

# Airwell

# Service Manual

## PNX DCI Nordic

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Indoor Units	Outdoor Units
<i>PNX009 DCI</i>	<i>GC 9 DCI Nordic</i>
<i>PNX012 DCI</i>	<i>GC 12 DCI Nordic</i>



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**REFRIGERANT**

**R410A**

**HEAT PUMP**

**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 .....September 2009

Total number of pages in this publication is 50 consisting of the following:

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\*Due to constant improvements please note that the data on this service manual can be modified with out notice.

\*\*Photos are not contractual

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## 1. INTRODUCTION

### 1.1 General

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

- **PNX009**
- **PNX012**

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

### 1.2 Main Features

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

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

### 1.3 Indoor Unit

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

**Indoor Unit features:**

Feature	PNX009	PNX012
Display	LED	
Ionizer	YES	
ESF	YES	
Fresh air	Optional	
Indoor fan motor	Variable speed (PG)	
Horizontal motorized louver	YES	
Vertical motorized louver	Optional	
Heating element	NO	
M2L Cable port	YES	
Dry contact	Presence detector or (jumper selected) power shedding	

### 1.4 Filtration

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

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

### 1.5 Ionizer (Optional)

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

### 1.6 Control

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

Remote controllers: RC-2/3/4/5/7, RC-4i-1, RCW, µBMS.

Networking system Airconet version 4.2 and up, MIU SW version H8 and up.

For further details please refer to the Operational Manual.

## 1.7 Outdoor Unit

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

- **GC 9 DCI Nordic**
- **GC 12 DCI Nordic**

Outdoor Unit Feature

Feature	GC 9 DCI Nordic	GC 12 DCI Nordic
Display	3 LED's	
Base Heater	Optional	
Outdoor Fan	Variable speed DC Inverter	
M2L cable Port	No	

## 1.8 Tubing Connections

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

## 1.9 Accessories

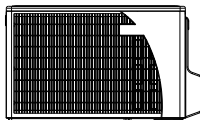
Item	Description
MIU ( <b>PNX</b> )	MODBUS interface unit
RS485 Adapter	To be used as an interface with RCW or $\mu$ BMS remote controllers
M2L cable Port	

## 1.10 Inbox Documentation

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

## 1.11 Matching Table

### 1.11.1 R410A

OUTDOOR UNITS			INDOOR UNITS	
			PNX009	PNX012
	MODEL	REFR"		
	GC 9 DCI Nordic	R410A	✓	
	GC 12 DCI Nordic			✓

The above tables lists outdoor units and **PNX** indoor units which can be matched together. For further information please refer to the relevant Service Manual.

## 2. PRODUCT DATA SHEET

### 2.1 PNX009 / GC 9 DCI Nordic

Model		PNX009 DCI / GC 9 DCI Nordic		
Item		Cooling	Heating	
Capacity	Btu/hr	8530 (3750-122800)	11600 (5290-17060)	
	Kcal/hr	2150(950-3100)	2920(1330-4300)	
	W	2500 (1100-3600)	3400 (1550-5000)	
Total Input (Cooling / Heating)		W	600 (350-1000) 830 (350-1500)	
E.E.R(Cooling) / C.O.P(Heating)		W/W	4.10 4.05	
Running Current(Cooling/Heating)		A	2.7 3.7	
Starting Current		A	10.50	
Power Supply (ph, cy, voltage)		single phase 50HZ 220-240V		
Dehumidification		L/h	1.0	
INDOOR UNIT	External finish		High Polish	
	Ionizer		Yes(Optional)	
	Electrostatic Filter dB(A)		Yes(Optional)	
	Heat exchanger		Hydrophilic louver fin coil	
	Fan (drive)		Crossflow * 1	
	Fan motor output		W 20	
	Airflow (Hi-Me-Lo)		m 3/hr 530-430-330 570-460-350	
	Operation control type		Remote control	
	Noise level(Lo-Hi)	Pressure <sup>(4)</sup>	dB(A)	26-38 26-39
		Power		39-50 39-51
	Condensate drain I.D.		mm(in)	16(5/8)
	Dimensions		W*D*H	810*202*285
	Weight			kg 11
	Packing dimensions		W*D*H mm	885*285*360
Unit stacking		units	7	
OUTDOOR UNIT	Refrigerant control		Electronic Expansion Valve	
	Compressor type		Scroll DC Inverter	
	Compressor Model		Matsushita 5CS102XDA04	
	Starter type		---	
	Protection device		Outdoor SW control	
	Heat exchanger Hydrophilic louver fin			
	Fan (drive)* No.		Propeller * 1	
	Motor output		W 50	
	Airflow		m3/h 1780	
	Defrost method Reverse cycle			
	Noise level	Pressure <sup>(4)</sup>	dB(A)	49 49
		Power		59 59
	Dimensions		W*D*H mm	795*290*610
	Weight		kg.	38
Packing dimensions		W*D*H mm.	945*395*655	
Unit stacking		units	3	
TUBING	Refrigerant		R410A	
	Charge(20m connection tube)		g 1100	
	Fresh Air		No	
	Tube size O.D.	liquid	mm(in)	6.35
		suction	mm(in)	9.53
	Connection method		indoor & outdoor	Flared
	height difference		m	Max. 10m
	tubing length		m	Max. 20m
additional charge			No need	

(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 PNx012 / GC 12 DCI Nordic

Model		PNx012 DCI / GC 12 DCI Nordic		
Item		Cooling	Heating	
Capacity	Btu/hr	11940(3750-14670)	14500(5290-18770)	
	Kcal/hr	3010(950-3700)	3610(1330-4730)	
	W	3500 (1100-4300)	4200(1550-5500)	
Total Input (Cooling / Heating)		W	0.97 (350-1400) 1140(310-1750)	
E.E.R(Cooling) / C.O.P(Heating)		W/W	3.60 3.65	
Running Current(Cooling/Heating)		A	4.3 5.1	
Starting Current		A	10.50	
Power Supply (ph, cy, voltage)		single phase 50HZ 220-240V		
Dehumidification		L/h	1.5	
INDOOR UNIT	External finish		High Polish	
	Ionizer		Yes(Optional)	
	Electrostatic Filter		Yes(Optional)	
	Heat exchanger		Hydrophilic louver fin coil	
	Fan (drive)		Crossflow * 1	
	Fan motor output	W	20	
	Airflow (Hi-Me-Lo)	m3/hr	550-450-350 580-480-370	
	Operation control type		Remote control	
	Noise level(Lo-Hi)	Pressure <sup>(4)</sup>	dB(A)	26-39
		Power		39-52
	Condensate drain I.D.		mm(in)	16(5/8)
	Dimensions	W*D*H	810*202*285	
	Weight		kg 11	
	Packing dimensions	W*D*H	mm	885*285*360
	Unit stacking		units	7
OUTDOOR UNIT	Refrigerant control		Electronical Expansion Valve	
	Compressor type		Scroll DC Inverter	
	Compressor Model		Matsushita 5CS102XDA04	
	Starter type		---	
	Protection device		Outdoor SW control	
	Heat exchanger Hydrophilic louver fin			
	Fan (drive)* No.		Propeller * 1	
	Motor output	W	40	
	Airflow	m3/h	1780	
	Defrost method Reverse cycle			
	Noise level	Pressure <sup>(4)</sup>	dB(A)	50
		Power		60
	Dimensions	W*D*H	mm	795*290*610
	Weight		kg.	38
	Packing dimensions	W*D*H	mm.	945*395*655
Unit stacking		units	3	
TUBING	Refrigerant		R410A	
	Charge(20m connection tube)		g 1100	
	Fresh Air		No	
	Tube size O.D.	liquid	mm(in)	6.35
		suction	mm(in)	9.53
	Connection method between the indoor and outdoor unit additional charge	indoor & outdoor		Flared
		height difference	m	Max. 10m
		tubing length	m	Max. 20m
		Additional charge		No need

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



### 3. RATING CONDITIONS

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

**Cooling:**

Indoor: 27°C DB 19°C WB

Outdoor: 35°C DB

**Heating:**

Indoor: 20°C DB

Outdoor: 7°C DB 6°C WB

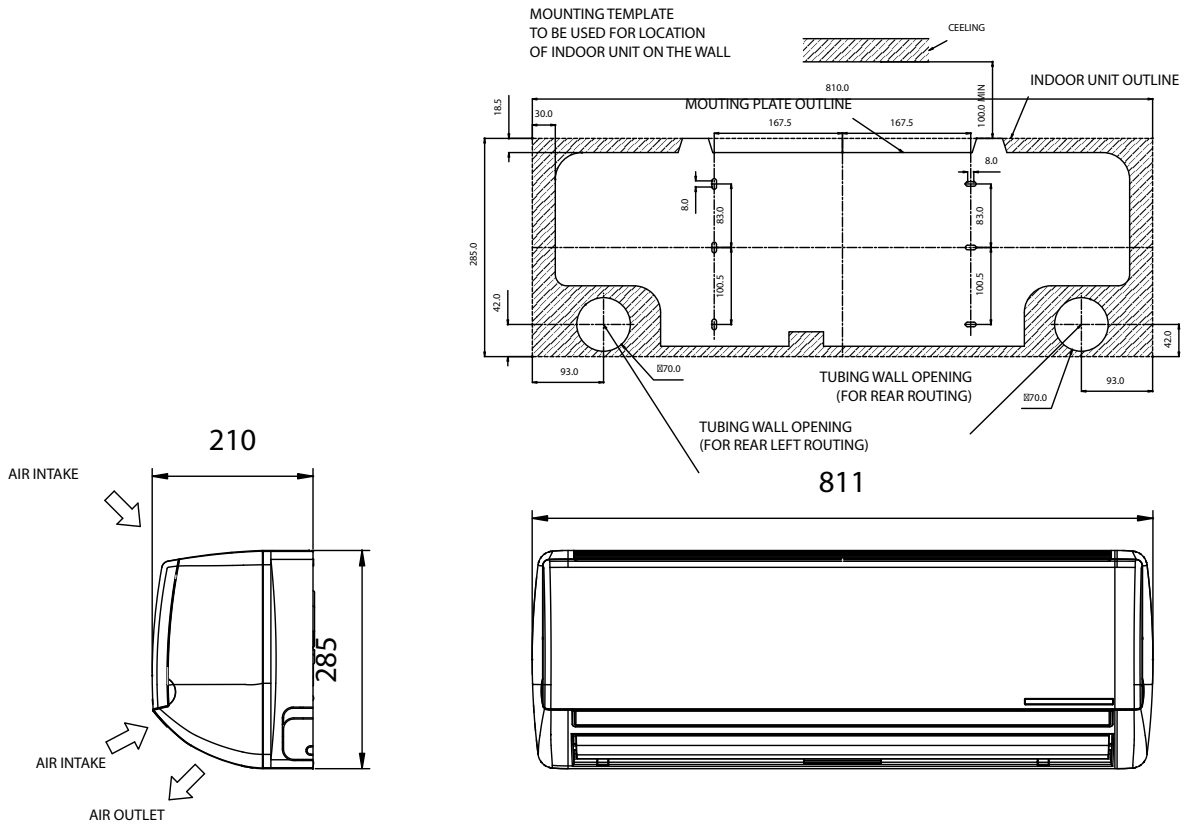
#### 3.1 Operating Limits

##### 3.1.1 R410A

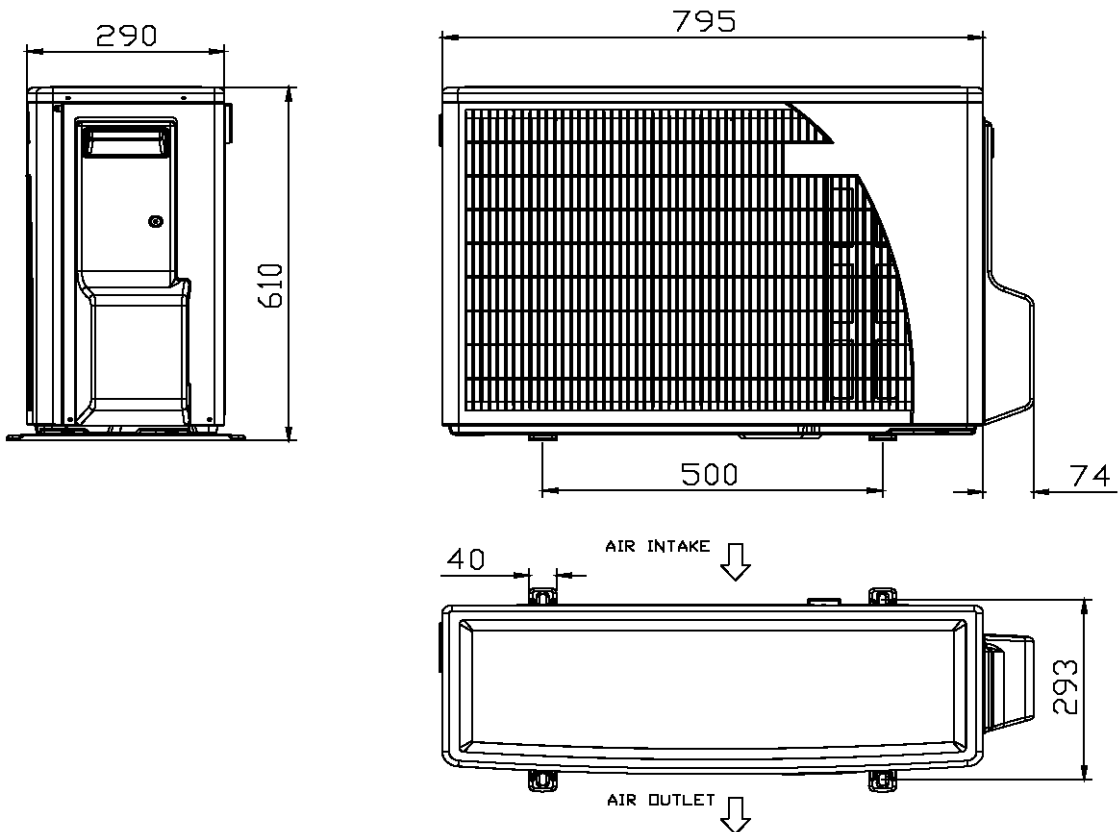
		Indoor	Outdoor
Cooling	Upper limit	32°C DB 23°C WB	46°C DB
	Lower limit	21°C DB 15°C WB	-10°C DB
Heating	Upper limit	27°C DB	24°C DB 18°C WB
	Lower limit	10°C DB	-15°C DB -16°C WB
Voltage		198 – 264 V	

