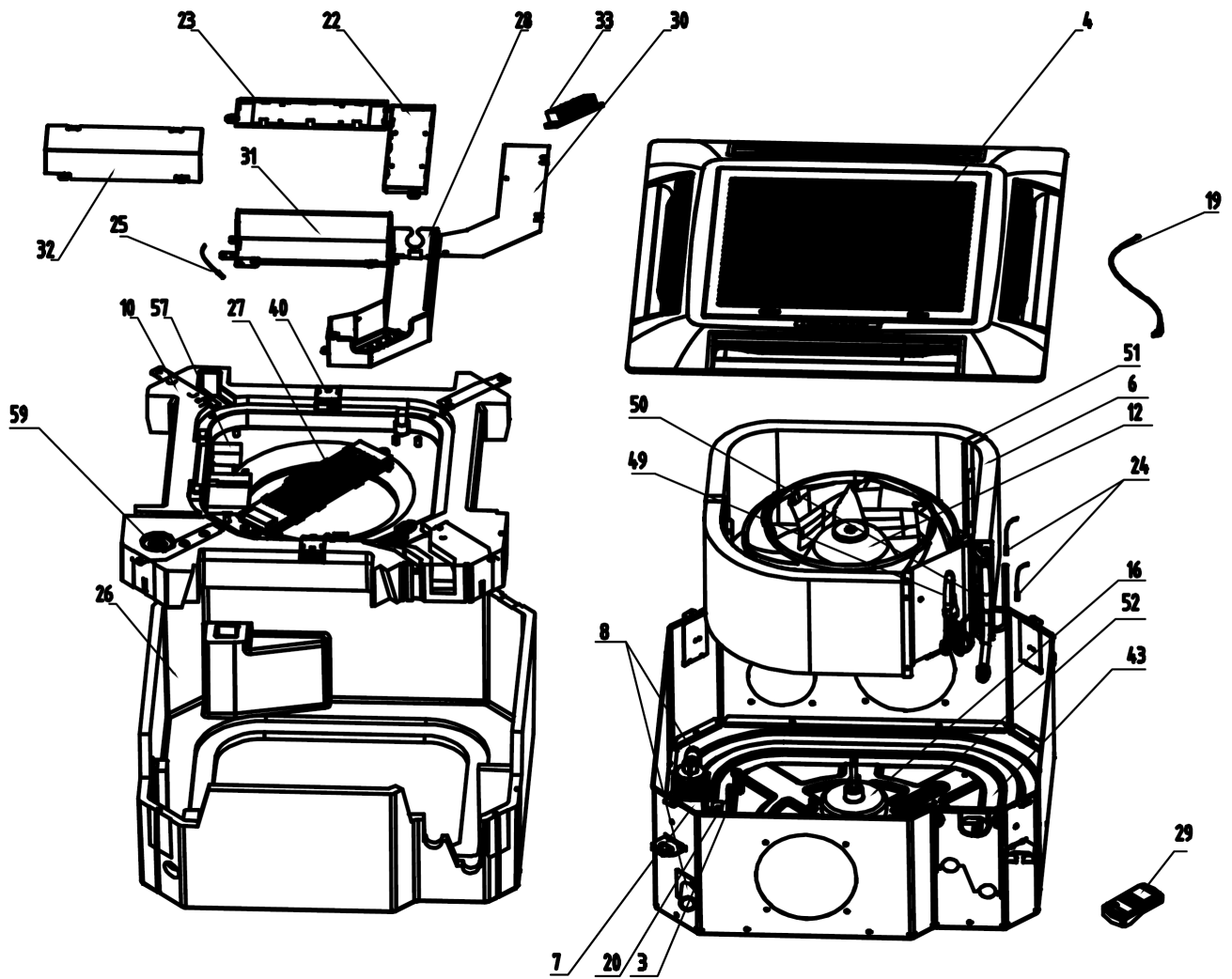
14.5 Exploded view of Indoor unit: PXD 60 DCI

