

Airwell

Service Manual

GCD 030 Series

Indoor Units	Outdoor Units
PNX 30 DCI	GCD 030
SX 30 DCI	
CKD 30 DCI	
DLS 30 DCI	



REFRIGERANT

R410A

HEAT PUMP

SM GCD030 1-A.0 GB

JULY 2009

LIST OF EFFECTIVE PAGES

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

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1. INTRODUCTION

1.1 General

The **GCD 030 R410A** can be matched to the following models:

- **PNX 30 DCI**
- **SX 30 DCI**
- **CKD 30 DCI**
- **DLS 30 DCI**

Remote control compatibility

The **PNX, SX, CKD, DLS** units are compatible with remote controls RC3, RC4, RCW1, RCW2.

1.2 Main Features

The **GCD 030** benefits from the most advanced technological innovations, namely:

- Sine wave form in both OFAN and Compressor drives.
- Partial switching PFC control.
- Fuzzy Logic Control (automatic control)
- R410A
- High COP ("A" class energy rating)
- Low noise levels
- Networking connectivity.
- Pre-charged system.
- Dry contact inputs and outputs:
 - STBY
 - Night mode
 - Power Shedding
 - Forced Mode operation
 - Dry contact output – Alarm.
 - Base heater
- Cooling operation at outdoor temperature down to -10°C
- Heating operation at outdoor temperature down to -15°C
- Up to 30m (*DLS 50m*) pipe length between indoor and outdoor units
- Up to 15m vertical high between indoor and outdoor units
- Support HMI Display Board (Human-Machine Interface) – 3x7-segment display shows system status and settings.
- Easy installation and maintenance.

1.3 Indoor Units

The **DLS 30** indoor unit is a low silhouette ducted unit, and can be easily fitted to many types of residential and commercial applications.

It includes:

- High technology plastic fan and fan housing.
- A drain pool that is under the entire unit with internal downward slope.
- An over-flow switch, stops compressor operation in case of is blocked drainage.
- A bended coil with treated aluminium fins.
- 3-speed fan motor an extra speed in case a higher external static pressure is needed.
- Advanced electronic control box assembly.
- All the tubing connections are in the back of the unit to allow easy outlet to left or right side of the unit.
- Field options:
 - (1) External water pump
 - (2) Airconet connection
 - (3) Plenum kit for connection of flexible hoses at air outlet.

1.3.1 Indoor Unit: CKD 30

The indoor unit is ceiling mounted, and can be easily fitted to residential and commercial applications

It includes:

- A large diameter centrifugal fan, allowing low noise level operation
- Motorized flaps
- Bended indoor coil with hydrophilic aluminum fins.
- Advanced electronic control boc assembly.

1.3.2 Indoor Unit: SX 30

The indoor unit is ceilingl mounted, and can be easily fitted to many types of residential and commercial applications.

It includes:

- Coil with hydrophilic aluminum fins.
- Motorized flaps (two step motors)
- Advanced electronic control box assembly (DCI storm)
- Mounting plate

1.3.3 Indoor Unit: PNX 30

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

Indoor Unit features:

Feature	PNX 30
Display	LCD
Ionizer	Yes
ESF	Yes
Fresh air	No
Indoor fan motor	Variable Speed (PG)
Horizontal motorized louver	Yes
Vertical motorized louver	Yes
Heating element	No
M2L Cable port	Yes
Dry contact	Presence detector or (Jumper selected) power shedding

1.4 Filtration

- The unit is equipped with pre filters.
- Easy and versatile access, rear or bottom, can be easily adjusted by the installer.

1.5 Ionizer (Optional)

A special design Ioniser 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, provide complete operating function and programming. For further details, please refer to the Operation Manual, Appendix A.

1.7 Outdoor Unit

The **GCD 030** outdoor units can be installed as floor or wall mounted units by using a wall supporting bracket. The metal sheets are protected by anti- corrosion paint work allowing long life resistance. All outdoor units are pre-charged. For further information, please refer to the Product Data Sheet, Chapter 2.

It includes:

- Compressor mounted in a soundproofed compartment :
Dual Rotary – for GCD 030
- Improved 3- blades axial fans for noise reduction.
- Fan grill air outlet.
- Service valves "flare" type connection.
- Service ports for high/ low pressure measurement.
- Advanced controller.
- Outdoor coil with hydrophilic louver fins.

Feature	GCD 030
Diagnostics Display	3 LED`s
Outdoor Fan	Variable speed DC Inverter
M2L cable Port	No

1.8 Tubing Connections

Flare type-interconnecting tubing to be produced on site.

All the units from 7KW and up can be installed with 50-meter tubing length and 25-meter height difference without oil traps.

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

1.9 Accessories

RCW Wall Mounted Remote Control

The RCW remote control is mounted on the wall, and controls the unit either as an infrared remote control or as a wired controller. The wired controller can control up to 10 Indoor units with the same program settings and adjustments.

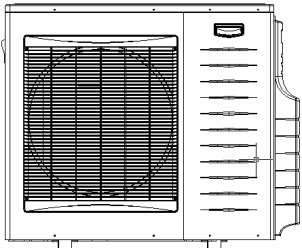
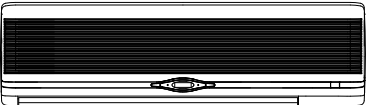
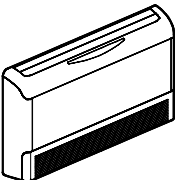
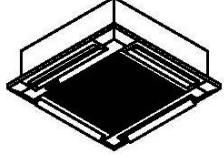
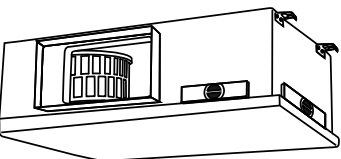
For further details, please refer to the Technical Service Manual.

1.10 Inbox Documentation

Each unit is supplied with its own operation/installation manual.

1.11 Matching Table

1.11.1 R410A

INDOOR UNITS			OUTDOOR UNIT			
						
	MODEL	REFRIGER.	GCD 030			
		PNX 30 DCI	R410A	√		
	SX 30 DCI	R410A		√		
	CKD 30 DCI	R410A			√	
	DLS 30 DCI	R410A				√

The above table lists outdoor units and DLS/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, floor/ceiling.

For further information please refer to the relevant Service Manual.

