ELECTRA

Service Manual

CN DC Inverter Series

Indoor Units	Outdoor Units
CN 25 DCI	DCI 25
CN 35 DCI	DCI 35
CN 50 DCI	DCI 50
CN 60 DCI	DCI 60
CN 70 DCI	DCI 72Z

REFRIGERANT **R410A**

HEAT PUMP

SM CN 1-E.1 GB

AUGUST – 2008

CONTENT

LIST OF EFFECTIVE PAGES

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

Dates of issue for original and changed pages are:

Original ..... 0 ..... December 2007

Total number of pages in this publication is 111 consisting of the following:

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

- Zero in this column indicates an original page.

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

Table of Contents

1. INTRODUCTION

1.1 General

The **CN DCI Inverter Cassette** type split air conditioner range comprise RC (heat pump) models, as follows:

- **CN 25**
- **CN 35**
- **CN 50**
- **CN 60**
- **CN 70**

1.2 Main Features

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

- DC inverter technology.
- R410A refrigerant.
- High COP.
- Precharged refrigerant.
- Low Sound level for both Indoor and Outdoor.
- 60 x60 cm dimension designed for integration in suspended ceilings.
- DC Brushless fan motor.
- New grille, modern style with elegant lines in line with every interior decor , 2 panels optional available (hard ceiling / Suspended ceiling).
- Motorized air distribution flaps.
- Very slim profile 219 mm at size 9-12, and 270 mm at size 18-24.
- Option of fresh air intake, and air distribution to adjacent room.
- Integrated condensate pump with a lift of 1 m Max.
- Connection to Multisplit outdoor units.
- Up to 30 m pipe length between indoor and outdoor units.
- Up to 15 m vertical high between indoor and outdoor units.
- Cooling operation at outdoor temperature down to -10°C.
- Heating operation at outdoor temperature down to -15°C.
- Built in over-flow protection against the condensate water.
- Easy installation and service.
- Product can have the option of additional function of Ionizer and ESF.
- Fan speed can be adjusted by compensation on PCB according to different installation height (Field option).

1.3 Indoor Unit

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

It includes:

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

1.4 Filtration

The **CN** series presents several types of air filters:

- Easily accessible, and re-usable pre-filters.
- Easily Static Filter (Field Option).

1.5 Control

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

1.6 Outdoor Unit

The **CN** outdoor units can be installed as floor or wall mounted units by using a wall supporting braCNet. 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:

  Single Rotary – for **DCI 25** and **DCI 35.**

  Scroll – for **DCI 50** and **DCI 60.**

  Twin Rotary – for **DCI 72Z.**

- Axial fan.
- Outdoor coil with hydrophilic louver fins for RC units.
- Outlet air fan grill.
- Service valves" flare" type connection.
- Interconnecting wiring terminal bloCN.

1.7 Tubing Connections

Flare type interconnecting tubing to be produced on site.
For further details please refer to the Installation Manual, Chapter 10.

1.8 Accessories

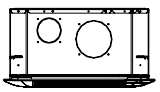
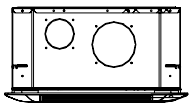
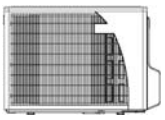
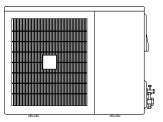
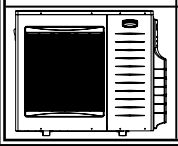
Remote Control.
Panel 625x625 for gird ceiling.
Panel 725x725 for hard ceiling.
ESF & Ionizer kit.

1.9 Inbox Documentation

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

1.10 Matching Table

1.10.1 R410A

OUTDOOR UNITS			INDOOR UNITS				
							
MODEL		REFRIGER.	CN 25	CN 35	CN 50	CN 60	CN 70
	DCI25/35/50	R410A	√	√	√		
	DCI 60	R410A				√	
	DCI 72Z	R410A					√

The above table lists outdoor units and PXD DCI indoor units which can be matched together.
In addition the listed outdoor units can be matched with other types of indoor units such as cassettes and wall mounted.
For further information please refer to the relevant Service Manual.

2. PRODUCT DATA SHEET

2.1 CN 25 DCI R410A

Model Indoor Unit					**CN25 DCI**	
Model Outdoor Unit					**DCI 25 R410A**	
Installation Method of Pipe					Flared	
Characteristics				**Units**	**Cooling**	**Heating**
Capacity (4)				Btu/hr	8550(5100-12300)	10900(5100-16400)
				kW	2.5(1.5-3.6)	3.2(1.5-4.8)
Power input (4)				kW	0.59(0.45-1.00)	0.8(0.50-1.40)
EER (Cooling) or COP(Heating) (4)				W/W	4.24	4.00
Energy efficiency class					A	A
Power supply				V/Ph/Hz	220-240V/Single/50Hz	
Rated current				A	2.6	3.6
Starting current				A	10.5	
Circuit breaker rating				A	15	
INDOOR	Fan type & quantity				Centrifugal x 1	
	Fan speeds	H/M/L		RPM	550/450/350	600/500/400
	Air flow (1)	H/M/L		m3/hr	440	460
	External static pressure	Min-Max		Pa	0	
	Sound power level (2)	H/M/L		dB(A)	49	49
	Sound pressure level (3)	H/M/L		dB(A)	32/26	32/26
	Moisture removal			l/hr	0.7	
	Condensate drain tube I.D			mm	20	
	Dimensions	WxHxD		mm	575X575X219	
	Weight			kg	13(2.2/2.8)	
	PaCNage dimensions	WxHxD		mm	681X681X297	
	PaCNaged weight			kg	15	
	Units per pallet			units	12	
	StaCNing height			units	6 levels	
OUTDOOR	Refrigerant control				Electronical Expansion Valve	
	Compressor type, model				Single Rotary DC Inverter, Panasonic 5RS102XAB	
	Fan type & quantity				Propeller x 1	
	Fan speeds	H/L		RPM	830	
	Air flow	H/L		m3/hr	1780	
	Sound power level	H/L		dB(A)	60	61
	Sound pressure level (3)	H/L		dB(A)	50	51
	Dimensions	WxHxD		mm	795*290*610	
	Weight			kg	38	
	PaCNage dimensions	WxHxD		mm	945*395*655	
	PaCNaged weight			kg	42	
	Units per pallet			Units	9	
	StaCNing height			units	3 levels	
	Refrigerant type				R410A	
	Refrigerant chargless distance			kg/m	1.1kg/7.5m	
	Additional charge			g/m	No need	
	Connections between units	Liquid line		In.(mm)	1/4"(6.35)	
		Suction line		In.(mm)	3/8"(9.53)	
		Max.tubing length		m.	Max.25	
		Max.height difference		m.	Max.10	
Operation control type					Remote control	
Heating elements				kW	NA	

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

2.2 CN 35 DCI R410A

Model Indoor Unit					**CN35 DCI**	
Model Outdoor Unit					**DCI 35 R410A**	
Installation Method of Pipe					Flared	
Characteristics				**Units**	**Cooling**	**Heating**
Capacity (4)				Btu/hr	11950(5800-14700)	14350(5450-18800)
				kW	3.5(1.7-4.3)	4.2(1.6-5.5)
Power input (4)				kW	0.96(0.50-1.30)	1.16(0.59-1.70)
EER (Cooling) or COP(Heating) (4)				W/W	3.63	3.64
Energy efficiency class					A	A
Power supply				V/Ph/Hz	220-240V/Single/50Hz	
Rated current				A	4.3	5.2
Starting current				A	10.5	
Circuit breaker rating				A	15	
INDOOR	Fan type & quantity				Centrifugal x 1	
	Fan speeds		H/M/L	RPM	600/500/400	650/550/450
	Air flow (1)		H/M/L	m3/hr	490	520
	External static pressure		Min-Max	Pa	0	
	Sound power level (2)		H/M/L	dB(A)	51	51
	Sound pressure level (3)		H/M/L	dB(A)	34/28	34/28
	Moisture removal			l/hr	1.38	
	Condensate drain tube I.D			mm	20	
	Dimensions		WxHxD	mm	575X575X219	
	Weight			kg	13	
	PaCNage dimensions		WxHxD	mm	681X681X297	
	PaCNaged weight			kg	15	
	Units per pallet			units	12	
	StaCNing height			units	6 levels	
OUTDOOR	Refrigerant control				Electronical Expansion Valve	
	Compressor type, model				Single Rotary DC Inverter, Panasonic 5RS102XAB	
	Fan type & quantity				Propeller x 1	
	Fan speeds		H/L	RPM	830	
	Air flow		H/L	m3/hr	1780	
	Sound power level		H/L	dB(A)	62	62
	Sound pressure level (3)		H/L	dB(A)	52	52
	Dimensions		WxHxD	mm	795*290*610	
	Weight			kg	38.5	
	PaCNage dimensions		WxHxD	mm	945*395*655	
	PaCNaged weight			kg	42.5	
	Units per pallet			Units	9	
	StaCNing height			units	3 levels	
	Refrigerant type				R410A	
	Refrigerant chargless distance			kg/m	1.2kg/7.5m	
	Additional charge			g/m	No need	
	Connections between units	Liquid line		In.(mm)	1/4"(6.35)	
		Suction line		In.(mm)	3/8"(9.53)	
		Max.tubing length		m.	Max.25	
		Max.height difference		m.	Max.10	
Operation control type					Remote control	
Heating elements				kW	NA	

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

2.3 CN 50 DCI R410A

Model Indoor Unit					**CN-50 DCI**	
Model Outdoor Unit					**DCI 50 R410A**	
Installation Method of Pipe					Flared	
Characteristics				**Units**	**Cooling**	**Heating**
Capacity (4)				Btu/hr	17050(4450-20500)	19100(4450-23900)
				kW	5.0(1.3-6.0)	5.6(1.3-7.0)
Power input (4)				kW	1.56(0.46-2.11)	1.55(0.36-2.50)
EER (Cooling) or COP(Heating) (4)				W/W	3.22	3.62
Energy efficiency class					A	A
Power supply				V/Ph/Hz	220-240V/Single/50Hz	
Rated current				A	7.0	7.2
Starting current				A	10.5	
Circuit breaker rating				A	20	
INDOOR	Fan type & quantity				Centrifugal x 1	
	Fan speeds		H/M/L	RPM	750/650/550	750/650/550
	Air flow (1)		H/M/L	m3/hr	700	700
	External static pressure		Min-Max	Pa	0	
	Sound power level (2)		H/M/L	dB(A)	53	53
	Sound pressure level (3)		H/M/L	dB(A)	38/30	38/30
	Moisture removal			l/hr	2.07	
	Condenstate drain tube I.D			mm	20	
	Dimensions		WxHxD	mm	575*575*270	
	Weight			kg	???	
	PaCNage dimensions		WxHxD	mm	575X575X270	
	PaCNaged weight			kg	15.2	
	Units per pallet			units	681X681X348	
	StaCNing height			units	17.7	
OUTDOOR	Refrigerant control				Electronical Expansion Valve	
	Compressor type,model				Single Rotary DC Inverter,Panasonic 5RS130XCC03	
	Fan type & quantity				Propeller x 1	
	Fan speeds		H/L	RPM	920	
	Air flow		H/L	m3/hr	2160	
	Sound power level		H/L	dB(A)	62	63
	Sound pressure level (3)		H/L	dB(A)	52	53
	Dimensions		WxHxD	mm	795*290*610	
	Weight			kg	39	
	PaCNage dimensions		WxHxD	mm	945*395*655	
	PaCNaged weight			kg	43	
	Units per pallet			Units	9	
	StaCNing height			units	3 levels	
	Refrigerant type				R410A	
	Refrigerant chargless distance			kg/m	1.5kg/7.5m	
	Additional charge			g/m	No need	
	Connections between units	Liquid line		In.(mm)	1/4"(6.35)	
		Suction line		In.(mm)	**1/2"(12.7)**	
		Max.tubing length		m.	Max.30	
		Max.height difference		m.	Max.10	
Operation control type					Remote control	
Heating elements				kW		

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

2.4 CN 60 DCI R410A

Model Indoor Unit					**CN 60 DCI**	
Model Outdoor Unit					**DCI 60 R410A**	
Installation Method of Pipe					Flared	
Characteristics				**Units**	**Cooling**	**Heating**
Capacity (4)				Btu/hr	19800(4800~22200)	23200(6800~27300)
				kW	5.8(1.4-6.5)	6.8(2.0~8.0)
Power input (4)				kW	1.92(0.44-2.20)	2.11(0.52~2.60)
EER (Cooling) or COP(Heating) (4)				W/W	3.02	3.22
Energy efficiency class					B	C
Power supply				V/Ph/Hz	220-240V/Single/50Hz	
Rated current				A	8.6	9.5
Starting current				A	15	
Circuit breaker rating				A	20	
INDOOR	Fan type & quantity				Centrifugal x 1	
	Fan speeds		H/M/L	RPM	800/7100/600	800/700/600
	Air flow (1)		H/M/L	m3/hr	800	800
	External static pressure		Min-Max	Pa	0	
	Sound power level (2)		H/M/L	dB(A)	58	58
	Sound pressure level (3)		H/M/L	dB(A)	41/33	41/33
	Moisture removal			l/hr	2.62	
	Condenstate drain tube I.D			mm	20	
	Dimensions		WxHxD	mm	575X575X270	
	Weight			kg	15.2	
	PaCNage dimensions		WxHxD	mm	681X681X348	
	PaCNaged weight			kg	17.7	
	Units per pallet			units	12	
	StaCNing height			units	6 levels	
OUTDOOR	Refrigerant control				EEV	
	Compressor type,model				E-Scroll MATSUSHITA 5CS130XCC03	
	Fan type & quantity				Propeller(direct) x 1	
	Fan speeds		H/L	RPM	820	
	Air flow		H/L	m3/hr	2860	
	Sound power level		H/L	dB(A)	65	
	Sound pressure level (3)		H/L	dB(A)	55	
	Dimensions		WxHxD	mm	846x690x302	
	Weight			kg	46	
	PaCNage dimensions		WxHxD	mm	990x770x430	
	PaCNaged weight			kg	50	
	Units per pallet			Units	9	
	StaCNing height			units	3 levels	
	Refrigerant type				R410A	
	Refrigerant chargless distance			kg/m	1.65kg/7.5m	
	Additional charge per 1 meter			g/m	No Need	
	Connections between units	Liquid line		In.(mm)	1/4"(6.35)	
		Suction line		In.(mm)	1/2"(12.7)	
		Max.tubing length		m.	Max.30	
		Max.height difference		m.	Max.15	
Operation control type					Remote control	
Heating elements (Option)				kW		

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

2.5 CN 72(Z) DCI R410A

Model Indoor Unit				**CN70 DCI**	
Model Outdoor Unit				**DCI 72Z R410A**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (4)			Btu/hr	23200(5110~25570)	24890(5110~28640)
			kW	6.8(1.5-8.0)	7.3(1.5~9.0)
Power input (4)			kW	2.41(0.5-2.65)	2.27(0.5~2.92)
EER (Cooling) or COP(Heating) (4)			W/W	2.82	3.22
Energy efficiency class				C	C
Power supply			V/Ph/Hz	220-240V/Single/50Hz	
Rated current			A	10.8	10.2
Starting current			A	15	
Circuit breaker rating			A	20	
INDOOR	Fan type & quantity			Centifugal x 1	
	Fan speeds	H/M/L	RPM	850/750/650	850/750/650
	Air flow (1)	H/M/L	m3/hr	830	830
	External static pressure	Min-Max	Pa	0	
	Sound power level (2)	H/M/L	dB(A)	60	60
	Sound pressure level (3)	H/M/L	dB(A)	43/35	43/35
	Moisture removal		l/hr	2.66	
	Condenstate drain tube I.D		mm	20	
	Dimensions	WxDxH	mm	575X575X270	
	Weight(		kg	15.5	
	PaCNage dimensions	WxDxH	mm	681X681X348	
	PaCNaged weight		kg	18	
	Units per pallet		units	12	
	StaCNing height		units	6 levels	
OUTDOOR	Refrigerant control			EEV	
	Compressor type,model			Two Rotary,Mitsubishi TNB220F	
	Fan type & quantity			Propeller(direct) x 1	
	Fan speeds	H/L	RPM	850	
	Air flow	H/L	m3/hr	3350	
	Sound power level	H/L	dB(A)	65	
	Sound pressure level (3)	H/L	dB(A)	55	
	Dimensions	WxHxD	mm	950x412x835	
	Weight		kg	65	
	PaCNage dimensions	WxHxD	mm	1080x477x910	
	PaCNaged weight		kg	70	
	Units per pallet		Units	9	
	StaCNing height		units	3 levels	
	Refrigerant type			R410A	
	Refrigerant chargless distance		kg/m	2.045kg/7.5m	
	Additional charge per 1 meter		g/m	No Need	
	Connections between units	Liquid line	In.(mm)	3/8"(9.53)	
		Suction line	In.(mm)	5/8"(15.88)	
		Max.tubing length	m.	Max.30	
		Max.height difference	m.	Max.15	
Operation control type				Remote control	
Heating elements (Option)			kW		

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

2.6 Optional accessory

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

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

3. RATING CONDITIONS

Standard conditions in accordance with ISO 5151, ISO 13253 (for ducted units) and EN 14511.

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

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

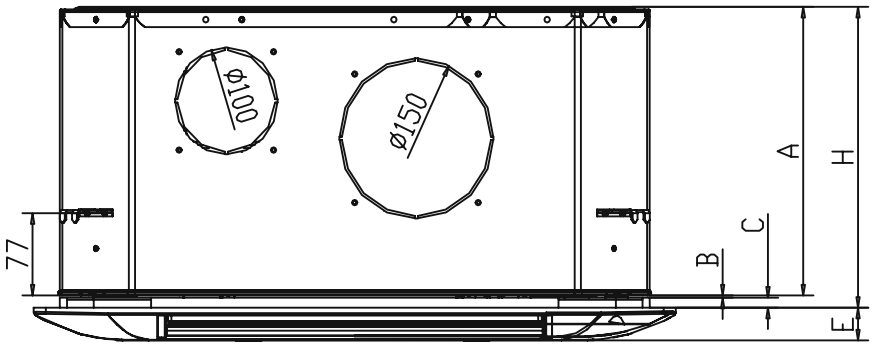
3.1 Operating Limits

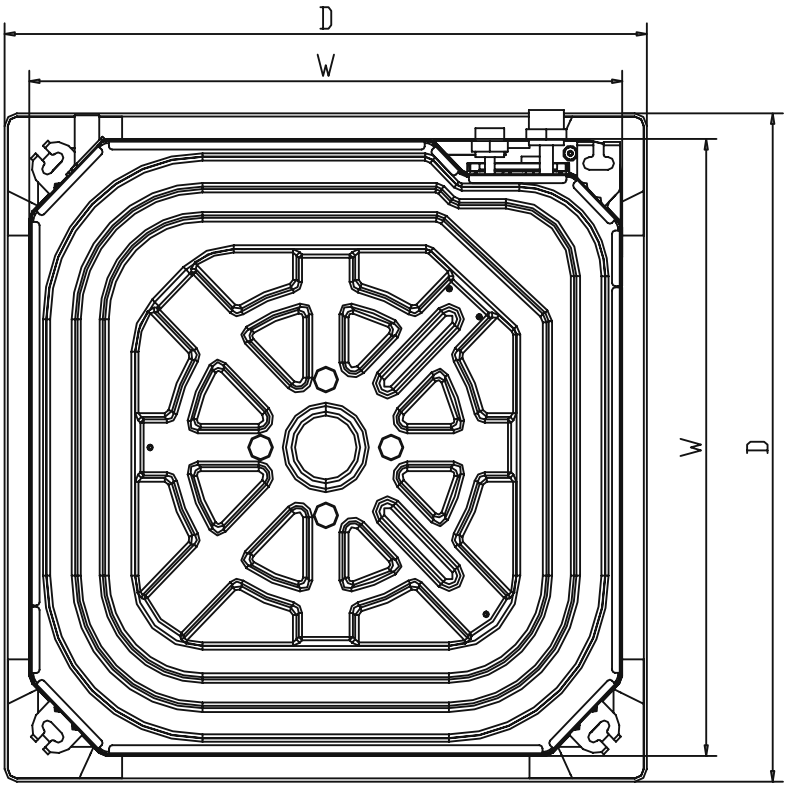
R410A DCI (Excluding Delta Units)

		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	1PH	198 – 264 V	
	3PH	N/A	

4. OUTLINE DIMENSIONS

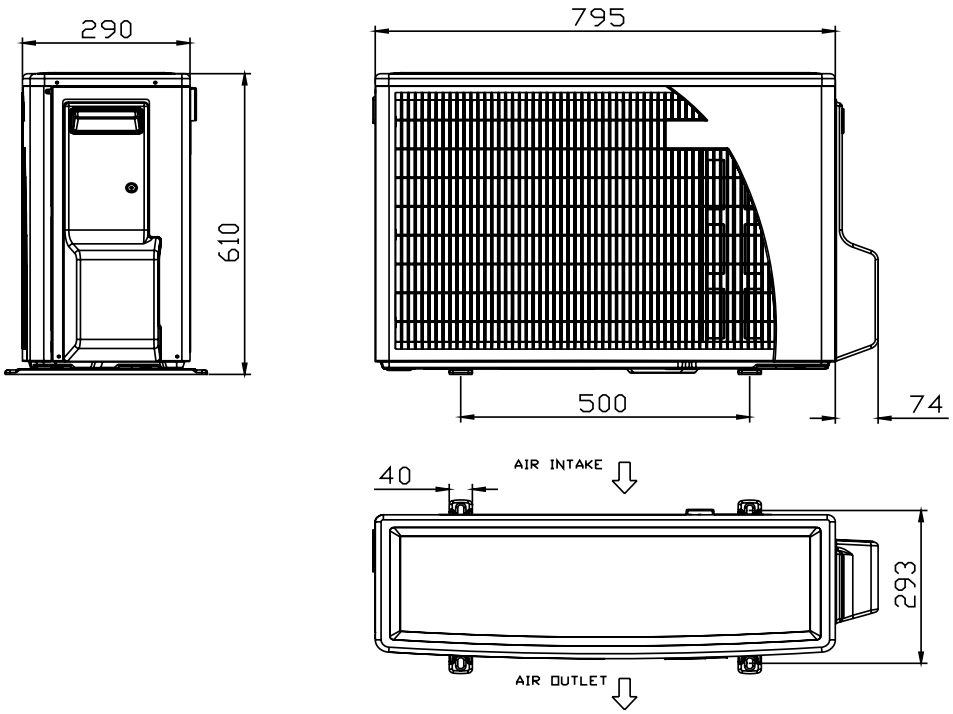
4.1 Indoor Unit: CN 25, 35, 50, 60, 70 R410A DCI



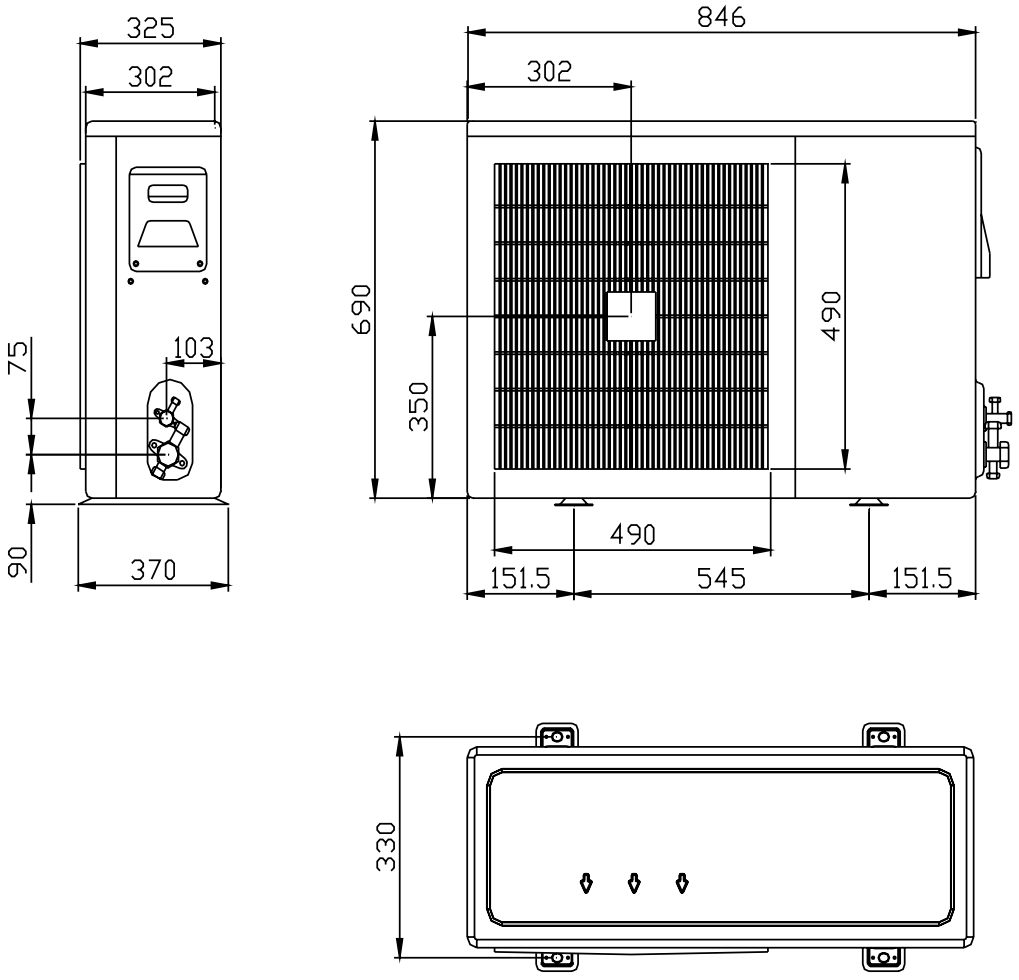


Unit Model	Main unit (A)	Insulation (B)	Front Step (C)	Front width (D)	Front height (E)	Unit Body Width (W)	Effective Height (H)
25/35	219	2	9	625/725	40	575	230
50/60/70	270	2	9	625/725	40	575	281

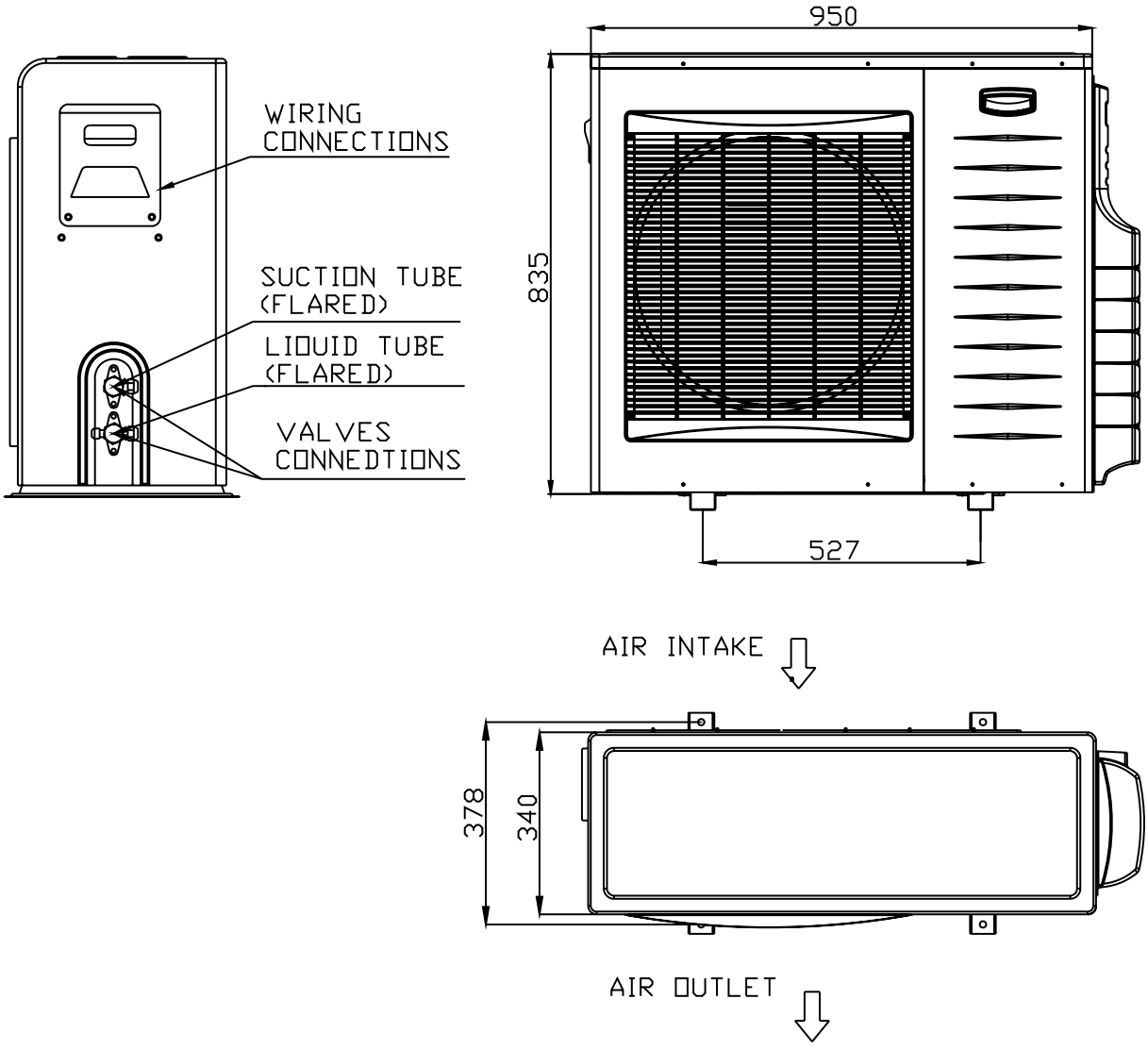
4.2 Outdoor Unit: DCI 50



4.3 Outdoor Unit: DCI 60



4.4 Outdoor Unit: DCI 72Z



5. PERFORMANCE DATA

5,1 CN 25 DCI

5.1.1 Cooling Capacity (kW) – Run Mode

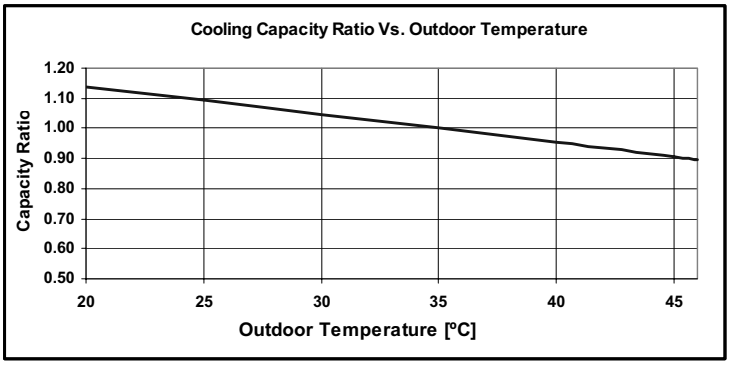
[230V] : Indoor Fan at High Speed.