## 4. OUTLINE DIMENSIONS

### 4.1 Indoor Unit: PNX009 / PNX012 DCI



### 4.2 Outdoor Unit: GC 9 DCI Nordic / GC 12 DCI Nordic



## 5. PERFORMANCE DATA

### 5.1 PNx009 / GC 9 DCI Nordicl

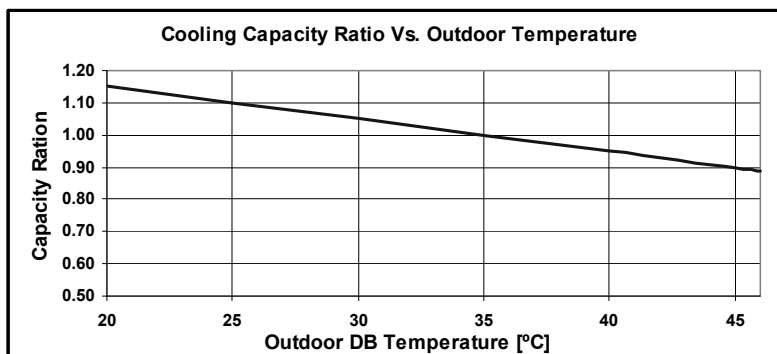
#### 5.1.1 Cooling Capacity (kW) - Run Mode

OD COIL ENTERING AIR DB TEMPERATURE [°C]		ID COIL ENTERING AIR DB/WB TEMPERATURE [°C]				
		22/15	24/17	27/19	29/21	32/23
<b>-10 - 20</b> (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
<b>25</b>	TC	2.46	2.61	2.75	2.90	3.04
	SC	1.71	1.74	1.76	1.79	1.81
	PI	0.47	0.48	0.49	0.50	0.51
<b>30</b>	TC	2.34	2.48	2.63	2.77	2.92
	SC	1.65	1.67	1.70	1.72	1.75
	PI	0.53	0.54	0.55	0.57	0.58
<b>35</b>	TC	2.21	2.36	<b>2.50</b>	2.65	2.79
	SC	1.58	1.60	<b>1.63</b>	1.66	1.68
	PI	0.60	0.61	<b>0.62</b>	0.63	0.64
<b>40</b>	TC	2.08	2.23	2.37	2.52	2.66
	SC	1.51	1.54	1.56	1.59	1.61
	PI	0.66	0.67	0.69	0.70	0.71
<b>46</b>	TC	1.93	2.08	2.22	2.37	2.51
	SC	1.43	1.46	1.48	1.51	1.53
	PI	0.74	0.75	0.76	0.77	0.78

#### LEGEND

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

#### 5.1.2 Capacity Correction Factors



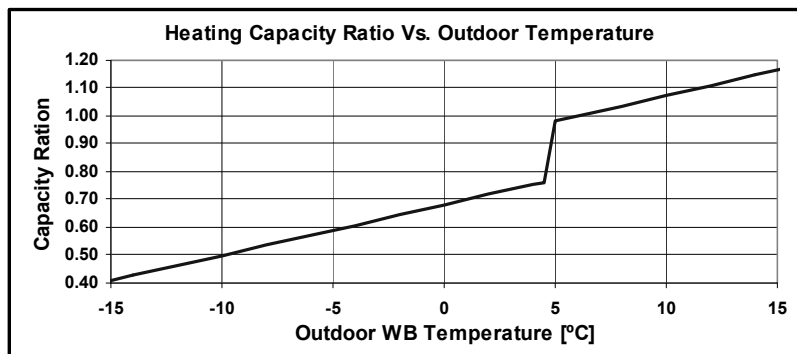
**5.1.3 Heating Capacity (kW) - Run Mode)**

OD COIL ENTERING AIR DB/WB TEMPERATURE [°C]	DATA	ID COIL ENTERING AIR DB TEMPERATURE [°C]		
		15	20	25
-15/-16	TC	1.55	1.32	1.10
	PI	0.58	0.62	0.66
-10/-12	TC	2.04	1.82	1.60
	PI	0.66	0.70	0.74
-7/-8	TC	2.41	2.19	1.97
	PI	0.71	0.75	0.80
-1/-2	TC	2.60	2.38	2.15
	PI	0.74	0.78	0.82
2/1	TC	2.72	2.50	2.28
	PI	0.76	0.80	0.84
7/6	TC	3.62	<b>3.40</b>	3.18
	PI	0.79	<b>0.83</b>	0.87
10/9	TC	3.81	3.59	3.36
	PI	0.80	0.86	0.89
15/12	TC	4.00	3.78	3.55
	PI	0.82	0.86	0.90
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

**LEGEND**

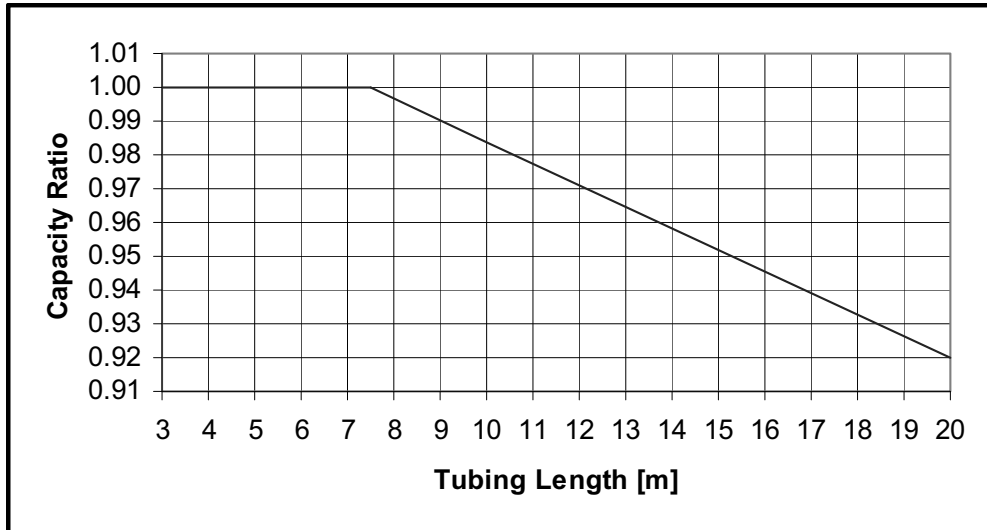
- TC – Total Heating Capacity, kW
- PI – Power Input, kW
- WB – Wet Bulb Temp., (°C)
- DB – Dry Bulb Temp., (°C)
- ID – Indoor
- OD – Outdoor

**5.1.4 Capacity Correction Factors**

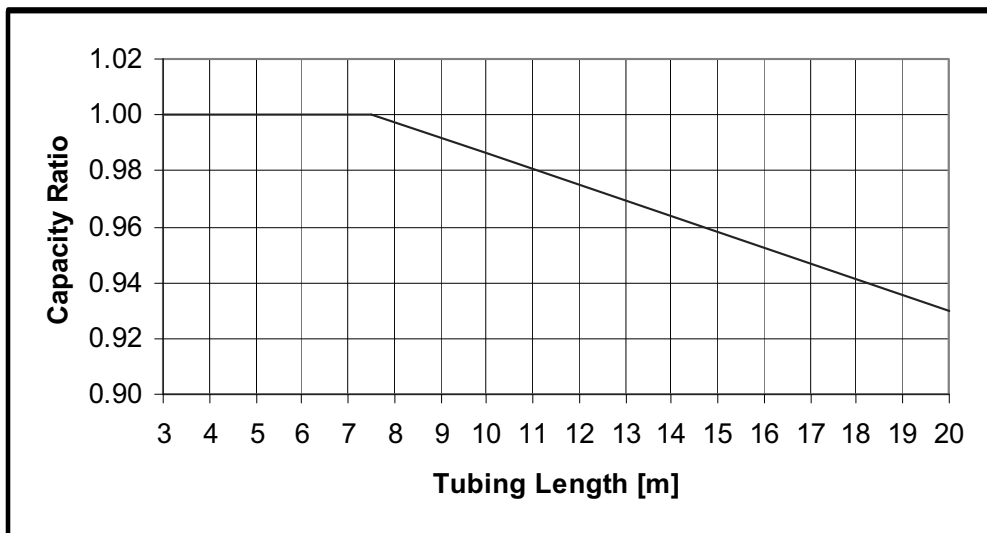


## 5.2 Capacity Correction Factor Due to Tubing Length

### 5.2.1 Cooling



### 5.2.2 Heating



### 5.3 PNX012 / GC 12 DCI Nordic

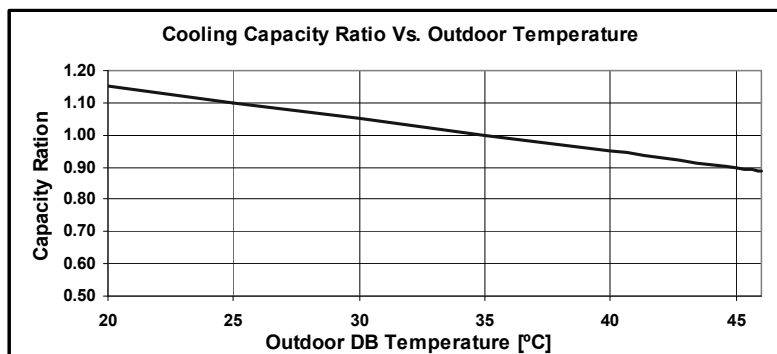
#### 5.3.1 Cooling Capacity (kW) - Run Mode

OD COIL ENTERING AIR DB TEMPERATURE [°C]		DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [°C]				
			22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal					
	SC	80 - 105 % of nominal					
	PI	25 - 50 % of nominal					
25	TC	3.45	3.65	3.85	4.06	4.26	
	SC	2.50	2.54	2.58	2.61	2.65	
	PI	0.79	0.80	0.82	0.84	0.66	
30	TC	3.27	3.47	3.68	3.88	4.08	
	SC	2.40	2.44	2.48	2.51	2.55	
	PI	0.90	0.91	0.93	0.95	0.97	
35	TC	3.09	3.30	<b>3.50</b>	3.70	3.91	
	SC	2.31	2.34	<b>2.38</b>	2.42	2.45	
	PI	1.00	1.02	<b>1.04</b>	1.06	1.08	
40	TC	2.92	3.12	3.32	3.53	3.73	
	SC	2.21	2.25	2.28	2.32	2.36	
	PI	1.11	1.13	1.15	1.17	1.18	
46	TC	2.71	2.91	3.11	3.31	3.52	
	SC	2.09	2.13	2.17	2.20	2.24	
	PI	1.24	1.26	1.28	1.30	1.32	

#### LEGEND

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

#### 5.3.2 Capacity Correction Factors



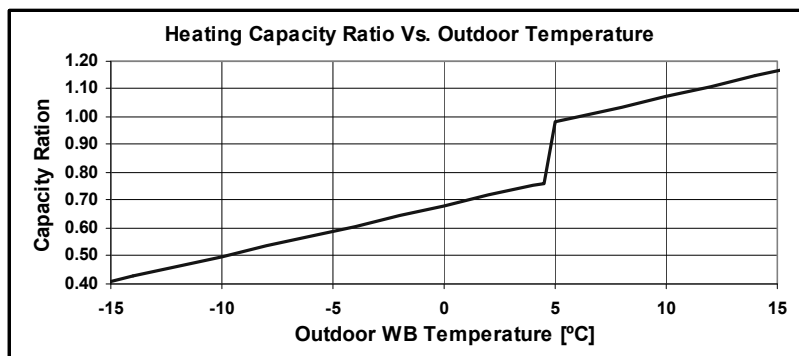
5.3.3 Heating Capacity (kW) - Run Mode

OD COIL ENTERING AIR DB/WB TEMPERATURE [°C]		ID COIL ENTERING AIR DB TEMPERATURE [°C]		
		15	20	25
-15/-16	TC	1.91	1.64	1.36
	PI	0.80	0.85	0.91
-10/-12	TC	2.52	2.25	1.974
	PI	0.90	0.96	1.02
-7/-8	TC	2.98	2.71	2.43
	PI	0.98	1.04	1.09
-1/-2	TC	3.21	2.94	2.66
	PI	1.02	1.08	1.13
2/1	TC	3.36	3.09	2.81
	PI	1.04	1.10	1.16
7/6	TC	4.48	<b>4.20</b>	3.92
	PI	1.08	<b>1.14</b>	1.20
10/9	TC	4.71	4.43	4.16
	PI	1.10	1.16	1.22
15/12	TC	4.94	4.66	4.39
	PI	1.12	1.18	1.24
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

**LEGEND**

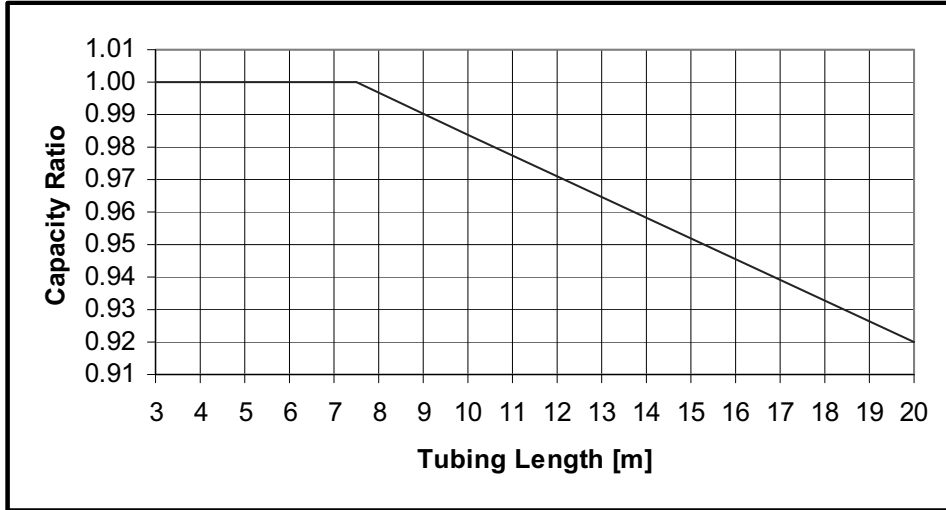
- TC – Total Cooling Capacity, kW
- SC – Sensible Capacity, kW
- PI – Power Input, kW
- WB – Wet Bulb Temp., (°C)
- DB – Dry Bulb Temp., (°C)
- ID – Indoor
- OD – Outdoor