2. PRODUCT DATA SHEET

2.1 PNX 30 DCI / GCD 030

Model Indoor Unit		PNX 30 DCI		
Model Outdoor Unit		GCD 030 R410A		
Installation Method of Pipe		Flared		
Characteristics	Units	Cooling	Heating	
Capacity ⁽⁴⁾	Btu/hr	26620(5100~30035)	29010(5100~32420)	
	kW	7.8(1.5-8.8)	8.5(1.5~9.5)	
Power input (4)	kW	2.59(0.5-3.1)	2.65(0.5~3.2)	
EER (Cooling) or COP(Heating) ⁽⁴⁾	W/W	3.01	3.21	
Energy efficiency class		B	C	
Power supply	V	220-240		
	Ph	1		
	Hz	50		
Rated current	A	11.3	11.5	
Power factor		0.97	0.97	
Prated (IDU)	W	105		
Prated (IDU+ODU)	W	3200		
Starting current	A	15		
Circuit breaker rating	A	25		
INDOOR	Fan type & quantity		Crossflow x 1	
	Fan speeds	H/M/L	RPM	1300/1150/1000
	Air flow ⁽¹⁾	H/M/L	m3/hr	1250/1050/900
	External static pressure	Min	Pa	0
	Sound power level ⁽²⁾	H/M/L	dB(A)	66/61/57
	Sound pressure level ⁽³⁾	H/M/L	dB(A)	51/48/44
	Moisture removal		l/hr	3
	Condensate drain tube I.D		mm	16
	Dimensions	WxHxD	mm	1200x340x236
	Net Weight		kg	18.5
	Package dimensions	WxHxD	mm	1304x430x325
	Packaged weight		kg	24
	Units per pallet		units	12
	Stacking height		units	6 levels
OUTDOOR	Refrigerant control		EEV	
	Compressor type,model		Two Rotary,Sanyo(Sheny) C-7RVN153H0W	
	Fan type & quantity		Propeller(direct) x 1	
	Fan speeds	H	RPM	850
	Air flow	H	m3/hr	3600
	Sound power level	H	dB(A)	66
	Sound pressure level ⁽³⁾	H	dB(A)	56
	Dimensions	WxHxD	mm	1040x864x412
	Net Weight		kg	66
	Package dimensions	WxHxD	mm	1140x930x510
	Packaged weight		kg	73.5
	Units per pallet		Units	4
	Stacking height		units	2 levels
	Refrigerant type			R410A
	Standard charge		kg(7.5m)	2.5
	Additional charge			7.5m<Length≤20m:+0g; 20m<Length≤30m:+250g
Connections between units	Liquid line	In.(mm)	3/8"(9.53)	
	Suction line	In.(mm)	5/8"(15.88)	
	Max.tubing length	m.	Max.30	
	Max.height difference	m.	Max.15	
Operation control type			Remote control	
Heating elements (Option)		kW		
Others				

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

(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 1.4 meter distance from unit.

2.2 SX 30 DCI / GCD 030

Model Indoor Unit			SX 30 DCI	
Model Outdoor Unit			GCD 030 R410A	
Installation Method of Pipe			Flared	
Characteristics		Units	Cooling	Heating
Capacity ⁽⁴⁾		Btu/hr	25590(5460~29340)	29680(6140~33440)
		kW	7.5(1.6-8.6)	8.7(1.8~9.8)
Power input ⁽⁴⁾		kW	2.49(0.5-3.1)	2.55(0.5~2.8)
EER (Cooling) or COP(Heating) ⁽⁴⁾		W/W	3.01	3.41
Energy efficiency class			B	B
Power supply		V	220-240	
		Ph	1	
		Hz	50	
Rated current		A	11.1	11.4
Power factor			0.97	0.97
Prated (IDU)		W	125	
Prated (IDU+ODU)		W	3200	
Starting current		A	15	
Circuit breaker rating		A	25	
INDOOR	Fan type & quantity		Centifugal x 2	
	Fan speeds	H/M/L	RPM	1300/1200/1050
	Air flow ⁽¹⁾	H/M/L	m3/hr	1020/950/800
	External static pressure	Min	Pa	0
	Sound power level ⁽²⁾	H/M/L	dB(A)	66/63/58
	Sound pressure level ⁽³⁾	H/M/L	dB(A)	54/51/46
	Moisture removal		l/hr	3.0
	Condensate drain tube I.D		mm	16
	Dimensions	WxHxD	mm	1200x630x190
	Net Weight		kg	32.0
	Package dimensions	WxHxD	mm	1300x726x273
	Packaged weight		kg	36
	Units per pallet		units	7
	Stacking height		units	7 levels
OUTDOOR	Refrigerant control		EEV	
	Compressor type,model		Two Rotary,Sanyo(Sheny) C-7RVN153H0W	
	Fan type & quantity		Propeller(direct) x 1	
	Fan speeds	H	RPM	850
	Air flow	H	m3/hr	3600
	Sound power level	H	dB(A)	69
	Sound pressure level ⁽³⁾	H	dB(A)	58
	Dimensions	WxHxD	mm	950x864x413
	Net Weight		kg	66
	Package dimensions	WxHxD	mm	1140x930x510
	Packaged weight		kg	73.5
	Units per pallet		Units	4
	Stacking height		units	2 levels
	Refrigerant type		R410A	
	Standard charge		kg(7.5m)	2.5
	Additional charge		7.5mLength≤20m:+0g; 20m<Length≤30m:+250g	
Connections between units	Liquid line	In.(mm)	3/8"(9.53)	
	Suction line	In.(mm)	5/8"(15.88)	
	Max.tubing length	m.	Max.30	
	Max.height difference	m.	Max.15	
Operation control type		Remote control		
Heating elements (Option)		kW		
Others				

- (1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units).
- (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 1.4 meter distance from unit.