		ID COIL ENTERING AIR DB/WB TEMPERATURE [C°]				
OD COIL ENTERING AIR DB TEMPERATURE [°C]	DATA	22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	2.42	2.57	2.73	2.89	3.05
	SC	1.72	1.75	1.79	1.82	1.86
	PI	0.46	0.47	0.48	0.49	0.50
30	TC	2.30	2.46	2.62	2.77	2.93
	SC	1.67	1.71	1.74	1.78	1.81
	PI	0.52	0.53	0.54	0.54	0.55
35	TC	2.18	2.34	2.50	2.66	2.82
	SC	1.63	1.66	1.70	1.74	1.77
	PI	0.57	0.58	0.59	0.60	0.61
40	TC	2.07	2.23	2.38	2.54	2.70
	SC	1.59	1.62	1.66	1.69	1.73
	PI	0.63	0.64	0.64	0.65	0.66
46	TC	1.93	2.09	2.24	2.40	2.56
	SC	1.53	1.57	1.60	1.64	1.67
	PI	0.69	0.70	0.71	0.72	0.73

LEGEND

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

5.1.2 Capacity Correction Factors



5.1.3 Heating Capacity (kW) - Run Mode

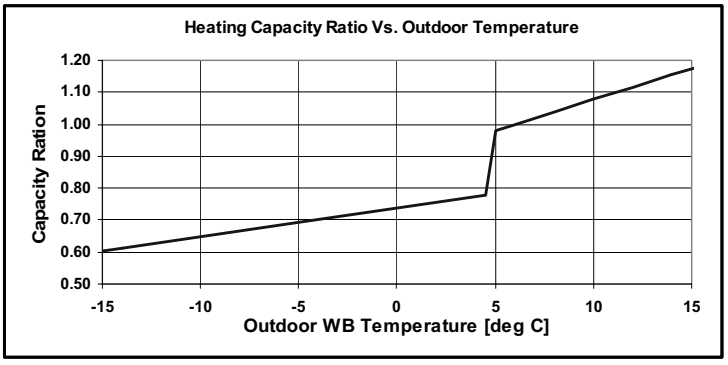
[230V] : Indoor Fan at High Speed.

		ID COIL ENTERING AIR DB TEMPERATURE [C^0]		
OD COIL ENTERING AIR DB/WB TEMPERATURE [^{0}C]	**DATA**	**15**	**20**	**25**
-15/-16	TC	2.04	1.89	1.75
	PI	0.48	0.53	0.58
-10/-12	TC	2.27	2.12	1.98
	PI	0.58	0.63	0.68
-7/-8	TC	2.44	2.30	2.16
	PI	0.65	0.70	0.75
-1/-2	TC	2.53	2.38	2.24
	PI	0.69	0.74	0.79
2/1	TC	2.58	2.44	2.30
	PI	0.71	0.76	0.81
7/6	TC	3.34	3.20	3.06
	PI	0.75	0.80	0.85
10/9	TC	3.53	3.38	3.24
	PI	0.80	0.84	0.89
15/12	TC	3.71	3.57	3.43
	PI	0.84	0.89	0.94
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

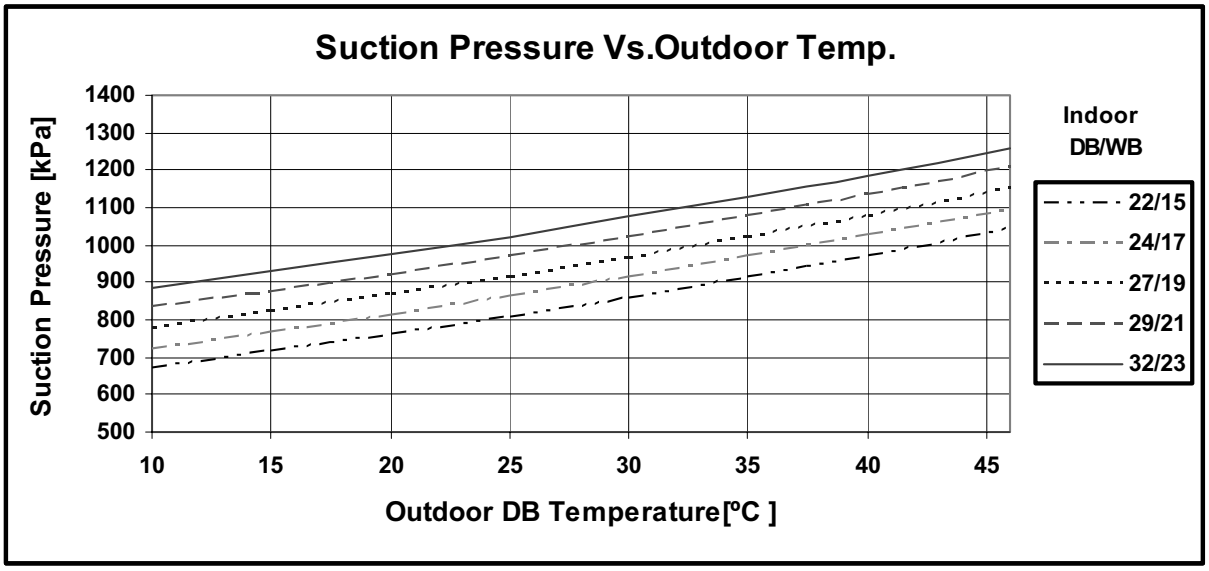
LEGEND

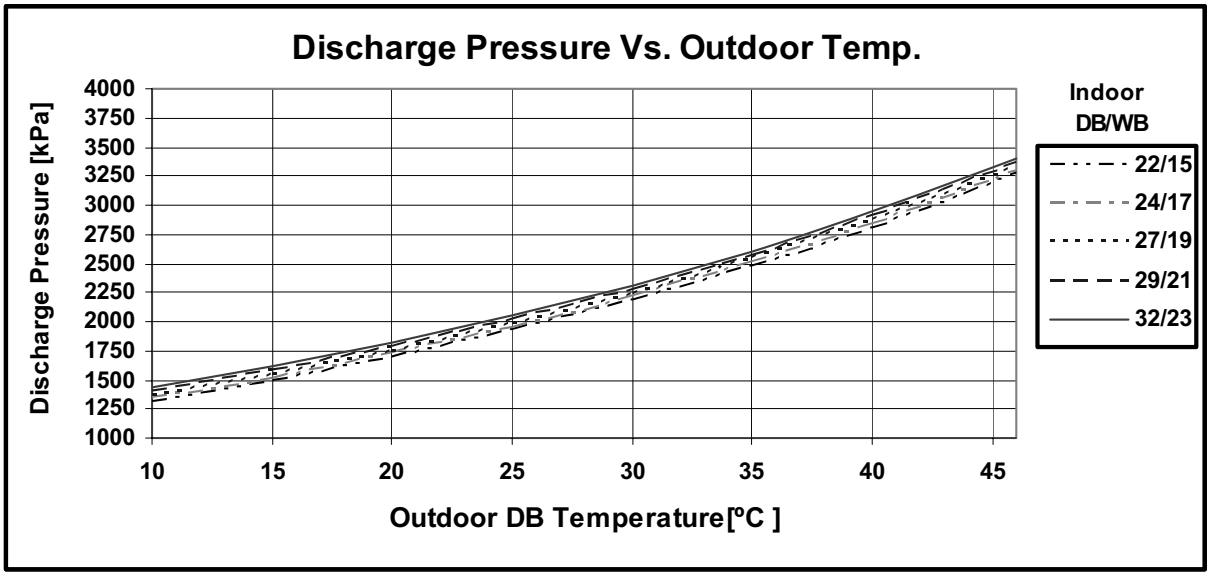
TC – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (^{o}C)
DB – Dry Bulb Temp., (^{o}C)
ID – Indoor
OU – Outdoor

5.1.4 Capacity Correction Factors

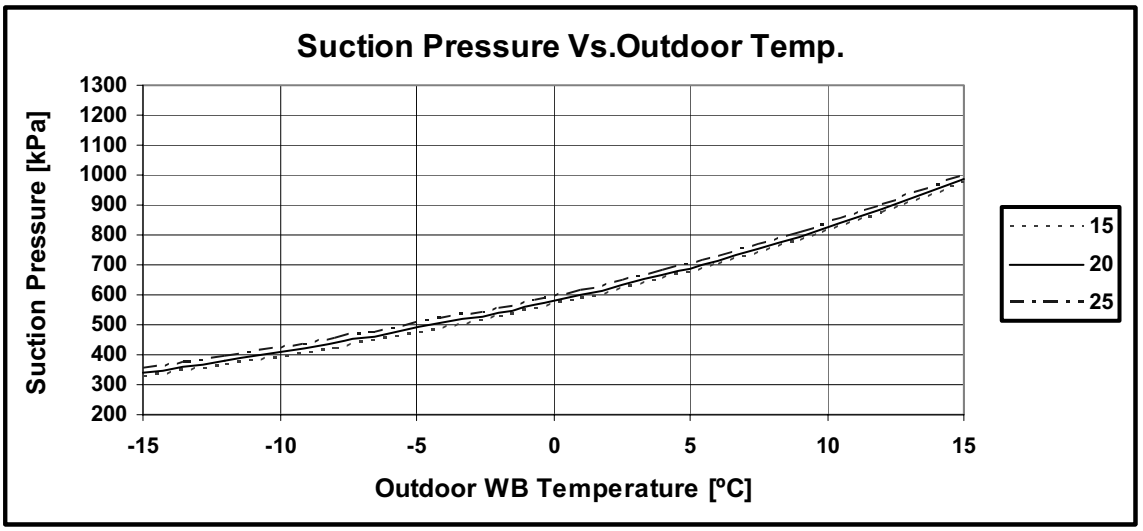


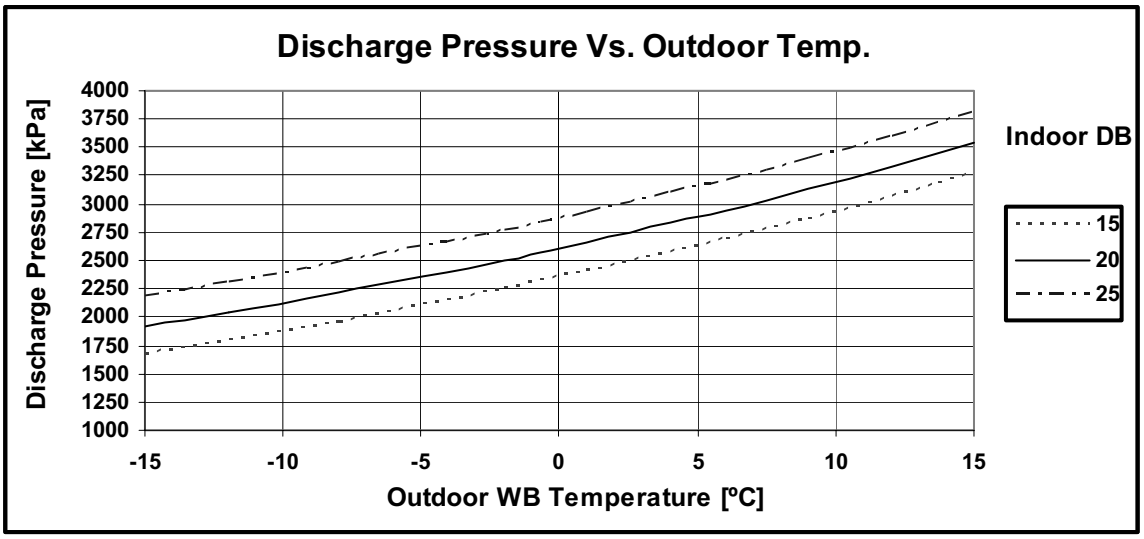
5.1.5 Model: CN 25 DCI Cooling - Test Mode





5.1.6 Heating - Test Mode





5.2 CN 35 DCI

5.2.1 Cooling Capacity (kW) - Run Mode

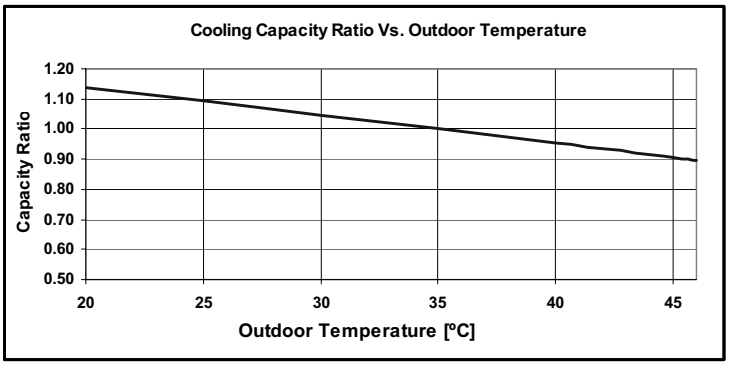
[230V] : Indoor Fan at High Speed.

OD COIL ENTERING AIR DB TEMPERATURE [^{0}C]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [C^0]				
		22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	3.38	3.60	3.83	4.05	4.27
	SC	2.40	2.45	2.50	2.55	2.60
	PI	0.75	0.77	0.78	0.80	0.81
30	TC	3.22	3.44	3.66	3.88	4.11
	SC	2.34	2.39	2.44	2.49	2.54
	PI	0.84	0.86	0.87	0.89	0.90
35	TC	3.06	3.28	3.50	3.72	3.94
	SC	2.28	2.33	2.38	2.43	2.48
	PI	0.93	0.95	0.96	0.97	0.99
40	TC	2.89	3.12	3.34	3.56	3.78
	SC	2.22	2.27	2.32	2.37	2.42
	PI	1.02	1.03	1.05	1.06	1.08
46	TC	2.70	2.92	3.14	3.36	3.58
	SC	2.15	2.20	2.25	2.30	2.34
	PI	1.13	1.14	1.15	1.17	1.18

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 Factor



5.2.3 Heating Capacity (kW) - Run Mode

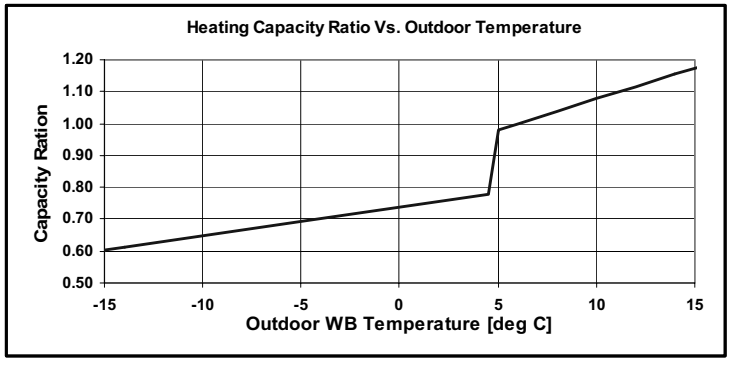
[230V] : Indoor Fan at High Speed.

		ID COIL ENTERING AIR DB TEMPERATURE [C^0]		
OD COIL ENTERING AIR DB/WB TEMPERATURE [^{0}C]	**DATA**	**15**	**20**	**25**
-15/-16	TC	2.67	2.49	2.30
	PI	0.70	0.77	0.84
-10/-12	TC	2.98	2.79	2.60
	PI	0.84	0.91	0.98
-7/-8	TC	3.20	3.02	2.83
	PI	0.95	1.02	1.09
-1/-2	TC	3.32	3.13	2.94
	PI	1.00	1.07	1.14
2/1	TC	3.39	3.20	3.02
	PI	1.04	1.11	1.18
7/6	TC	4.39	4.20	4.01
	PI	1.09	1.16	1.23
10/9	TC	4.63	4.44	4.26
	PI	1.15	1.23	1.30
15/12	TC	4.87	4.68	4.50
	PI	1.22	1.29	1.36
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

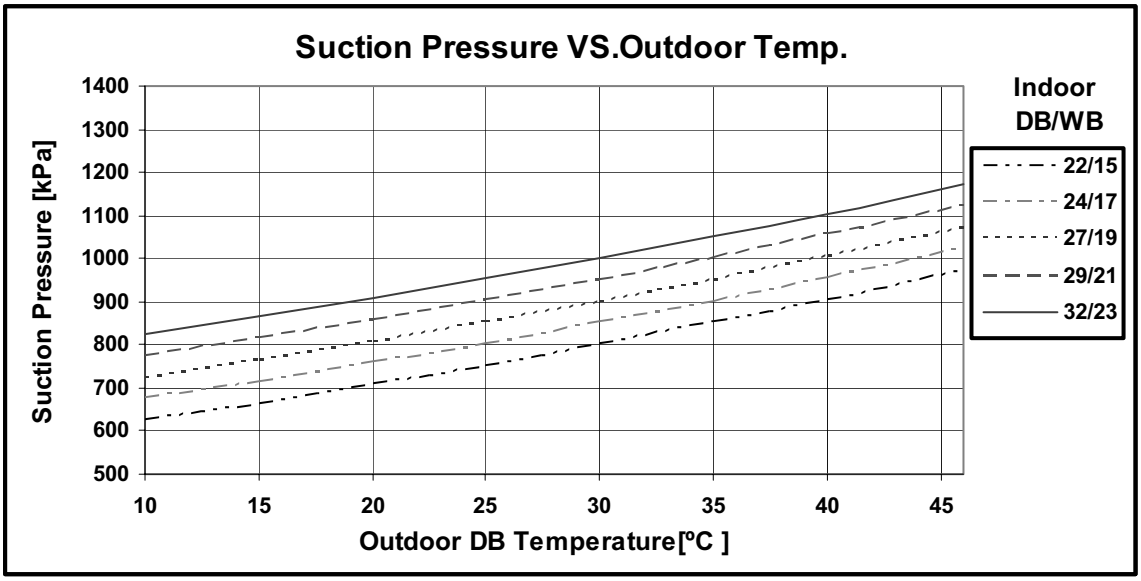
LEGEND

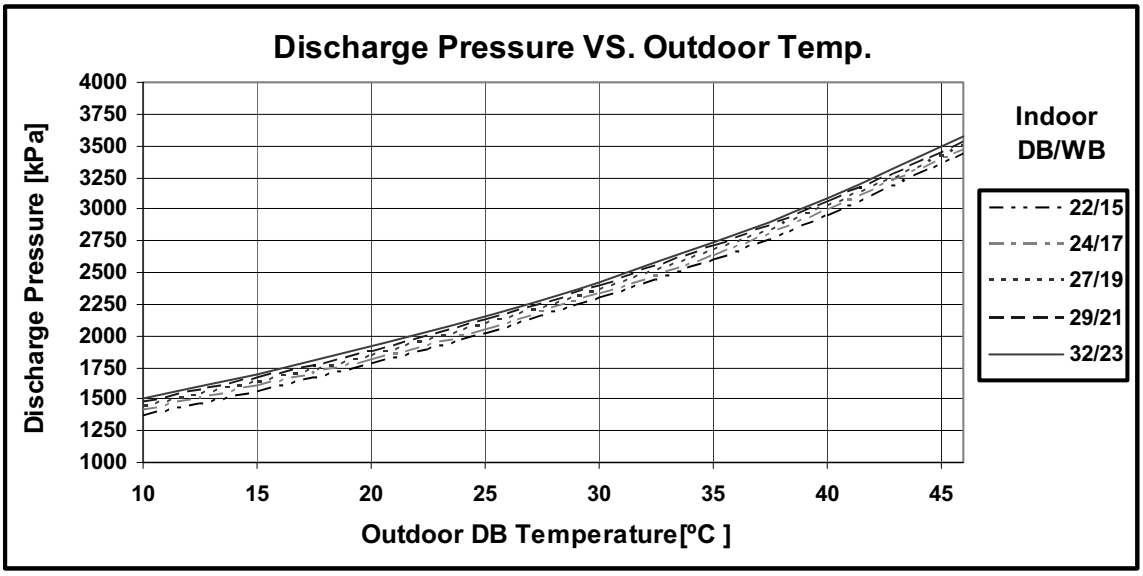
TC – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (^{o}C)
DB – Dry Bulb Temp., (^{o}C)
ID – Indoor
OU – Outdoor

5.2.4 Capacity Correction Factors

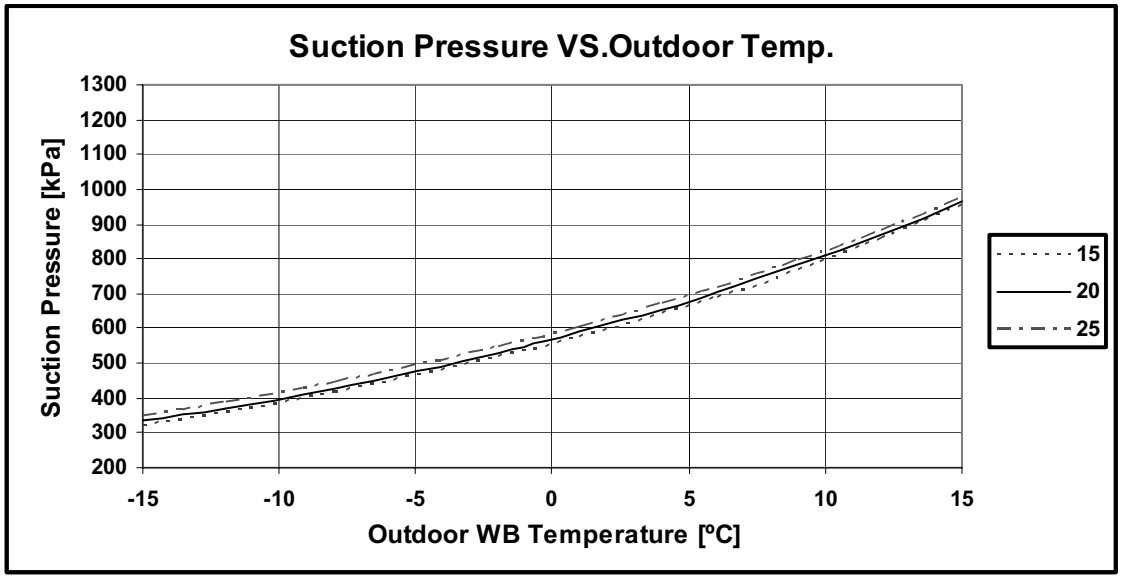


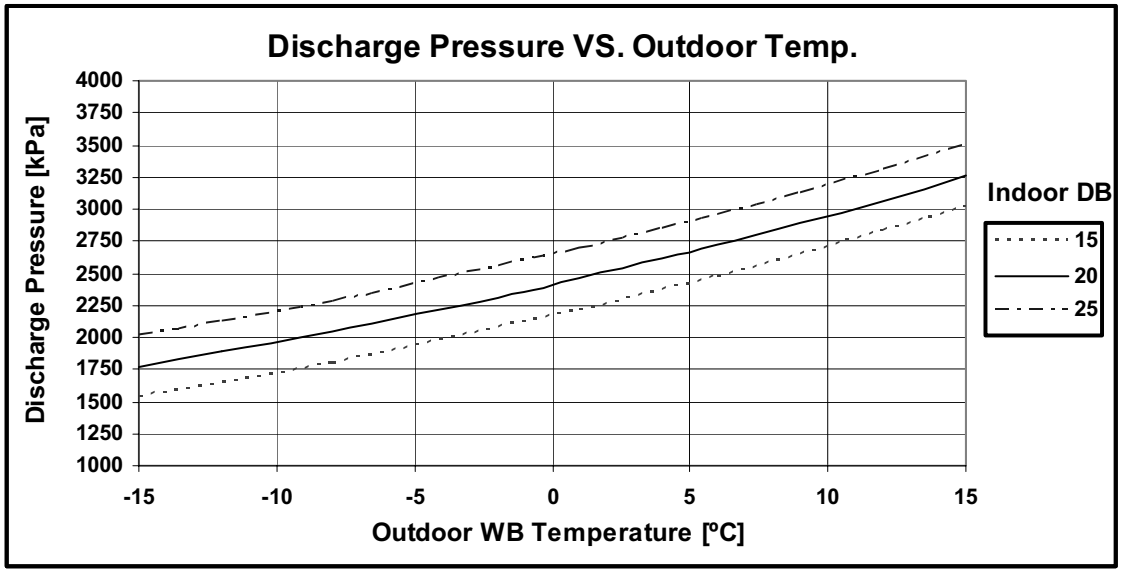
5.2.5 Model: CN 35 DCI Cooling - Test Mode





5.2.6 Heating - Test Mode





5.3 CN 50 DCI

5.3.1 Cooling Capacity (kW) - Run Mode

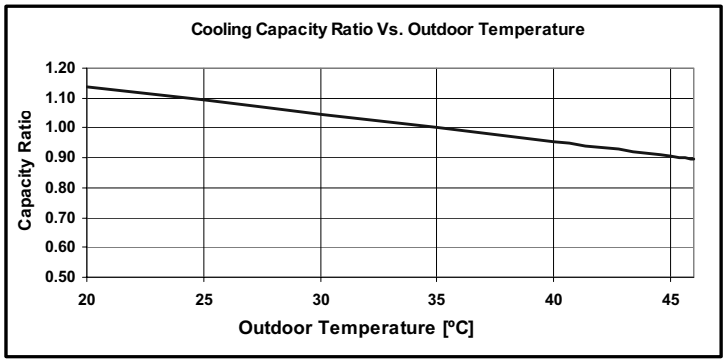
[230V] : Indoor Fan at High Speed.

OD COIL ENTERING AIR DB TEMPERATURE [^{0}C]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [C^0] 22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	4.83	5.15	5.47	5.78	6.10
	SC	3.43	3.50	3.57	3.64	3.71
	PI	1.23	1.25	1.27	1.30	1.32
30	TC	4.60	4.92	5.23	5.55	5.86
	SC	3.35	3.42	3.49	3.56	3.63
	PI	1.37	1.39	1.42	1.44	1.46
35	TC	4.37	4.68	5.00	5.32	5.63
	SC	3.26	3.33	3.40	3.47	3.54
	PI	1.51	1.54	1.56	1.58	1.61
40	TC	4.14	4.45	4.77	5.08	5.40
	SC	3.17	3.24	3.31	3.38	3.45
	PI	1.66	1.68	1.70	1.73	1.75
46	TC	3.86	4.17	4.49	4.80	5.12
	SC	3.07	3.14	3.21	3.28	3.35
	PI	1.83	1.85	1.88	1.90	1.92

LEGEND

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

5.3.2 Capacity Correction Factors



5.3.3 Heating Capacity (kW) - Run Mode

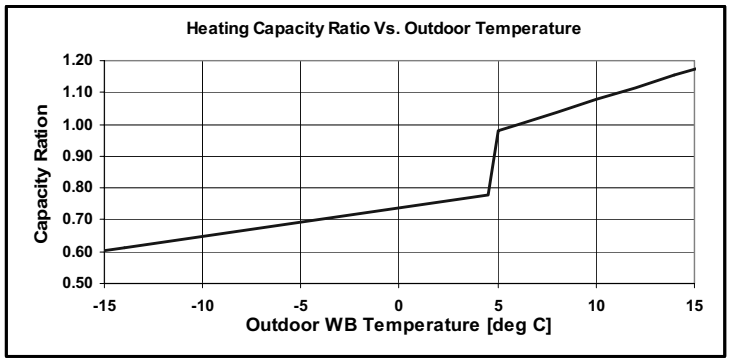
[230V] : Indoor Fan at High Speed.