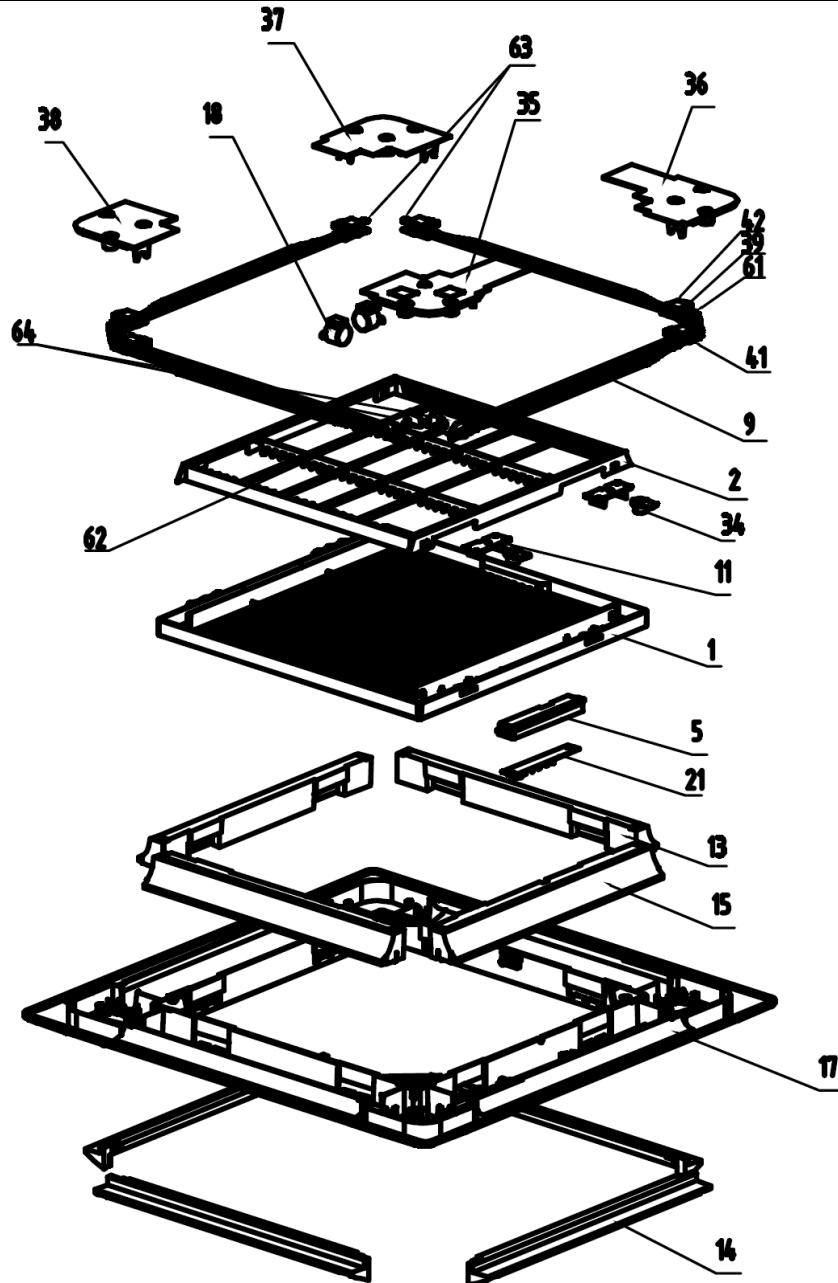


14.6 Spare part list of Indoor unit: PXD 60 DCI

No	PN.	Name	Qua.
1	465800148	Air Intake Grille Assy.	1
2	221554	Air Filter	2
3	465060005	Right panel	1
4	465020283	Frame Assy/Front panel	1
5	455000602	Capacitor	1
6	4527244	Evaporator PXD18 R410A	1
7	465800147	Air Outlet Assy	1
8	285032	Draining Hose	1
9	465160059	Horizontal louver front	1
9	465160060	Horizontal louver back	1
10	465160057	Vertical Flap	16
	465160058	Linkage/ Veritcal Flap	3
11	372340	Fan cover	2
12	293322	Fan	2
13	307980	Back panel	1
14	466236	Installation Plate	1
15	382333	Base panel EPS	1
16	4520931R	Motor	1
17	323422	Motor support	1
18	436665	Step Motor	1
18	263034	Swing motor	1
19	455013707R	Power Wire	1
20	465020290	Display panel	1
21	234213R	Display	1
22	464101	Fan frame	1
23	452935900R	Control Box Assy/STORM	1
24	467400053	Thermistor indoor coil	1
25	467400025	Thermistor Room	1
26	311036	Storm panel	1
27	391508	Display Connect wire	1
29	467240023	Remote control	1
30	465060004	Left panel	1
31	4520934	Transformer	1
32	4525333	Motor connect wire	1
33	324296	Spring clip	2