2.3 CKD 30 DCI / GCD 030

Model Indoor Unit		CKD 30 DCI	
Model Outdoor Unit		GCD 030 R410A	
Installation Method of Pipe		Flared	
Characteristics		Units	Cooling Heating
Capacity ⁽⁴⁾		Btu/hr	27280(6800~30000) 30690(5110~34100)
		kW	8.0(2.0-8.8) 9.0(1.5~10.0)
Power input ⁽⁴⁾		kW	2.49(0.5-3.2) 2.49(0.5~3.1)
EER (Cooling) or COP(Heating) ⁽⁴⁾		W/W	3.21 3.61
Energy efficiency class			A A
Power supply		V	220-230
		Ph	1
		Hz	50
Rated current		A	11.1 11.1
Power factor			0.97 0.97
Prated (IDU)		W	140
Prated (IDU+ODU)		W	3200
Starting current		A	15
Circuit breaker rating		A	25
INDOOR	Fan type & quantity		Centrifugal x 1
	Fan speeds	H/M/L	RPM 610/570/540
	Air flow ⁽¹⁾	H/M/L	m3/hr 1170/1080/990
	External static pressure	Min	Pa 0
	Sound power level ⁽²⁾	H/M/L	dB(A) 56/53/51
	Sound pressure level ⁽³⁾	H/M/L	dB(A) 44/42/40
	Moisture removal		l/hr 3
	Condensate drain tube I.D		mm 32
	Dimensions	WxHxD	mm 840x840x300
	Net Weight		kg 32
	Package dimensions	WxHxD	mm 955x955x317
	Packaged weight		kg 40
	Units per pallet		units 6
	Stacking height		units 6 levels
	OUTDOOR	Refrigerant control	
Compressor type,model		Two Rotary,Sanyo(Sheny) C-7RVN153H0W	
Fan type & quantity		Propeller(direct) x 1	
Fan speeds		H	RPM 850
Air flow		H	m3/hr 3600
Sound power level		H	dB(A) 69
Sound pressure level ⁽³⁾		H	dB(A) 58
Dimensions		WxHxD	mm 950x864x413
Net Weight			kg 66
Package dimensions		WxHxD	mm 1140x930x510
Packaged weight			kg 73.5
Units per pallet			Units 4
Stacking height			units 2 levels
Refrigerant type		R410A	
Standard charge		kg(7.5m) 2.5	
Additional charge		7.5m<Length≤20m:+0g; 20m<Length≤30m:+250g	
Connections between units	Liquid line	In.(mm)	3/8"(9.53)
	Suction line	In.(mm)	5/8"(15.88)
	Max.tubing length	m.	Max.30
	Max.height difference	m.	Max.15
Operation control type		Remote control	
Heating elements (Option)		kW	
Others			

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

(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 1.4 meter distance from un

2.4 DLS 30 DCI / GCD 030

Model Indoor Unit		DLS 30 DCI	
Model Outdoor Unit		GCD 030 R410A	
Installation Method of Pipe		Flared	
Characteristics		Units	Cooling Heating
Capacity ⁽⁴⁾		Btu/hr	25590(5460-30710) 29340(6140-35830)
		kW	7.5(1.6-9.0) 8.6(1.8-10.5)
Power input ⁽⁴⁾		kW	2.48(0.55-3.15) 2.68(0.5-2.8)
EER (Cooling) or COP(Heating) ⁽⁴⁾		W/W	3.02 3.21
Energy efficiency class			B C
Power supply		V	220-240
		Ph	1
		Hz	50
Rated current		A	11.1 12.0
Power factor			0.97 0.97
Prated (IDU)		W	260
Prated (IDU+ODU)		W	3200
Starting current		A	15
Circuit breaker rating		A	25
INDOOR	Fan type & quantity		Centrifugal x 1
	Fan speeds	T/H/M/L	RPM 800/670/550
	Air flow ⁽¹⁾	T/H/M/L	m3/hr 1320/1150/935
	External static pressure	Min	Pa 25
	Sound power level ⁽²⁾	H/M/L	dB(A) 64/61/58
	Sound pressure level ⁽³⁾	H/M/L	dB(A) 48/44/40
	Moisture removal		l/hr 1.5
	Condensate drain tube I.D		mm 22
	Dimensions	WxHxD	mm 770x690x260
	Net Weight		kg 31
	Package dimensions	WxHxD	mm 959x854x315
	Packaged weight		kg 33
	Units per pallet		units 6
	Stacking height		units 6
	OUTDOOR	Refrigerant control	
Compressor type,model		Two Rotary,Sanyo(Sheny) C-7RVN153H0W	
Fan type & quantity		Propeller(direct) x 1	
Fan speeds		H	RPM 850
Air flow		H	m3/hr 3600
Sound power level		H	dB(A) 66
Sound pressure level ⁽³⁾		H	dB(A) 56
Dimensions		WxHxD	mm 1040x864x412
Net Weight			kg 66
Package dimensions		WxHxD	mm 1140x930x510
Packaged weight			kg 73.5
Units per pallet			Units 4
Stacking height			units 2 levels
Refrigerant type			R410A
Standard charge		kg(7.5m)	2.5
Additional charge		7.5m<Length≤20m:+0g;	
		20m<Length≤30m:+250g;	
		30m<Length≤50m:+1450g;	
Connections between units	Liquid line	In.(mm)	3/8"(9.53)
	Suction line	In.(mm)	5/8"(15.88)
	Max.tubing length	m.	Max.50
	Max.height difference	m.	Max.25
Operation control type			Remote control
Heating elements (Option)		kW	
Others			

- (1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units).
- (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 1.4 meter distance from unit.

3. RATING CONDITIONS

Standard conditions in accordance with ISO 5151 and 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