OD COIL ENTERING AIR DB/WB TEMPERATURE [^{0}C]	DATA	ID COIL ENTERING AIR DB TEMPERATURE [C^0]		
		15	20	25
-15/-16	TC	3.69	3.43	3.18
	PI	0.96	1.06	1.16
-10/-12	TC	4.11	3.85	3.59
	PI	1.16	1.26	1.35
-7/-8	TC	4.42	4.16	3.91
	PI	1.31	1.40	1.50
-1/-2	TC	4.58	4.32	4.06
	PI	1.38	1.48	1.57
2/1	TC	4.68	4.43	4.17
	PI	1.43	1.53	1.62
7/6	TC	6.06	5.80	5.54
	PI	1.50	1.60	1.70
10/9	TC	6.39	6.13	5.88
	PI	1.59	1.69	1.79
15/12	TC	6.73	6.47	6.21
	PI	1.68	1.78	1.88
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

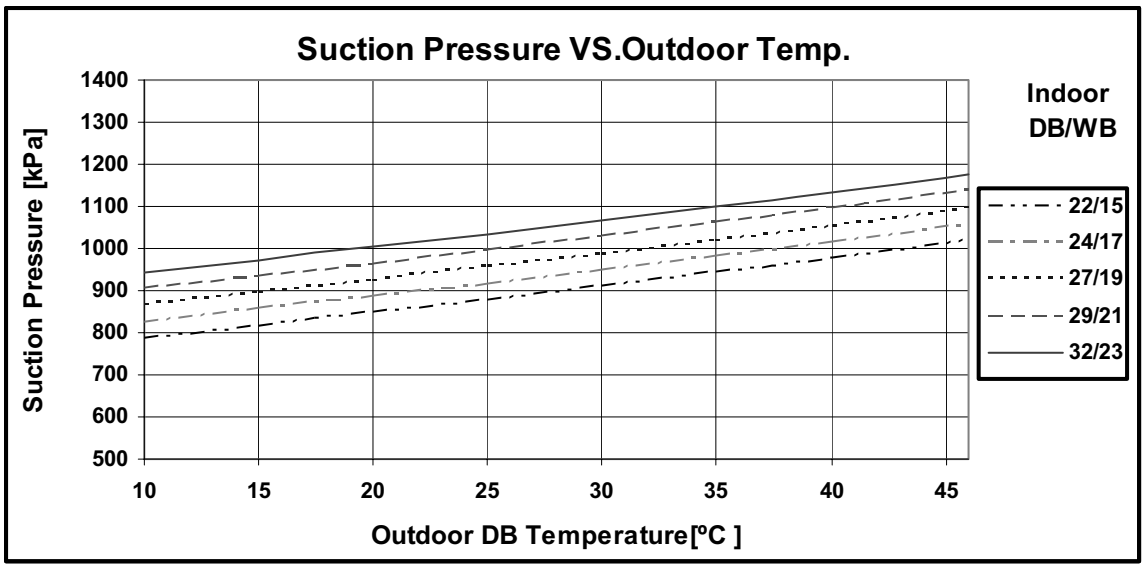
LEGEND

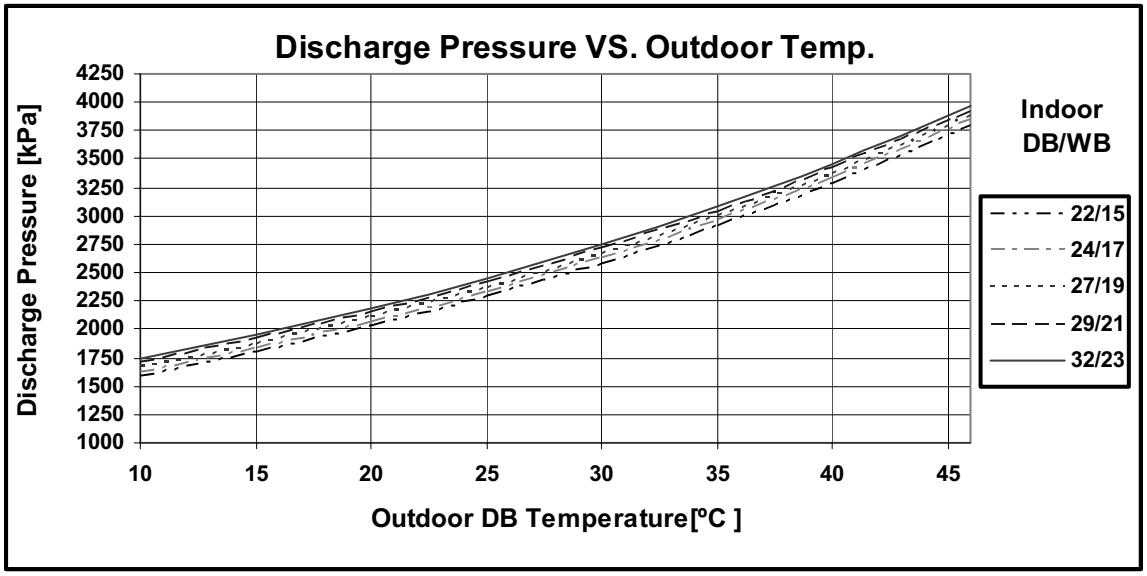
TC – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (°C)
DB – Dry Bulb Temp., (°C)
ID – Indoor
OU – Outdoor

5.3.4 Capacity Correction Factors

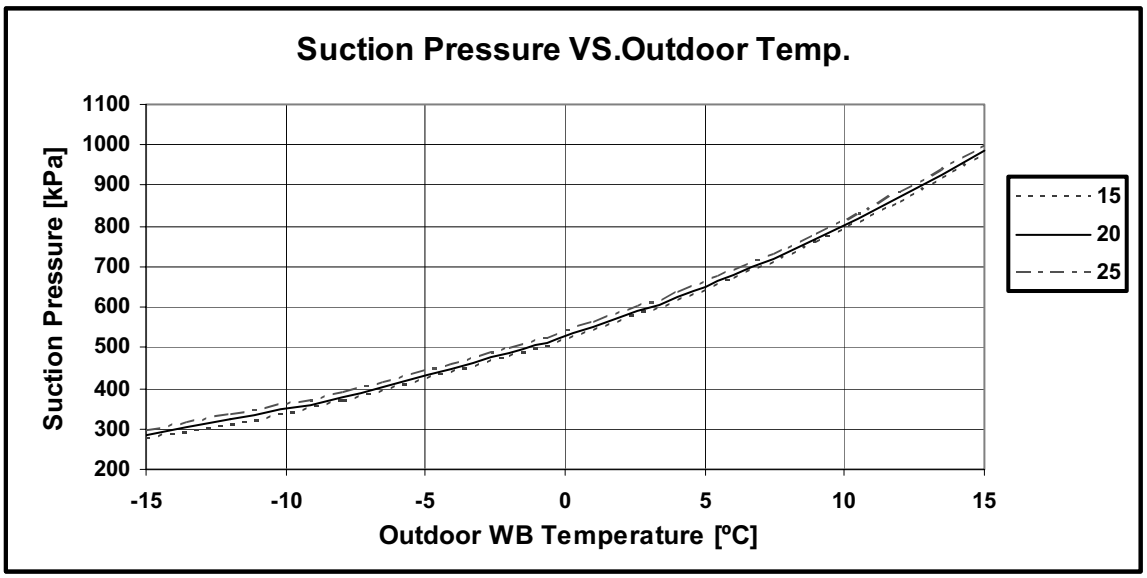


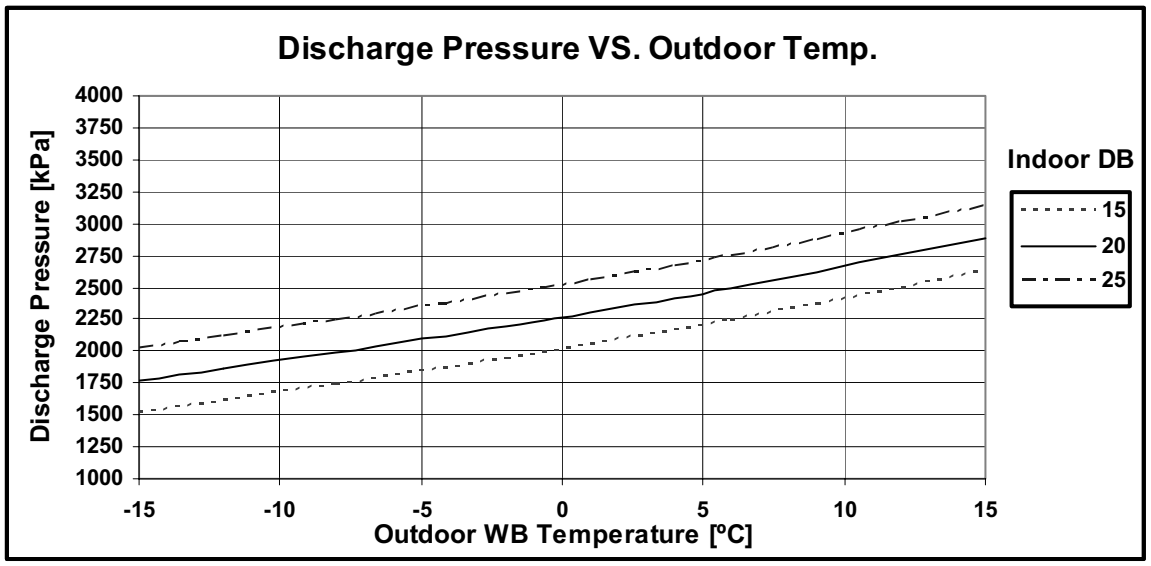
5.3.5 Model: CN 50 DCI Cooling - Test Mode





5.3.6 Heating - Test Mode





5.4 CN 60 DCI

5.4.1 Cooling Capacity (kW) - Run Mode

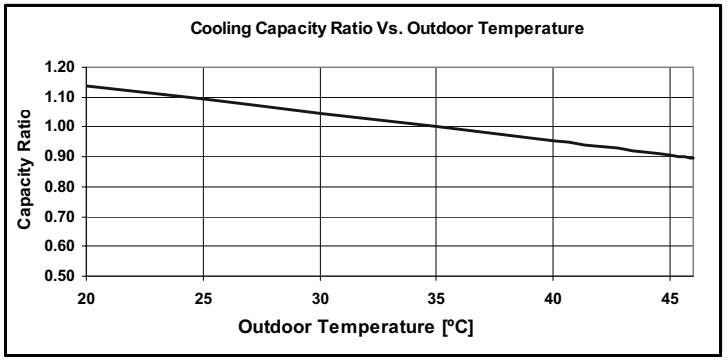
[230V] : Indoor Fan at High Speed.

OD COIL ENTERING AIR DB TEMPERATURE [^{0}C]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [C^0]				
		22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	5.61	5.97	6.34	6.71	7.07
	SC	3.98	4.06	4.15	4.23	4.31
	PI	1.51	1.54	1.57	1.60	1.62
30	TC	5.34	5.70	6.07	6.44	6.80
	SC	3.88	3.96	4.04	4.13	4.21
	PI	1.69	1.71	1.74	1.77	1.80
35	TC	5.07	5.43	5.80	6.17	6.53
	SC	3.78	3.86	3.94	4.03	4.11
	PI	1.86	1.89	1.92	1.95	1.98
40	TC	4.80	5.16	5.53	5.90	6.26
	SC	3.68	3.76	3.84	3.92	4.01
	PI	2.04	2.07	2.10	2.13	2.15
46	TC	4.47	4.84	5.21	5.57	5.94
	SC	3.56	3.64	3.72	3.80	3.89
	PI	2.25	2.28	2.31	2.34	2.37

LEGEND

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

5.4.2 Capacity Correction Factors



5.4.3 Heating Capacity (kW) - Run Mode

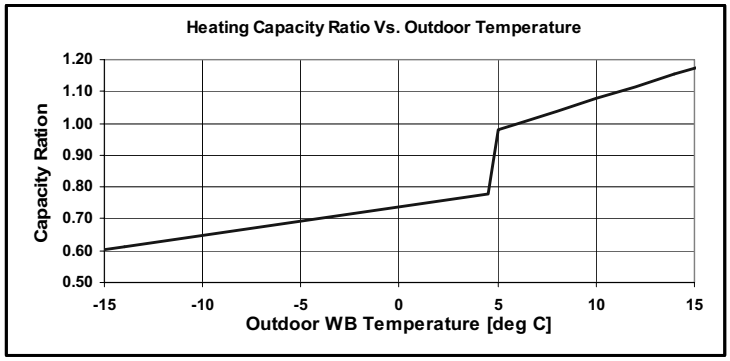
[230V] : Indoor Fan at High Speed.

		ID COIL ENTERING AIR DB TEMPERATURE [C^0]		
OD COIL ENTERING AIR DB/WB TEMPERATURE [^{0}C]	**DATA**	**15**	**20**	**25**
-15/-16	TC	4.33	4.03	3.72
	PI	1.27	1.40	1.52
-10/-12	TC	4.82	4.52	4.21
	PI	1.53	1.66	1.78
-7/-8	TC	5.19	4.88	4.58
	PI	1.72	1.85	1.98
-1/-2	TC	5.37	5.07	4.76
	PI	1.82	1.95	2.08
2/1	TC	5.49	5.19	4.89
	PI	1.88	2.01	2.14
7/6	TC	7.10	6.80	6.50
	PI	1.98	2.11	2.24
10/9	TC	7.49	7.19	6.89
	PI	2.10	2.23	2.36
15/12	TC	7.89	7.58	7.28
	PI	2.22	2.35	2.48
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

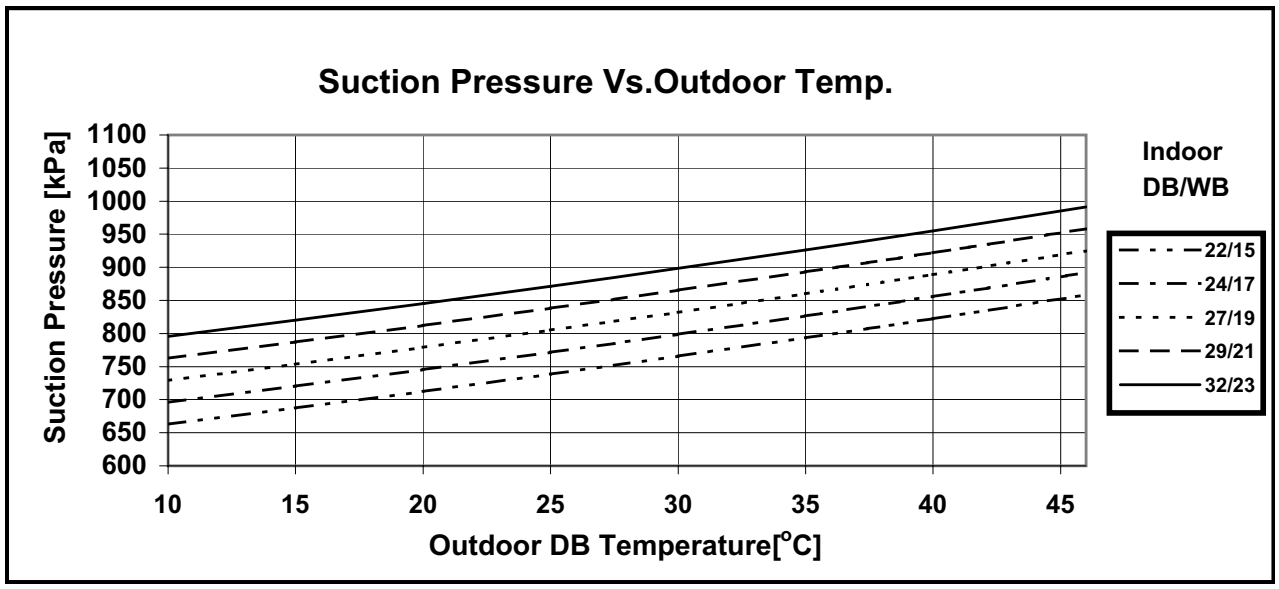
LEGEND

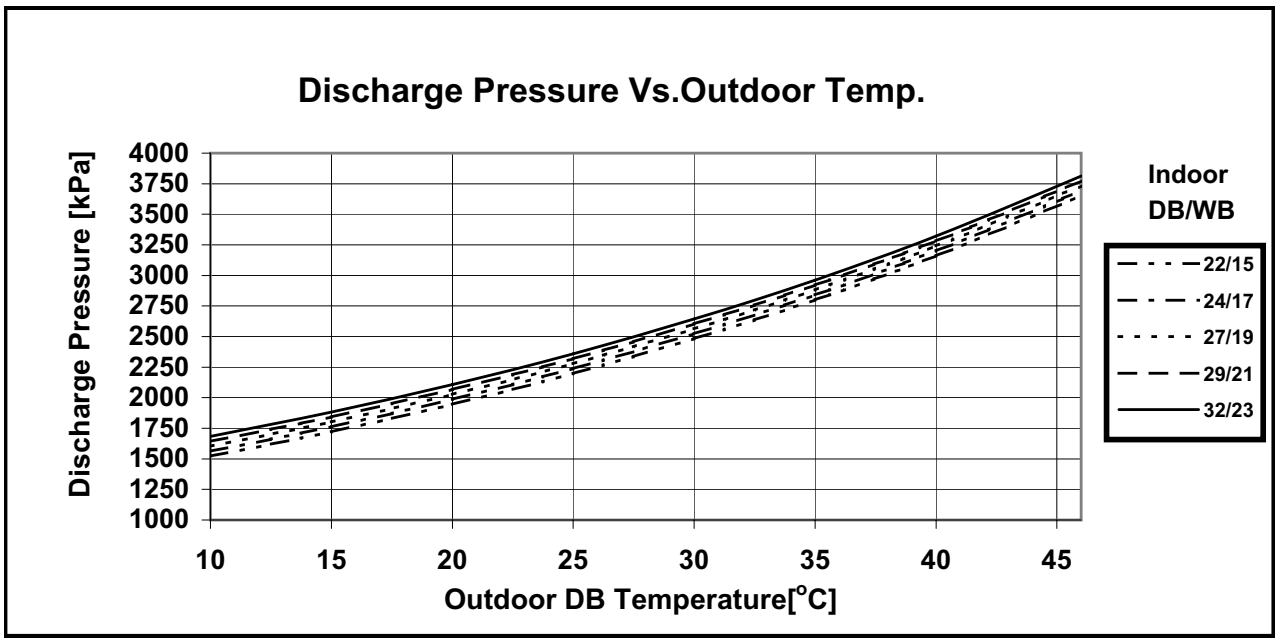
TC – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (^{o}C)
DB – Dry Bulb Temp., (^{o}C)
ID – Indoor
OU – Outdoor

5.4.4 Capacity Correction Factors

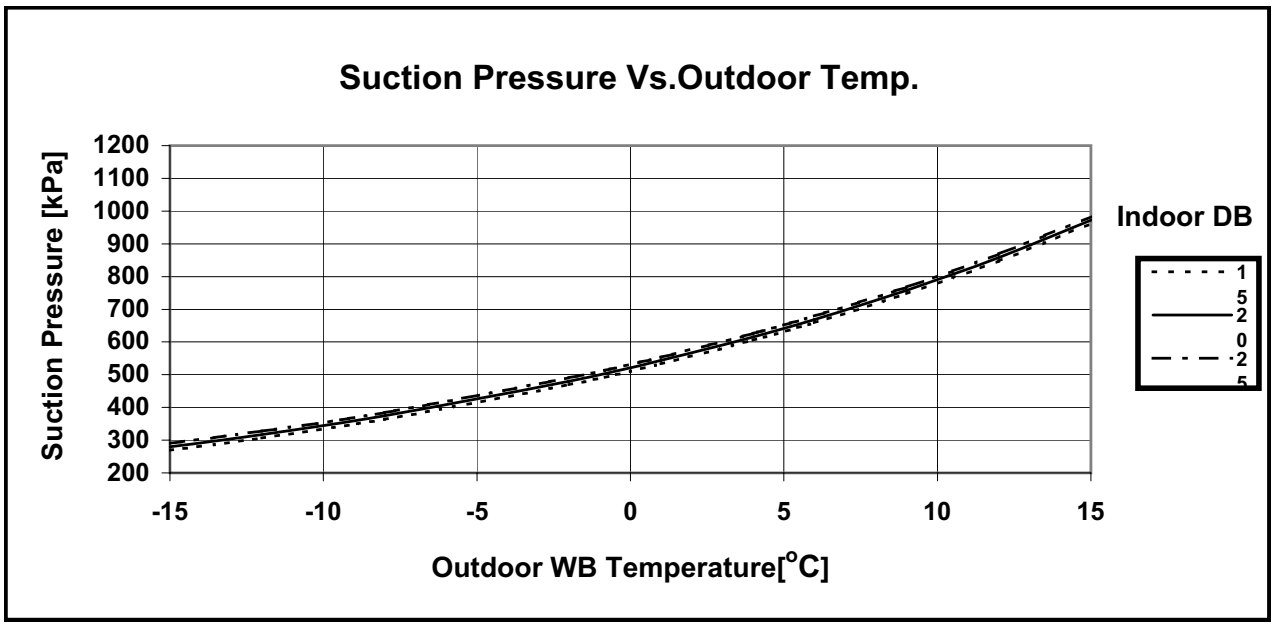


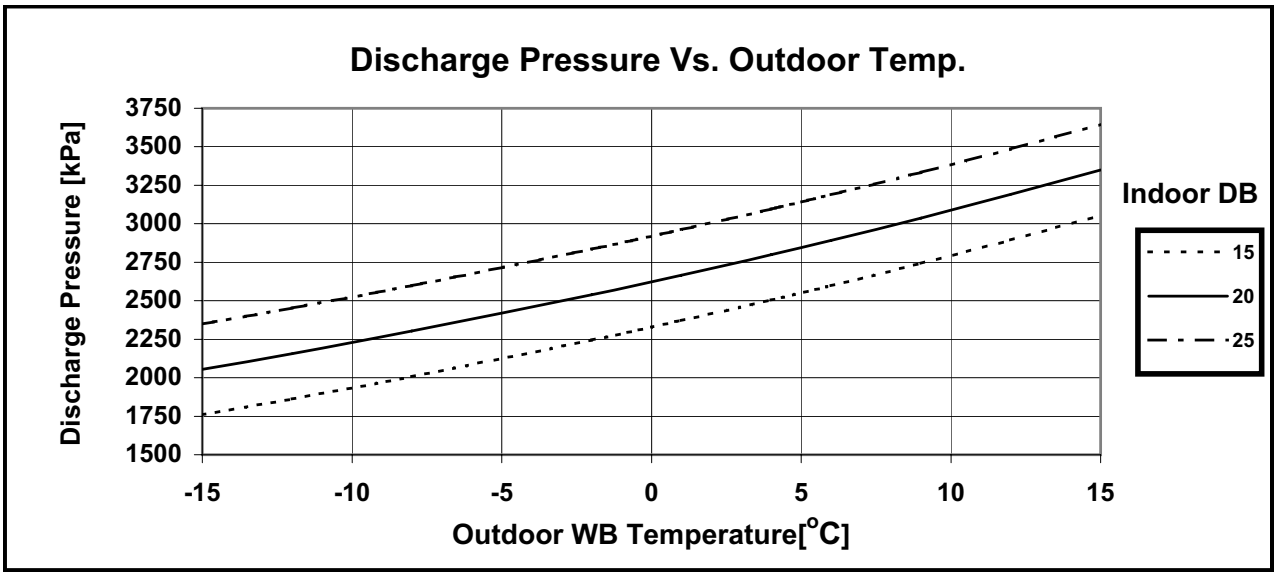
5.4.5 Model: CN 60 DCI Cooling – Test Mode





5.4.6 Heating – Test Mode





5.5 CN 70 DCI

5.5.1 Cooling Capacity (kW) - Run Mode

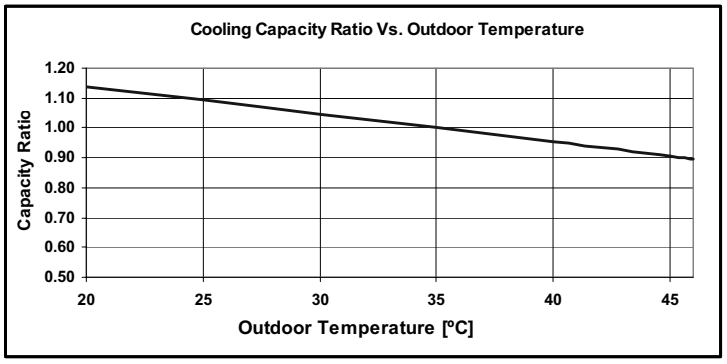
[230V] : Indoor Fan at High Speed.

OD COIL ENTERING AIR DB TEMPERATURE [^{0}C]	DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [C^0]				
		22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	6.57	7.00	7.43	7.86	8.29
	SC	4.67	4.76	4.86	4.96	5.05
	PI	1.89	1.93	1.97	2.00	2.04
30	TC	6.26	6.69	7.12	7.55	7.98
	SC	4.55	4.65	4.74	4.84	4.93
	PI	2.12	2.15	2.19	2.22	2.26
35	TC	5.94	6.37	6.80	7.23	7.66
	SC	4.43	4.53	4.62	4.72	4.81
	PI	2.34	2.37	2.41	2.45	2.48
40	TC	5.62	6.05	6.48	6.91	7.34
	SC	4.32	4.41	4.51	4.60	4.70
	PI	2.56	2.60	2.63	2.67	2.70
46	TC	5.24	5.67	6.10	6.53	6.96
	SC	4.17	4.27	4.36	4.46	4.56
	PI	2.83	2.86	2.90	2.93	2.97

LEGEND

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

5.5.2 Capacity Correction Factors



5.5.3 Heating Capacity (kW) - Run Mode

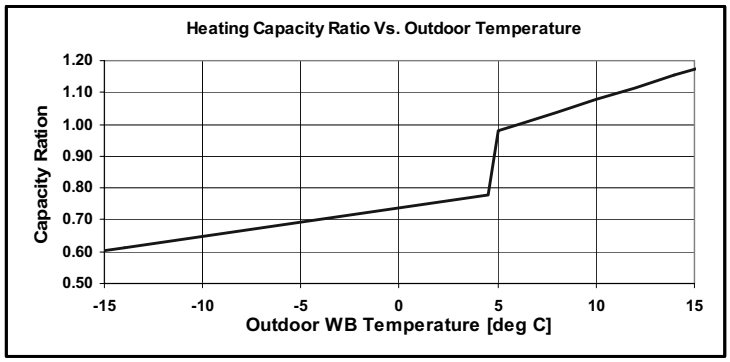
[230V] : Indoor Fan at High Speed

OD COIL ENTERING AIR DB/WB TEMPERATURE [^{0}C]	DATA	ID COIL ENTERING AIR DB TEMPERATURE [C^0]		
		15	20	25
-15/-16	TC	4.65	4.32	4.00
	PI	1.36	1.50	1.64
-10/-12	TC	5.17	4.85	4.52
	PI	1.64	1.78	1.92
-7/-8	TC	5.57	5.24	4.92
	PI	1.85	1.99	2.13
-1/-2	TC	5.76	5.44	5.11
	PI	1.96	2.10	2.23
2/1	TC	5.89	5.57	5.25
	PI	2.03	2.17	2.30
7/6	TC	7.62	7.30	6.98
	PI	2.13	2.27	2.41
10/9	TC	8.05	7.72	7.40
	PI	2.26	2.40	2.54
15/12	TC	8.47	8.14	7.82
	PI	2.39	2.52	2.66
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

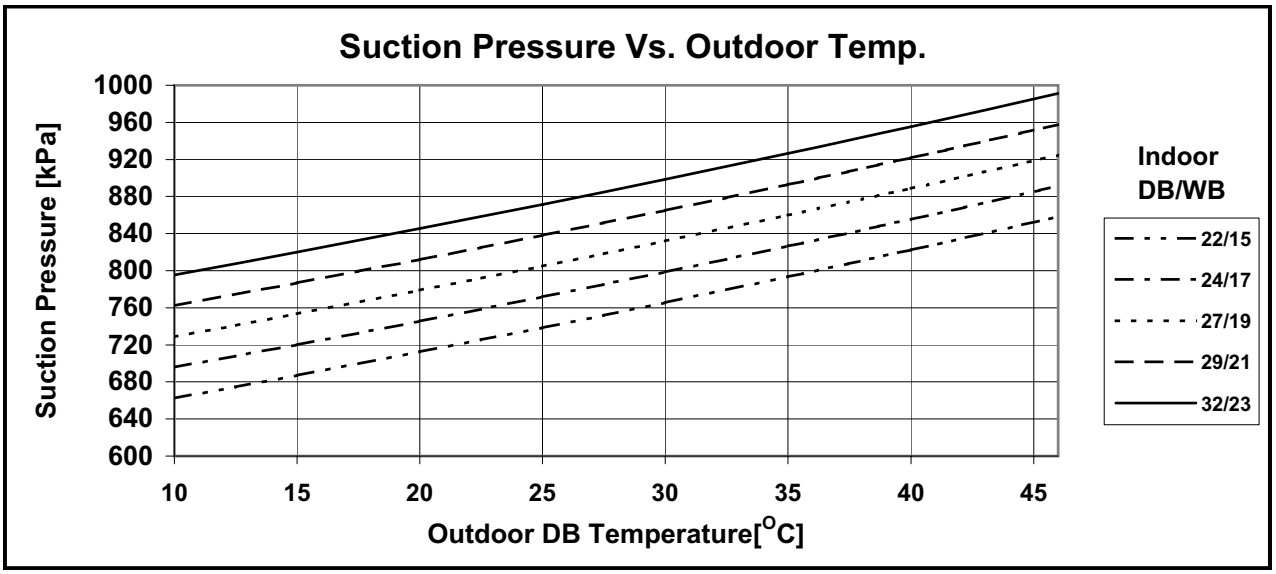
LEGEND

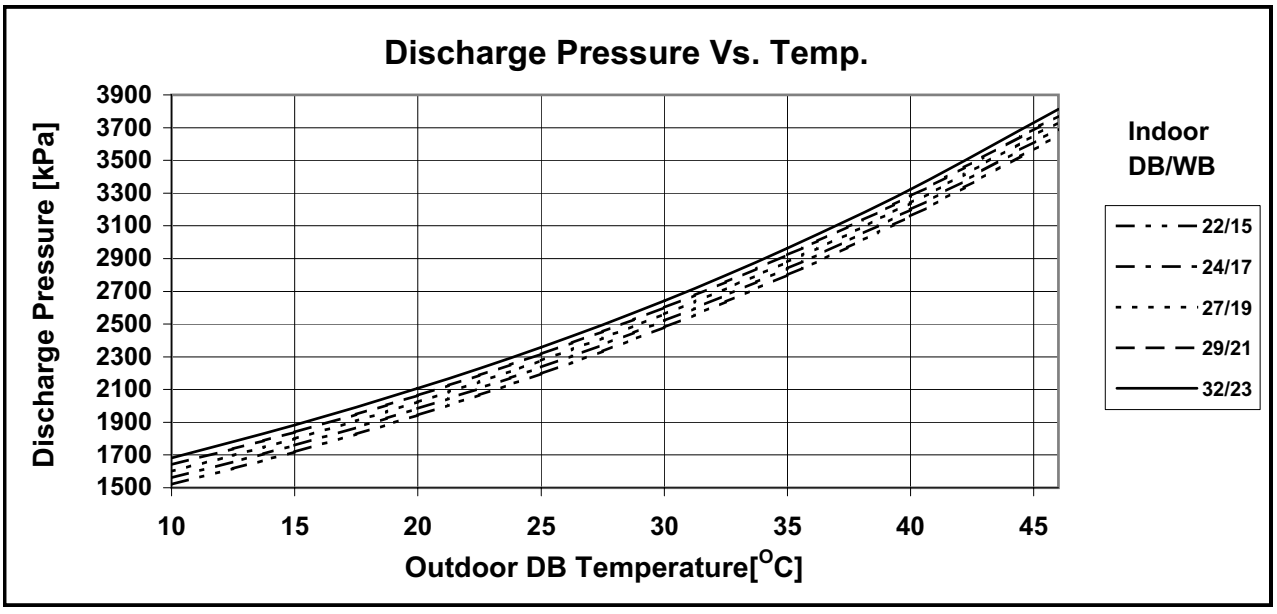
TC – Total Heating Capacity, kW
PI – Power Input, kW
WB – Wet Bulb Temp., (^{o}C)
DB – Dry Bulb Temp., (^{o}C)
ID – Indoor
OU – Outdoor