14.7 Exploded view of Indoor unit: CN 60 DCI

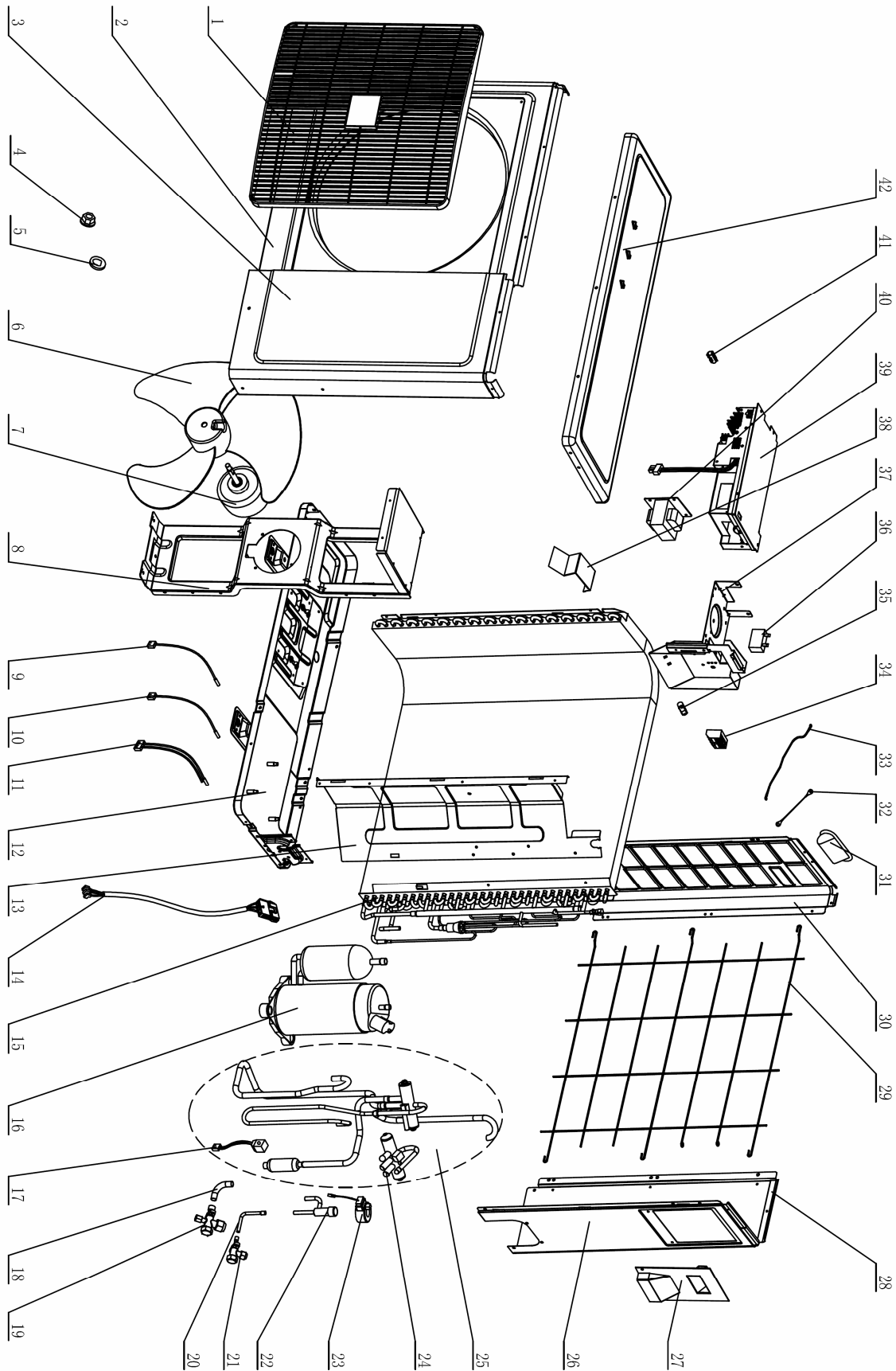




14.8 Spare part list of Indoor unit: CN 60 DCI

NO	PN	Name	Qua.
1	453189500	Grille	1
2	453189900	Filter Assy.	1
3	453192700	Water-Level Switch	1
4	465720163	Front Plate Assy. 625x625	1
4	465720169	Front Plate Assy. 725x725 ION/CN Airwell	1
5	465080003	Display Cover	1
6	462350077	Evaporator Assy./CN DCI 50/60 R410A	1
7	453192600	Pump CN	1
8	465800084	Drain Pipe Assy/CN.	1
9	453189700	Horizontal Flap	4
10	453191300	Drain pan Assy	1
11	465360021	Support/Grill Clasp	2
12	453189300	Centrifugal Fan (High)CN60X60	1
13	453191600	EPS 1 / Front Frame	3
14	453191700	EPS 2 / Front Frame	4
14	470250017	EPS /Air outlet/Front Frame	4
15	470250004	EPS 3/Front Frame	1
16	466130009R	DC Motor 67w(SIC-72FV-F167-1)/CN	1
17	465020104	Front Frame (625x625)	1
17	465020105	Front Frame (725x725) (Airwell)/CN	1
18	433050	Step Motor	2
19	453232400R	Power Cord Without Plug/ EU	1
20	464250066	Fixing Plate/Pump Assy.	1
21	467300128R	Display Board/CN	1
22	467300122R	Filter Board/CN DCI	1
23	467300121R	Control Board/CN DCI	1
24	467400078	Condenser Coil Temperature Sensor(OCT) ϕ 6/XHP-2/Blue	1
24	467400069	ICT Indoor Coil Temperature (RT2) sensor/10K/Copper ϕ 6	1
25	4519813	Thermistor room	1