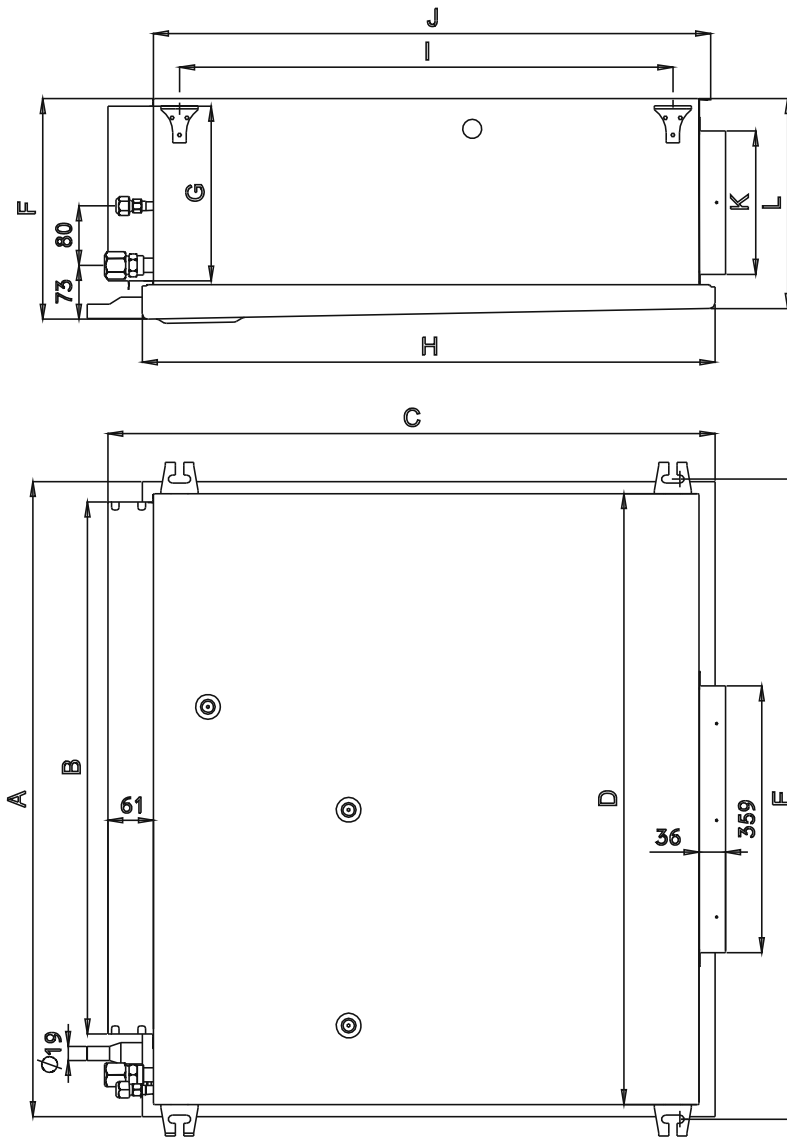
Outdoor: 7°C DB 6°C WB

3.1 Operating Limits

		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 – 264V	

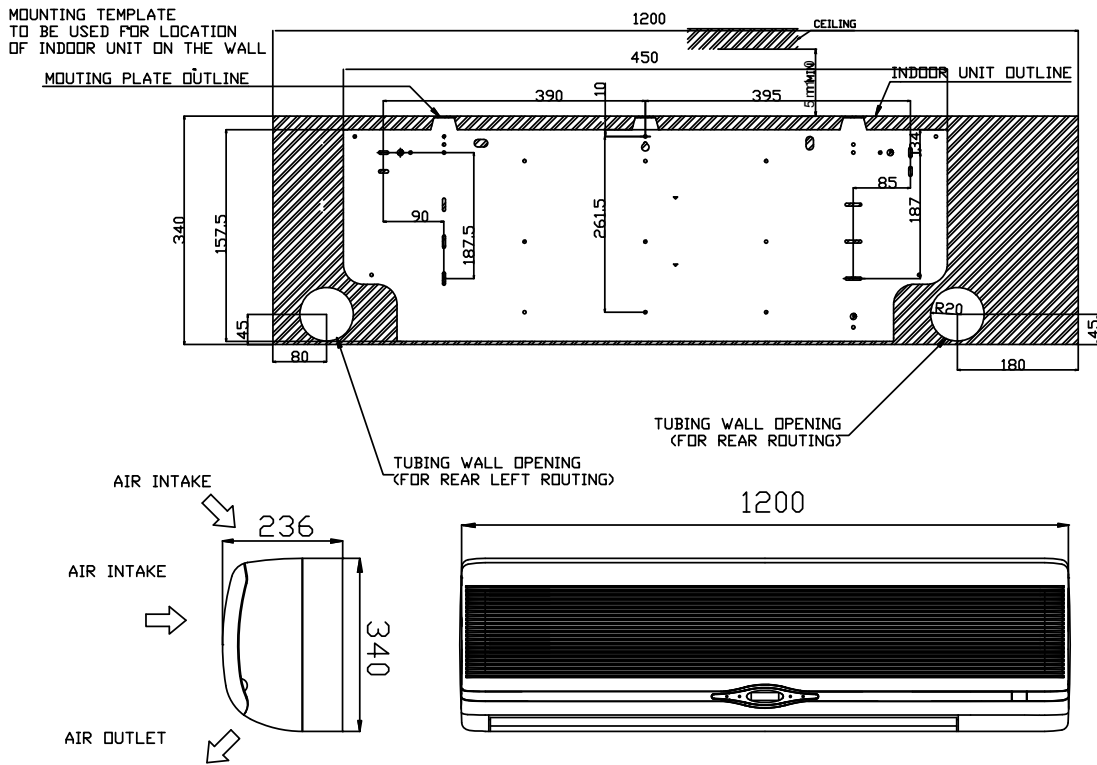
4. OUTLINE DIMENSIONS

4.1 Indoor Unit: DLS 30 DCI

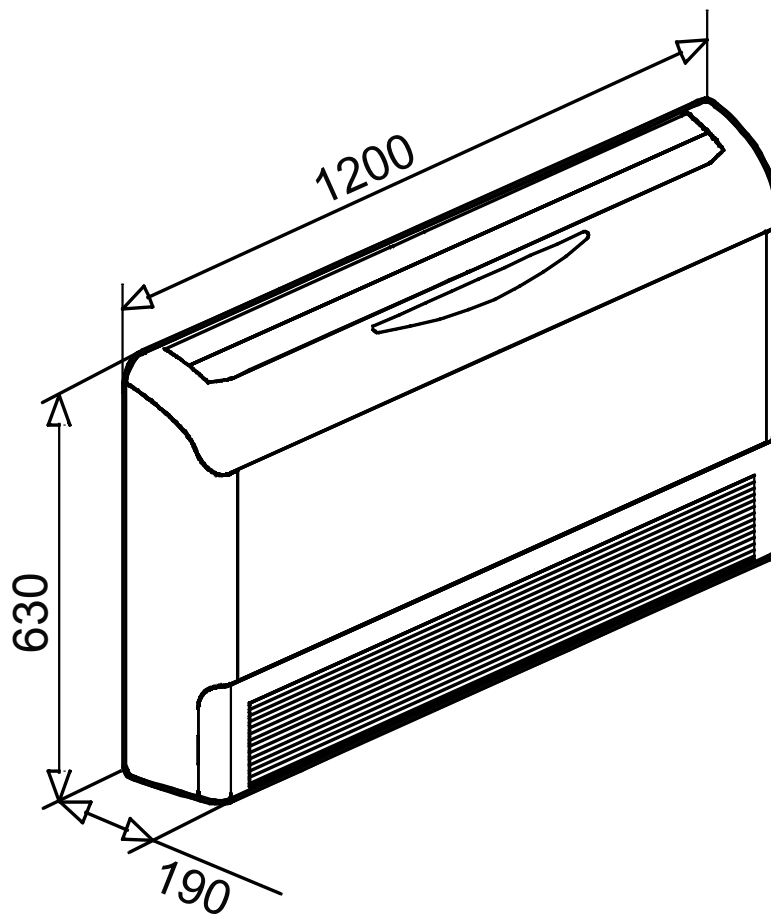


Model	A	B	C	D	E	F	G	H	I	J	K	L
DLS 30	790	653	749	758	797	256	195	702	599	684	162	242