5.5.4 Capacity Correction Factors

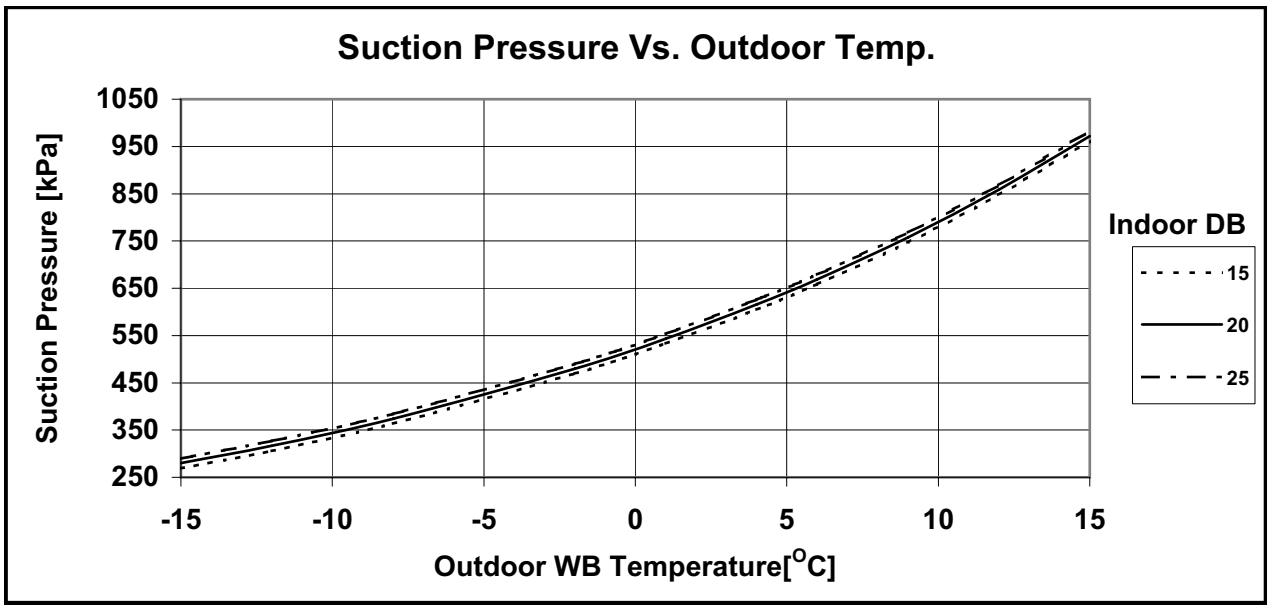


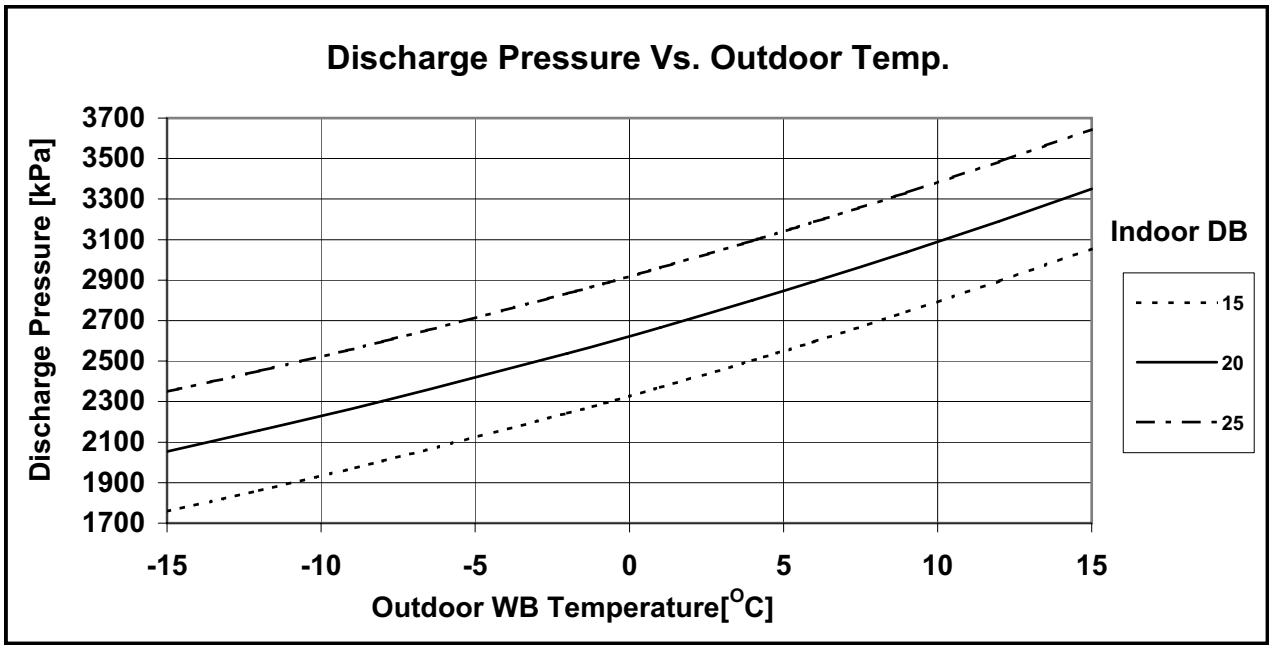
5.5.5 Model: CN 70 DCI Cooling – Test Mode





5.5.6 Heating – Test Mode





5.6 Capacity Correction Factor Due to Tubing Length

5.6.1 Cooling

	TOTAL TUBING LENGTH								
Model	3m	**7.5m**	10m	15m	20m	25m	30m	40m	50m
	1.02	**1**	0.98	0.96	0.95	0.95	0.93	---	---

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

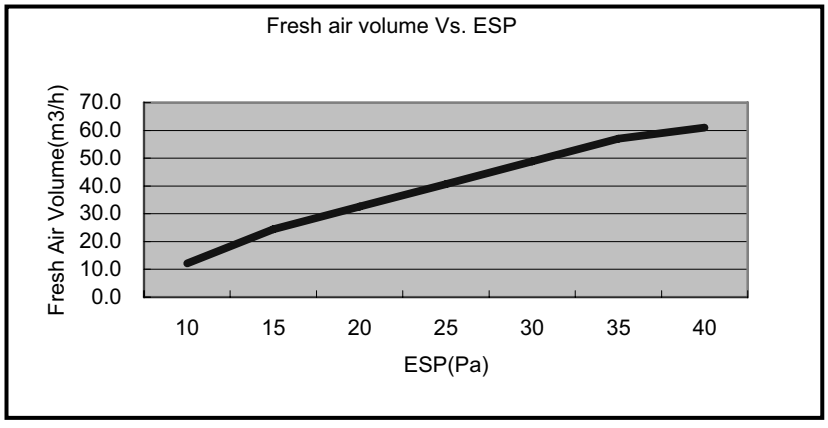
5.6.2 Heating

	TOTAL TUBING LENGTH								
Model	3m	**7.5m**	10m	15m	20m	25m	30m	40m	50m
	1.02	**1**	0.98	0.96	0.95	0.95	0.93	---	---

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

5.7 Fresh air volume to the external static pressure (Field option)

KnoCN-down opening :φ100mm on the casing for the fresh duct
Fresh air control: by external booster fan
Select the fresh air volume according to required external static pressure.



5.8 Conditioned air supply to adjacent room (Field option)

(To be finished)

6. SOUND LEVEL CHARACTERISTICS

6.1 Sound Pressure Level

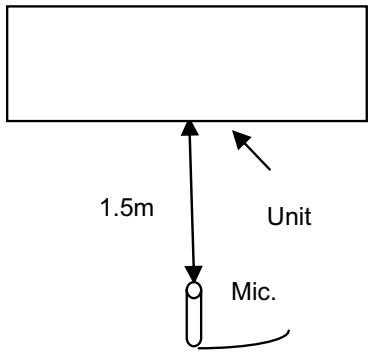
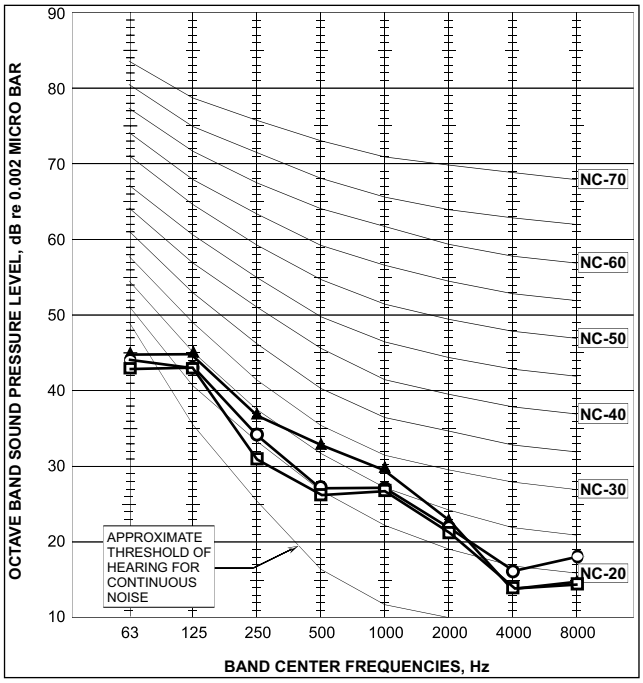


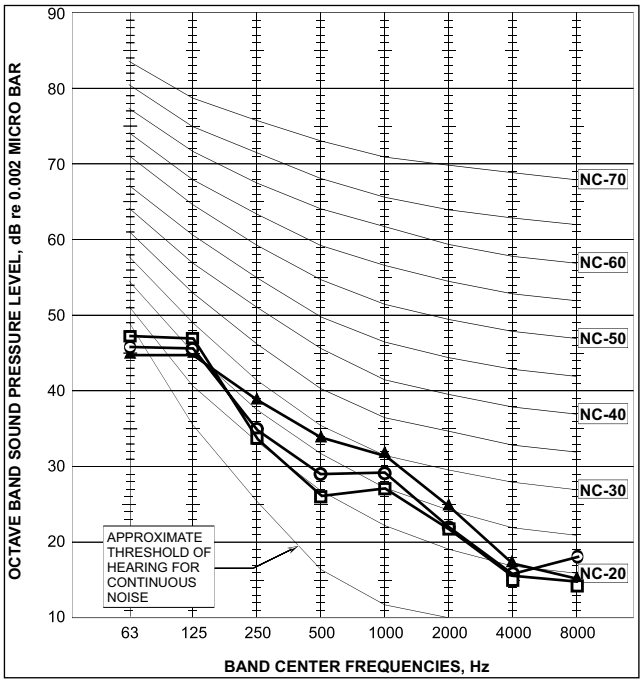
Figure 1

6.2 Soud Pressure Level Spectrum (Measured as Figure 1)

CN 25

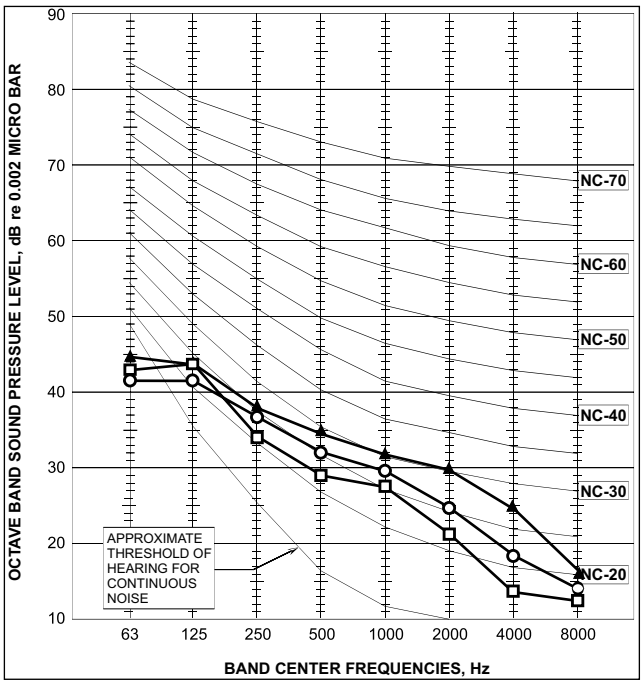


CN 35

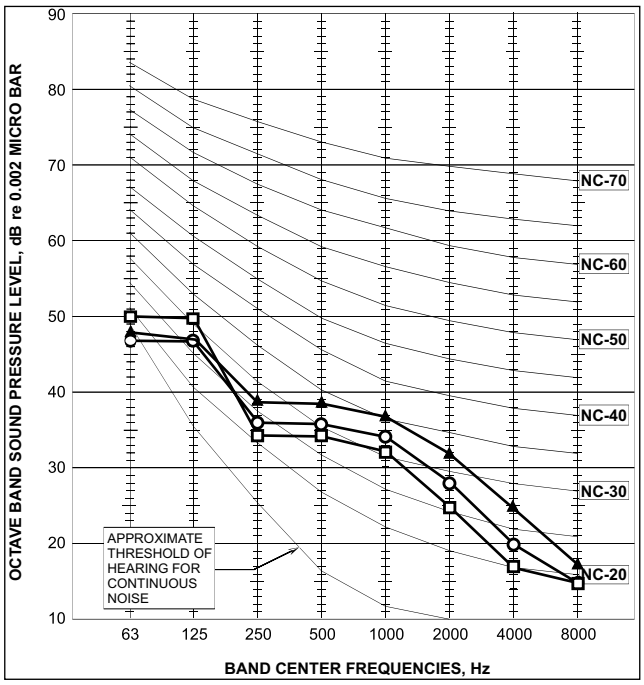


FAN SPEED	LINE
HI	▲
ME	○
LO	□

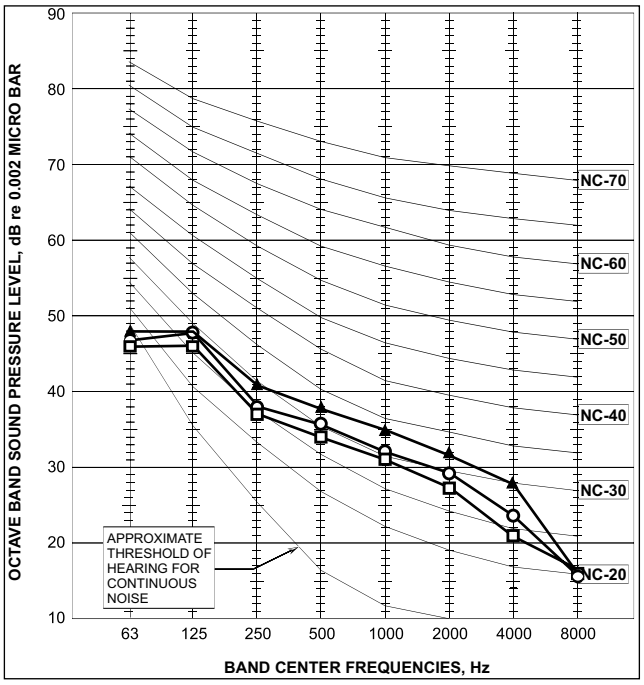
CN 50



CN 60



CN 70



FAN SPEED	LINE
HI	▲
ME	○
LO	□

6.3 Outdoor units

MODEL		SPL dB(A)	SPW dB(A)
Indoor	Outdoor	Cooling/Heating	Cooling/Heating
CN 25	DCI 25	50/51	60/61
CN 35	DCI 35	52/52	62/62
CN 50	DCI 50	52/53	62/63
CN 60	DCI 60	55/55	65/65
CN 70	DCI 72Z	56/56	66/66

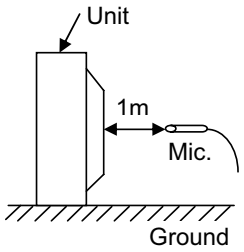
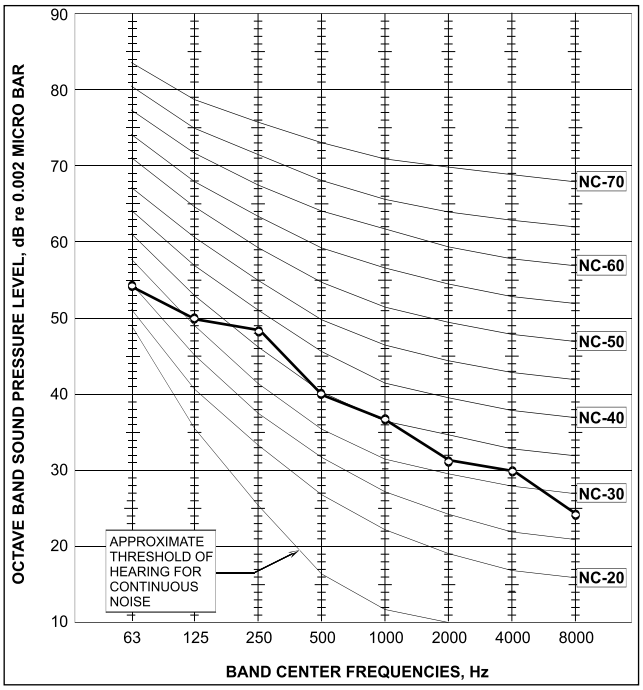


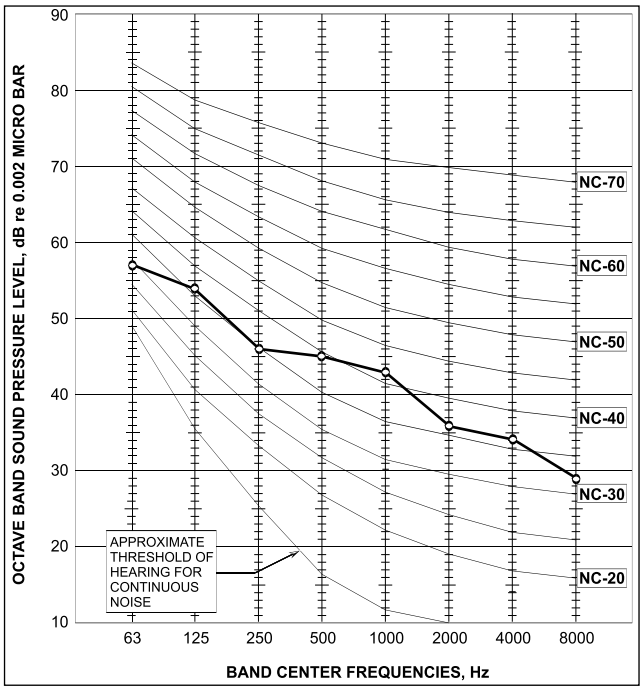
Figure 2

6.4 Sound Pressure Level Spectrum (Measured as Figure 2)

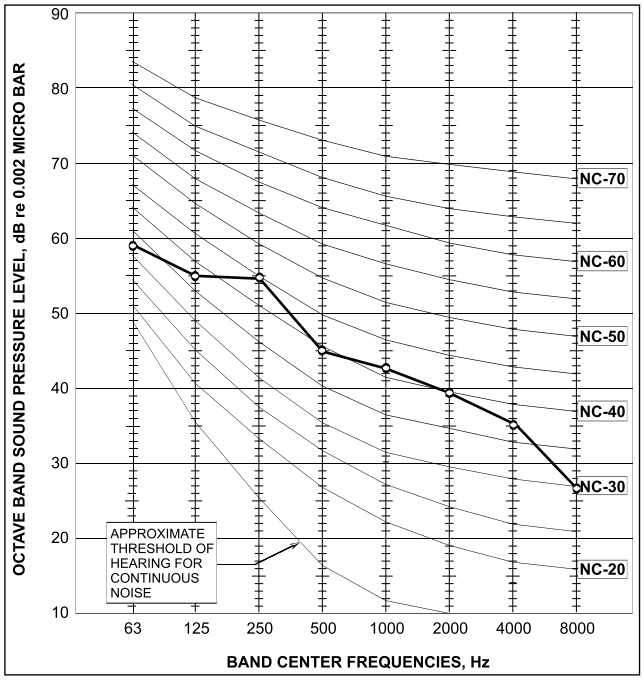
DCI 25 Cooling



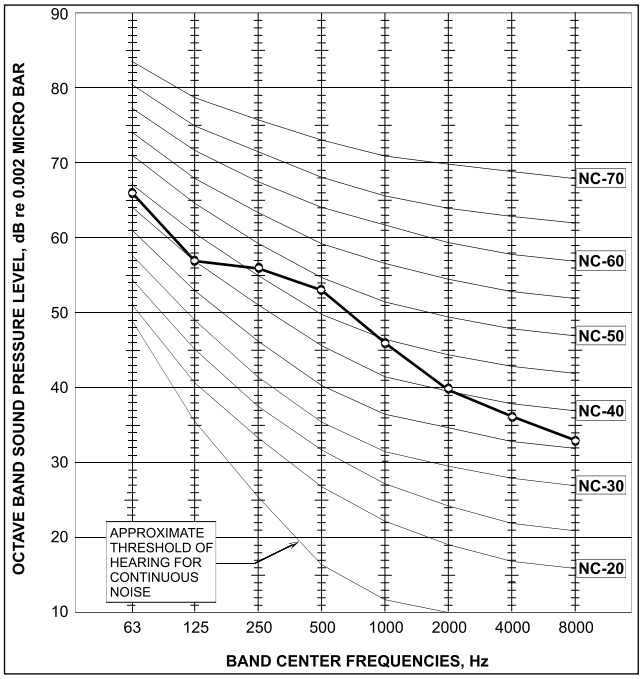
DCI 25 Heating



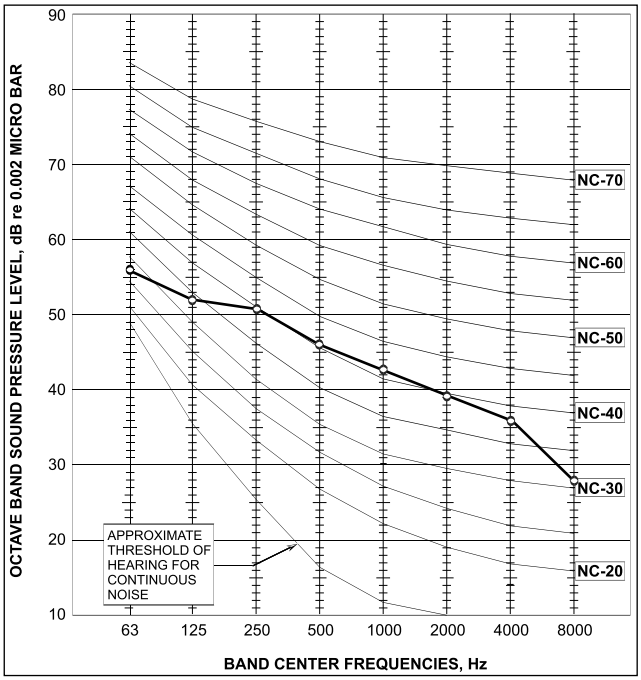
DCI 35 Cooling



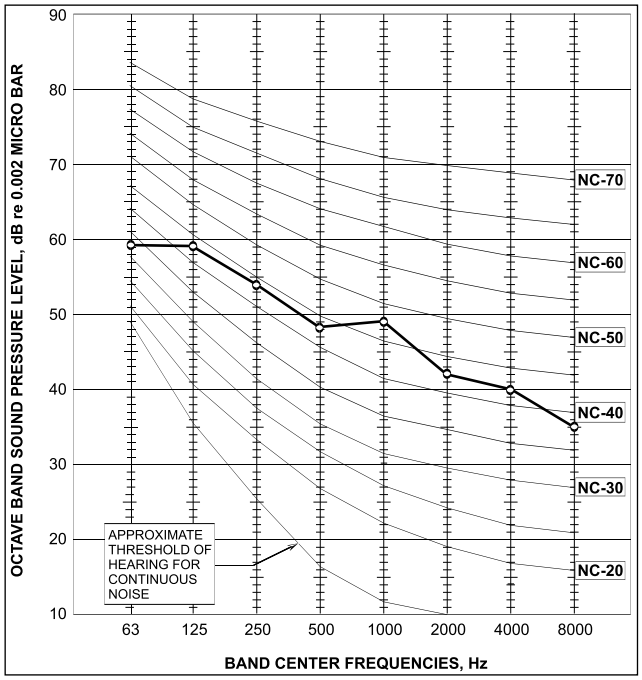
DCI 35 Heating



DCI 50 Cooling

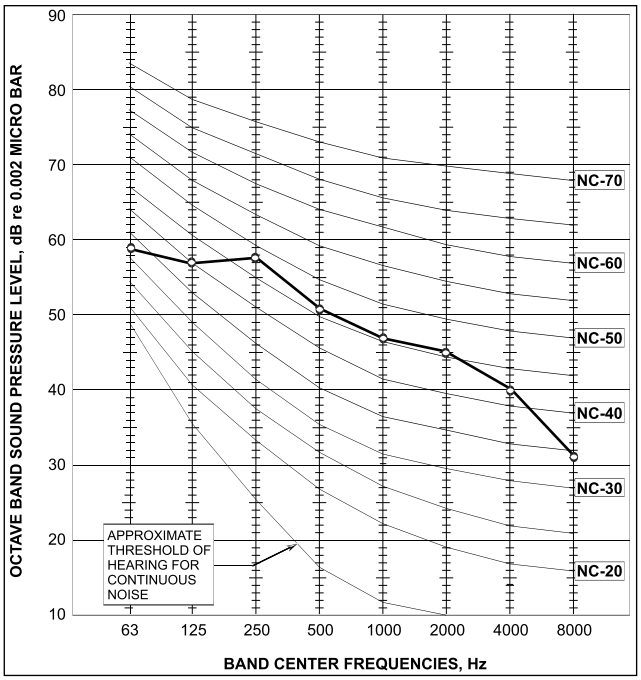


DCI 50 Heating

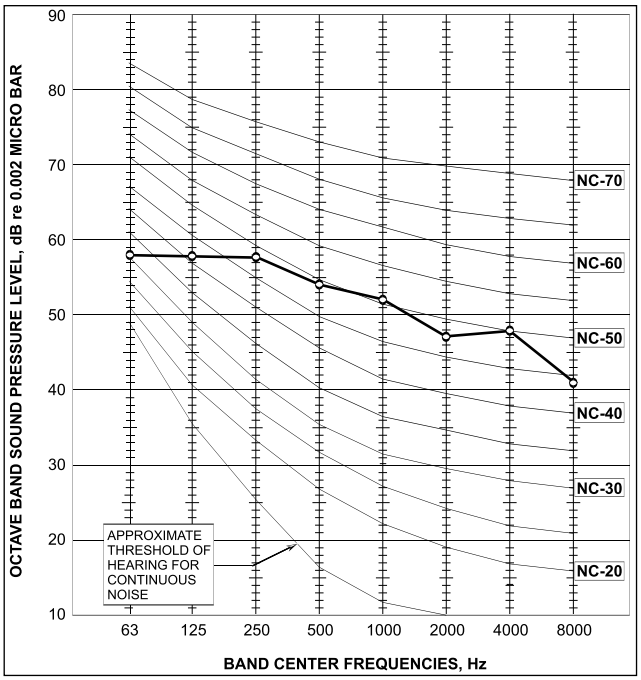


FAN SPEED	LINE
HI	▲
ME	○
LO	□

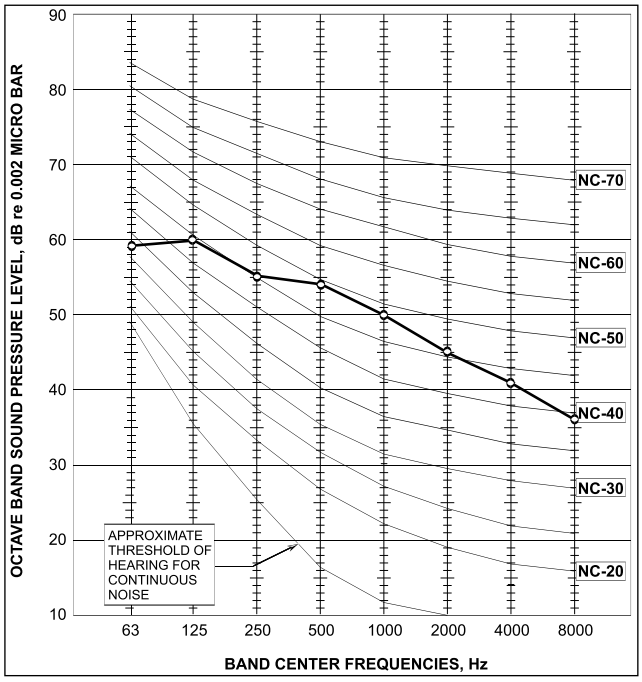
DCI 60 Cooling



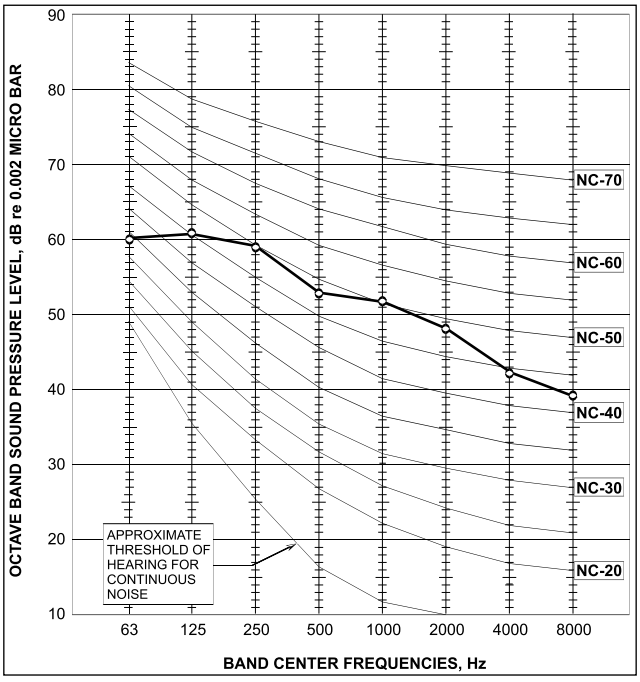
DCI 60 Heating



DCI 72 Cooling



DCI 72 Heating



FAN SPEED	LINE
HI	▲
ME	○
LO	□

7. ELECTRICAL DATA

7.1 Single Phase Units

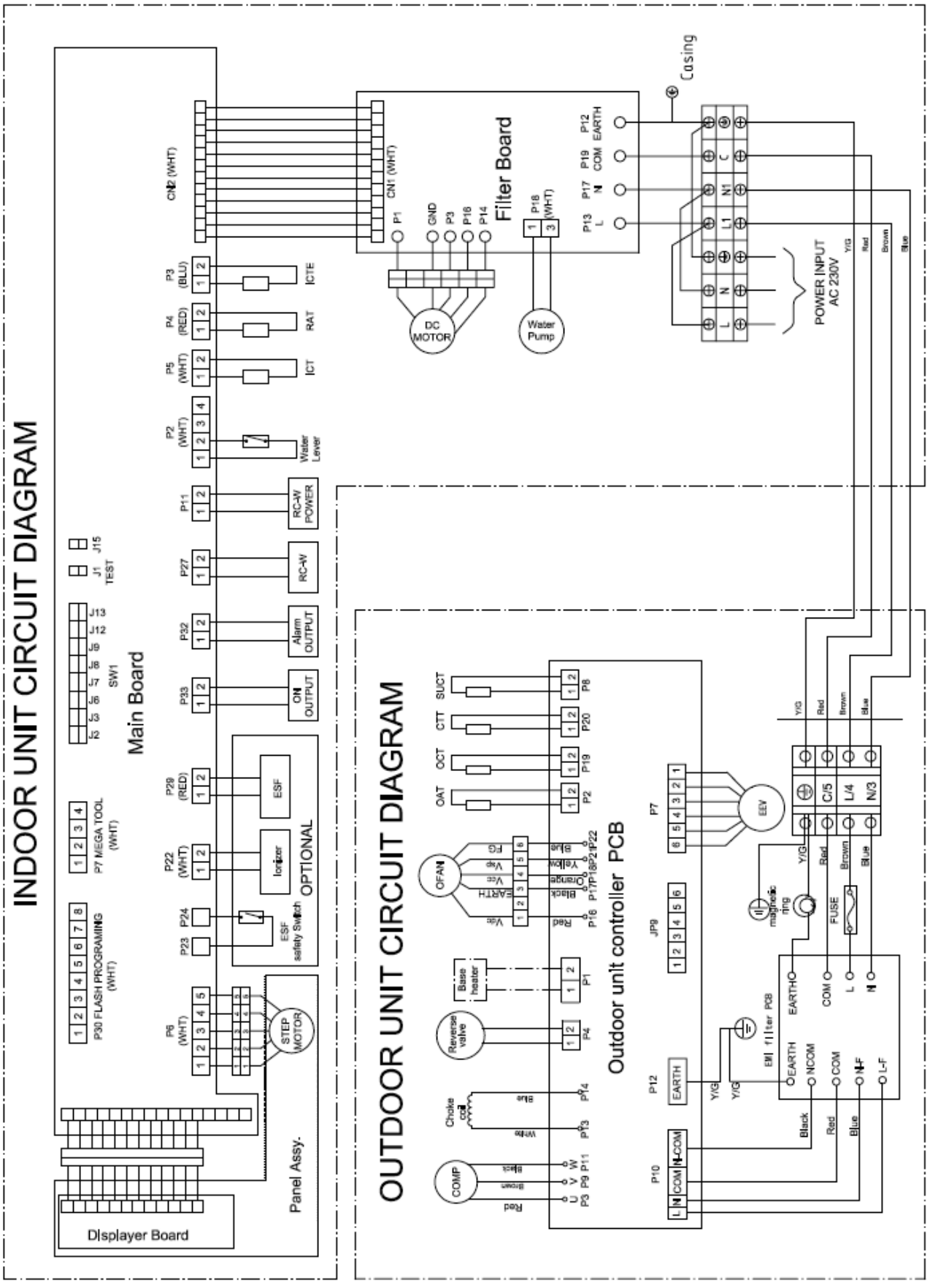
MODEL	CN 25 DCI	CN 35 DCI	CN 50 DCI	CN 60 DCI	CN 70 DCI
Power Supply	To indoor	To indoor	To indoor	To indoor	To outdoor
	1PH-230V-50Hz	1PH-230V-50Hz	1PH-230V-50Hz	1PH-230V-50Hz	1PH-230V-50Hz
Max Current, A	10	10	12	13	14
Inrush Current A	35	35	35	35	45
Starting Current A	10.5	10.5	10.5	10.5	10.5
Circuit Breaker A	16	16	20	20	20
Power Supply Wiring No.X Cross Section mm^2	3 x 1.5 mm^2	3 x 1.5 mm^2	3 x 2.5 mm^2	3 x 2.5 mm^2	3 x 2.5 mm^2
Interconnecting Cable No.X Cross Section mm^2	4 x 1.5 mm^2	4 x 1.5 mm^2	4 x 2.5 mm^2	4 x 2.5 mm^2	4 x 2.5 mm^2