5.3.4 Capacity Correction Factors

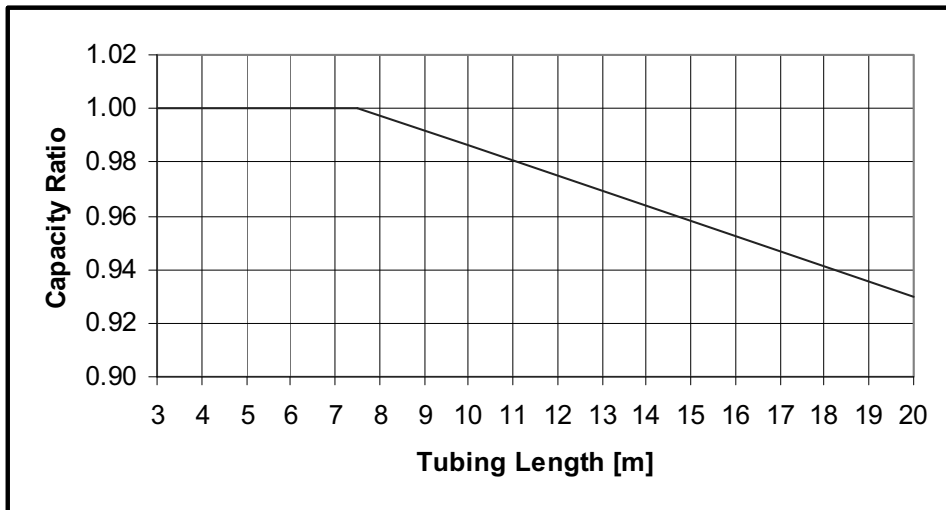


### 5.4 Capacity Correction Factor Due to TUBing Length

#### 5.4.1 Cooling



#### 5.4.2 Heating

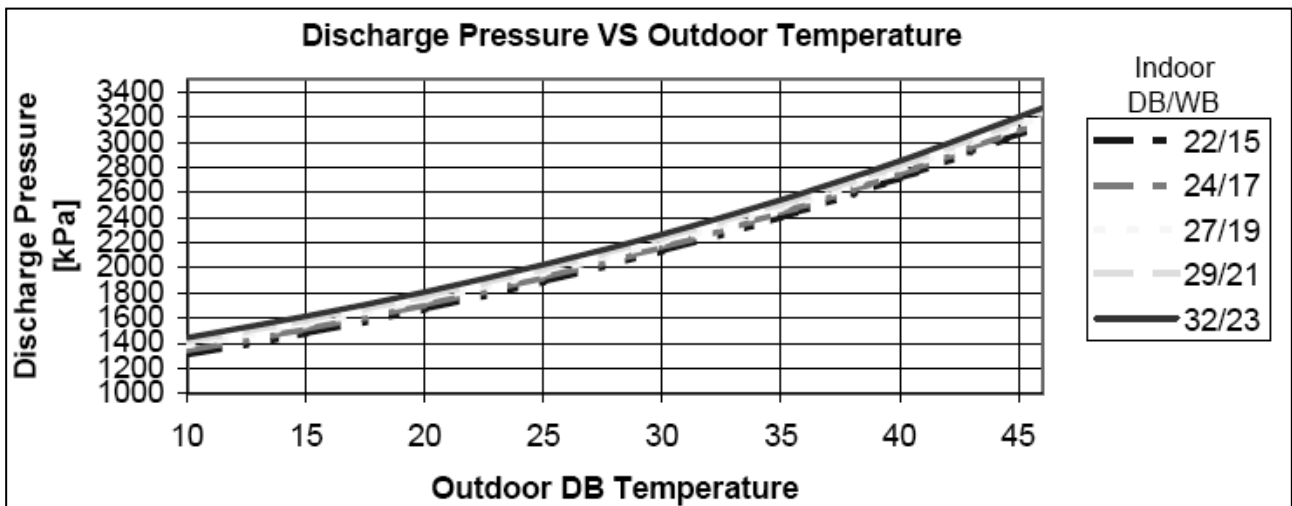
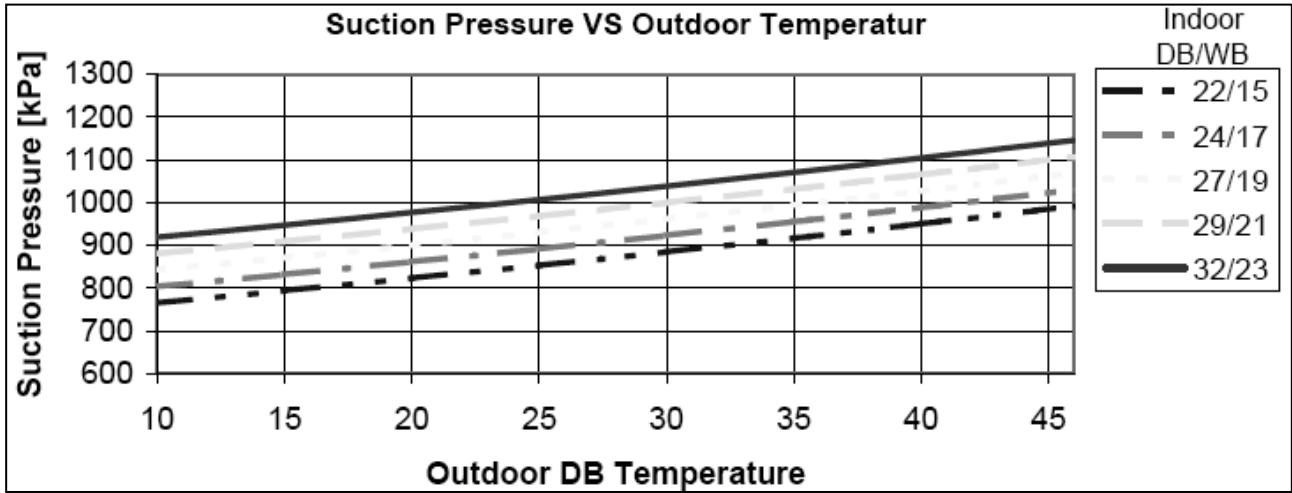




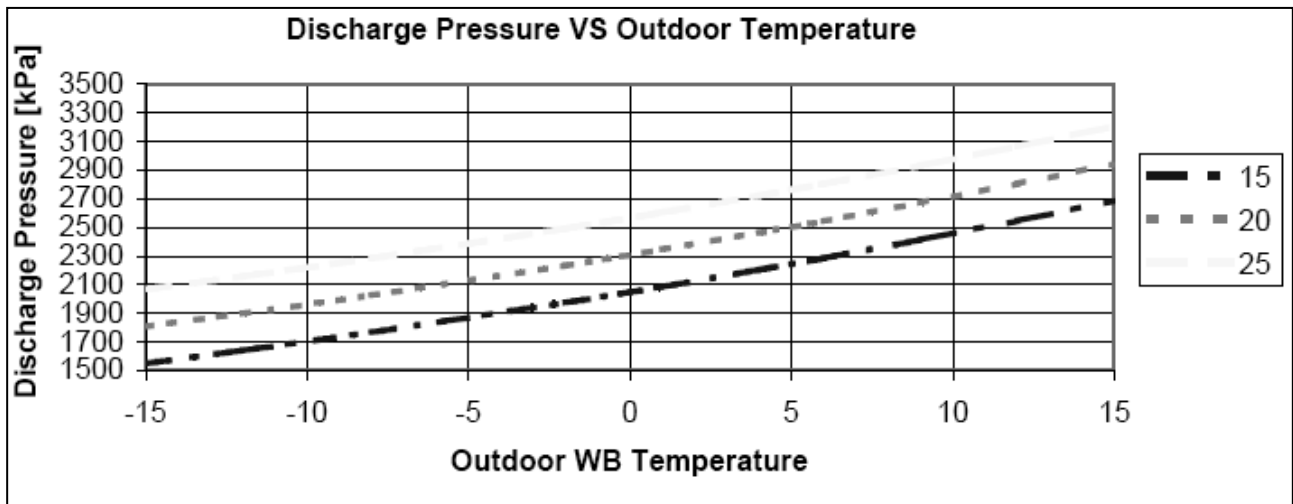
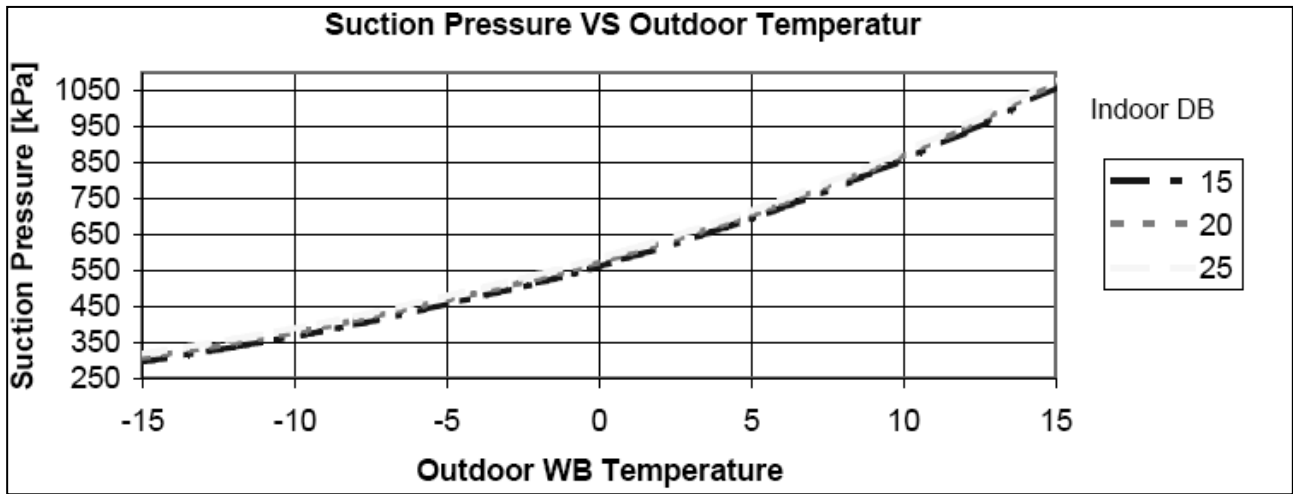
**5.5 Pressure Curves**

**5.5.1. Model: PNX009 / GC 9 DCI Nordic**

Cooling - Test Mode



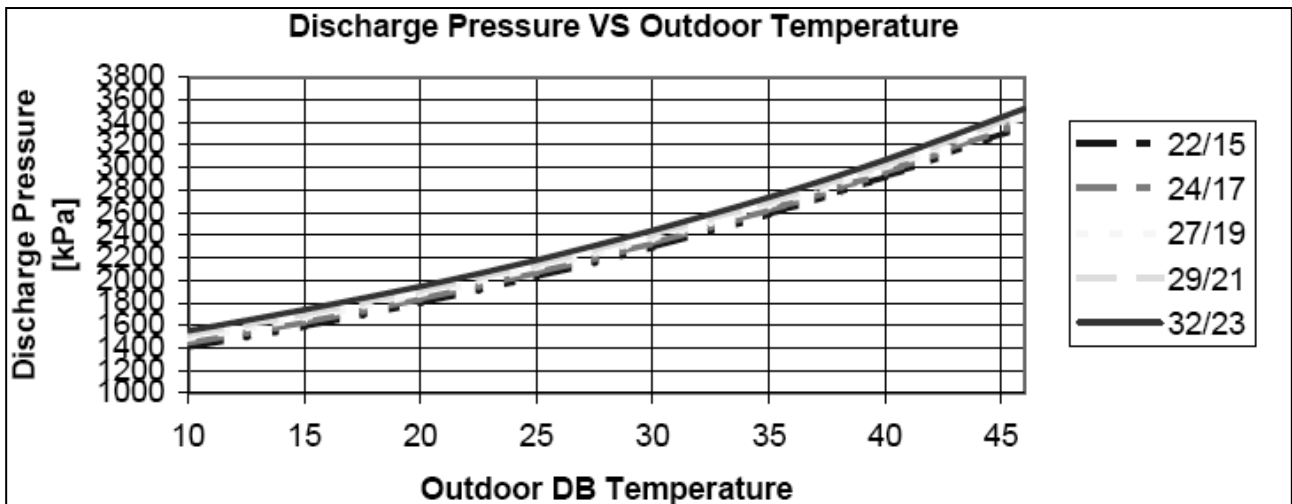
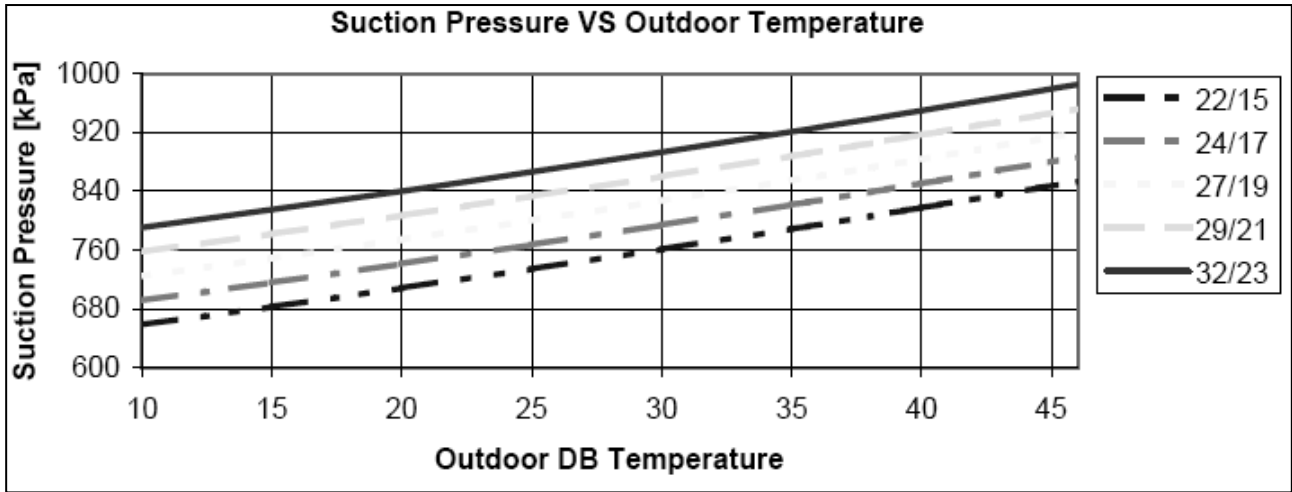
**5.5.2 Cooling - Test Mode**