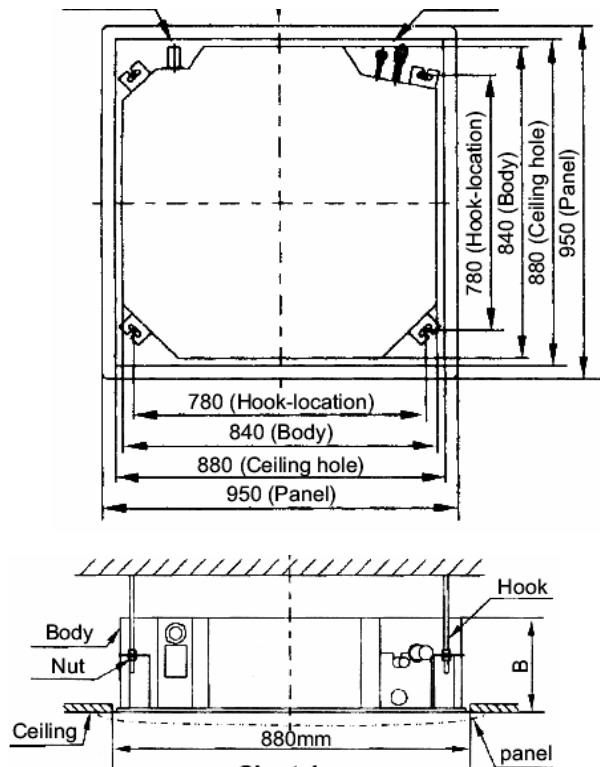
4.2 Indoor Unit: PNX 30 DCI



4.3 Indoor Unit: SX 30 DCI

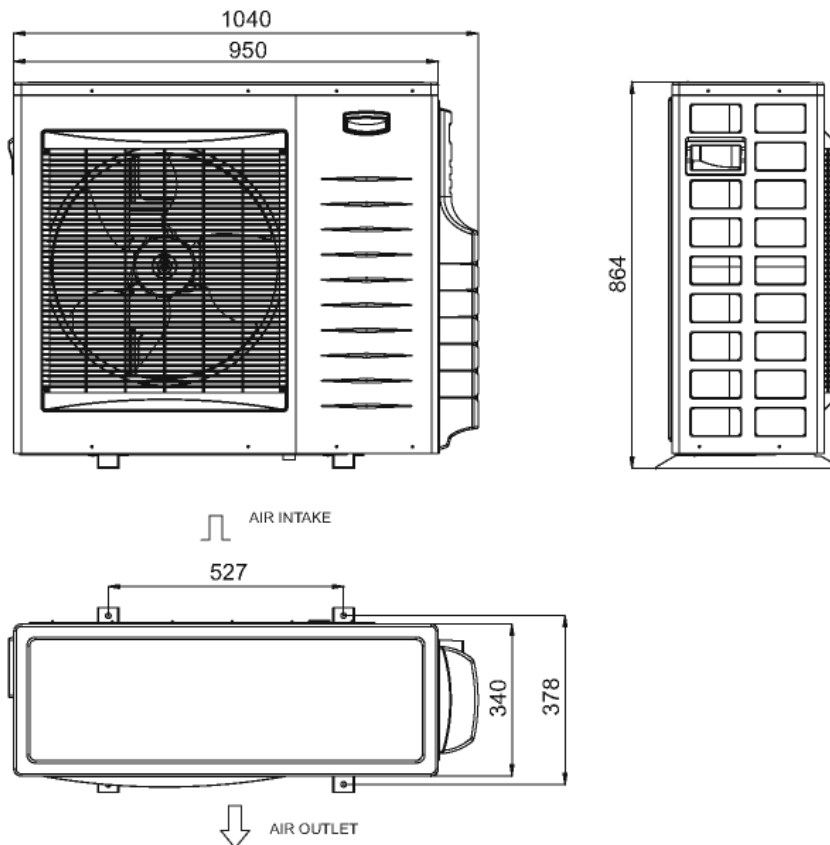


4.4 Indoor Unit: CKD 30 DCI



KN 60 DCI: KN 72 DCI: B=240mm
 KN 80 DCI: B=310mm
 Remark: KN 60 DCI is the same as KN 72 DCI

4.4 Outdoor Unit: GCD 030



5. PERFORMANCE DATA & PRESSURE CURVES

5.1 PNX 30 DCI / GCD 030

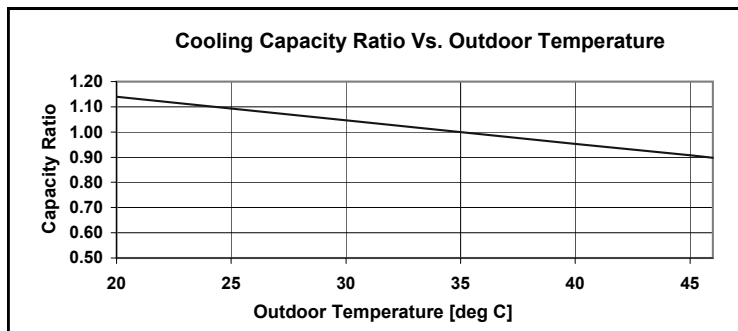
5.1.1 Cooling Capacity (kW)