NOTE

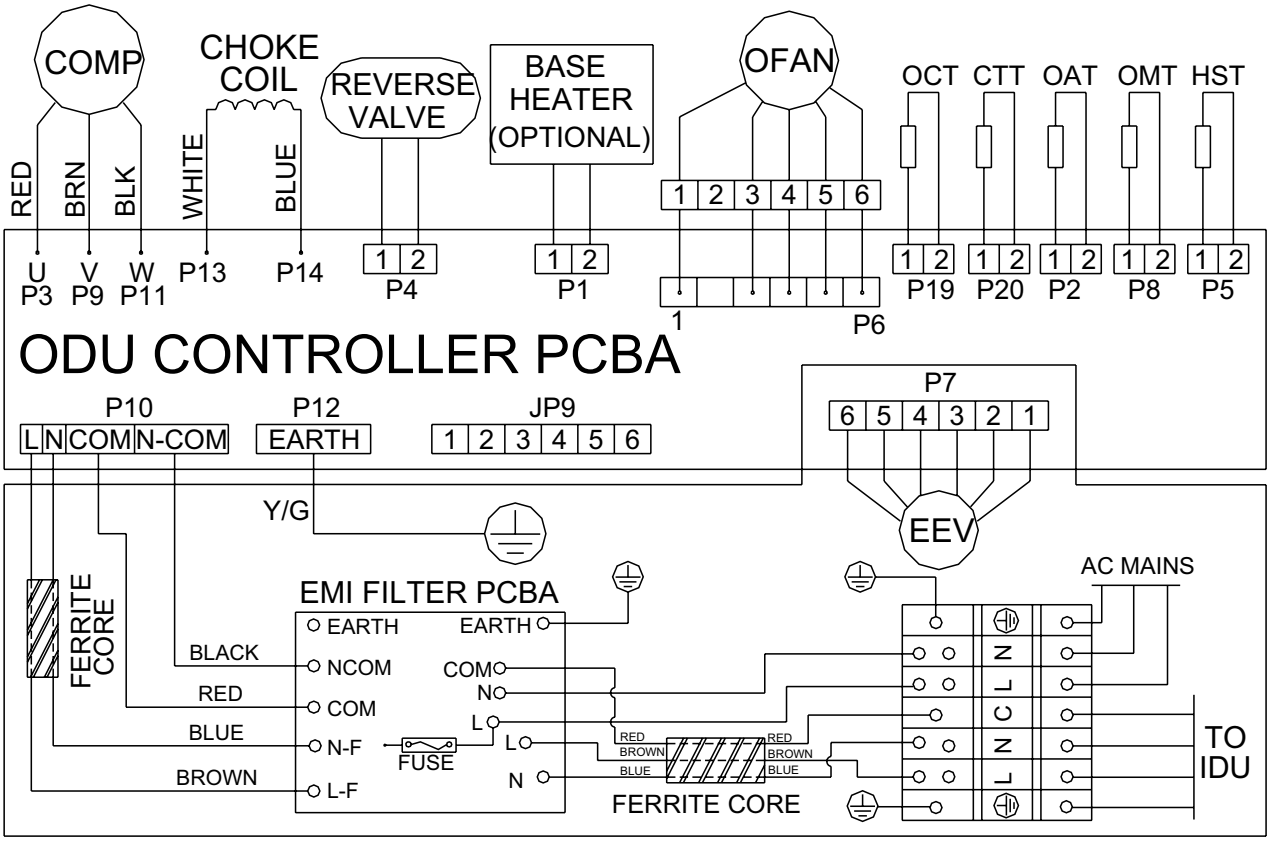
Power wiring cord should comply with local lows and electrical regulations requirements.

8. WIRING DIAGRAMS

8.1 CN 25, 35, 50, 60, 70 DCI



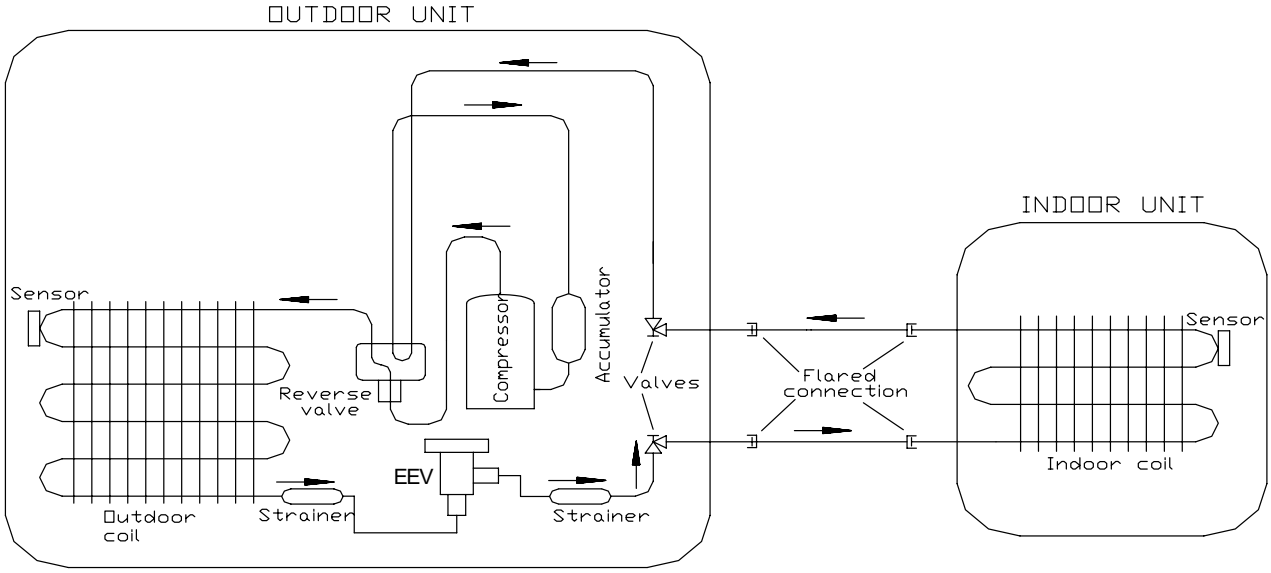
8.2 Outdoor Unit: DCI 72Z



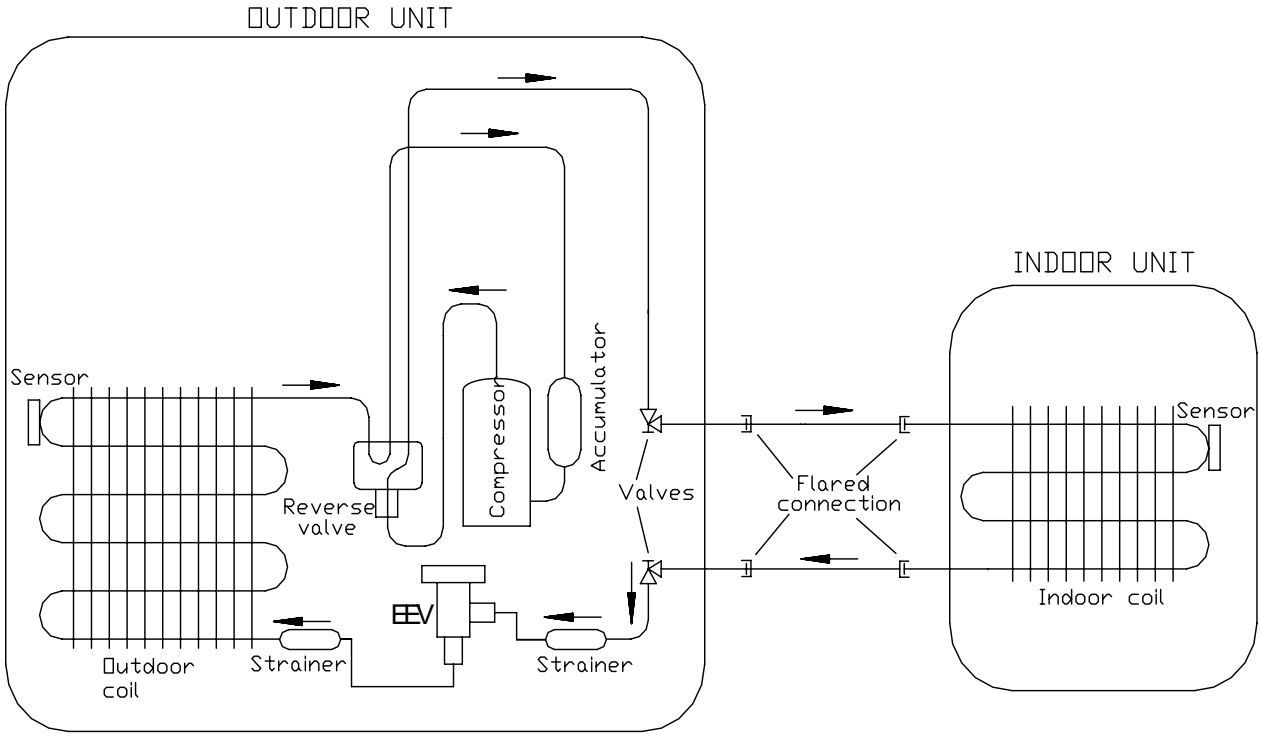
9. REFRIGERATION DIAGRAMS

9.1 CN 25, 35, 50, 60, 70 DCI

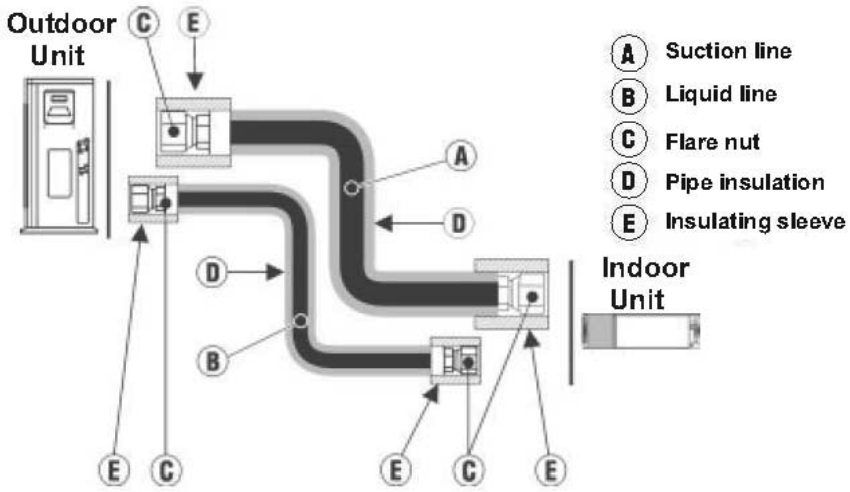
Cooling Mode

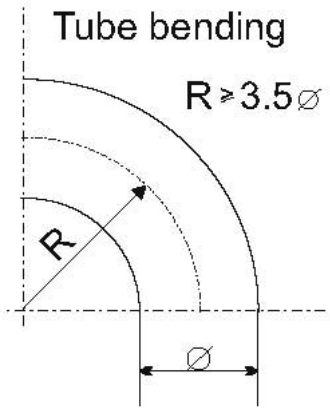


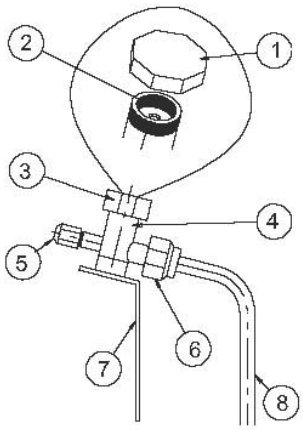
Heating Mode



10. TUBING CONNECTIONS



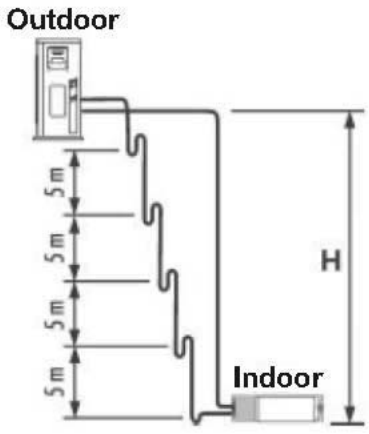




TUBE (Inch) / TORQUE (Nm)	1/4"	3/8"	1/2"	5/8"	3/4"
Flare Nuts	11-13	40-45	60-65	70-75	80-85
Valve Cap	13-20	13-20	18-25	18-25	40-50
Service Port Cap	11-13	11-13	11-13	11-13	11-13

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 BaCN 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. Incase the indoor unit is installed above the outdoor, no trap is required.



11. CONTROL SYSTEM

11.1 General Functions and Operating RulesThe DCI software is fully parametric.

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

11.1.1 System Operation Concept

The control function is divided between indoor and outdoor unit controllers. Indoor unit is the system 'Master', requesting the outdoor unit for cooling/heating capacity supply. The outdoor unit is the system 'Slave' and it must supply the required capacity 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.

11.1.2 Compressor Frequency Control

11.1.2.1 NLOAD setting

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

Indoor Fan Speed Maximum NLOAD Cooling Maximum NLOAD Heating

Indoor Fan Speed	Maximum NLOAD Cooling	Maximum NLOAD Heating
Low	*MaxNLOADIF1C*	*MaxNLOADIF1H*
Medium	*MaxNLOADIF2C*	*MaxNLOADIF2H*
High	*MaxNLOADIF3C*	*MaxNLOADIF3H*
Turbo	*MaxNLOADIF4C*	*MaxNLOADIF4H*
Auto	*MaxNLOADIF5C*	*MaxNLOADIF5H*

NLOAD limits as a function of power shedding:

Mode	Power Shedding OFF	Power Shedding ON
Cooling	No limit	Nominal Cooling
Heating	No limit	Nominal heating

11.1.3 Target Frequency Setting

11.1.3.1 Target Frequency Setting for DCI 25/35/50/60/72Z

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

Basic Target Frequency Setting:

Up to **SW 35V12**

NLOAD	Target Frequency [Hz]
<10	0
10	*MinFreqC* in cool OR *MinFreqH* in heat mode
11-126	NLOAD (as long it is in the allowed range, if not, the *MinFreqC* or *Max FreqC* in cool mode OR *MinFreqH* or *MaxFreqH* in heat mode will be selected).
127	*MaxFreqC* in cool OR *MaxFreqH* in heat mode.

SW 35V14 and **above**

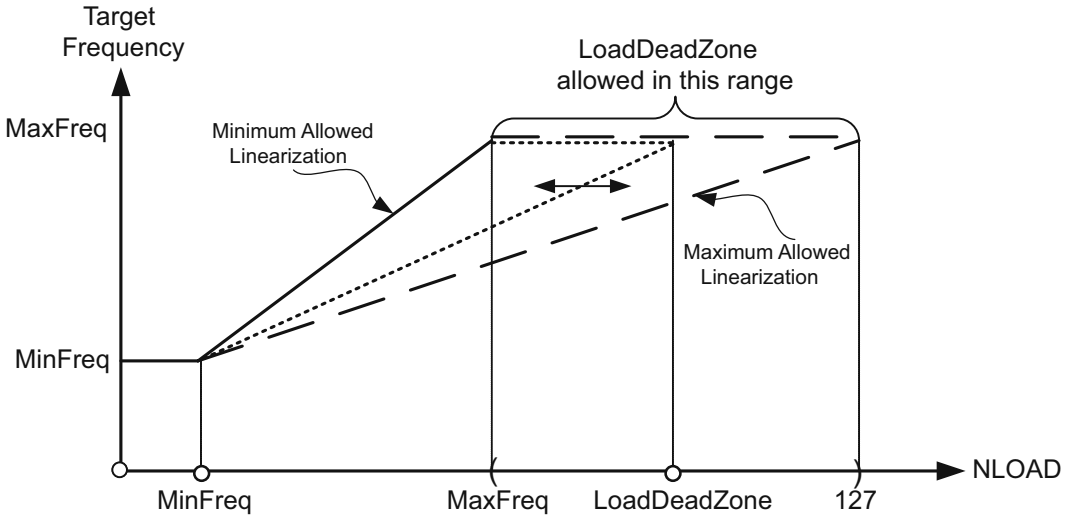
NLOAD	Target Frequency [Hz]
0	*0*
0 < NLOAD ≤ MinFreq	*MinFreq*
> MinFreq	$\frac{\text{MaxFreq} - \text{MinFreq}}{\text{LoadDeadZone} - \text{MinFreq}} \cdot \{\min(\text{NLOAD}, \text{LoadDeadZone}) - \text{MinFreq}\} + \text{MinFreq}$

Differences between Old and New ODU DCI/DCR software

Unit	Current software	New software
DCI	35V12	35V14

Comment: there is no use for **35V13** software. This software is used in the past for Nordic countries. However, currently it's stopped completely from being used.

Graphical Illustration:



	Mode	During initial period (Start Phase)	After initial period (Run Phase)
MaxFreq	Cool	*MaxFreqC*	*MaxFreqCRunPhase*
	Heat	*MaxFreqH*	*MaxFreqHRunPhase*
MinFreq	Cool	*MinFreqC*	
	Heat	*MinFreqH*	
LoadDeadZone	Cool	*LoadDeadZoneC*	
	Heat	*LoadDeadZoneH*	

#	Name	A Single DCI-25	B Single DCI-35	C Single DCI-50	D Single DCI 60	E Duo 50	F DCR 50	G Duo Delta38	H Trio Delta52	I DCR 50T
1	*MinFreqC*	30	33	20	20	20	20	38	20	20
2	*MaxFreqC*	64	80	85	95	97	77	93	100	77
3	*MaxFreqCRunPhase*	64	80	85	95	97	77	85	95	77
4	*MinFreqH*	30	35	20	26	26	26	38	25	26
5	*MaxFreqH*	81	93	95	94	106	79	100	100	79
6	*MaxFreqHRunPhase*	81	93	95	94	106	79	90	95	79
7	*LoadDeadZoneC*	90	95	95	111	97	90	93	127	90
8	*LoadDeadZoneH*	127	127	127	127	106	127	100	100	127

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

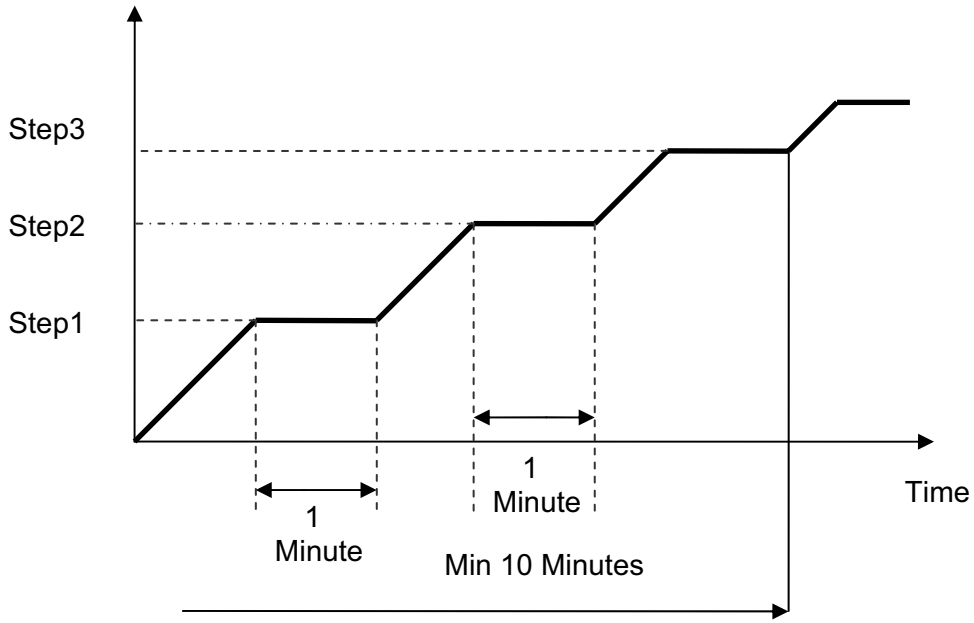
OAT Range	Cooling Mode limits	Heating Mode limits
OAT < 6	***MaxFreqAsOATC***	**No limit**
6 ≤ OAT < 15		***MaxFreqAsOAT1H***
15≤ OAT<28		***MaxFreqAsOAT2H***
28≤ OAT	**No limit**	

11.1.4 Frequency Changes Control

When the unit is running normally , the compressor frequency change rate is 1 Hz/sec.

11.1.5 Compressor Starting Control

11.1.5.1 Compressor starting control for DCI25/35/50/60



11.1.5.2 Compressor starting control for DCI72Z

Step 1

Whenever the compressor starts up, after it has been off for more than 45 minutes, the compressor frequency cannot go below *Step1RPS* for 3 continuous minutes (*this rule comes to ensure oil return to the compressor*).

Step 2

The compressor speed cannot go above *Step2RPS* once after each compressor start up for 3 continuous minutes (*this rule comes to prevent oil exit from the compressor after its start up)*.

Step 3

The speed cannot go higher than *Step3RPS* unless it was operating for more than 1 continuous minutes between *Step3RPS* – 5 and *Step3RPS* .

After passing above *Step3RPS*, this rule is re-applied when passing below *Step3RPS*-5.

11.1.6 Minimum On and Off Time

3 minutes

11.1.7 Indoor Fan Control

8 Indoor fan speeds are determined for each model. 4 speeds for cool/dry/fan modes and 4speeds for heat mode.
When user sets the indoor fan speed to a fixed speed (Low/ Medium/ High), unit will operate constantly at set speed.
When Auto Fan is selected, indoor unit controller can operate in all speeds. The actual speed is set according to the cool/heat load.

11.1.7.1 Turbo Speed

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

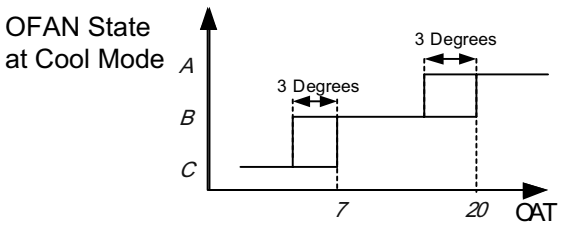
11.1.8 Outdoor Fan Control

11.1.8.1 Outdoor Fan Control for DCI25/35/50/60

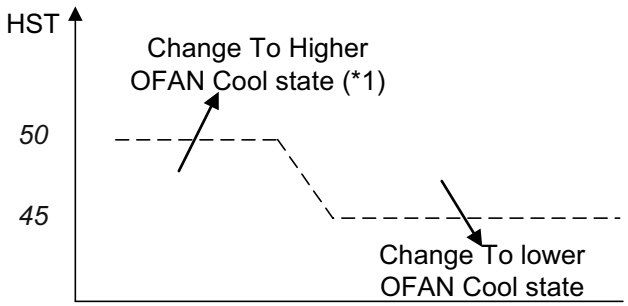
7 outdoor fan speeds are determined for each model. 3 speeds for cool and dry modes, and 3speeds for heat mode, and a very low speed.
Outdoor fan speed is a function of compressor frequency and outdoor air temperature (OAT).
4 routines for fan control are determined. The control routine selection depends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

Routine	Conditions
A	Heating with OAT < 15°C or Cooling with OAT > 20°C, or Faulty OAT
B	Cooling with 20°C > OAT > 7°C
C	Cooling with 7°C > OAT
D	Heating with OAT > 15°C

	OFAN Speed			
Compressor Target Frequency	Routin A	Routin B	Routin C	Routin D
Freq=0	OFF	OFF	OFF	OFF
10 ≤ Freq < *OFLowFreq*	Low	Low	VL	Low
OFLowFreq ≤ Freq< *OFMedFreq*	Medium	Low	VL	Low
OFMedFreq≤ Freq	High	Low	Low	Medium



Note: Periorities A>B>C



*(*1) If State C, change to B*
If State B, change to A

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

11.1.8.2 Outdoor Fan Control for DCI72Z

OFAN operates between *OFMinRPM* to *OFMaxRPM*.
Min time for speed change of OFAN *OFMinTimeReduce* (60 seconds).
There are 4 defined speeds – High, Med, Low, and Very Low.
The actual OFAN speeds in cool mode are defined according to the following table:

Freq	Outdoor air temperature (OAT)											
	-10	-5	0	5	10	15	20	25	30	35	40	46
0	0	0	0	0	0	0	0	0	0	0	0	0
15	80	100	120	130	220	340	460	580	600	730	730	730
25	130	140	160	190	250	380	600	610	670	730	740	750
35	160	180	210	250	330	470	730	730	730	730	780	800
45	205	230	260	320	440	600	730	730	730	730	800	850
55	250	280	310	390	550	730	730	730	730	730	800	850
65	275	315	355	470	640	730	730	730	730	730	800	850
75	300	350	400	550	730	730	730	730	730	730	800	850
85	*325*	*395*	*445*	*630*	*730*	*730*	*730*	*730*	*730*	*730*	*800*	*850*
95	*350*	*440*	*490*	*710*	*730*	*730*	*730*	*730*	*730*	*730*	*800*	*850*

The actual OFAN speeds in heat mode are defined according to the following table

Freq	Outdoor air temperature (OAT)						
	-15	-7	0	7	14	21	24
0	0	0	0	0	0	0	0
15	***850***	***850***	***750***	***750***	500	350	300
25	***850***	***850***	***750***	***750***	520	370	320
35	***850***	***850***	***750***	***750***	540	390	340
45	***850***	***850***	***750***	***750***	560	410	360
55	***850***	***850***	***750***	***750***	580	430	380
65	***850***	***850***	***750***	***750***	600	450	400
75	***850***	***850***	***750***	***750***	620	470	420
85	***850***	***850***	***750***	***750***	640	490	440
95	***850***	***850***	***750***	***750***	650	500	450

The fan speed is also related to protections and OMT value.

11.1.9 EEV (Electronic Expansion Valve) Control

11.1.9.1 EEV Control for DCI25/35/50/60

EEV opening is defined as EEV = EEV_{OL} + EEV_{CV}
EEV_{OL} is the initial EEV opening as a function of the compressor frequency, operation mode, unit model and capacity.
EEV_{CV} is a correction value for the EEV opening that is based on the compressor temperature. During the first 5 minutes of compressor operation EEV_{CV} = 0.
Once the first 5 minutes are over, the correction value is calculated as follow: $EEV_{CV}(n) = EEV_{CV}(n-1) + EEV_{CTT}$
EEV_{CTT} is the correction based on the compressor temperature. A target compressor temperatureɜs set depending on frequency and outdoor air temperature, and the actual compressor temperature is compared to the target temperature to set the required correction to the EEVopening.

11.1.9.2 EEV Control for DCI72Z

The target EEV value is the sum of open loop value (OL) and a result of the accumulative correction values (CV).

$$EEV = EEV_{OL} + \sum EEV_{CV}$$

Initial EEV value is set according to compressor frequency and according to indoor and outdoor model
The corrective value is calculate every 30 sec the EEV corrective value is set to keep the discharged super heat temperature between 20º to 30º in cooling and 12º to 20º in heating.

11.1.10 RV(Reversing Valve) Control

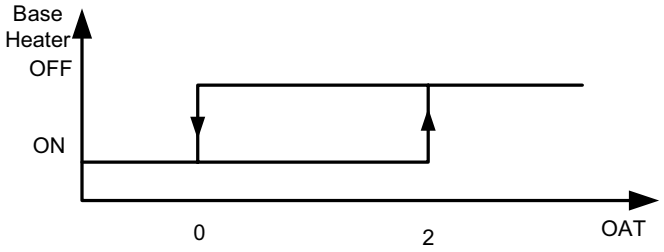
Reversing valve is on in heat mode.
Switching of RV state is done only after compressor is off for over 3 minutes.

11.1.10.1 Ioniser Control

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

11.1.10.2 Base Heater Control

The base heater will be working only when RV is “ON” according to the following graph:



When OAT is faulty the base heater will be “ON” continuously in HEAT mode.

11.1.11 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.

11.1.12 Cool Mode

NLOAD is calculated according to the difference between actual room temperature and user set point temperature by **fuzzy** 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.

11.1.13 Heat Mode

NLOAD is calculated according to the difference between actual room temperature and user set point temperature by **fuzzy** 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.