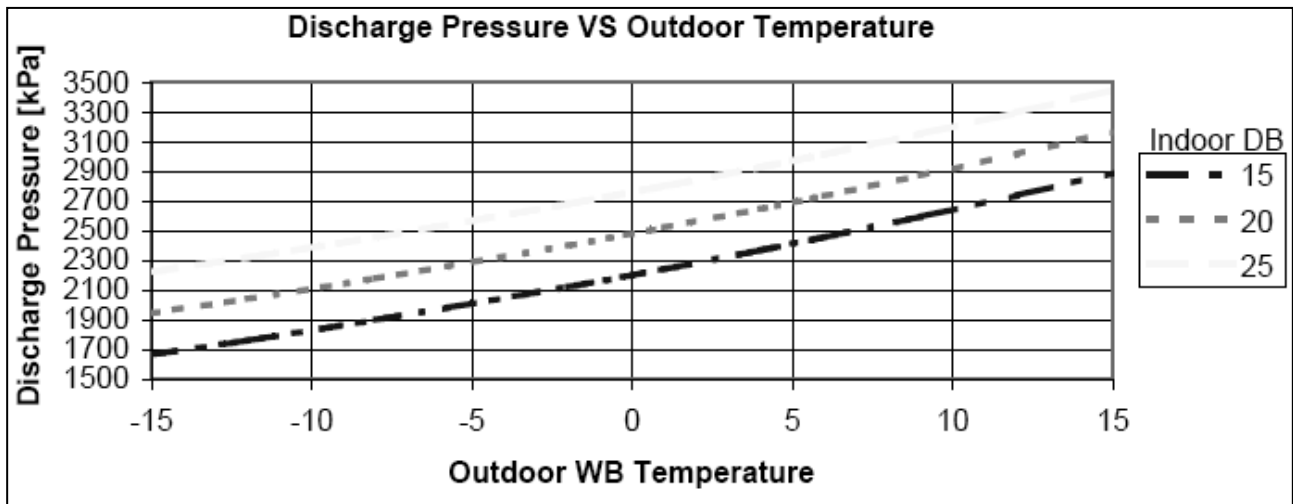
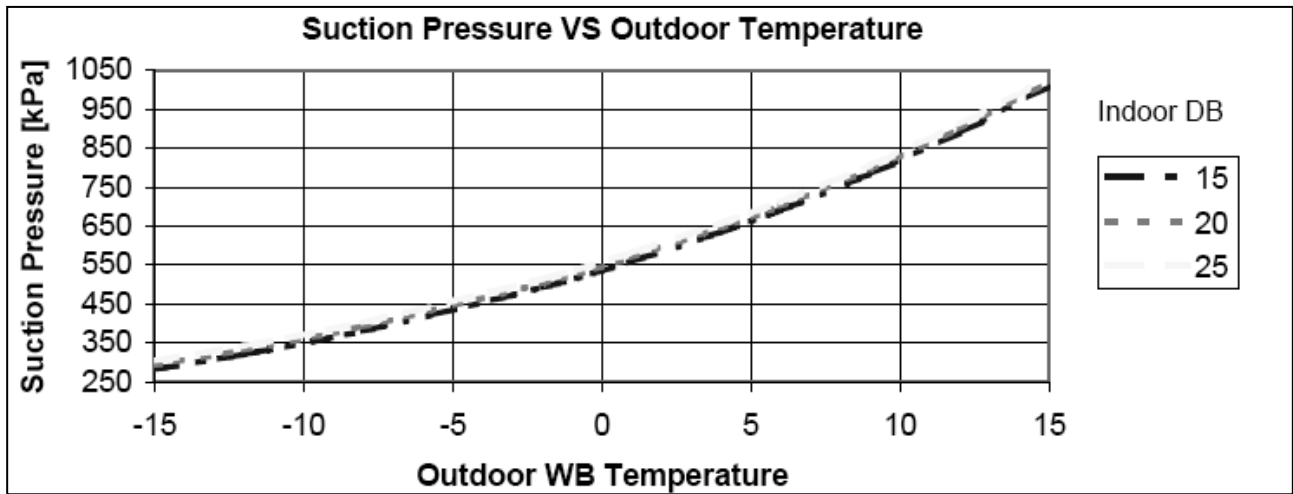
### 5.6 Pressure Curves

#### 5.6.1. Model: PNX012 / GC 12 DCI Nordic

Cooling - Test Mode



**5.6.2 Heating - Test Mode**



## 6. SOUND LEVEL CHARACTERISTICS

### 6.1 Sound Pressure Level

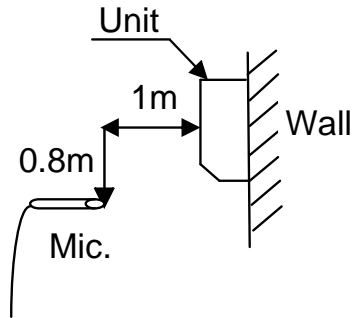
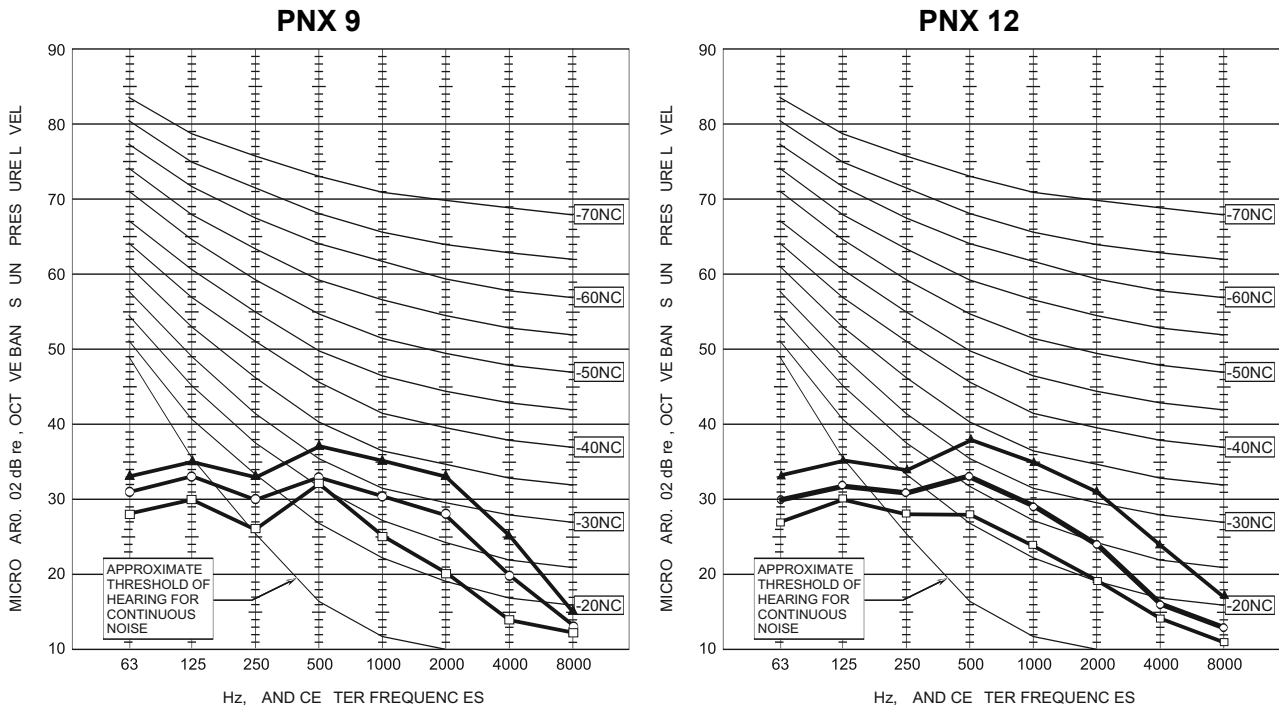


Figure 1

### 6.2 Sound Pressure Level Spectrum (Measured as Figure 1)



FAN SPEED	LINE
HI	—▲—
ME	—○—
LO	—□—

### 6.3 Outdoor units

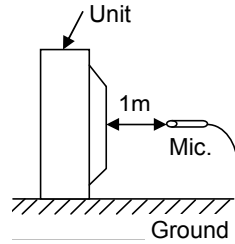
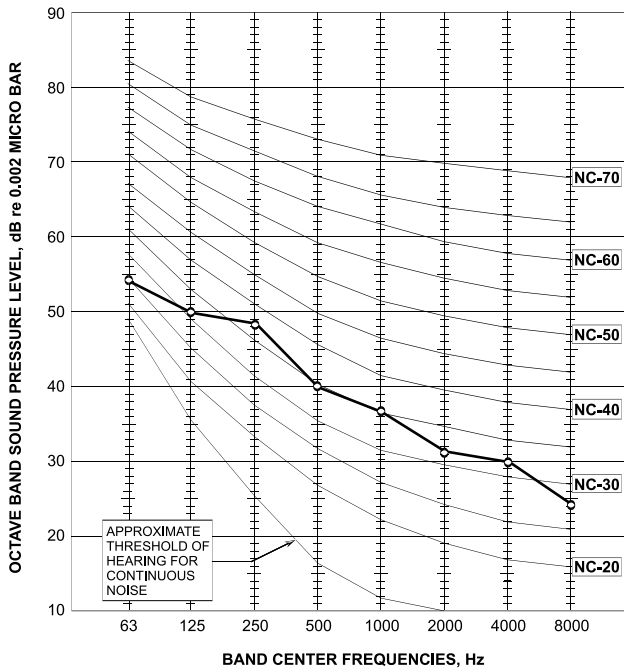


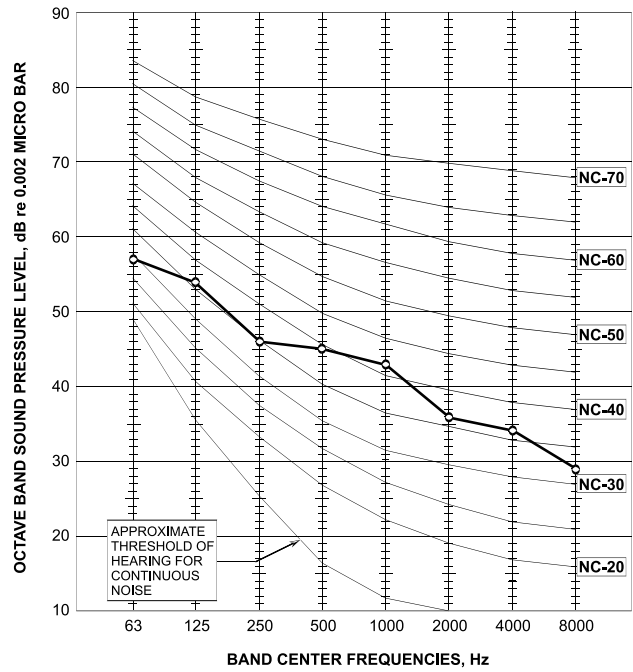
Figure 2

### 6.4 Sound Pressure Level Spectrum (Measured as Figure 2)

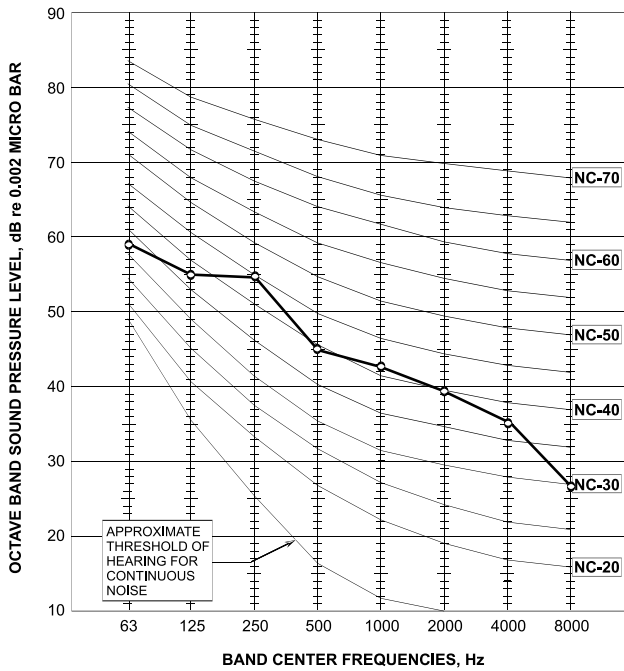
**GC 9 DCI Cooling**



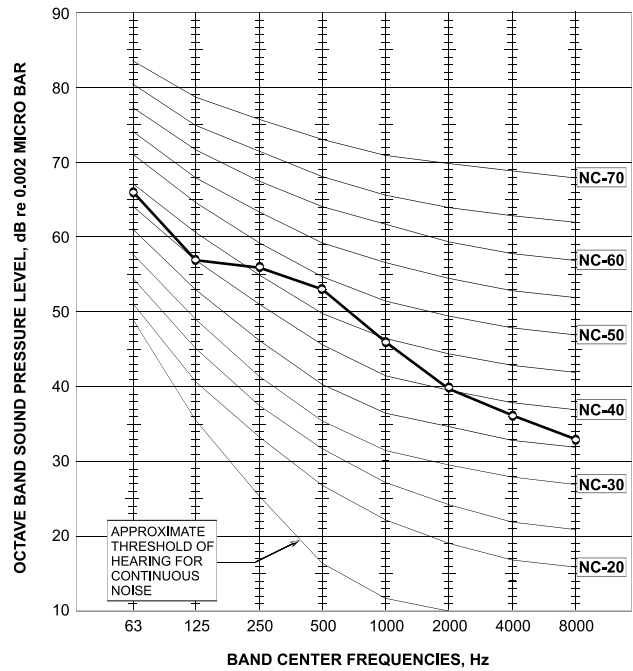
**GC 9 DCI Heating**



**GC 12 DCI Cooling**



**GC 12 DCI Heating**



## 7. ELECTRICAL DATA

### 7.1 Single Phase Unit

Model	PNX009 DCI	PNX012 DCI
Power Supply	1 PH ,220-240VAC ,50HZ	
Connected to	To indoor	
Maximum Current	10A	
Inrush Current <sup>(a)</sup>	35A	
Starting Current <sup>(b)</sup>	10A	
Circuit Breaker	16A	
Power Supply wiring no. x cross section	3 X 1.5 mm <sup>2</sup>	
Interconnecting cable no. x cross section	4 X 1.5 mm <sup>2</sup>	