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
-10 - 20 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
25	TC	7.54	8.03	8.53	9.02	9.51
	SC	5.36	5.47	5.57	5.68	5.79
	PI	2.04	2.07	2.11	2.15	2.19
30	TC	7.18	7.67	8.16	8.66	9.15
	SC	5.22	5.33	5.44	5.55	5.66
	PI	2.27	2.31	2.35	2.39	2.43
35	TC	6.81	7.31	7.80	8.29	8.79
	SC	5.09	5.19	5.30	5.41	5.52
	PI	2.51	2.55	2.59	2.63	2.67
40	TC	6.45	6.94	7.44	7.93	8.42
	SC	4.95	5.06	5.17	5.28	5.39
	PI	2.75	2.79	2.83	2.87	2.91
46	TC	6.02	6.51	7.00	7.50	7.99
	SC	4.79	4.90	5.01	5.12	5.22
	PI	3.04	3.08	3.11	3.15	3.19

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 (Cooling)



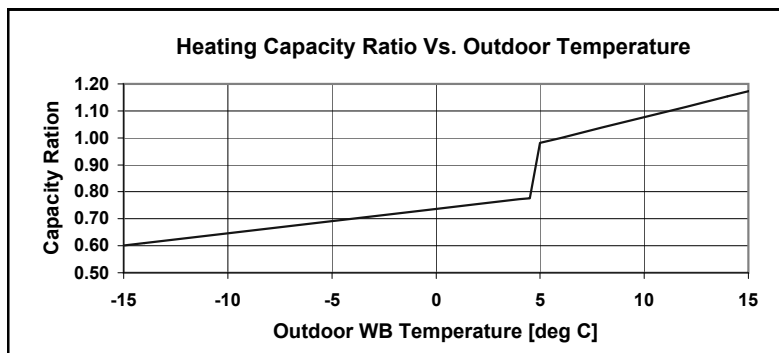
5.1.3 Heating

		ID COIL ENTERING AIR DB TEMPERATURE [C°]		
OD COIL ENTERING AIR DB/WB TEMPERATURE [C°]	DATA	15	20	25
-15/-16	TC	5.41	5.03	4.65
	PI	1.59	1.75	1.91
-10/-12	TC	6.02	5.64	5.27
	PI	1.92	2.08	2.24
-7/-8	TC	6.48	6.10	5.72
	PI	2.16	2.32	2.49
-1/-2	TC	6.71	6.33	5.95
	PI	2.28	2.45	2.61
2/1	TC	6.86	6.49	6.11
	PI	2.37	2.53	2.69
7/6	TC	8.88	8.50	8.12
	PI	2.49	2.65	2.81
10/9	TC	9.37	8.99	8.61
	PI	2.64	2.80	2.96
15/12	TC	9.86	9.48	9.10
	PI	2.79	2.95	3.11
15-24	TC	85 - 105 % of nominal		
(Protection Range)	PI	80 - 120 % of nominal		

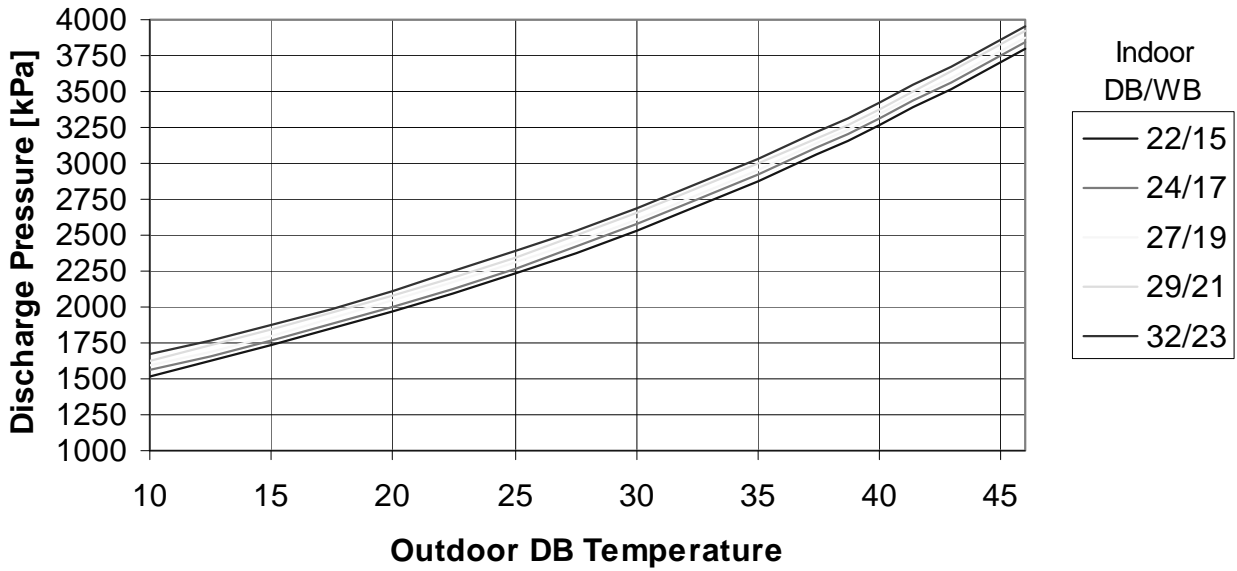
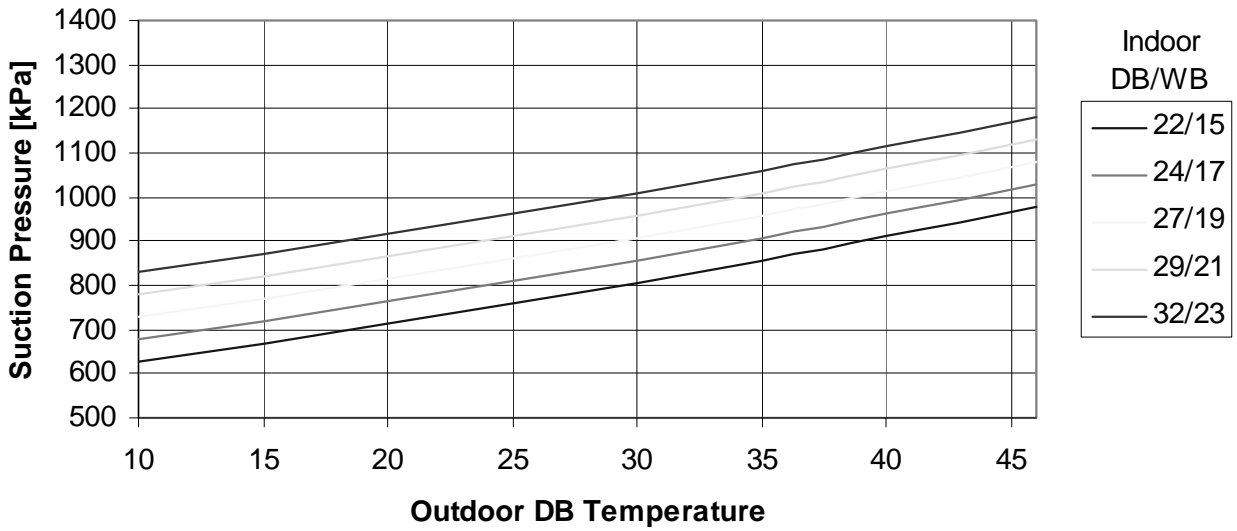
LEGEND