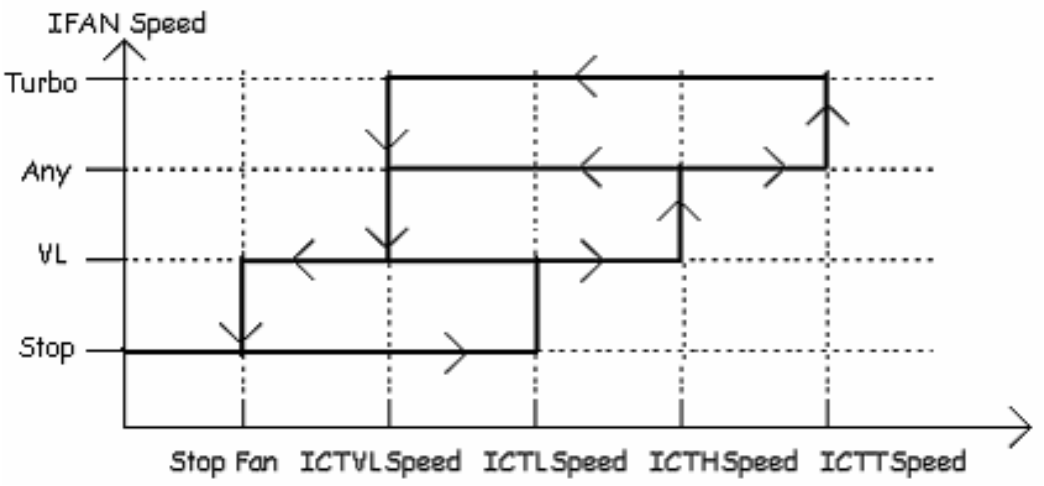
11.1.11.1 Temperature Compensation

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

Model	J2 Shorted	J2 Opened
Cassette	Compensation Enabled	Compensation Disabled
Ducted	Compensation Enabled	Compensation Disabled

11.1.11.2 Indoor Fan Control in Heating Mode

Indoor fan speed depends on the indoor coil temperature:



11.1.14 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 (.T).
Unit will switch from cool to heat when compressor is off for 3 minutes, and .T < -3.
Unit will switch from heat to cool when compressor is off for 5 minutes, and .T < -3.

11.1.15 Dry Mode

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

11.1.16 Protections

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

11.1.16.1 Indoor Coil Defrost Protection — CN

Min(ICT,ICTE)	Trend				
	Fast Increasing	Increasing	No Change	Decreasing	Fast Decreasing
< -2	SC	SC	SC	SC	SC
[-2, 0)	D1	D1	D2	D2	D2
[0, 2)	SR	SR	D1	D2	D2
[2, 4)	SR	SR	SR	D1	D2
[4, 6)	Norm	Norm	SR	SR	D1
[6, 8]	Norm	Norm	Norm	SR	SR
> 8	Norm				

11.1.16.2 Indoor Coil Defrost Protection — CN

ICT	Trend				
	Fast Increasing	Increasing	No Change	Decreasing	Fast Decreasing
< -2	SC	SC	SC	SC	SC
[-2, 0)	D1	D1	D2	D2	D2
[0, 2)	SR	SR	D1	D2	D2
[2, 4)	SR	SR	SR	D1	D2
[4, 6)	Norm	Norm	SR	SR	D1
[6, 8]	Norm	Norm	Norm	SR	SR
> 8	Norm				

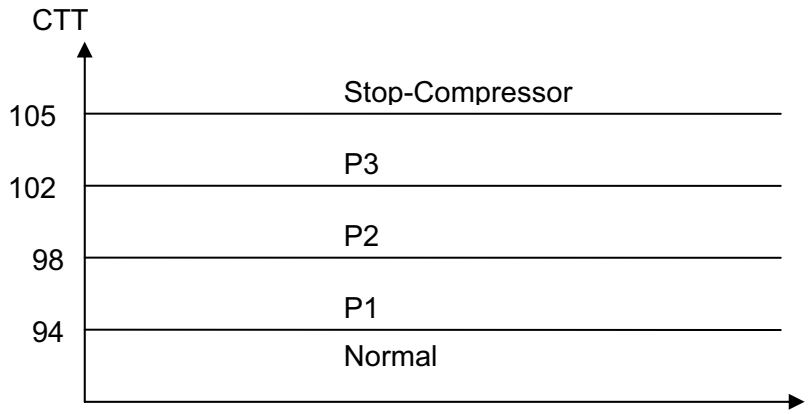
11.1.16.3 Indoor Coil Overheating Protection

ICT	ICT Trend				
	Fast Decreasing	Decreasing	No Change	Increasing	Fast Increasing
>62	SC	SC	SC	SC	SC
[60, 62)	D1	D1	D2	D2	D2
[55, 60)	SR	SR	D1	D2	D2
[52, 55)	SR	SR	SR	D1	D2
[48, 52)	Norm	Norm	SR	SR	D1
[45, 48)	Norm	Norm	Norm	SR	SR
I<45	Norm				

11.1.17 Compressor Overheating Protection

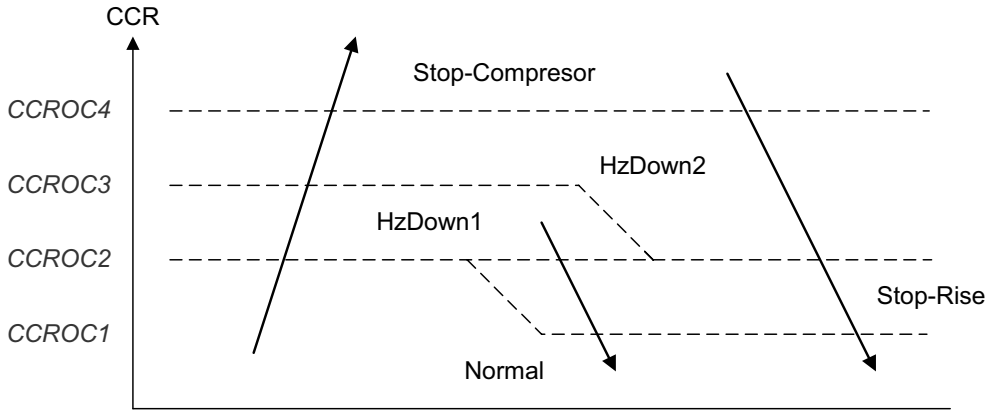
11.1.17.1 Compressor Overheating Protection for DCI25/35/50/60/72Z

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



Control Status	Compressor Temperature Increases	Else
P1	Normal	Stop Rise
P2	HzDown 1	Stop Rise
P3	HzDown 2	HzDown 1
Stop Compressor	Stop Compressor	

11.1.17.2 Compressor Over Current Protection Only For DCI25/35/50/60/72Z



11.1.18 Heat Sink Overheating Protection

11.1.08.1 Heat Sink Overheating Protection For DCI25/35/50/60/72Z

HST	HST Trend				
	Fast Decreasing	Decreasing	No Change	Increasing	Fast Increasing
≥ 90	SC	SC	SC	SC	SC
[85, 90)	D1	D1	D2	D2	D2
[82, 85)	SR	SR	D1	D2	D2
[80, 82)	SR	SR	SR	D1	D1
[78 , 80)	Norm	Norm	Norm	SR	SR
< 78	Norm				

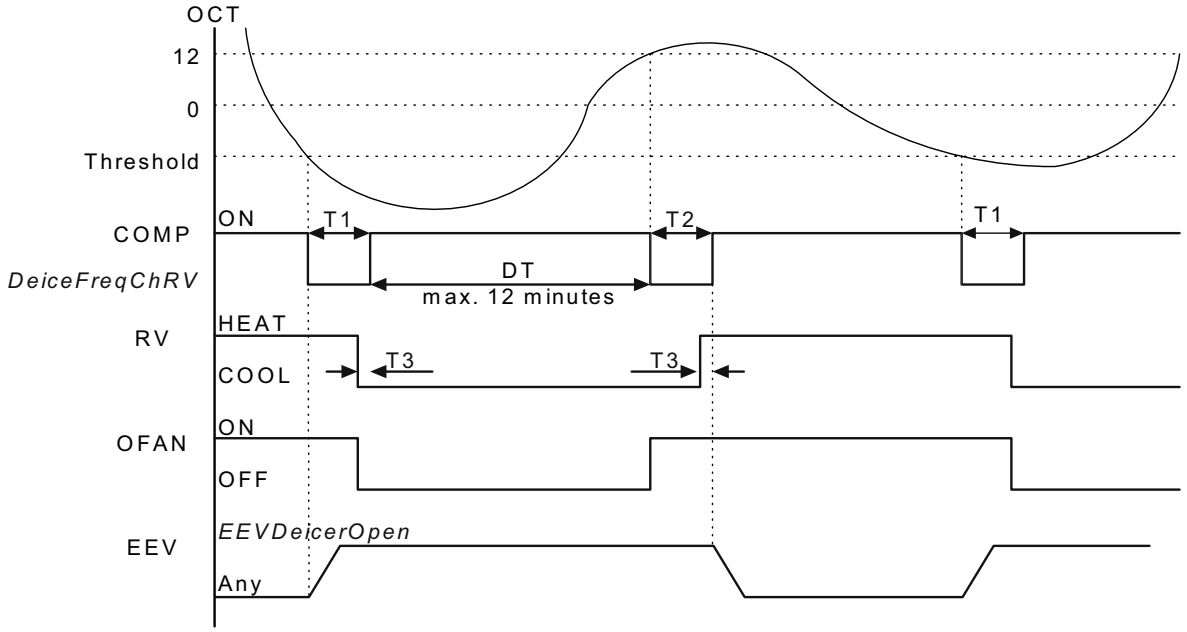
11.1.19 Outdoor Coil Deicing Protection

11.1.19.1 Outdoor coil Deicing Protection For DCI25/35/50/60/72Z

- Entering Deicing Conditions

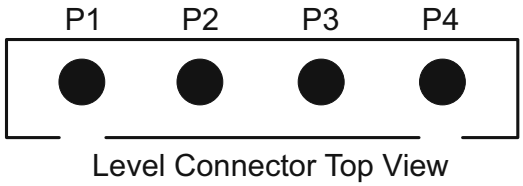
Deicing operation will start when either one of the following conditions exist:
Case 1: OCT < OAT – 8 AND TLD > DI
Case 2: OCT < OAT – 12 AND TLD > 30 minutes.
Case 3: OCT is Invalid AND TLD > DI
Case 4: Unit is just switched to STBY AND OCT < OAT – 8
Case 5: NLOAD = 0 AND OCT < OAT -8
Case 6: OCT<-19 AND TLD>*60* minutes
All this condition will exist during 10 seconds
OCT – Outdoor Coil Temperature
OAT – Outdoor Air Temperature
TLD – Time from Last Deicing
DI – Deicing Interval (Time Interval Between Two Deicing)
Deicing interval time when compressor is first started in heat mode, is 10 minutes if OCT < -2, and is 40 minutes in other cases.
Deicing interval time is changed (increased/ decreased in 10 minutes steps) as a function of deicing time. If deicing time is shorter then former deicing time, the deicing interval time will be increased. If deicing time is longer then former deicing time, the deicing interval time will be decreased.

- Deicing Operation Procedure



T1=60 secondes;T2=36 secondes;T3=6 secondes
T1=50 secondes;T2=36 secondes;T3=6 secondes

11.1.20 Condensate Water Over Flow Protection



Level Connector Top View

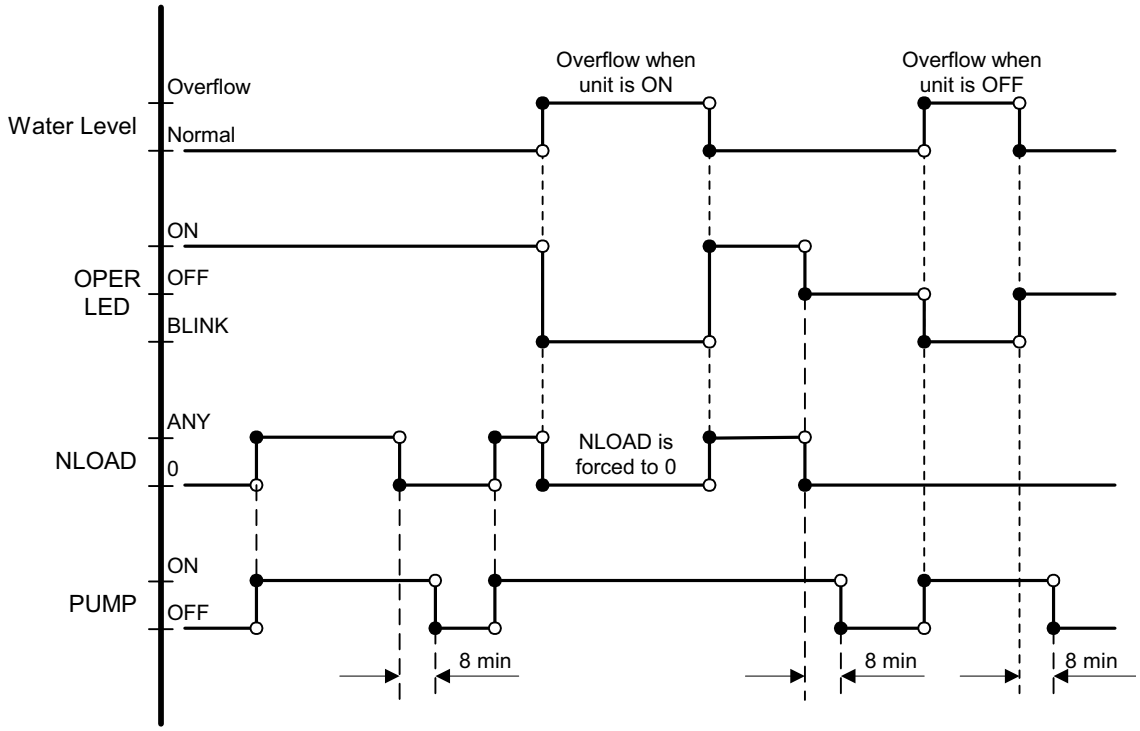
Each of the pins P1, P2, P3 can have two options:
1 – When it is shorted with P4
0 – When it is not shorted to P4

P1	P2	P3	Level
Don't care	Don't care	1	Normal
Don't care	Don't care	0	Overflow

(*) 1- Pin P1, P2, or P3 is connected to P4.

0- Pin P1, P2 or P3 is not connected to P4.

For CN unit:
In case of vertical installation, change dipswitch 7 to OFF position to cancel Water Pump operation.



11.1.21 Operating the Unit from Mode Button (On display)

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

11.1.22 On Unit Controls and Indicators

11.1.22.1 Indoor Unit controller Controls and Indicatiors for All Models Except for Floor/Ceiling model

During OFF, Fan, Cool, Heat, Dry, and Auto modes (for operation in other modes, see at the relevant spec paragraph):

STAND BY/OPERATION INDICATOR	● Lights up when the Air Conditioner is connected to power and ready to receive the R/C commands ● Lights up during operations. Blinks when compressor is stopped as a result of a thermodynamic protection.
ESF/INOIZER INDICATOR	● Lights up during ESF/ ionizer operation.
TIMER INDICATOR	● Lights up during Timer and Sleep operation.
FILTER INDICATOR	● Lights up when Air Filter needs to be cleaned.
MODE/RESET BUTTON	● Every short pressing , the next operation mode is selected, in this order : SB → Cool Mode → Heat Mode → SB → … ● Press to turn off the filter indicator and to reset the filter function, after the cleaned filter has been reinstalled. ● In long pressing the system enters into diagnostic mode.

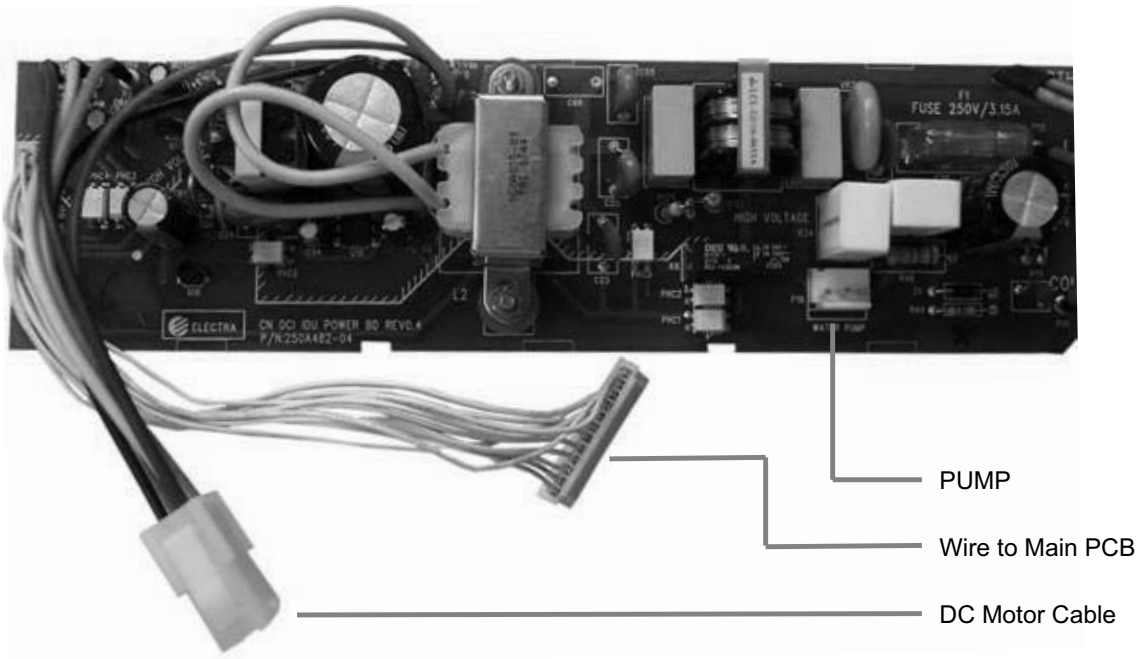
11.1.22.2 Outdoor Unit controller Indicatiors

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

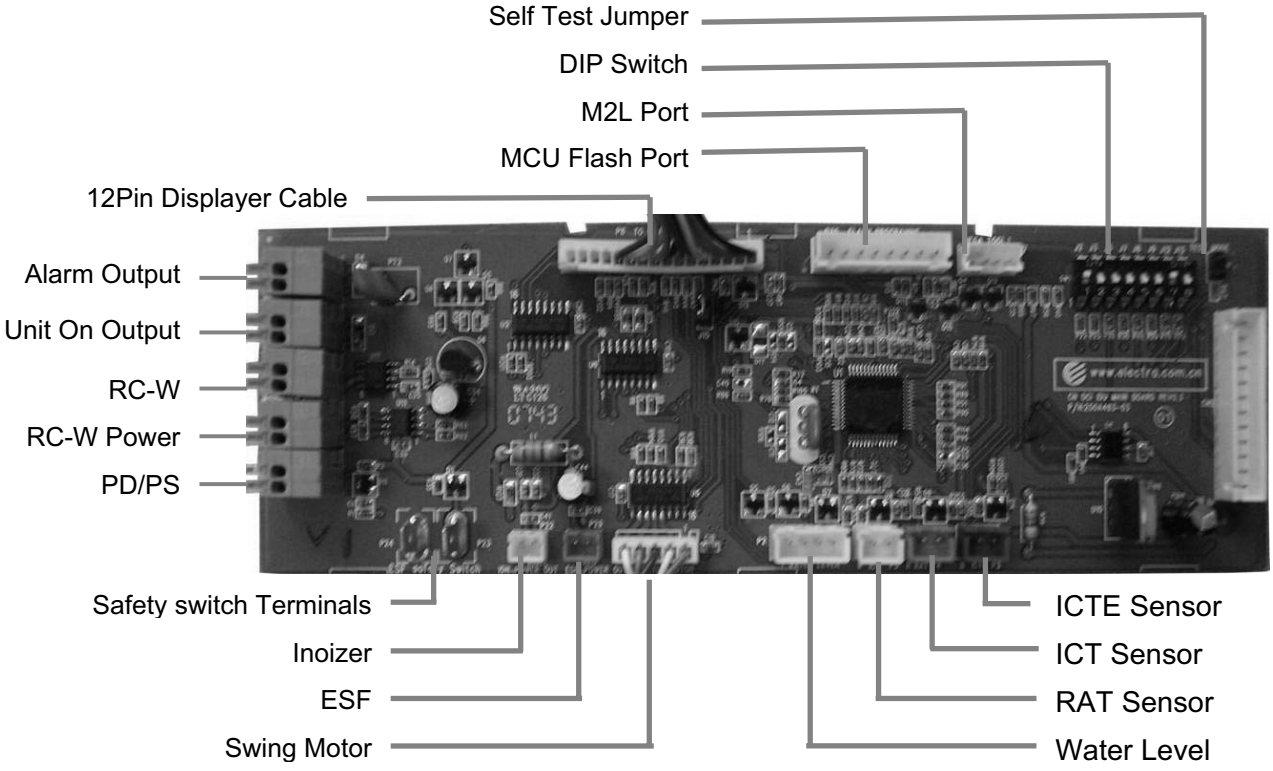
11.1.23 DIP switch settings

Indoor Unit Controller

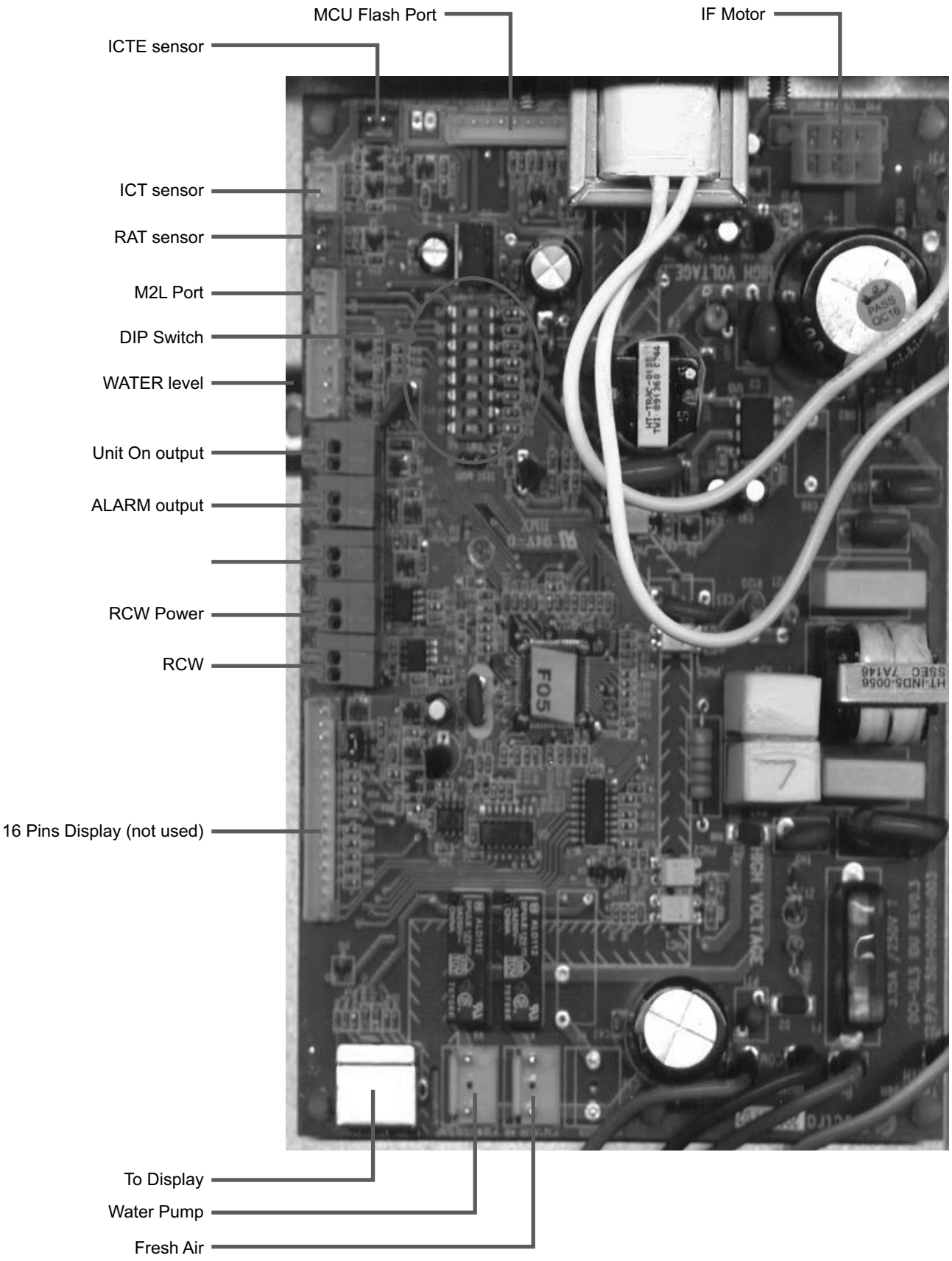
11.1.23.1 Power PCB - CN



11.1.23.2 Main PCB - CN



11.1.23.3 Main PCB − CN



11.1.24 Self Test Jumper(J1))

- Jumper for production line only, never install jumper on site!

11.1.25 DIP Switch and Jumper Settings

- CN - Dip switch default setting for each model

DIP / MODEL / J	1	2	3	4	5	6	7	8
	J2	J3	J6	J7	J8	J9	J12	J13
2.5 KW	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF
3.5 KW	ON	OFF	OFF	ON	OFF	OFF	ON	OFF
5.0 KW	ON	ON	OFF	OFF	OFF	OFF	ON	OFF
6.0 KW	ON	ON	OFF	ON	OFF	OFF	ON	OFF
7.0 KW	ON	ON	OFF	OFF	ON	OFF	ON	OFF

- CN - Dip switch default setting for each model

DIP / MODEL / J	1	2	3	4	5	6	7*	8**
	J2	J3	J5	J7	J8	J9	J10	J12
2.5 KW	ON	OFF	OFF	ON	OFF	OFF	ON	OFF
3.5 KW	ON	OFF	OFF	OFF	ON	OFF	ON	OFF
5.0 KW	ON	OFF	OFF	ON	ON	OFF	ON	OFF
6.0 KW	ON	ON	OFF	OFF	OFF	OFF	ON	OFF
7.0 KW	ON	ON	OFF	ON	OFF	OFF	ON	OFF

*Water pump and float switch setting
In case of vertical installation, change dipswitch 7 to OFF position to cancel their operation.

**High external static pressure
There is an option of increasing the airflow if the ESP (external static pressure) is higher than planned. To increase the speed change dipswitch 8 to ON position.

- **Compensation setting (Factory setting)**

This setting activates the compensation to the return air temperature in heating mode. For indoor unit like cassette, the DIP switch J2 should be ON.

Compensation	J2
Activated(factory setting)	ON
Deactivated	OFF

- **Unit model setting (Factory setting)**

The unit model setting should be in accordance with the unit model on the nameplate. The unit operating parameters will be improper with wrong settings.

Unit model(Capacity)	J3	J6	J7	J8
2.5kW model	OFF	OFF	OFF	OFF
3.5kW model	OFF	OFF	ON	OFF
5.0kW model	ON	OFF	OFF	OFF
6.0kW model	ON	OFF	ON	OFF
7.0kW model	ON	OFF	OFF	ON

- **Presence Detector/Power Shedding Selection**

Select the functions of dry contact PD/PS by setting the Dip switch J9

Selection	J9
Presence Detector	OFF
Power Shedding	ON

- **Installation of height compensation settings (By installer)**

The compensation settings according to installation height should be set by using the dip switch J12, J13 on the controller PCB

Installation Height	J12	J13	Installation height
H0	OFF	OFF	2.1-2.7m
H1(Factory setting)	ON	OFF	2.7-3.3m
H2	OFF	ON	>3.3m
H3	ON	ON	Reserved

Compensation data according to the installation height

Installation Height	**Speed Compensation for Heating Mode**		**Speed Compensation for other Modes**		Temperature compensation in heating mode	
	CN	**CN**	**CN**	**CN**	CN	CN
H0	-50	0	-50	0	*4*	*2*
H1	0	*150*	0	*150*	*4*	*2*
H2	100	*150*	100	*150*	*6*	*2*
H3	150	*150*	150	*150*	*7*	*2*

IDU Diagnostic Table.

- **Alarm Output**

The Alarm Output dry contact will be on (closed), when a predefined set faults occur.
The fault set is defined under diagnostics section.
The alarm output will be off (open), when the predefined fault is cleared.
The indoor alarm outputs are defined according to the following IDU Diagnostic Table:

No	Problem	AO	5	4	3	2	1
1	ICT is disconnected	Yes	0	0	0	0	1
2	ICT is shorted	Yes	0	0	0	1	0
3	RAT is disconnected	Yes	0	0	0	1	1
4	RAT is shorted	Yes	0	0	1	0	0
5	Reserved (for MSMP used as RGT fault)	No	0	0	1	0	1
*6	ICTE shorted/disconnected (when enabled)	Yes	0	0	1	1	0
7	Undefined IDU family/model	Yes	0	0	1	1	1
8	No Communication	Yes	0	1	0	0	0
9	No Encoder	No	0	1	0	0	1
10	Reserved	No	0	1	0	1	0
11	Outdoor Unit Fault	No	0	1	0	1	1
…	Reserved	No					
17	Defrost protection	No	1	0	0	0	1
18	Deicing Protection	No	1	0	0	1	0
19	Outdoor Unit Protection	No	1	0	0	1	1
20	Indoor Coil HP Protection	No	1	0	1	0	0
21	Overflow Protection	Yes	1	0	1	0	1
22	Reserved	No					
24	EEPROM Not Updated	No	1	1	0	0	0
25	Bad EEPROM	No	1	1	0	0	1
26	Bad Communication	No	1	1	0	1	0
27	Using EEPROM data	No	1	1	0	1	1
28	Model A	No	1	1	1	0	0
29	Model B	No	1	1	1	0	1
30	Model C	No	1	1	1	1	0
31	Model D	No	1	1	1	1	1

* CN Unit only

OUD Diagnostic Table

AO - Alarm output

No	Problem	AO	5	4	3	2	1
1	OCT is disconnected	Yes	0	0	0	0	1
2	OCT is shorted	Yes	0	0	0	1	0
3	CTT is disconnected	Yes	0	0	0	1	1
4	CTT is shorted	Yes	0	0	1	0	0
5	HST is disconnected (when enabled)	Yes	0	0	1	0	1
6	HST is shorted (when enabled)	Yes	0	0	1	1	0
7	OAT is disconnected (when enabled)	Yes	0	0	1	1	1
8	OAT is shorted (when enabled)	Yes	0	1	0	0	0
9	TSUC is disconnected (when enabled)	Yes	0	1	0	0	1
10	TSUC is shorted (when enabled)	Yes	0	1	0	1	0
11	IPM Fault	Yes	0	1	0	1	1
12	Bad EEPROM	No	0	1	1	0	0
13	DC under voltage	Yes	0	1	1	0	1
14	DC over voltage	Yes	0	1	1	1	0
15	AC under voltage	Yes	0	1	1	1	1
16	Mismatch IDU & ODU models (*SW 35V14 and above)	Yes	1	0	0	0	0
17	No Communication	Yes	1	0	0	0	1
18	Reserved	No	1	0	0	1	0
20	Heat sink Over Heating	No	1	0	1	0	0
21	Deicing	No	1	0	1	0	1
22	Compressor Over Heating	No	1	0	1	1	0
23	Compressor Over Current	No	1	0	1	1	1
24	No OFAN FeedbaCN	No	1	1	0	0	0
25	OFAN loCNed	Yes	1	1	0	0	1
26	Compressor LoCN	Yes	1	1	0	1	0
27	Bad Communication	No	1	1	0	1	1
28	Missing ODU configuration (*SW 35V14 and above)	Yes	1	1	1	0	0
29	Undefined ODU Model (*SW 35V14 and above)	Yes	1	1	1	0	1
30	For future use	No	1	1	1	1	0
31	Operation condition is exceeded (*SW 35V14 and above)	Yes	1	1	1	1	1

*Alarm Output - is on SW 35V14 and above. There is no alarm on SW 35V12 and below/

- **Unit ON Output**

The ‘On/Off status’ dry contact will be on (closed), when the indoor mode is not STBY.
If the indoor mode is STBY mode, the ‘On/Off status’ will be off (open).