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

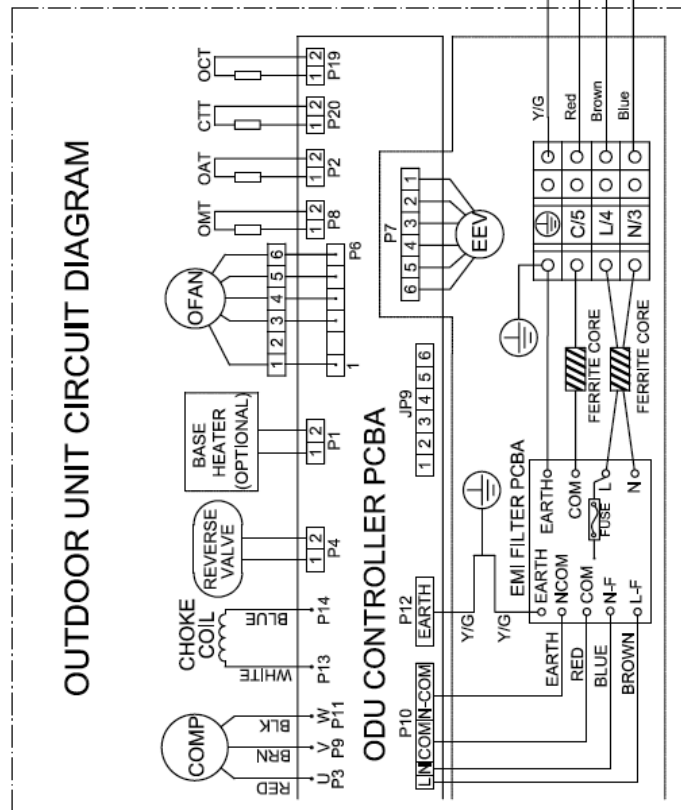
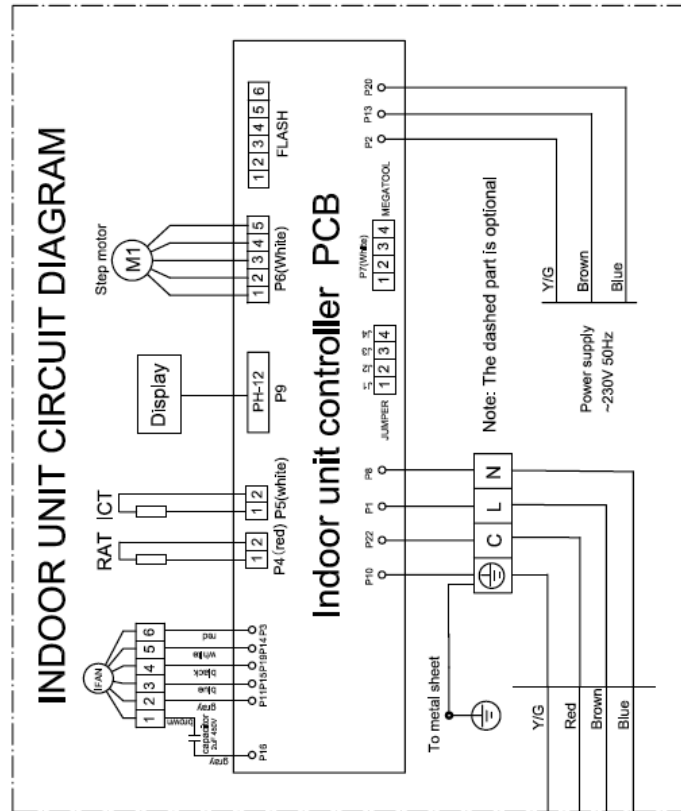
(b) Starting current is the current at compressor start up.

#### **NOTE**

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

8. WIRING DIAGRAMS

8.1 Indoor & Outdoor Units: PNX009, PNX012 / GC 9 DCI Nordic, GC 12 DCI Nordic

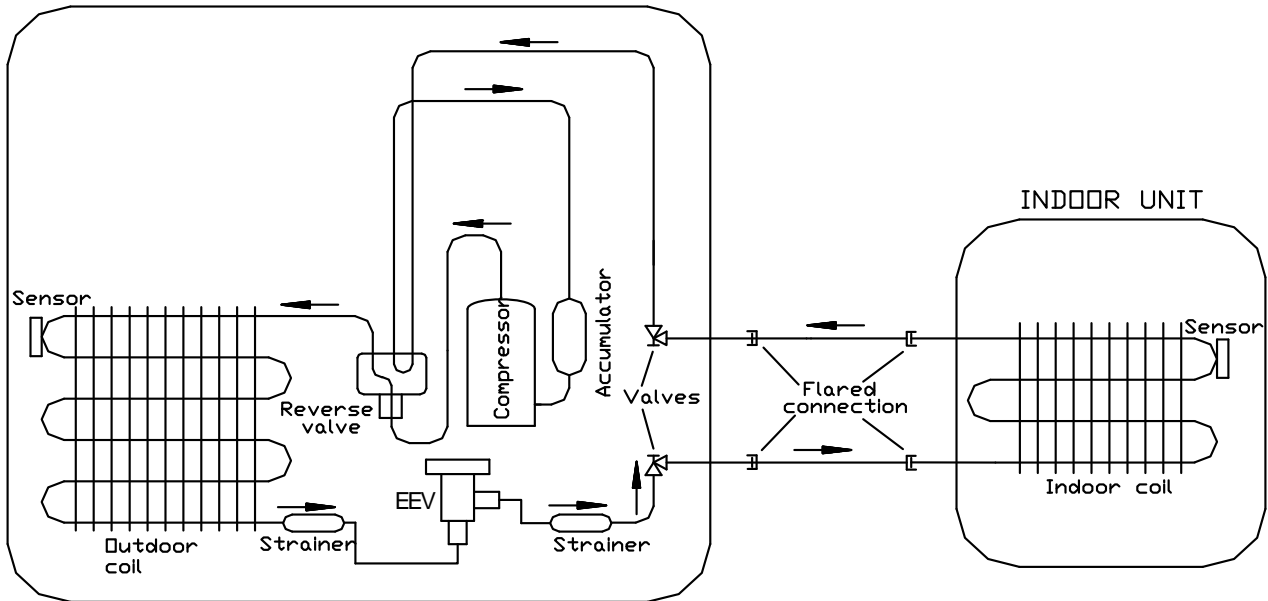




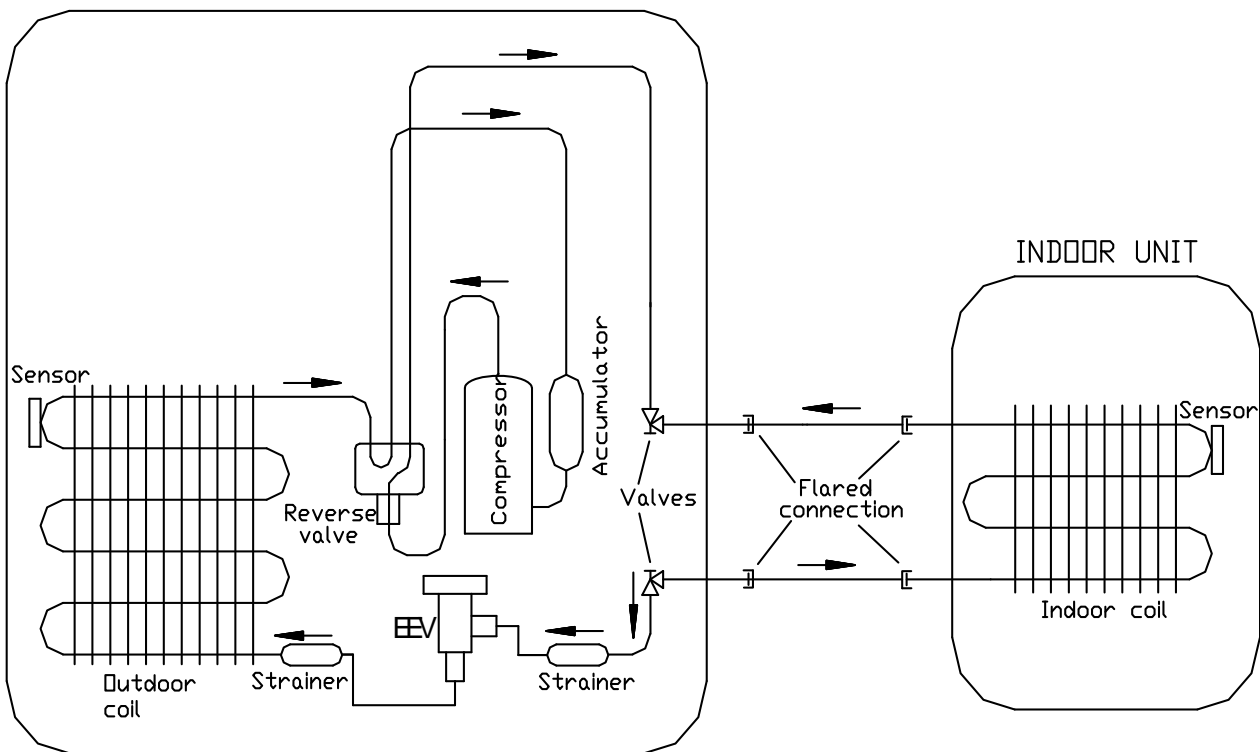
**9. REFRIGERATION DIAGRAMS**

**9.1 Heat Pump Models**

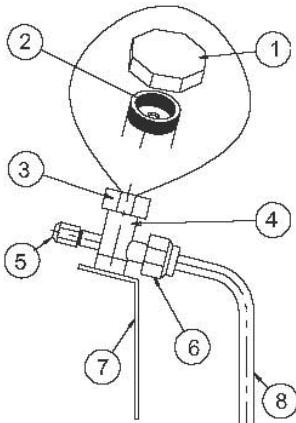
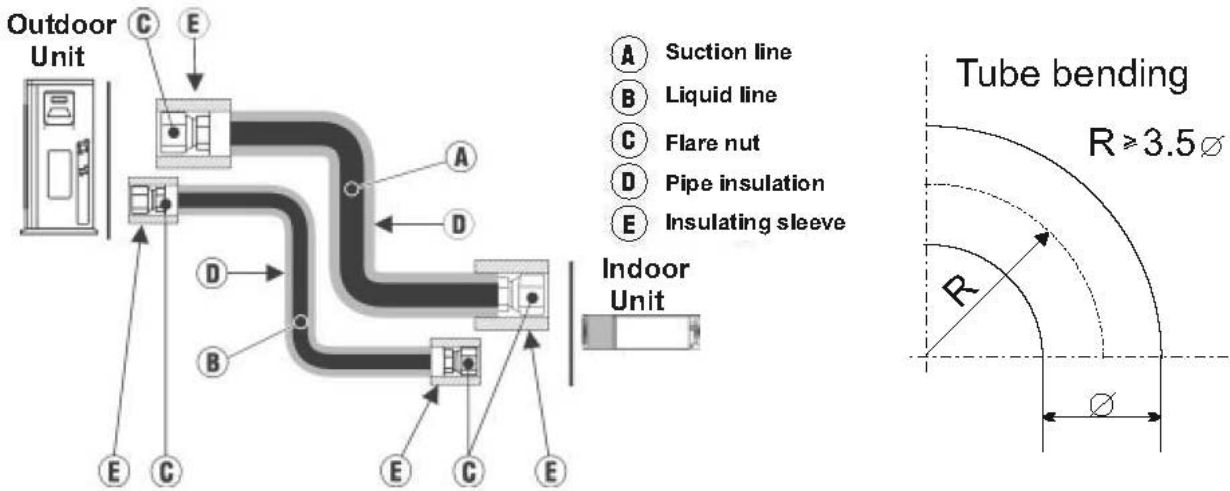
**9.1.1 PN009 / GC 9 DCI Nordic, PN012 / GC 12 DCI Nordic => Cooling Mode**



**9.1.2 PN009 / GC 9 DCI Nordic, PN012 / GC 12 DCI Nordic => Heating Mode**



# 10. TUBING CONNECTIONS



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

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

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

# 11. CONTROL SYSTEM

## 11.1 General Functions and Operating Rules

The DCI software is fully parametric.

All the model dependent parameters are shown in *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
Low	<i>Max NLOADIF1C</i>	127
Medium	<i>Max NLOADIF2C</i>	127
High	<i>Max NLOADIF3C</i>	127
Turbo	<i>Max NLOADIF4C</i>	127
Auto	<i>Max NLOADIF5C</i>	127

NLOAD limits as a function of power shedding:

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

NLOAD limits as a function of indoor fan speed:

NLOAD	Target Frequency [Hz]
0	0
0 < NLOAD ≤ MinFreq	MiniFreq
> MinFreq	$\frac{\text{MaxFreq} - \text{MinFreq}}{127 - \text{MinFreq}} \cdot (\text{NLOAD} - \text{MinFreq}) + \text{MinFreq}$

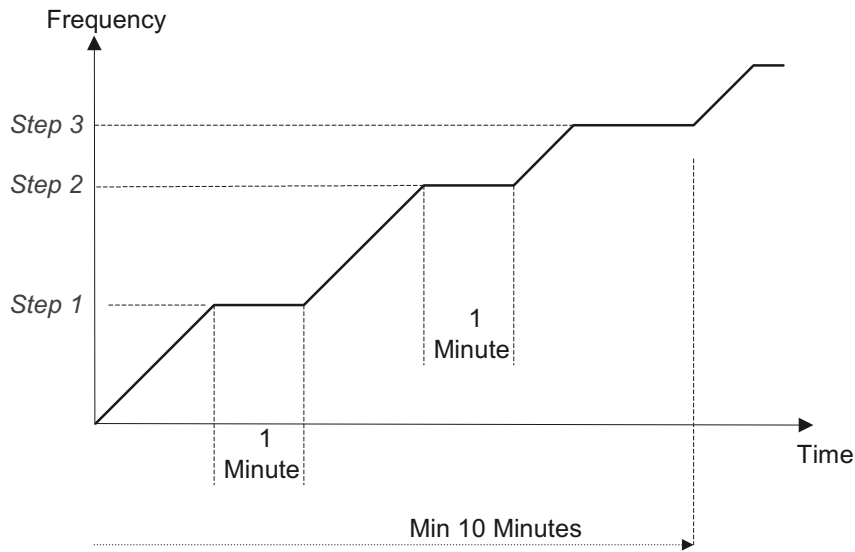
Target frequency limits as a function of outdoor air temperature (OAT):

OAT Range	Cool mode limits	Heat mode limits
OAT < 6	<b><i>MaxFreqAsOATC</i></b>	No limit
6 < OAT < 15		<b><i>MaxFreqAsOATIH</i></b>
15 < OAT < 24		<b><i>MaxFreqAsOAT2H</i></b>
24 < OAT	No limit	

**11.1.4 Frequency Changes Control**

.Frequency change rate is 1 Hz/sec

**11.1.5 Compressor Starting Control**



**11.1.6 Minimum On and Off Time**

3 minutes.