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

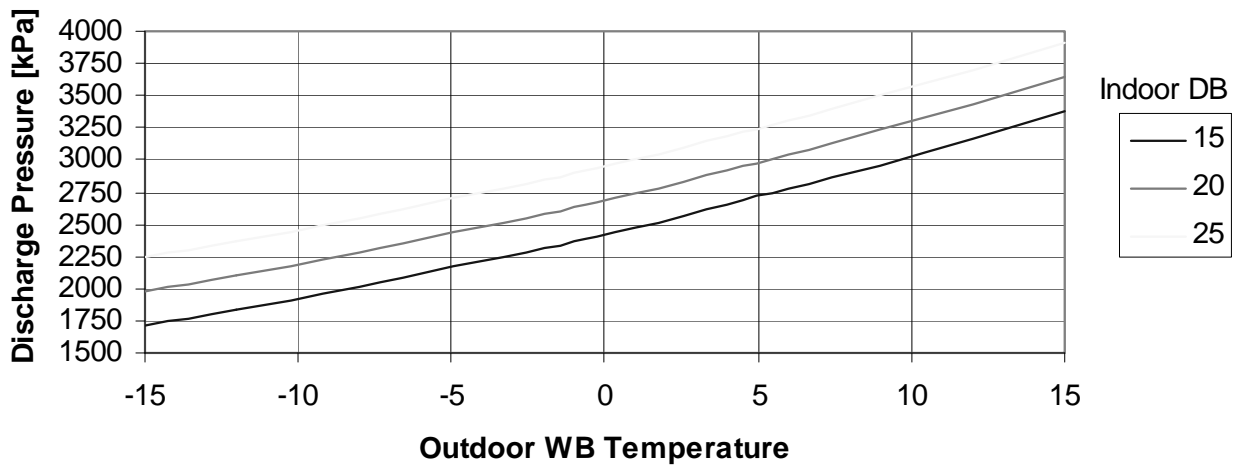
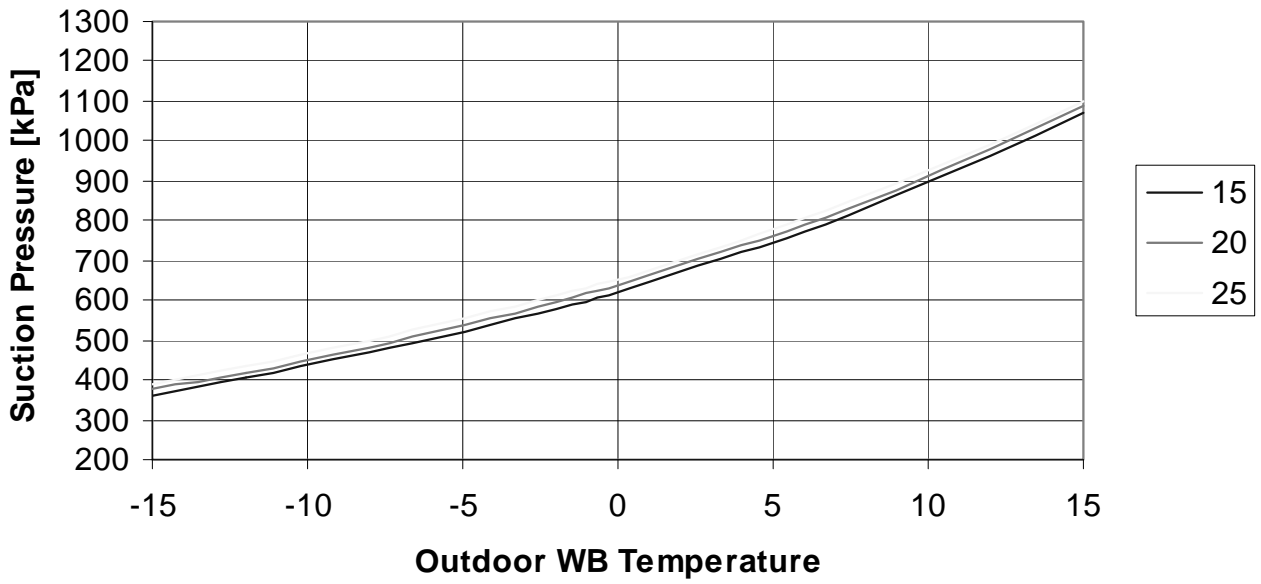
5.1.4 Capacity Correction Factors (Heating)



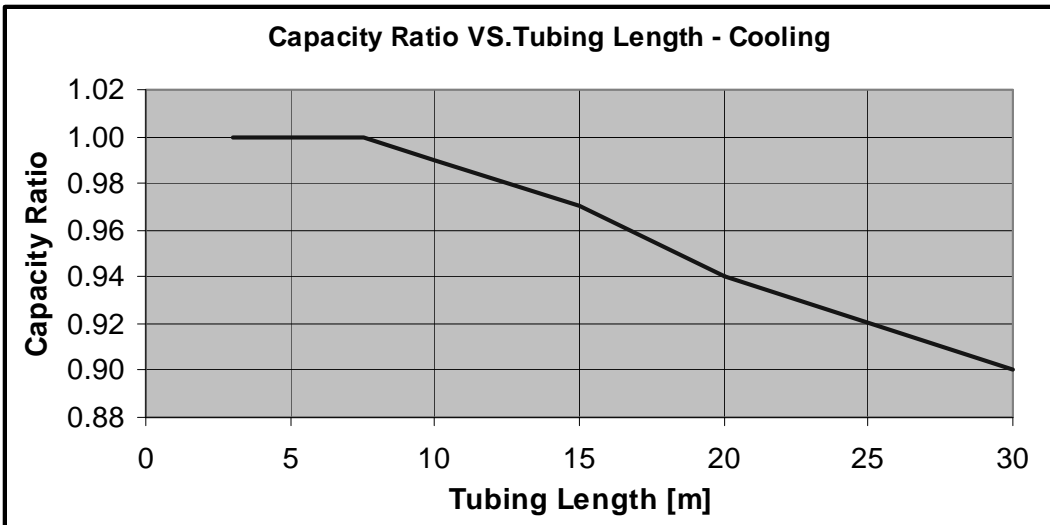
5.1.5 Pressure Curves (Cooling – Test Mode)