- **PD/PS(Presence Detector/Power Shedding)**

	Function	Contact=open	Contact=short
J9=open	Presence Detector Connection	Last Mode	Force to STBY
J9=short	Power Shedding Function	No limit	Limit NLOAD

11.1.25 Outdoor Unit Controller

11.1.25.1 Outdoor Unit Controller - Jumper setting

JP9 Jumper Layout

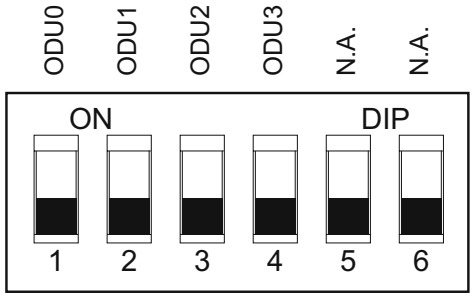
Reserved *(PIN 9)*	**ODU3** *(PIN 7)*	**ODU2** *(PIN 5)*	**ODU1** *(PIN 3)*	**ODU0** *(PIN 1)*
GND *(PIN 10)*	**GND** *(PIN 8)*	**GND** *(PIN 6)*	**GND** *(PIN 4)*	**GND** *(PIN 2)*

11.1.26 ODU Model Selection

ODU3	ODU2	ODU1	ODU0	ODU Model
OFF	OFF	OFF	ON	A (Single DCI 25)
OFF	OFF	ON	OFF	B (Single DCI 35)
OFF	OFF	ON (PIN3 & PIN4)	ON (PIN1 & PIN2)	C (Single DCI 50)
OFF	ON (PIN5 & PIN6)	OFF	OFF	D (Single DCI 60)
ON (PIN7 & PIN8)	ON (PIN5 & PIN6)	OFF	OFF	L (Single DCI 72Z)

11.1.27 Outdoor Unit Controller

11.1.27.1 Outdoor Unit Controller - DIP Switch setting



ODU MODEL SETTING

ODU3	ODU2	ODU1	ODU0	ODU MODEL
OFF	OFF	OFF	ON	DCI 25
OFF	OFF	ON	OFF	DCI 35
OFF	OFF	ON	ON	DCI 50
OFF	ON	OFF	OFF	DCI 60
ON	ON	OFF	OFF	DCI 72Z

11.2 Test Mode

11.2.1 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/-2), Outdoor temperature = 35(+2/-1)
Or
Mode = Heat, Set point = 30, Room temperature = 20±1, Outdoor temperature = 7±(+1/-2)
Manually when entering diagnostics with the following settings:
Mode = Cool, Set point = 16
Mode = Heat, Set point = 30

11.2.3 Unit Operation in Test Mode

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

Indoor FAN Speed Setting	Unit Setting
Low	Minimum Capacity Setting
Turbo	Nominal Capacity Setting
Auto	Maximum Capacity Setting

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

11.3 Parameters

11.3.1 General Parameters for all models

#	Name	Values(Factory Setting)
1	*CVStep*	0
2	*Cool2Heat*	3
3	*Heat2Cool*	3
4	*ICTDef1*	8
5	*ICTDef2*	6
6	*ICTDef3*	4
7	*ICTDef4*	2
8	*ICTDef5*	0
9	*ICTDef6*	-2
10	*ICTDeltaDef1*	1
11	*ICTDeltaDef2*	-1
12	*ICTDeltaOH1*	-1
13	*ICTDeltaOH2*	1
14	*FLTRTime*	1023
15	*PITconst*	30
16	*STARTTIMETURBOH*	10
17	*IFANOffTimeDry*	3
18	*IFANOnTimeDry*	1
19	*ICTLowLimitDry*	10
20	*ICTHighLimitDry*	12
21	*ExtraNLOADDry*	20
22	*IFANMAXTimeH*	150
23	*IFANOffTimeH*	4
24	*IFANOnTimeH*	3
25	*IFANTimeHeat2STBY*	30
26	*MAXTURBOTIMEF*	30
27	*MAXTURBOTIMEC*	30
28	*MAXTURBOTIMEH*	30

11.3.2 Family Dependent Parameter

#	Name	CN_A	CN_B	CN_A	CN_B
1	*BasicCV1*	***4***	***4***	*2*	*2*
2	*BasicCV2*	***4***	***4***	*2*	*2*
3	*BasicCV3*	***6***	***6***	*2*	*2*
4	*BasicCV4*	***7***	***7***	*2*	*2*
5	*Max_Swg*	***40***	***40***	*NA*	*NA*
6	*Min_H_Angle*	*5*	*5*	*NA*	*NA*
7	*Max_H_Angle*	*40*	*40*	*NA*	*NA*
8	*Min_C_Angle*	*5*	*5*	*NA*	*NA*
9	*Max_C_Angle*	*40*	*40*	*NA*	*NA*
10	*MTR_Cls_Dir*	*C*	*C*	*NA*	*NA*
11	*MTR_Cls_Dir_V*	*C*	*C*	*NA*	*NA*
12	*Max_Angle_V*	*NA*	*NA*	*NA*	*NA*
13	*Min_Angle_V*	*NA*	*NA*	*NA*	*NA*
14	*Max_Swg_V*	*NA*	*NA*	*NA*	*NA*
15	*IFSPCHNA*	*10*	*10*	*10*	*10*
16	*IFSPCHND*	*4*	*4*	*10*	*10*
17	*IFSPCHAA*	*6*	*6*	*6*	*6*
18	*IFSPCHAD*	*4*	*4*	*6*	*6*
19	*IFSTARTSPEED*	*670*	*670*	*670*	*670*
20	*ICTSTSpeed*	*25*	*25*	*25*	*25*
21	*ICTVLSpeed*	*28*	*28*	*28*	*28*
22	*ICTLSpeed*	*30*	*30*	*30*	*30*
23	*ICTHSpeed*	*32*	*32*	*32*	*32*
24	*ICTTSpeed*	*40*	*40*	*35*	*35*
25	*NLOADHForcedValue*	*60*	*60*	*60*	*60*
26	*ICTOH1*	*45*	*45*	*49*	*49*
27	*ICTOH2*	*48*	*48*	*51*	*51*
28	*ICTOH3*	*52*	*52*	*53*	*53*
29	*ICTOH4*	*55*	*55*	*55*	*55*
30	*ICTOH5*	*60*	*60*	*60*	*60*
31	*ICTOH6*	*62*	*62*	*62*	*62*
32	*ICTEEnable*	*1*	*1*	*0*	*0*

11.3.3 Indoor Model Parameters:

Indoor Family	CN_A		CN_B			CN_A			CN_B	
Indoor Model / Parameter	A (CN25)	B (CN 35)	A (CN50)	B (CN 60)	C (CN72)	A (CN25)	B (CN35)	C (CN50)	A (CN60)	B (CN72)
IFVLOWC	250	300	450	500	550	670	690	800	900	900
IFLOWC	450	450	550	600	650	740	730	860	960	980
IFMEDC	500	520	620	660	700	810	860	980	1050	1050
IFHIGHC	550	600	680	720	750	920	980	1100	1170	1200
IFTURBOC	650	700	800	900	1000	960	1060	1170	1240	1280
IFVLOWH	250	300	450	500	550	670	690	800	900	900
IFLOWH	450	450	550	600	650	740	730	860	960	980
IFMEDH	520	550	620	660	700	810	860	980	1050	1050
IFHIGHH	600	650	680	720	750	920	980	1100	1170	1200
IFTURBOH	650	700	850	950	1000	960	1060	1220	1240	1280
Cap .Group	0	1	3	3	4	0	1	3	3	4
NomLoadC	40	62	66	81	62	40	60	64	79	54
NomLoadH	52	67	67	81	57	57	70	73	82	57
MaxNLOADIF1C	47	42	55	56	50	127	127	127	127	127
MaxNLOADIF2C	70	60	78	81	70	127	127	127	127	127
MaxNLOADIF3C	127	127	127	127	127	127	127	127	127	127
MaxNLOADIF4C	127	127	127	127	127	127	127	127	127	127
MaxNLOADIF5C	127	127	127	127	127	127	127	127	127	127
IFAN_SPEED_COMP0_C	-50	-50	-50	-50	-50	0	0	0	0	0
IFAN_SPEED_COMP1_C	0	0	0	0	0	150	150	150	150	150
IFAN_SPEED_COMP2_C	100	100	100	100	100	150	150	150	150	150
IFAN_SPEED_COMP3_C	150	150	150	150	150	150	150	150	150	150
IFAN_SPEED_COMP0_H	-50	-50	-50	-50	-50	0	0	0	0	0
IFAN_SPEED_COMP1_H	0	0	0	0	0	150	150	150	150	150
IFAN_SPEED_COMP2_H	100	100	100	100	100	150	150	150	150	150
IFAN_SPEED_COMP3_H	150	150	150	150	150	150	150	150	150	150
ModelEnable	1	1	1	1	1	1	1	1	1	1

11.3.4 Outdoor Parameters

General Parameters (for every software):

#	Name	Default Value
1	*MinOFFTime*	3
2	*MinONTime*	3
3	*OFSPCH*	4
4	*Down1*	3
5	*Down2*	10
6	*DImin*	30
7	*DImax*	120
8	*TimeD*	1
9	*DTmin*	2
10	*DTmax*	12
11	*DIT*	10
12	*CTMRUP*	15
13	*DIF*	30
14	*TCT*	10
15	*HSTOH1*	78
17	*HSTOH2*	80
18	*HSTOH3*	82
19	*HSTOH4*	85
20	*HSTOH5*	90
21	*HSTOHDelta1*	-1
22	*HSTOHDelta2*	1
23	*EEVCVTConst*	30
24	*BalanceTime*	5
25	*EEVInitOpen*	300

11.3.5 ODU Model Dependent Parameters (35V12)

#	Parameter \ Outdoor Model	A Single DCI-25	B Single DCI-35	C Single DCI-50	D Single DCI 60
1	*MinFreqC*	30	33	20	20
2	*MaxFreqC*	64	80	85	95
3	*MinFreqH*	30	35	20	26
4	*MaxFreqH*	81	93	95	94
5	*NormAccel*	1	1	1	1
6	*NormDecel*	1	1	1	1
7	*Step1Freq*	60	60	60	60
8	*Step2Freq*	70	70	70	70
9	*Step3Freq*	90	90	90	90
10	*OFVL*	20	20	20	20
11	*OFLOWC*	55	55	60	55
12	*OFMEDC*	70	70	76	70
13	*OFMAXC*	83	83	92	79
14	*OFLOWH*	55	55	60	55
15	*OFMEDH*	70	70	83	70
16	*OFMAXH*	83	83	100	79
17	*OFANTESTMODEC*	83	83	92	83
18	*OFANTESTMODEH*	83	83	100	83
19	*OFDelTestMode*	20	20	28	28
20	*CTTOH1*	94	94	94	94
21	*CTTOH2*	98	98	98	98
22	*CTTOH3*	102	102	102	102
23	*CTTOH4*	105	105	105	105
24	*CCROC1*	7.1	7.1	10	11.4
25	*CCROC2*	7.5	7.5	10.5	11.8
26	*CCROC3*	7.9	7.9	10.8	12.2
27	*CCROC4*	8.3	8.3	11.2	12.6
28	*DEICT1*	60	60	60	60
29	*DEICT2*	36	36	36	36
30	*DEICT3*	6	6	6	6
31	*ProtFreqLimit*	60	60	60	60
32	*EEVDecierOpen*	180	180	100	180
33	*OptimDeicFreq*	90	90	90	90
34	*EEVMinOperOpenC*	50	50	50	80
35	*EEVMaxOperOpenC*	380	380	380	380
36	*EEVMinOperOpenH*	50	50	50	60
37	*EEVMaxOperOpenH*	300	300	380	300
38	*EEVNormRate*	33	33	33	33
39	*EEVHighRate*	12	12	12	12
40	*EEVMaxOpen*	500	500	500	500
41	*OFLowFreqC*	45	45	40	35
42	*OFMedFreqC*	57	57	70	55
43	*OFLowFreqH*	45	45	40	40
44	*OFMedFreqH*	57	57	86	60
45	*HeaterDisableFlag*	0	0	0	0
46	*DeiceFreqChRV*	0	0	0	0
47	*OATRefC*	35	35	35	35
48	*SUCT Enable*	0	0	0	0
49	*HST Enable*	0	0	1	1
50	*OAT Enable*	1	1	1	1
51	*OATRefH*	7	7	7	7
52	*MinTargCTTC*	30	30	30	30
53	*MaxTargCTTC*	95	95	95	90
54	*MinTargCTTH*	40	40	40	45
55	*MaxTargCTTH*	95	95	95	90
56	*DST*	8	8	8	8
57	*DSTF*	12	12	12	12
58	*OATLimitC*	24	24	28	28
59	*OATLimit1H*	6	6	6	6
60	*OATLimit2H*	15	15	15	15
61	*MaxFreqAsOATC*	50	50	64	85
62	*MaxFreqAsOAT1H*	65	75	85	80
63	*MaxFreqAsOAT2H*	60	60	60	60

11.3.6 ODU Model Dependent Parameters (35V14)

#	Parameter \ Outdoor Model	A Single DCI-25	B Single DCI-35	C Single DCI-50	D Single DCI 60
1	*MinFreqC*	30	33	20	20
2	*MaxFreqC*	64	80	85	95
3	*MaxFreqCRunPhase*	64	80	85	95
4	*MinFreqH*	30	35	20	26
5	*MaxFreqH*	81	93	95	94
6	*MaxFreqHRunPhase*	81	93	95	94
7	*LoadDeadZoneC*	90	95	95	111
8	*LoadDeadZoneH*	127	127	127	127
9	*NormAccel*	1	1	1	1
10	*NormDecel*	1	1	1	1
11	*Step1Freq*	60	60	60	60
12	*Step2Freq*	70	70	70	70
13	*Step3Freq*	90	90	90	90
14	*OFVL*	20	20	20	20
15	*OFLOWC*	55	55	60	55
16	*OFMEDC*	70	70	76	70
17	*OFMAXC*	83	83	92	79
18	*OFLOWH*	55	55	60	55
19	*OFMEDH*	70	70	83	70
20	*OFMAXH*	83	83	100	79
21	*OFANTESTMODEC*	83	83	92	83
22	*OFANTESTMODEH*	83	83	100	83
23	*OFDelTestMode*	20	20	28	28
24	*CTTOH1*	94	94	94	94
25	*CTTOH2*	98	98	98	98
26	*CTTOH3*	102	102	102	102
27	*CTTOH4*	105	105	105	105
28	*CCROC1*	7.1	7.1	10	11.4
29	*CCROC2*	7.5	7.5	10.5	11.8
30	*CCROC3*	7.9	7.9	10.8	12.2
31	*CCROC4*	8.3	8.3	11.2	12.6
32	*DEICT1*	60	60	60	60
33	*DEICT2*	36	36	36	36
34	*DEICT3*	6	6	6	6
35	*ProtFreqLimit*	60	60	60	60
36	*EEVDecierOpen*	180	180	100	180
37	*OptimDeicFreq*	90	90	90	90
38	*OCTExitDeicer*	12	12	12	12
39	*MaxDeicerTime*	12	12	12	12
40	*EEVMinOperOpenC*	50	50	50	80
41	*EEVMaxOperOpenC*	380	380	380	380
42	*EEVMinOperOpenH*	50	50	50	60
43	*EEVMaxOperOpenH*	300	300	380	300
44	*EEVNormRate*	33	33	33	33
45	*EEVHighRate*	12	12	12	12
46	*EEVMaxOpen*	500	500	500	500
47	*OFLowFreqC*	45	45	40	35
48	*OFMedFreqC*	57	57	70	55
49	*OFLowFreqH*	45	45	40	40
50	*OFMedFreqH*	57	57	86	60
51	*HeaterDisableFlag*	0	0	0	0
52	*DeiceFreqChRV*	0	0	0	0
53	*OATRefC*	35	35	35	35
54	*SUCT Enable*	0	0	0	0
55	*HST Enable*	1	1	1	1
56	*OAT Enable*	1	1	1	1
57	*OATRefH*	7	7	7	7
58	*MinTargCTTC*	30	30	30	30
59	*MaxTargCTTC*	95	95	95	90
60	*MinTargCTTH*	40	40	40	45
61	*MaxTargCTTH*	95	95	95	90
62	*DST*	8	8	8	8
63	*DSTF*	12	12	12	12
64	*OATLimitC*	24	24	28	28
65	*OATLimit1H*	6	6	6	6
66	*OATLimit2H*	15	15	15	15
67	*MaxFreqAsOATC*	50	50	64	85
68	*MaxFreqAsOAT1H*	65	75	85	80
68	*MaxFreqAsOAT2H*	60	60	60	60
69	*EnableExceedCond*	*0*	*0*	*0*	*0*

11.3.7 ODU Model Dependent Parameters (36V1-S01)

#	Parameter \ Outdoor Model	L Single DCI-72Z
1	MinFreqC	15
2	MaxFreqC	70
3	MinFreqH	15
4	MaxFreqH	90
7	Step1Freq	35
8	Step2Freq	55
9	Step3Freq	90
10	OFMinRPM	8
11	OFMaxRPM	90
12	NightRPM	65
13	OFNNoiseMaxRPM	78
14	CTTOH1	90
15	CTTOH2	95
16	CTTOH3	100
17	CTTOH4	105
18	CCROC1	12.5
19	CCROC2	11.3
20	CCROC3	14.1
21	CCROC4	14.9
22	ProtFreqLimit	60
23	EEVMinOperOpenC	50
24	EEVMaxOperOpenC	480
25	EEVMinOperOpenH	50
26	EEVMaxOperOpenH	480
27	HeaterDisableFlag	0
28	HST Enable	1
29	OATLimitC	25
30	OATLimit1H	4
31	OATLimit2H	15
32	MaxFreqAsOATC	60
33	MaxFreqAsOAT1H	68
34	MaxFreqAsOAT2H	57
35	NormAccel	1
36	NormDecel	1
37	OCTExitDeicer	12
38	MaxDeicerTime	15

12. 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 3 Min. to discharge the system.

Touching the controller before discharging may cause an electrical shoCN!!!

For safe handling of the controller please refer to section 12.6 below.

12.1 General DCI 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	CheCN power supply. If power supply is OK, cheCN 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	CheCN remote control batteries, if batteries are OK, cheCN 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 cheCN.
		Problem with PCB or capacitor	Change to high speed and CheCN power supply to motor is higher than 130VAC (for triaCN 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 12.3), and follow the actions described.
7	Compressor stops during operation and Green LED remains on	Electronic control or power supply problem	Perform diagnostics (See 12.3), 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	CheCN outdoor fan motor according to the procedure in section 12.5.3 , 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	CheCN RV power connections, if OK, CheCN 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	CheCN refrigeration system.
11	Compressor is over heated and unit does not generate capacity	EEV problem	CheCN EEV
12	Units goes into protections and compressor is stopped with no clear reason	Control problem or refrigeration system problem	Perform diagnostics (See 12.3), and follow the actions described.
13	Compressor motor is generating noise and no suction occurs	Phase order to compressor is wrong	CheCN compressor phase order.
14	Water leakage from indoor unit	Indoor unit drainage tube is bloCNed	CheCN and open drainage tube.
15	Freezing of outdoor unit in heat mode and outdoor unit base is bloCNed with ice		Connect base heater.
16	Unit operates with wrong fan speeds or wrong frequency	Wrong jumper settings	Perform diagnostics (See 12.3), and cheCN if units is operating by EEPROM parameters.

12.2 CheCNing the refrigeration system

CheCNing 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.

12.3 Judgment by Indoor/Outdoor Unit Diagnostics

Enter diagnostics mode - press for five seconds Mode button in any operation mode. ACNnowledgment is by 3 short beeps and lights of COOL and HEAT LED's. Then, every short pressing of Mode button will scroll between Indoor and Outdoor unit diagnostic modes by the aCNnowledgment of 3 short beeps and lighting of COOL and HEAT LED's.
During the Outdoor unit diagnostics all four Indoor LED's (STBY, Operate, Filter and Timer) are blinking. When Indoor diagnostics is displayed, all four 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 Heat & Cool LEDs. The coding method will be as follows:
Heat LED will blink 5 times in 5 seconds, and then will be shut off for the next 5 seconds. Cool LED will blink during the same 5 seconds according to the following Indoor / Outdoor unit tables:
Note: 0 – OFF, 1-ON

12.3.1 Indoor Unit Diagnostics

- **Alarm Output**

The Alarm Output dry contact will be on (closed), when a predefined set faults occur.
The fault set is defined under diagnostics section.
The alarm output will be off (open), when the predefined fault is cleared.
The indoor alarm outputs are defined according to the following table:

No	Problem	AO	5	4	3	2	1
1	ICT is disconnected	Yes	0	0	0	0	1
2	ICT is shorted	Yes	0	0	0	1	0
3	RAT is disconnected	Yes	0	0	0	1	1
4	RAT is shorted	Yes	0	0	1	0	0
5	Reserved (for MSMP used as RGT fault)	No	0	0	1	0	1
*6	ICTE shorted/disconnected (when enabled)	Yes	0	0	1	1	0
*7	Undefined IDU family/model	Yes	0	0	1	1	1
8	No Communication	Yes	0	1	0	0	0
9	No Encoder	No	0	1	0	0	1
10	Reserved	No	0	1	0	1	0
11	Outdoor Unit Fault	No	0	1	0	1	1
…	Reserved	No					
17	Defrost protection	No	1	0	0	0	1
18	Deicing Protection	No	1	0	0	1	0
19	Outdoor Unit Protection	No	1	0	0	1	1
20	Indoor Coil HP Protection	No	1	0	1	0	0
21	Overflow Protection	Yes	1	0	1	0	1
22	Reserved	No					
24	EEPROM Not Updated	No	1	1	0	0	0
25	Bad EEPROM	No	1	1	0	0	1
26	Bad Communication	No	1	1	0	1	0
27	Using EEPROM data	No	1	1	0	1	1

No	Problem	AO	5	4	3	2	1
28	Model A	No	1	1	1	0	0
29	Model B	No	1	1	1	0	1
30	Model C	No	1	1	1	1	0
31	Model D	No	1	1	1	1	1

* CN / LSN Units only

12.3.2 Indoor Unit Diagnostics and Corrective Actions

No.	Fault	Probable Cause	Corrective Action
1	Sensor failures of all types		CheCN 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.	CheCN Indoor to Outdoor wiring and grounding
4	No Encoder	Indoor electronics or motor	CheCN 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	CheCN Indoor to Outdoor wiring and grounding
9	Using EEPROM data	No problem. System is using EEPRRRROM parameters	

12.3.3 Outdoor Unit Diagnostics

The outdoor alarm outputs are defined in the following way:

No	Problem	AO	5	4	3	2	1
1	OCT is disconnected	Yes	0	0	0	0	1
2	OCT is shorted	Yes	0	0	0	1	0
3	CTT is disconnected	Yes	0	0	0	1	1
4	CTT is shorted	Yes	0	0	1	0	0
5	HST is disconnected (when enabled)	Yes	0	0	1	0	1
6	HST is shorted (when enabled)	Yes	0	0	1	1	0
7	OAT is disconnected (when enabled)	Yes	0	0	1	1	1
8	OAT is shorted (when enabled)	Yes	0	1	0	0	0
9	OMT is disconnected (DCI72 / 72Z / 80)	Yes	0	1	0	0	1

No	Problem	AO	5	4	3	2	1
10	OMT is shorted (DCI72 / 72Z / 80)	Yes	0	1	0	1	0
11	IPM Fault	Yes	0	1	0	1	1
12	Bad EEPROM	No	0	1	1	0	0
13	DC under voltage	Yes	0	1	1	0	1
14	DC over voltage	Yes	0	1	1	1	0
15	AC under voltage	Yes	0	1	1	1	1
16	Mismatch IDU & ODU models (*SW 35V14 and above)	Yes	1	0	0	0	0
17	No Communication	Yes	1	0	0	0	1
18	Reserved	No	1	0	0	1	0
20	Heat sink Over Heating	No	1	0	1	0	0
21	Deicing	No	1	0	1	0	1
22	Compressor Over Heating	No	1	0	1	1	0
23	Compressor Over Current	No	1	0	1	1	1
24	No OFAN FeedbaCN	No	1	1	0	0	0
25	OFAN loCNed	Yes	1	1	0	0	1
26	Compressor LoCN	Yes	1	1	0	1	0
27	Bad Communication	No	1	1	0	1	1
28	Missing ODU configuration (*SW 35V14 and above)	Yes	1	1	1	0	0
29	Undefined ODU Model (*SW 35V14 and above)	Yes	1	1	1	0	1
30	For future use	No	1	1	1	1	0
31	Operation condition is exceeded (*SW 35V14 and above)	Yes	1	1	1	1	1

*Alarm Output - is on SW 35V14 and above. There is no alarm on SW 35V12 and below/

12.3.4 Outdoor Unit Diagnostics and Corrective Actions

No.	Fault	Probable Cause	Corrective Action
1	Sensors failures of all types		CheCN sensors connections or replace sensors.
2	IPM Fault	Electronics HW problem	CheCN all wiring and jumper settings, if OK, replace electronics.
3	Bad EEPROM		No action, unless special parameters are required for unit operation.
4	DC under/over Voltage	Electronics HW problem	CheCN outdoor unit power supply voltage
5	AC under Voltage		CheCN outdoor unit power supply voltage
6	Indoor / Outdoor unit Communication mis-match	Indoor and Outdoor controllers are with different versions	Replace Indoor controller
7	No Communication	Communication or grounding wiring is not good.	CheCN Indoor to Outdoor wiring and grounding

No.	Fault	Probable Cause	Corrective Action
8	Compressor LoCN		Switch unit to STBY and restart If still not ok cheCN compressor (12.5.4) If comp is ok replace OU controller If compressor is not ok replace compressor
9	Bad Communication	Communication quality is low reliability	CheCN Indoor to Outdoor wiring and grounding

12.4 Judgment 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.

12.5 Simple procedures for cheCNing the Main Parts

12.5.1 CheCNing 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 cheCN the Power (Circuit) Breaker and look for broken or loosed cable lugs or wiring mistake(s).

12.5.2 CheCNing Power Input.

If Indoor unit power LED is unlighted, power down the system and cheCN 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.
CheCNing Power Input procedure for the Outdoor unit is the same as with the Indoor unit.

12.5.3 CheCNing the Outdoor Fan Motor.

Enter Test Mode (where the OFAN speed is high)
CheCN the voltage between lead wires according to the normal value as following:

- Between red wire and blaCN wire: 310VDC +/- 20V
- Between orange wire and blaCN wire: 15VDC +/- 1V
- Between yellow wire and blaCN wire: 2-6VDC

12.5.4 CheCNing the Compressor.

The compressor is brushless permanence magnetic DC motor. Three coil resistance is same. CheCN the resistance between three poles. The normal value should be below 0.5 ohm (TBD).

12.5.5 CheCNing the Reverse Valve (RV).

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

12.5.6 CheCNing the electrical expansion valve (EEV).

The EEV has two parts, drive part and valve. The drive part is a step motor; it is ringed on the valve. CheCN the drive voltage (12VDC). When Outdoor unit is power on, EEV shall run and have cliCN and vibration.

12.6 Precaution, Advise and Notice Items

12.6.1 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 shoCN.

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

12.6.2 Charged Capacitors

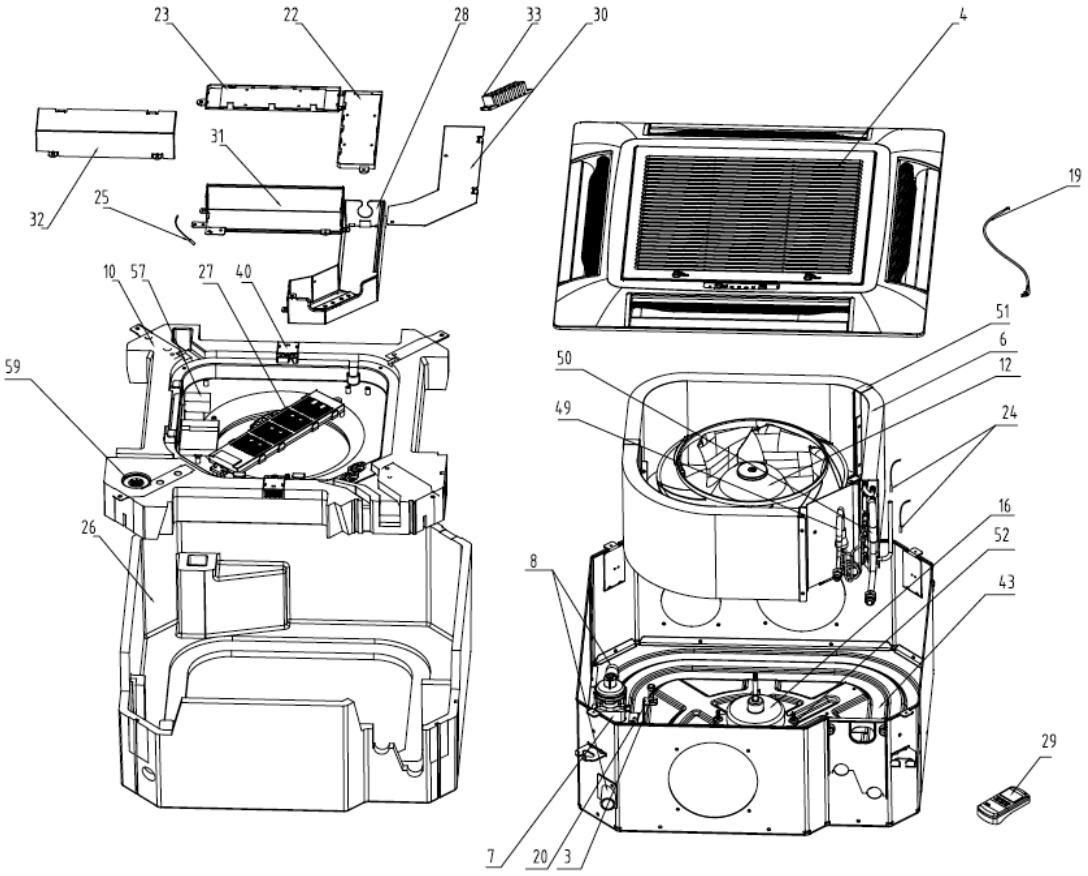
Three large-capacity electrolytic capacitors are used in the Outdoor unit controller. Therefore, charging voltage (380VDC) remains after power down. Discharging takes about four minutes after power is off. Touching the Outdoor unit controller before discharging may cause an electrical shoCN.