**11.1.7 Indoor Fan Control**

10 Indoor fan speeds are determined for each model. 5 speeds for cool/dry/fan modes and 5 speeds for heat mode.

When user sets the indoor fan speed to a fixed speed (Low/ Medium/ High), unit will operate constantly at set speed.

When Auto Fan is selected, indoor unit controller can operate in all speeds. The actual speed is set according to the cool/ heat load.

**11.1.7.1 Turbo Speed**

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

Difference between set point and actual room temperature is bigger then 3 degrees.

Room temperature > 22 for cooling, or < 25 for heating.

**11.1.8 Heating Element Control**

Heating element can be started if  $LOAD > 0.8 * MaximumNLOAD$  AND Indoor Coil temperature < 45.

The heating element will be stopped when  $LOAD < 0.5 * MaximumNLOAD$  OR if Indoor Coil Temperature > 50.

**11.1.9 Outdoor Fan Control**

**In cooling mode:**

The OFAN speed is controlled according to the following objectives:

Mode	Ofan Target	Implementation
Cool Mode	Keep the condensation temperature to the minimum possibly value	Keep OMT as low as possible down to 27°C

The target OFAN speed is the sum of open loop value (OLs) and a result of the accumulative correction values (CV).

$$OFAN_{Target} = OFAN_{OL} + \sum OFAN_{CV}$$

	During 2 minutes after the compressor start up	After 2 minutes
OFAN Open Loop	Yes, Continuously according to the software timer	No
OFAN Corrections	No	Yes, every 40 seconds

When OMT or OCT is faulty there will be no OFAN connections, and the OFAN will operate according to the open loop table.

The following table describes the open loop of outdoor fan speed, at cool mode, related to outdoor air temperature and the frequency (ROM table):

Freq	Outdoor air temperature (OAT)						
	~ - 10	0	10	20	30 or faulty	40	50~
0	0	0	0	0	0	0	0
20	80	120	220	460	600	730	780
40	130	210	330	730	730	780	780
60	250	310	550	730	730	780	780
80	300	400	730	730	730	780	780
100~	350	490	730	730	730	780	780

**Notes**

1. Linear interpolation will be used for values in between the outdoor temperature and the compressor frequencies.
2. The speed values, of the above table, are of 10 RPM resolution.
3. OFAN speeds are less than OFMinRPM, OFMinRPM will be used, and the OFMinRPM can't be set less than 10rpm at lest.

**11.1.10 EEV (electronic Expansion valve) Control**

**EEV opening determination in normal run mode**

The Target EEV value is the sum of open loop value (OL) and a result of the accumulative collection values (CV). The EEV collections are calculated every 30 seconds.

$$EEV = EEV_{ol} + 2 EEV_{cv}$$

EEV open loop setting [EEV<sub>ol</sub>part]

The EEV initial value (open loop) is determined according to the operation mode, the actual frequency and ODU model. The values are determined according to the 'EEV<sub>ol</sub> Parameters Table'

EEV correction setting (EEV<sub>cv</sub>part)

EEV<sub>cv</sub> is a collection EEV value, it's calculated as follows:

- EEV<sub>cv</sub> = 0 during the first 1 minutes after the compressor starts.
- After 1 minutes are over, the EEV<sub>cv</sub> is updated and calculated every 30 seconds.

The EEV<sub>cv</sub> is based only on discharge super heat correction:

$$EEV_{cv} = EEV_{SH\ Discharge}$$

EEV<sub>SH Discharge</sub> is function of \*SH<sub>Discharge</sub>\* and Der SH<sub>Discharge</sub>, where:

For COoling. SH<sub>DischargeC</sub> = CTT- OMT

For Heating. SH<sub>Discharge</sub> = CTT- ICT

Der SH<sub>Discharge</sub> : SH<sub>Discharge</sub> (current) - SH<sub>Discharge</sub> (previous)

**11.1.11 Reversing Valve (RV) Control**

Reversing valve is on in heat mode.

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

**11.1.12 Ionizer Control**

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

**11.1.13 Electro Static Filter )ESF( Control**

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

**11.1.14 Base Heater Control**

When OAT is connected, Base Heater will be on when unit is in heating and OAT<2°C.

When OAT is disconnected, Base Heater will be on when unit is in heating.

**11.2 Fan Mode**

In high/ medium/ low indoor fan user setting, unit will operate fan in selected speed.

In AutoFan user setting, fan speed will be adjusting automatically according to the difference between actual room temperature and user set point temperature.

### 11.3 Cool Mode

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

In high / medium / low indoor fan user setting, unit will operate fan in selected speed.

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

### 11.4 Heat Mode

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

In high / medium / low indoor fan user setting, unit will operate fan in selected speed.

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

#### 11.4.1 Temperature Compensation

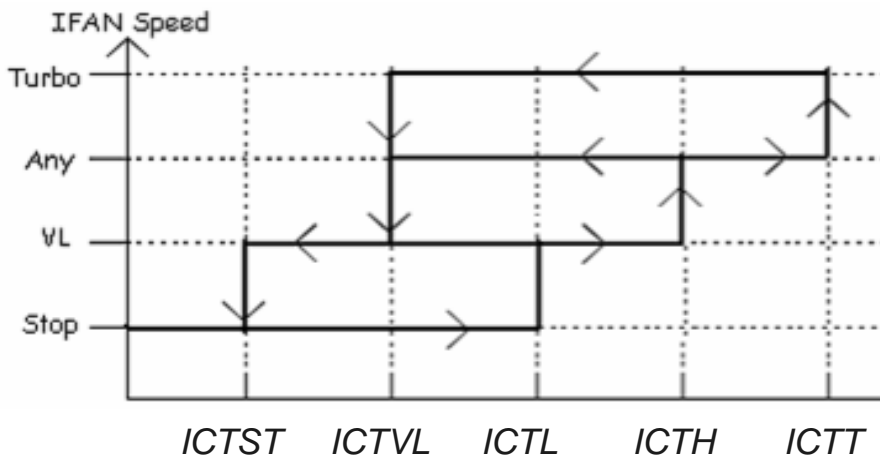
In wall mounted models, 3 degrees are reduced from room temperature reading (except when in I-Feel mode), to compensate for temperature difference between high and low areas in the heated room, and for coil heat radiation on room thermistor.

The temperature compensation can be enabled/disabled by shortening of J2 on the indoor unit controller.

Model	J2 Shorted	J2 Opened
Wall Mounted (PNX)	Compensation Disable	Compensational Enabled

#### 11.4.2 Indoor Fan Control in Heat Mode

Indoor fan speed depends on the indoor coil temperature:



### 11.5 Auto Cool/Heat Mode

When in auto cool heat mode unit will automatically select between cool and heat mode according to the difference between actual room temperature and user set point temperature ( $\Delta T$ ).

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

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

### 11.6 Dry Mode

As long as room temperature is higher than the set point, indoor fan will work in low speed and compressor will work between 0 and  $MaxNLOADIF1C$  Hz.

When the room temperature is lower than the set point, compressor will be switched OFF and indoor fan will cycle 3 minutes OFF, 1 minute ON.

### 11.7 Protections

There are 5 protection codes.

Normal (Norm) – unit operate normally.

Stop Rise (SR) – compressor frequency can not be raised but does not have to be decreased.

HzDown1 (D1) – Compressor frequency is reduced by 2 to 5 Hz per minute.

HzDown2 (D2) – Compressor frequency is reduced by 5 to 10 Hz per minute.

Stop Compressor (SC) – Compressor is stopped.

11.7.1 Indoor Coil Defrost Protection

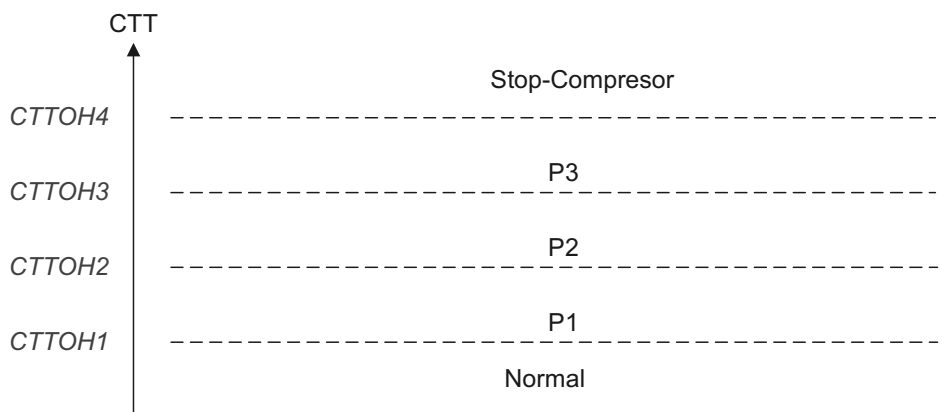
ICT	ICT Trend				
	Fast Increasing	Increasing	No change	Decreasing	Fast Decreasing
ICT < -2	SC	SC	SC	SC	SC
-2 ≤ ICT < 0	D1	D1	D2	D2	D2
0 ≤ ICT < 2	SR	SR	D1	D2	D2
2 ≤ ICT < 4	SR	SR	SR	D1	D2
4 ≤ ICT < 6	Norm	Norm	SR	SR	D1
6 ≤ ICT < 8	Norm	Norm	Norm	SR	SR
8 ≤ ICT	Normal				

1.7.2 Indoor Coil over Heating Protection

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

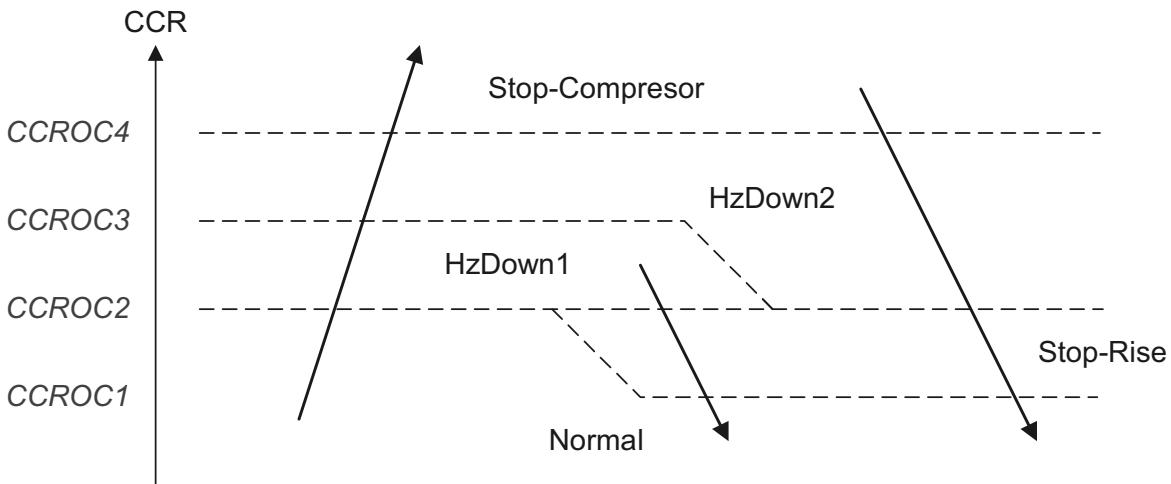
11.7.3 Compressor over Heating Protection

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



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

**11.7.4 Compressor over Current Protection**



**11.7.5 Heat Sink Over Heating Protection (NA for DCI 25 and 35)**

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

**11.7.6 Outdoor Coil Deicing Protection**

**11.7.6.1 Deicing Starting Conditions**

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

- Case 1: OCT < - DST – AND TLD > DI
- Case 2: OCT < OAT – 12 AND TLD > 30 minutes.
- Case 3: OCT < - AND TLD > 75 minutes
- OCT is Invalid AND OCT < 0
- Compressor ON Time > 15 minutes

OCT – Outdoor Coil Temperature

OAT – Outdoor Air Temperature

TLD – Time from Last Deicing

DI – Deicing Interval (Time Interval Between Two Deicing)

DST – Deicing static threshold (Temperature)