26	453191800	EPS/Air Housing (high)	1
27	453193600	ESF(option)	1
28	464750006	control Box assy1	1
29	467240025	Remote controller Assy.with batteries. RC-7i-1 467200037R	1
30	464750003	Cover/Controll Box 1	1
31	464750002	Controll Box 2/CN	1
32	464750004	Cover/Controll Box 2	1
33	467420016	7 Poles Terminal Block	1
34	453189600	Grille Clasp	2
35	465340022	Cover1 /Front Plate	1
36	453190600	Cover2 /Front Plate	1
37	465340040	Cover3 /Front Plate	1
38	465080002	Cover4 /Front Plate	1
39	465800089	Support 1/lever Assy/CN	4
40	453193500	Ionizer(option)	1
41	465800090	Support 2/lever Assy/CN	4
42	465360028	Orienting Support/Lever	6
43	464000020	Base Plate Assy./CN DCI	1
49	463750124	Liquid Pipe Assy. /6.35	1
50	463750120	Gas Pipe Assy./12.7	1
51	453188400	Fixing Plate/Evaporator (high)	2
52	470100003	Cushion Rubber	3
57	453190900	Air Intake Panel (high)	1
59	453195100	Drain Jam	1
61	465800091	Linkage Assy./Flap/CN	2
62	465440018	connect Shaft/Motor	2
63	453190000	Linkage /Flap	2
64	465360022	Support/Step Motor	1
64	465360032	Support/Step Moter 2	1

14.9 Exploded view of Outdoor unit: YBD 022



14.10 Spare part list of Outdoor unit: YBD 022

No	PN	Description	Quantity
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 Basket	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

APPENDIX