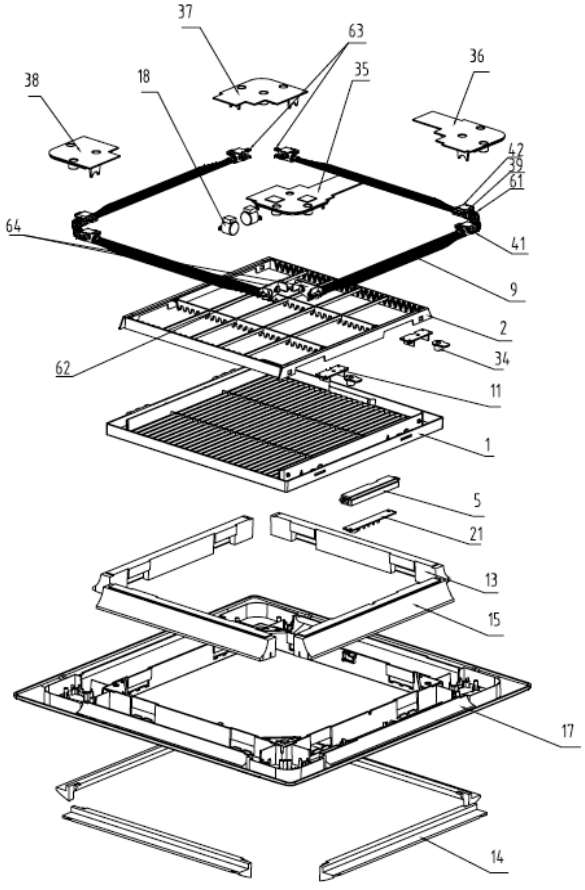
12.6.3 Additional advises

- 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 the A/C units.

13. EXPLODED VIEWS AND SPARE PARTS LISTS

13.1 Indoor Unit: CN 25, 35. 50, 60, 70 DCI





13.2 Indoor Unit: CN 25, 35 DCI

No.	Part No.	Description	Unit
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	462350078	Evaporator Assy/CN DCI 25/35 R410A	1
7	453192600	Pump CN	1
8	465800084	Drain Pipe Assy/CN	1
9	453189700	Horizontal Flap	4
10	453191300	Drain pan Assy	1
11	465360021	Support/Grill Clasp	2
12	466010002	Centrifugal Fan Low (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	466130010R	DC Motor 40W/ CN60x60	1
17	465020104	Front Frame (625x625)	1
17	465020105	Front Frame (725x725) (Airwell)./CN	1
18	433050	Step Motor	2
19	4520278R	power cord	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	232299	Indoor Sensor BLACN	1
24	467400032	Coil Air Temperature Sensor-Thermister EVAP(Φ6)./CN	1
25	4519813	Thermistor room	1
26	470250006	EPS/Air Housing assy.(Low)	1
27	453193600	ESF(option)	1
28	464750006	control Box assay1	1
29	453042500R	Remote controller/RC4-I-1 EHK P/N 974-710-00	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 BloCN	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

No.	Part No.	Description	Unit
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	463750123	Liquid Pipe Assy. /6.35	1
50	463750122	Gas Pipe Assy./9.53	1
51	464250047	Fixing Plate/Evaporator (Low height)	2
52	470100003	Cushion Rubber	3
57	465120005	Air Intake Panel (Low)	1
59	453195100	Drain Jam	1
61	465800091	Linkage Assy./Flap/CN	2
62	465440018	connect Shaft/Motor	2
63	453190000	Linkage /Flap	2
64	465360022	Support/Step Motor	1
64	465360032	Support/Step Moter 2	1

13.3 Indoor Unit: CN 50, 60 DCI

No.	Part No.	Description	Unit
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 40W/ CN60x60	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	232299	Indoor Sensor BLACN	1
24	467400032	Coil Air Temperature Sensor-Thermister EVAP(Φ6)./CN	1
25	4519813	Thermistor room	1
26	453191800	EPS/Air Housing (high)	1
27	453193600	ESF(option)	1
28	464750006	control Box assay1	1
29	453042500R	Remote controller/RC4-I-1 EHK P/N 974-710-00	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 BloCN	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

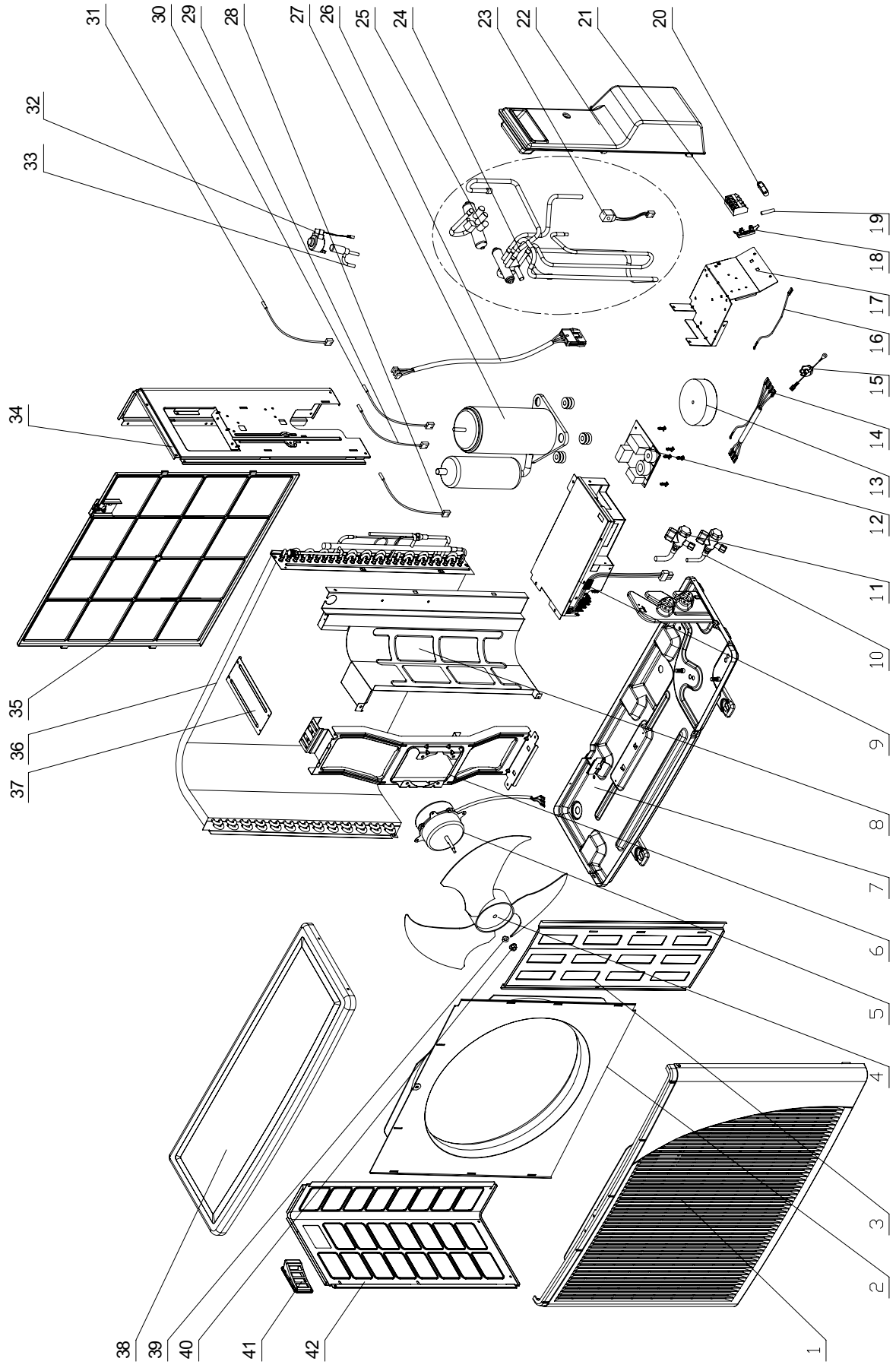
No.	Part No.	Description	Unit
40	453193500	Ionizer(option)	1
41	465800090	Support 2/lever Assy/CN	4
42	465360028	Orienting Support/Lever	6
43	464000020	Base Plate Assy./CN DCI	1
49	463750124	Liquid Pipe Assy. /6.35	1
50	463750120	Gas Pipe Assy./12.7	1
51	453188400	Fixing Plate/Evaporator high)	2
52	470100003	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 Motor 2	1

13.4 Indoor Unit: CN 70 DCI

No.	Part No.	Description	Unit
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	462350079	Evaporator Assy./CN DCI 70 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	Motor 40W/ CN60x60	1
17	465020104	Front Frame (625x625)	1
17	465020105	Front Frame (725x725) (Airwell)./CN	1
18	433050	Step Motor	2
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	232299	Indoor Sensor BLACN	1
24	467400032	Coil Air Temperature Sensor-Thermister EVAP(Φ6)./CN	1
25	4519813	Thermistor room	1
26	453191800	EPS/Air Housing (high)	1
27	453193600	ESF(option)	1
28	464750006	control Box assay1	1
29	453042500R	Remote controller/RC4-I-1 EHK P/N 974-710-00	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 BloCN	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

No.	Part No.	Description	Unit
41	465800090	Support 2/lever Assy/CN	4
42	465360028	Orienting Support/Lever	6
43	464000020	Base Plate Assy./CN DCI	1
49	453194200	Liquid Pipe Assy. /9.53	1
50	453194500	Gas Pipe Assy./15.88	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

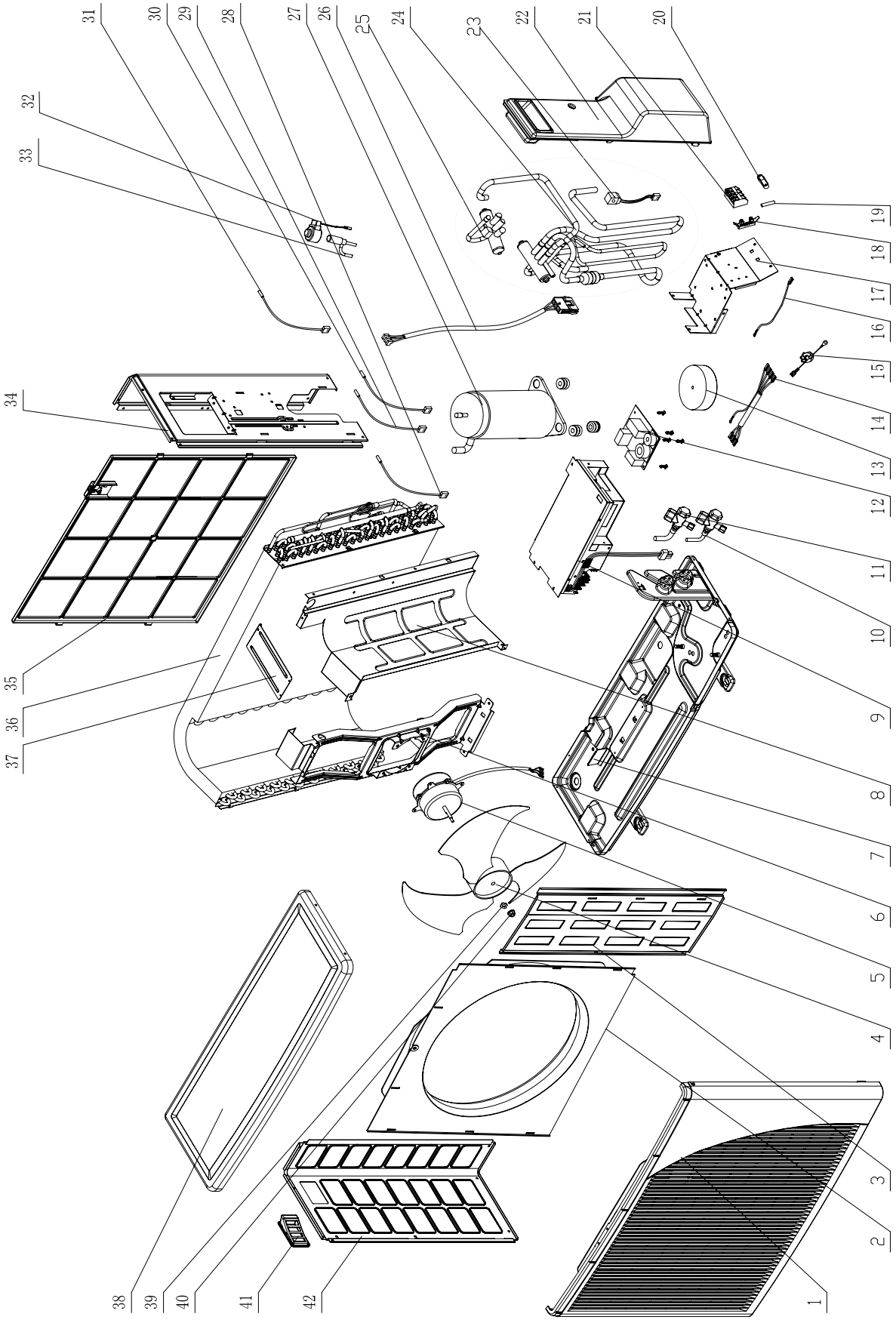
13.5 Outdoor Unit: ONG3 25, 35 DCI



13.6 Outdoor Unit: ONG3 25, 35 DCI

No.	Part No.	Description	Unit
1	433218	Front panel A	1
2	4526340	Air inlet ring-420	1
3	433223	Painting insulation plate	1
4	4526476	Axial fan OD=401	1
5	4527092	DC motor for DCI25/35	1
6	433215	Motor support	1
7	4523060	Base painting Assy.	1
8	4526299	Partition	1
9	4526403	Outdoor DC inverter controller (English)	1
10	4524177	Gas valve (R410A)	1
11	4524176	Liquid valve(R410A)	1
12	4526224	EMI fliter board 901-098-00	1
13	4526396	ChoCN Assy. 167-021-01	1
14	4526223	AC-IN connected wire	1
15	4526968	Earthing wire for DCI	1
16	4526222	Fuse connecting wire	1
17	4526300	Therminal sheet	1
18	4526220	Fuse stand JEF-511B(EHK P/N:150-038-00)	1
19	4526219	Fuse 65TS(15A,230)150-031-00	1
20	204107	Cable clip nylon	1
21	4519188	4 poles terminal bloCN	1
22	433229	Value cover	1
23	4522509	4-Way valve coil	1
24	4526367	4-way valve welding Assy. (DCI25)	1
	4526393	4-way valve welding Assy. (DCI35)	1
25	4518952	4-way valve (DCI25)	1
	4518951	4-way valve (DCI35)	1
26	4526221	Compressor wire	1
27	4526204	DC Inverter compressor Assy. 5RS102XAB	1
28	4526775	Compressor top thermistor(CTT)	1
29	4526774	Outside air thermistor(OAT)	1
30	4526776	Outside coil thermistor(OCT)	1
31	4526969	Suction coil thermistor(SUCT)	1
32	4526828	EEV Coil (CAN-MD 12FKS-1 White)	1
33	4526827	Electronic expansion value (CAMB20YGFKS-1)	1
34	4519606	Right side panel	1
35	433228	BaCN side net	1
36	4526368	Condenser soldering assy	1
37	4526298	Bridge	1
38	4519614	Painting top cover	1
39	4526480	Gasket for axial fan	1
40	4519300	Nut M5 L	1
41	433225	Handle	1
42	4519607	Left side panel painting plate	1

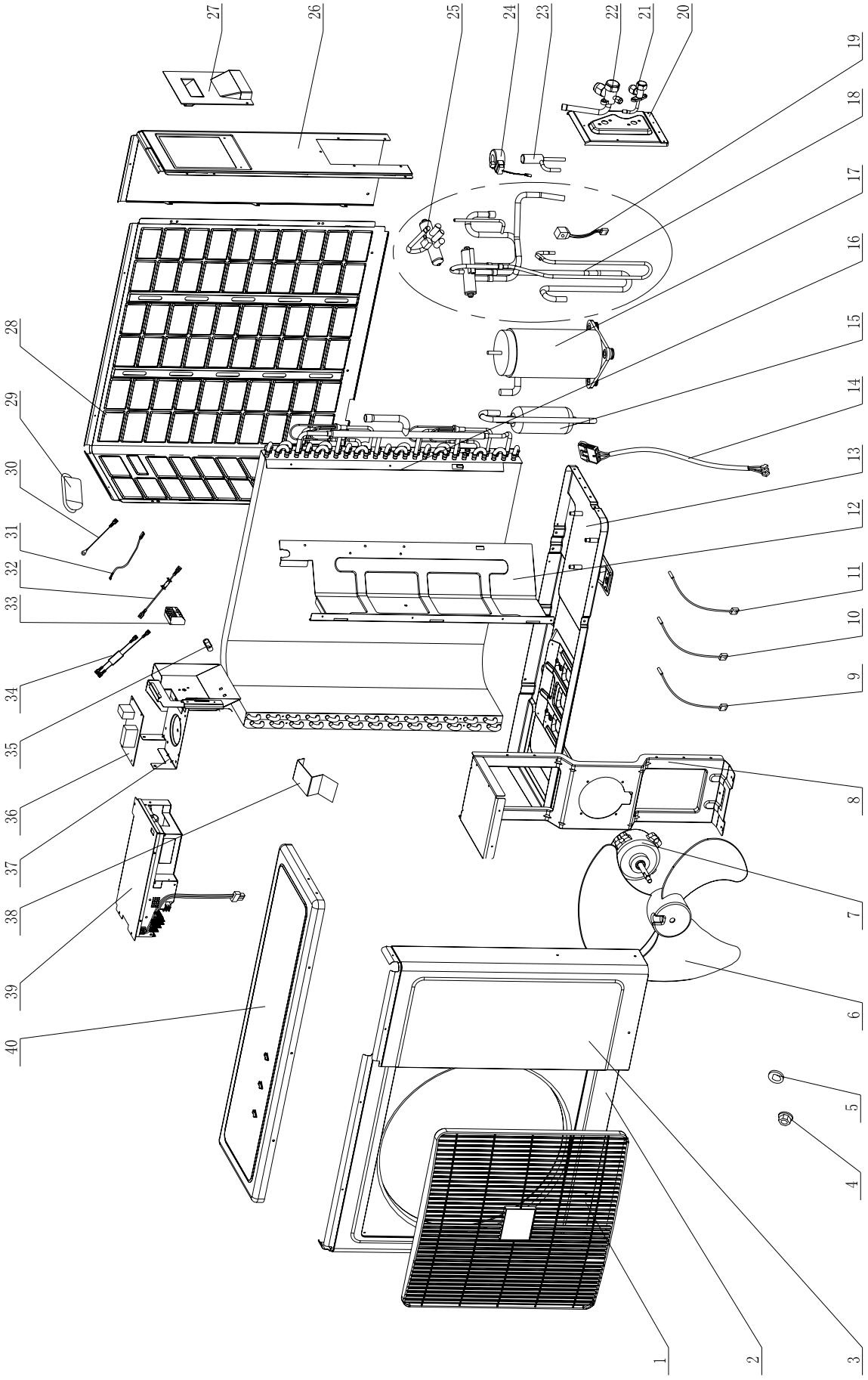
13.9 Outdoor Unit: ONG3 50 DCI



13.10 Outdoor Unit: ONG3 50 DCI

No.	Part No.	Description	Unit
1	433218	Front panel A	1
2	4526340	Air inlet ring-420	1
3	433223	Painting insulation plate	1
4	4526476	Axial fan OD=401	1
5	4526475	DC motor for DCI 50	1
6	4526457	Motor support	1
7	4527363	Base painting Assy.	1
8	4526459	Partition	1
9	4526203	Outdoor DC inverter controller (English)	1
10	4524595	Gas valve (R410A)	1
11	4524176	Liquid valve(R410A)	1
12	4526224	EMI fliter board 901-098-00	1
13	4526396	ChoCN Assy. 167-021-01	1
14	4526223	AC-IN connected wire	1
15	4526968	Earthing wire for DCI	1
16	4526222	Fuse connecting wire	1
17	4526300	Therminal sheet	1
18	4526220	Fuse stand JEF-511B(EHK P/N:150-038-00)	1
19	4526533	Fuse 65TS(20A,230)150-031-00	1
20	204107	Cable clip nylon	1
21	4519188	4 poles terminal bloCN	1
22	433229	Value cover	1
23	4522509	4-Way valve coil	1
24	4527327	4-way valve welding Assy.	1
25	4518952	4-way valve	1
26	4526221	Compressor wire	1
27	4523446	DC Inverter compressor Assy. 5CS130XCC03	1
28	4526775	Compressor top thermistor(CTT)	1
29	4526774	Outside air thermistor(OAT)	1
30	4526776	Outside coil thermistor(OCT)	1
31	4526969	Suction coil thermistor(SUCT)	1
32	4526215	Electronic expansion valve ZDPF(L)-1.6C-01-RK for R410A	1
33	4526216	EEV COIL QA(L)12-HR-01A-RK	1
34	4519606	Right side panel	1
35	433228	BaCN side net	1
36	4526459	Condenser soldering assy	1
37	4526298	Bridge	1
38	4519614	Painting top cover	1
39	4526480	Gasket for axial fan	1
40	4519300	Nut M5 L	1
41	433225	Handle	1
42	4519607	Left side panel painting plate	1

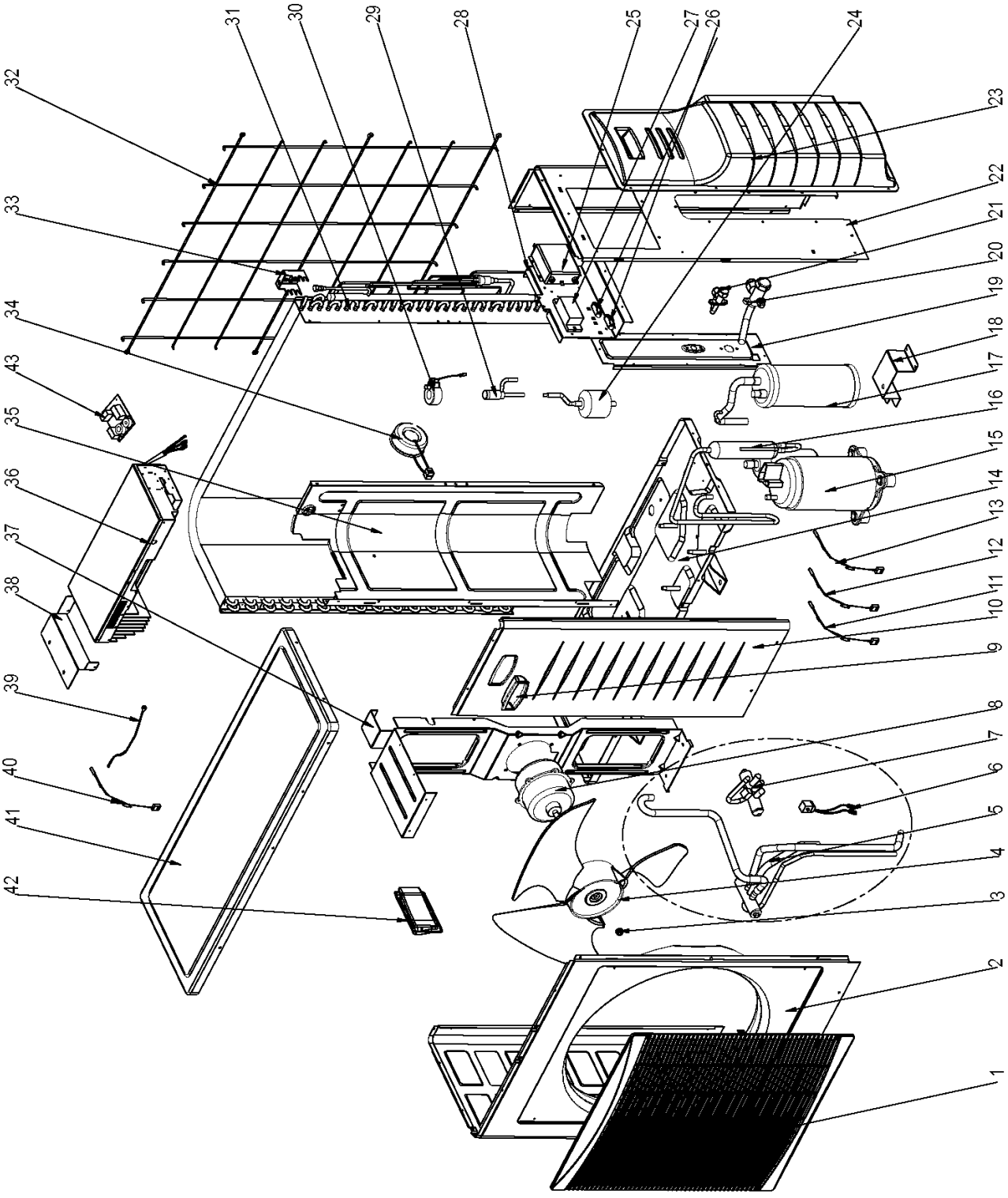
13.11 Outdoor Unit: DCI 60



13.12 Outdoor Unit: DCI 60

No.	Part No	Description	Unit
1	4517144	FAN COVER PP+UV	1
2	452795700	PAINTED LEFT CABINET ASSY	1
3	4521642	Painted Right Cabinet and Isolation Assy.	1
4	4523141	M10 Hexagon loCNed nut M10	1
5	4526841	cusion for fan	1
6	4526510	FAN D=460mm (3 blade)	1
7	453026500	DC Motor SIC-71FW-F170-2	1
8	453036400	Motor Support	1
9	453238900	Sensor/OAT	1
10	4526775	Compressor top thermistor(CTT)	1
11	4526776	Outdoor coil thermistor(OCT)	1
12	453035800	Partition Plate	1
13	453036100	Base Plate Paint Assy.	1
14	4526221	Compressor wire	1
15	453041900	Liquid Accumulator	1
16	452882900	Condenser and distributor welding assy.	1
17	4523446	Liquid Accumulator	1
18	453034000	4-way Valve System Assy.	1
19	4522509	4-Way valve coil	1
20	4516766	PAINTED VALVE PLATE ASSY	1
21	4526301	High pressure stop valve R410a	1
22	4524595	1/2" Gas Valve for ONG R410A	1
23	4526215	Electronic expansion valve ZDPF(L)-1.6C-01-RK for R410A	1
24	4526216	EEV COIL QA(L)12-MD-02	1
25	4518952	4-W valve SHF-7H for R410A	1
26	4525938	PAINTED RIGHT-BACN CABINET ASSY	1
27	4523145	R.lifter	1
28	4517028	PAINTED LEFT-BACN GRILL	1
29	4516758	SMALL HANDLE	1
30	452841100	Earth wire	3
31	453238800	Ground Wire	1
32	453238700	Wire UL1007 16AWG/COM	1
33	4519188	4 poles terminal bloCN	1
34	453238600	Wire 1015 16#/Power Input	1
35	204107	Cable clip Nylon	1
36	453048500	DCI 2.8kW EMI Filter Board 901-107-00	1
37	453052900	Therminal Plate Assy.	1
38	4526585	connect for motor baCNet	1
39	453030500	Outdoor DCI Controller/2.8kW(English) 906-105-00	1
40	4516788	PAINTED TOP COVER ASSY	1

13.13 Outdoor Unit: DCI 72Z



13.14 Outdoor Unit: DCI 72Z

No.	Item	Description	Quan.
1	465100000	Grill/ DCI Trio	1
2	4523652	PAINTED LEFT CABINET ASSY	1
3	4523758	Nut M8 left	1
4	452960400	Outdoor Fan	1
5	461600023	4-Way Valve Assy.	1
6	4522509	4-way Valve Coil	1
7	4526522	FOUR-WAY VALVE R410A	1
8	466130002R	DC Motor 70W 8P	1
9	4522601	Right Handle	1
10	4523653	PAINTED RIGHT CABINET ASSY	1
11	4526775	Compressor Top Thermistor(CTT)	1
12	452956500	OMT Thermistor(OMT)	1
13	452677601	Outdoor Coil Thermistor(OCT)	1
14	452809900	Base Plate Painting Assy.	1
15	460080000R	Compressor Assy./ C-7RVN153H0W SANYO ShenYang)	1
16	452783600	Oil Separator Assy.	1
17	452783200	Liquid-gas Separator	1
18	453256100	Support Painting Support Assy./Gas-Liquid Separator	1
19	4526080	Valve plate paint assy	1
20	4526513	LOW PRESS VALVE (R410A)	1
21	4526514	Hight press valve(R410A)	1
22	4523654	PAINTED RIGHT BACN CABINET ASSY	1
23	4522602	Valve Cover	1
24	4518950	Filter Drier BFK-053S	1
26	204107	Cable clip Nylon	2
27	467420003	7 Poles Terminal BloCN	1
28	464280001	Terminal Plate/ DCI 72Z	1
29	4526215	Electronic expansion valve ZDPF(L)-1.6C-01-RK for R410A	1
30	4526216	EEV COIL QA(L)12-MD-02	1
31	462300002	Condenser Assy.	1
32	453175500	Guard Net Painting Assy.	1
33	453083800	Support/OAT	1
34	4526396	Choke Assy.167-021-01	1
35	464730006	Partition Plate Assy./DCI 72Z	1
36	467300082R	Controller/Outdoor Unit DCI 3.0KW(English) 906A-361-00	1
37	452888500	Motor Support	1
38	464250044	Connect Plate/Controller DCI 72Z	1
39	452841100	Earth wire	3
39	4516540	Earth wire	2
40	453238900	Sensor/OAT	1
41	4523657	PAINTED TOP COVER ASSY	1
42	4522600	Left Handle	1
43	467300114R	DCI 3.0KW EMI Fillter Board 901A-574-00	1

APPENDIX A

INSTALLATION AND OPERATION MANUAL

- ► **OPERATION MANUAL RC4**
- ► **OPERATION MANUAL CN DCI**
- ► **INSTALLATION MANUAL CN DCI**