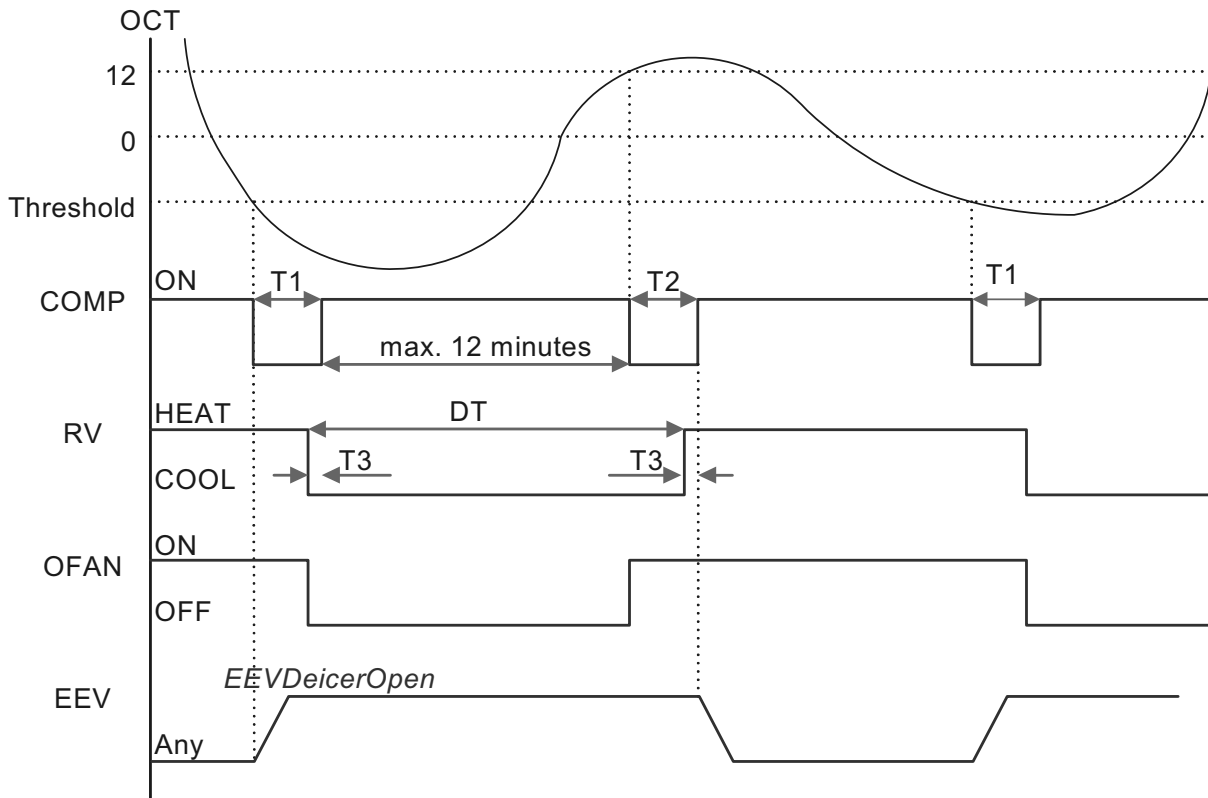
Where DST is defined as:

When OAT > 0 or OAT is invalid, then DST = 8

When OAT ≤ 0 then DST = round down (- 0.7\*OAT)+8



11.7.6.2 Deicing Protection Procedure



T1 = 60 seconds, T2 = 36 seconds, T3 = 6 seconds

11.8 Condensate Water Over Flow Protection

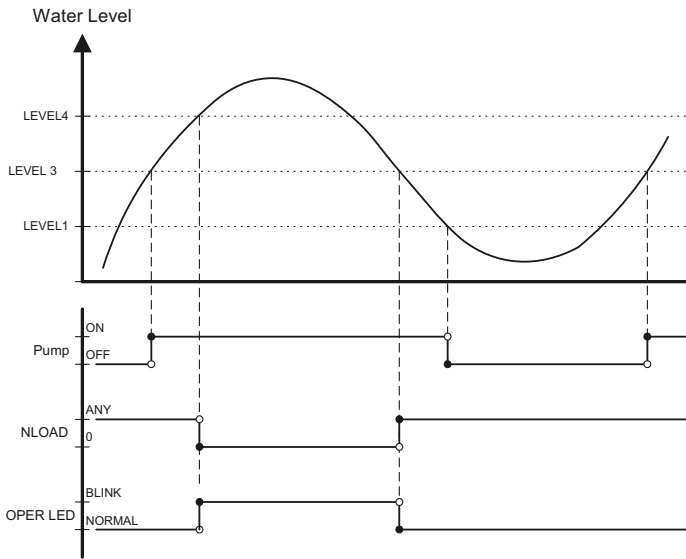


Each of the pins P1, P2, P3 can have two options:

- 1 – When it is shorted with P4
- 0 – When it is not shorted to P4

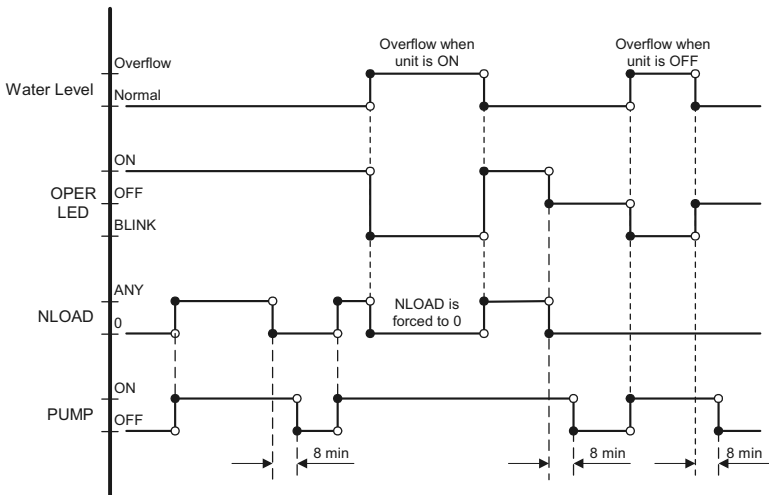
11.8.1 3 Levels Logic (used in floor/ceiling models)

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



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

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



**11.9 Indoor Unit Dry Contact**

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

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

**11.10 Operating the Unit from the Mode Button**

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

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

## 11.11 On Unit Controls and Indicators

### 11.11.1 Indoor Unit Controller Controls and Indicators.

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

### 11.11.2 Outdoor Unit Controller Indicators

Unit has three LED

SB LED is ON when power is ON (230 VAC, even when no communication).

STATUS LED is ON when COMP is ON, and Blinks according to diagnostics mode definitions when either fault or protection occurs.

FAULT LED Blinks according to diagnostics mode definitions when either fault or protection occurs.

## 11.12 Jumper Settings

### 11.12.1 Indoor Unit Controller

0 = Open Jumper (disconnect jumper).

1 = Close Jumper (connect jumper).

#### Self test Jumper – J1

OPERATION	J1
SELF-TEST	1
NORMAL	0

#### Compensation Jumper –J2

Model	J2 (Default)	Compensation
Wall Mounted (PNX)	0	Activated

#### Family selection Jumper – J3, J4 and J5

Family	J5	J4	J3
Reserved	0	0	0
Reserved	0	0	1
Reserved	0	1	1
Wall Mounted (PNX)	0	1	1

IDU Model	Jumper Setting					
	J8	J7	J6	J5	J4	J3
PNX009	0	0	0	0	1	1
PNX012	0	1	0	0	1	1

For wall mounted units Jumper J7, J8 can be configured by service. All other Jumpers on the above table and factory default (cannot be changed by service).

**Model selection Jumper – J7, J8**

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

**J9 – Presence Detector / Power Shedding**

OPERATION	J9
Presence Detector	0
Power Shedding	1

**Jumper – J10**

OPERATION	J1
PNX	1

**11.12.2 Outdoor Unit Controller**

J9 – Jumper Layout

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

**ODU Model Selection**

N.A.  
N.A.  
ODU3  
ODU2  
ODU1  
ODU0

ODU MODEL SETTING

ODU3	ODU2	ODU1	ODU0	ODU MODEL
ON	OFF	ON	OFF	DCI 25 NORDIC
ON	OFF	ON	ON	DCI 35 NORDIC

### 11.13 Test Mode

#### 11.13.1 Entering Test Mode

System can enter Test mode in two ways:

Automatically when the following conditions exists for 30 minutes continuously:

Mode = Cool, Set point =16, Room temperature = 27±1, Outdoor temperature = 35±1  
Or

Mode = Heat, Set point = 30, Room temperature = 20±1, Outdoor temperature = 7±1

Manually when entering diagnostics with the following settings:

Mode = Cool, Set point = 16

Mode = Heat, Set point = 30

#### 11.13.2 Unit Operation in Test Mode

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

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

### 11.14 SW Parameters

#### 11.14.1 Indoor Units SW Parameters

##### General Parameters for All Models:

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

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

##### Model Depended Parameters:

Parameter name	Wall Mounted Models	
	PNX009	PNX012
<b>NLOAD limits as a function of selected indoor fan speed</b>		
MaxNLOADIF1C	40	40
MaxNLOADIF2C	53	53
MaxNLOADIF3C	120	120
MaxNLOADIF4C	127	127
MaxNLOADIF5C	127	127
<b>Indoor Fan speeds</b>		
IFVLOWC	700	700
IFLOWC	800	850
IFMEDC	900	950
IFHIGHC	1050	1100
IFTURBOC	1150	1200
IFVLOWH	700	700
IFLOWH	800	850
IFMEDH	950	1000
IFHIGHH	1100	1150
IFTURBOH	1200	1300
<b>Nominal Compressor Frequency</b>		
NomLoadC	40	62
NomLoadH	55	67

## 11.14.2 Outdoor Units SW Parameters

Parameter Name	GC 9 DCI Nordic	GC 12 DCI Nordic
<b>Compressor Parameters</b>		
MinFreqC	20	20
MaxFreqC	60	80
MinFreqH	30	30
MaxFreqH	78	88
Step1Freq	35	35
Step2Freq	50	55
Step3Freq	90	90
<b>Frequency limits as a function of outdoor air temperature</b>		
MaxFreqAsOATC	40	50
MaxFreqAsOAT1H	65	75
MaxFreqAsOAT2H	50	60
<b>Compressor Over Heating Protection</b>		
CTTOH1	90	90
CTTOH2	95	95
CTTOH3	100	100
CTTOH4	105	105
<b>Compressor Over Current Protection [A]</b>		
CCR01	7.1	7.1
CCR02	7.5	7.5
CCR03	7.9	7.9
CCR04	8.3	8.3

## 12. TROUBLESHOOTING

### 12.1 Troubleshooting GC 9 DCI Nordic, GC 12 DCI Nordic

**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 shock!!!

#### 12.1.1 Single Split System failures and Corrective Actions

No	Symptom	Probable Cause	Corrective Action
1	Power supply indicator (Red LED) does not light up.	No power supply	Check power supply. If power supply is OK, check display and display wiring. if OK, replace controller.
2	Unit does not respond to remote control message	Remote control message not reached the indoor unit	Check remote control batteries, if batteries are OK, check display and display wiring, if OK, replace display PCB. If still not OK replace controller.
3	Unit responds to remote control message but Operate indicator (Green LED) does not light up	Problem with display PCB	Replace display PCB. If still not OK replace controller.
4	Indoor fan does not start (louvers are opened and Green LED does light up)	Unit in heat mode and coil is still not warm.	Change to cool mode and check.
		Problem with PCB or capacitor	Change to high speed and Check power supply to motor is higher than 130VAC (for triack controlled motor) or higher than 220VAC for fixed speed motors, if OK replace capacitor, if not OK replace controller.
5	Indoor fan works when unit is OFF, and indoor fan speed is not changed by remote control command.	PCB problem	Replace controller
6	Compressor does not start	Electronics control problem or protection	Perform diagnostics and follow the actions described.
7	Compressor stops during operation and Green LED remains on	Electronic control or power supply problem	Perform diagnostics and follow the actions described.
8	Compressor is on but outdoor fan does not work	Problem with outdoor electronics or outdoor fan	Check outdoor fan motor according to the procedure below, if not OK replace controller.

No	Symptom	Probable Cause	Corrective Action
9	Unit works in wrong mode (cool instead of heat or heat instead of cool)	Electronics or power connection to RV	Check RV power connections, if OK, check RV operation with direct 230VAC power supply, if OK, replace outdoor controller.
10	All components are operating properly but no cooling or no heating	Refrigerant leak	Check refrigeration system.
11	Compressor is over heated and unit does not generate capacity	EEV problem	Check EEV.
12	Units goes into protections and compressor is stopped with no clear reason	Control problem or refrigeration system problem	Perform diagnostics , and follow the actions described.
13	Compressor motor is generating noise and no suction occurs	Phase order to compressor is wrong	Check compressor phase order.
14	Water leakage from indoor unit	Indoor unit drainage tube is blocked	Check and open drainage tube.
15	Freezing of outdoor unit in heat mode and outdoor unit base is blocked with ice		Connect base heater.
16	Unit operates with wrong fan speeds or wrong frequency	Wrong jumper settings	Perform diagnostics, and check if units is operating by EEPROM parameters.

## 12.2 Checking the refrigeration system

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

Entering test mode:

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



## 12.3 Judgment by Indoor/Outdoor Unit Diagnostics

Enter diagnostics mode - press for five seconds Mode button in any operation mode. Acknowledgment 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 acknowledgment 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

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

**12.3.2 Indoor Unit Diagnostics and Corrective Actions**

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

### 12.3.3 Outdoor Unit Diagnositis

No	Problem	5	4	3	2	1
1	OCT is disconnected	0	0	0	0	1
2	OCT is shorted	0	0	0	1	0
3	CTT is disconnected	0	0	0	1	1
4	CTT is shorted	0	0	1	0	0
5	HST is disconnected (when enabled)	0	0	1	0	1
6	HST is shorted (when enabled)	0	0	1	1	0
7	OAT is disconnected (when enabled)	0	0	1	1	1
8	OAT is shorted (when enabled)	0	1	0	0	0
9	TSUC is disconnected (when enabled)	0	1	0	0	1
10	TSUC is shorted (when enabled)	0	1	0	1	0
11	IPM Fault	0	1	0	1	1
12	Bad EEPROM	0	1	1	0	0
13	DC under voltage	0	1	1	0	1
14	DC over voltage	0	1	1	1	0
15	AC under voltage	0	1	1	1	1
16	Indoor / Outdoor unit Communication mismatch	1	0	0	0	0
17	No Communication	1	0	0	0	1
18	Reserved	1	0	0	1	0
20	Heat sink Over Heating	1	0	1	0	0
21	Deicing	1	0	1	0	1
22	Compressor Over Heating	1	0	1	1	0
23	Compressor Over Current	1	0	1	1	1
24	No OFAN Feedback	1	1	0	0	0
25	OFAN locked	1	1	0	0	1
26	Compressor Lock	1	1	0	1	0
27	Bad Communication	1	1	0	1	1
30	Outdoor Coil Overheating	1	1	1	1	0
31	Operation Condition Is Exceeded	1	1	1	1	1

**1 - ON**

**0 - OFF**

Only one code is shown. Order of priority is 1-31. Diagnostics is continuously ON as long power is on.

### 12.3.4 Outdoor Unit Diagnostics and Corrective Actions

No	Fault	Probable Cause	Corrective Action
1	Sensors failures of all types		Check sensors connections or replace sensors.
2	IPM Fault	Electronics HW problem	Check all wiring and jumper settings, if OK, replace electronics.
3	Bad EEPROM		No action, unless special parameters are required for unit operation.

No	Fault	Probable Cause	Corrective Action
4	DC under/over Voltage	Electronics HW problem	Check outdoor unit power supply voltage
5	AC under Voltage		Check outdoor unit power supply voltage
6	Indoor / Outdoor unit Communication mismatch	Indoor and Outdoor controllers are with different versions	Replace Indoor controller
7	No Communication	Communication or grounding wiring is not good.	Check Indoor to Outdoor wiring and grounding
8	Compressor Lock		Switch unit to STBY and restart
9	Bad Communication	Communication quality is low reliability	Check 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 checking the Main Parts

### 12.5.1 Checking Mains Voltage.

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

### 12.5.2 Checking Power Input.

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

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

### 12.5.3 Checking the Outdoor Fan Motor.

Enter Test Mode (where the OFAN speed is high)

Check the voltage between lead wires according to the normal value as following:

Between red wire and black wire: 310VDC +/- 20V

Between orange wire and black wire: 15VDC +/- 1V

Between yellow wire and black wire: 2-6VDC

#### **12.5.4 Checking the Compressor.**

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

#### **12.5.5 Checking the Reverse Valve (RV).**

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

#### **12.5.6 Checking 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. Check the drive voltage (12VDC). When Outdoor unit is power on, EEV shall run and have click 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 shock.

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

#### **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 shock.

#### **12.6.3 Additional advises**

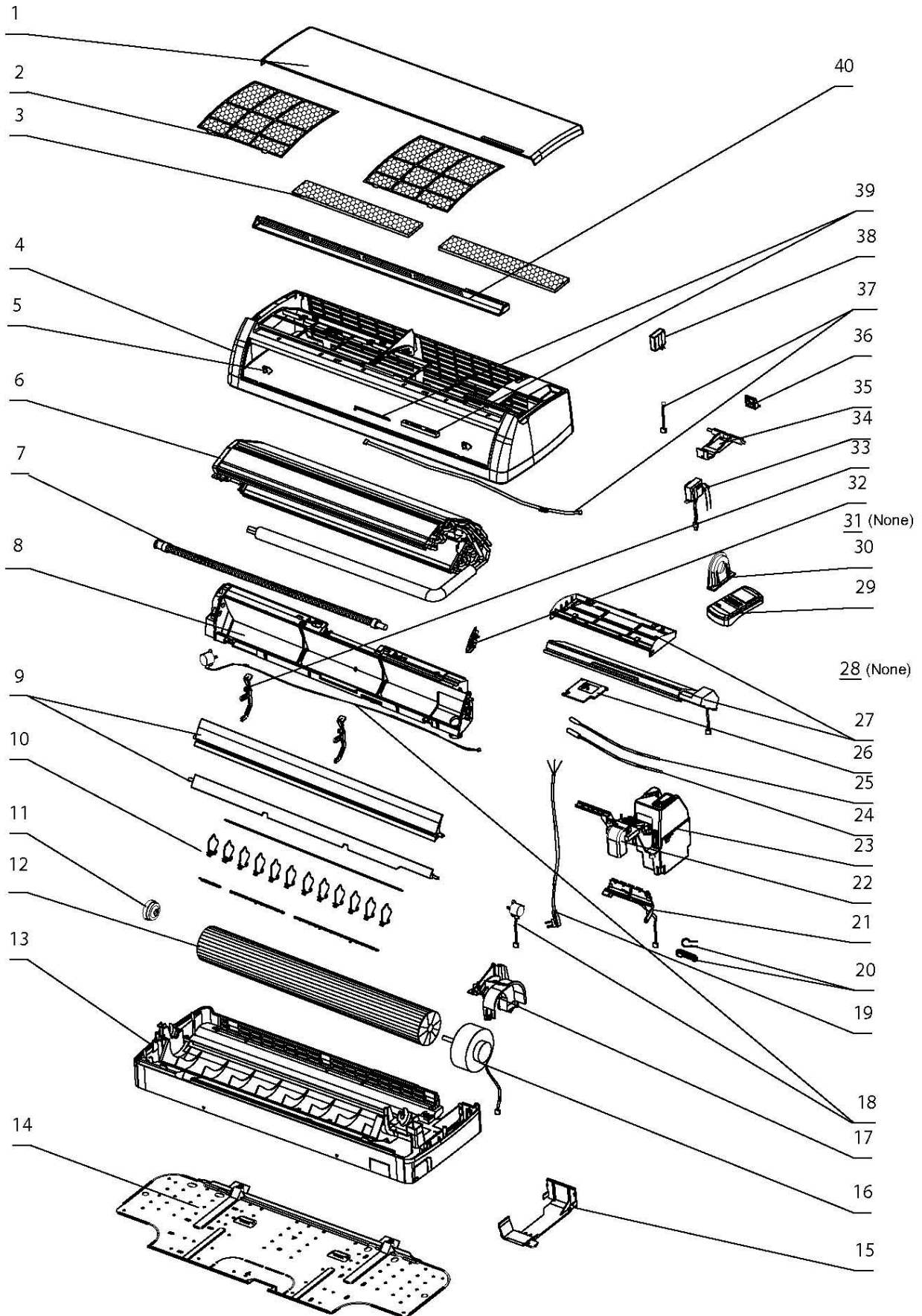
When disassemble the controller or the front panel, turn off the power supply.

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

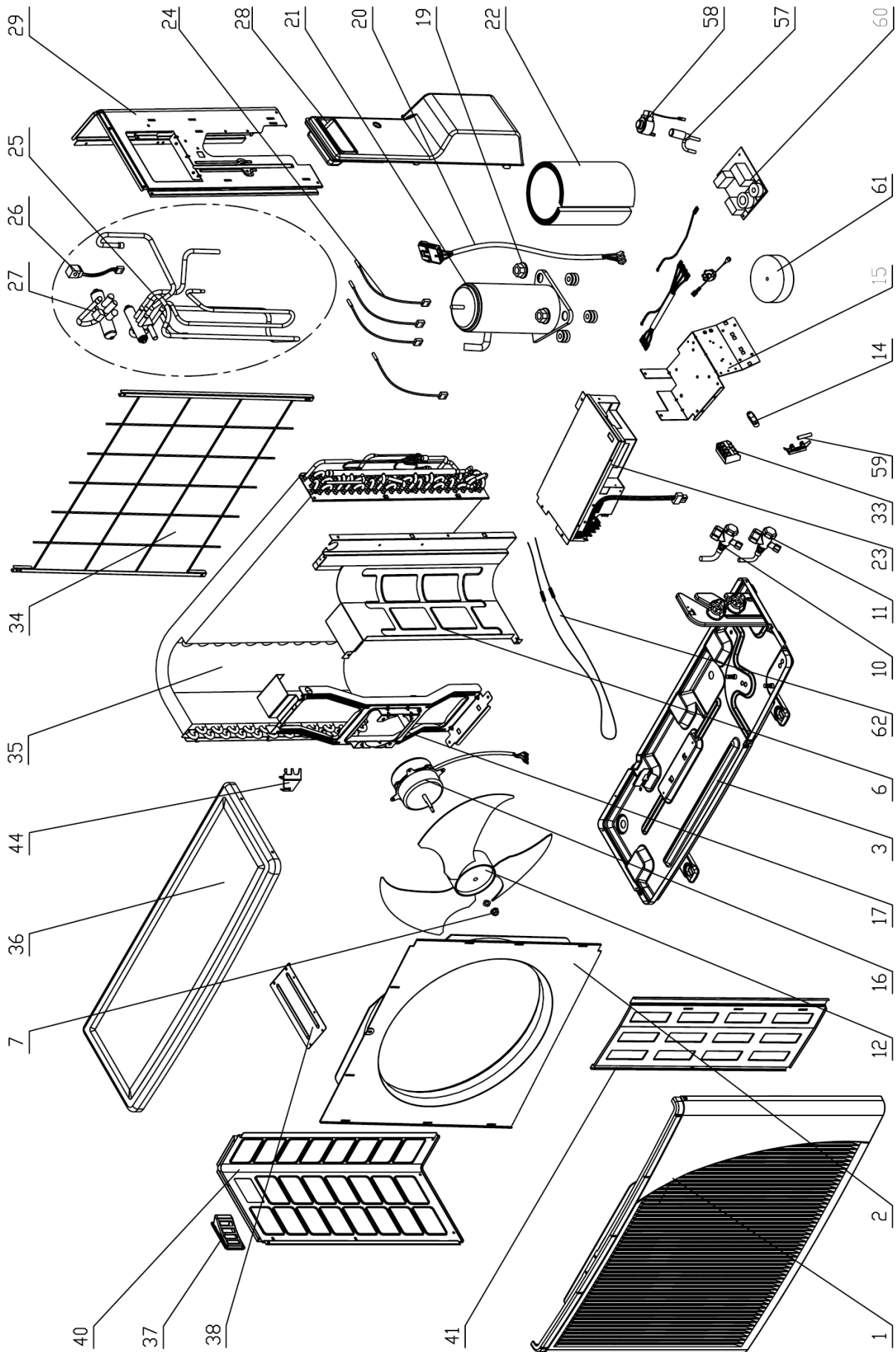
## 13.1 Indoor Unit: PNX009, PNX012 DCI



**13.2 Indoor Unit: PNX009 DCI, PNX012 DCI**

No.	PN	Description	Qty
1	465800009	Grill A Assy./ LEX7/9/12/14 for Airwell	1
	465800016	Grill A Assy./ LEX7/9/12/14 for Electra	1
2	4518655	Air Filter	2
3	4519132	Active Carbon Static Fiber filter	1
	4519744	Low Temperature Catalyst Fiber Filter	1
4	465720059	Front Frame Assy./ LEX7/9/12/14	1
5	4526952	Screw Cover	2
6	4526389	R410A EVAPORATOR ASSY HPI DC WNG9/12	1
7	4518664	Draining Hose(ordinary)	1
	4522754	Draining Hose(For Aust.)	1
8	4527434	Air Outlet Assy	1
9	4518638	Upper Louver	1
9	4526953	Lower Louver	1
10	4518640	Vert. Louver A	2
	4518641	Vert. Louver B	10
11	4518662	Bearing assy fan	1
12	4518661	Fan assy plastic D91	1
13	465700000	Rear panel assy	1
14	4518670	WNG INSTALLATION PLATE	1
15	4518654	Tube Bracket	1
16	4519864R	Motor (LEX DCI25/35 and LEX7/9/12/14 with new function)	1
17	4518650	Motor Cover	1
18	452969400	Step Motor A	1
	452969500	Step Motor B	1
19	4521158R	Power cord cable (Euro.)	1
	4520061R	Power cord cable(Israel)	1
	4520278R	Power cord cable(Without plug)	1
20	4519147	Power Cord Clip	1
	465320006	Wire Fixing Block	1
21	467300079R	Display Board Assy./ LEX25/35DCI With new function	1
22	4518666	Sensor Braket	1
23	467300067R	LEX DCI Indoor Controller With Vertical Louver EHK: 916A512-03	1
24	438082	Thermistor Indoor coil BLACK	1
25	4519813	Thermistor room	1
26	465340012	Terminal Cover	1
27	4518663	ELECTROSTATIC FLITER WNG-1	1
	4519338	FILTER FRAME(Optional)	1
28	none	none	0
29	453042500	Remote controller/RC4-I-1 EHK P/N 974-710-00	1
30	4518651	Cover Side Motor	1
31	none	none	0
32	4518682	Gear BOX ASSY	1
33	4518646	Louver Support	1
34	452867800R	Transformer For LEX DCI25/35 (Optional)	1
35	4518657	Tube Lock	1
36	4518656	Mounting Hook	2
37	4519900	IONIZER CABLE A (Optional)	1
38	467430000	Power Supply Unit /Ionizer(Optional)	1
39	467480001	Ionizer/WNG NWNG SERIES(Optional)	1
	4526951	Ionizer Cover (Optional)	1
40	465800018	Air Inlet Frame A Assy.	1

13.4 Outdoor Unit: GC 9 DCI Nordic, GC 12 DCI Nordic





**13.5 Outdoor Unit: GC 9 DCI Nordic, GC 12 DCI Nordic**

No.	P/N	Description	Qty.
1	433218	Front panel A	1
2	4526340	Air inlet ring-420	1
3	464600009	Base Painting Assy.	1
6	4526299	Partition Plate	1
7	4519300	Nut for Fan Motor	1
10	4524177	Gas Valve	1
11	4526301	Liquid Valve	1
14	204107	Cable clip Nylon	1
15	452808700	Terminal Plate Assy.	1
16	452889600R	Fan Motor	1
17	433215	Motor support	1
19	4510677	Nut With Flange M8 -D=24 GB6137-S6	1
20	4526221	Compressor Wire Assy	1
21	460150007R	Compressor Assy.	1
22	469100006	Compressor Jacket	1
22	469120009	Compressor Jacket	1
22	469100005	Compressor Jacket	1
22	469100007	Compressor Jacket	1
23	467300194R	Controller	1
24	467400027	Outside air thermistor(OAT)	1
24	4526775	Compressor top thermistor(CTT)	1
24	467400030	Outside coil thermistor(OCT)	1
24	467400031	Outside middle coil thermistor(OIVIT)	1
25	461600048	4-Way Valve Soldering Assy	1
26	4522509	4-W Valve coil(RC)	1
27	4518951	4-W Valve(RC)	1
28	433229	Valve Cover	1
29	4519606	Right side panel (painting plate)	1
33	4519188	4 poles terminal block	1
34	464800002	Guard Net Painting Assy.	1
35	462300055	Condenser Soldering Assy.	1
36	4519614	Cover panel Painting Assy	1
36	4524510	TOP PANEL INSULATION 335*270*10	1
37	433225	Handle	1
38	4526298	Bridge	1
40	4519607	LeftSide Panel Painting Plate	1
41	433223	Painting Insulation Plate	1
44	453225500	Support/OAT $\Phi$ 7	1
57	461040000	Electronic Expansion Valve(DPF151-01 R410A)	1
58	461050000	Electronic Expansion Valve Coil(XQ05-211	1
60	467300024R	Filter Board/901 A108-00	1
61	4526396	Chock Assy. 167-021-01	1

# APPENDIX A

## INSTALLATION AND OPERATION MANUALS

- ▶ **INSTALLATION MANUAL PNX009 / PNX012 DCI**
- ▶ **OPERATING MANUAL PNX009, PNX012 DCI**