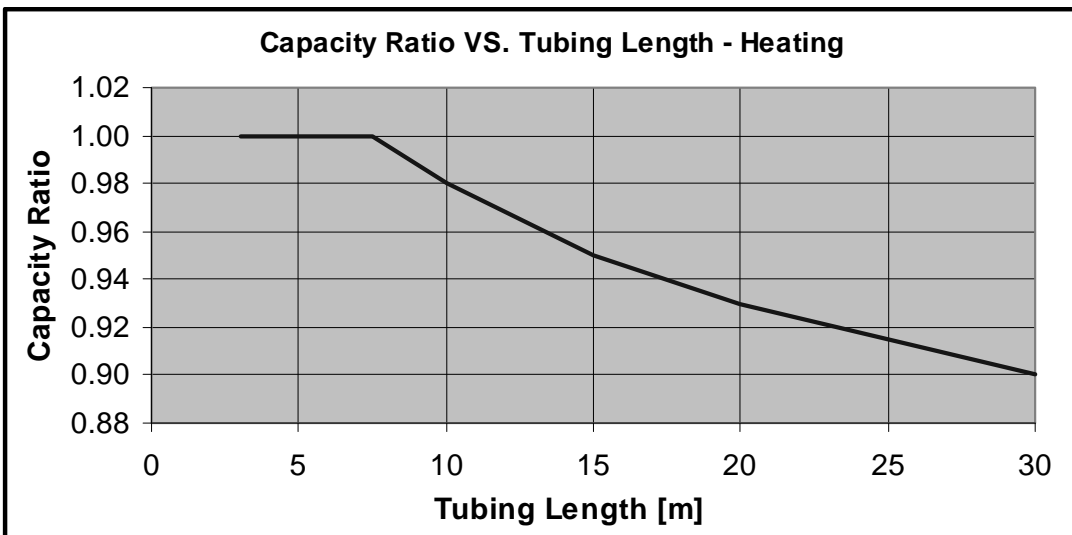
5.1.6 Pressure Curves (Heating – Test Mode)



**5.1.7 Capacity Correction Factor Due to Tubing Length
Cooling**



Heating



5.2 SX 30 DCI / GCD 030

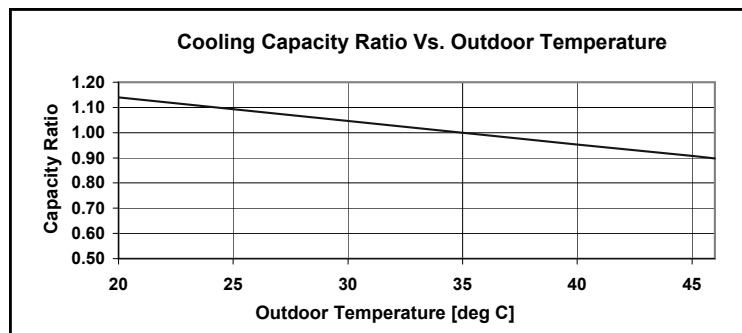
5.2.1 Cooling Capacity (kW)

		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	7.25	7.72	8.20	8.67	9.15
	SC	5.15	5.26	5.36	5.47	5.57
	PI	1.98	2.02	2.05	2.09	2.13
30	TC	6.90	7.37	7.85	8.32	8.80
	SC	5.02	5.12	5.23	5.34	5.44
	PI	2.21	2.25	2.29	2.32	2.36
35	TC	6.55	7.03	7.50	7.97	8.45
	SC	4.89	4.99	5.10	5.21	5.31
	PI	2.44	2.48	2.52	2.56	2.59
40	TC	6.20	6.68	7.15	7.63	8.10
	SC	4.76	4.86	4.97	5.08	5.18
	PI	2.67	2.71	2.75	2.79	2.83
46	TC	5.78	6.26	6.73	7.21	7.68
	SC	4.60	4.71	4.81	4.92	5.02
	PI	2.95	2.99	3.03	3.07	3.10

LEGEND

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

5.2.2 Capacity Correction Factors (Cooling)



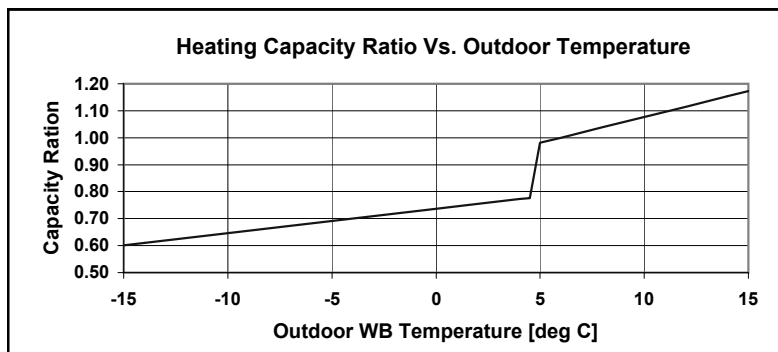
5.2.3 Heating

OD COIL ENTERING AIR DB/WB TEMPERATURE [C°]		ID COIL ENTERING AIR DB TEMPERATURE [C°]		
		15	20	25
-15/-16	TC	5.54	5.15	4.76
	PI	1.57	1.73	1.89
-10/-12	TC	6.16	5.78	5.39
	PI	1.90	2.06	2.22
-7/-8	TC	6.63	6.25	5.86
	PI	2.14	2.30	2.46
-1/-2	TC	6.87	6.48	6.09
	PI	2.26	2.42	2.58
2/1	TC	7.03	6.64	6.25
	PI	2.34	2.50	2.66
7/6	TC	9.09	8.70	8.31
	PI	2.46	2.62	2.78
10/9	TC	9.59	9.20	8.81
	PI	2.61	2.77	2.93
15/12	TC	10.09	9.70	9.32
	PI	2.76	2.92	3.08
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

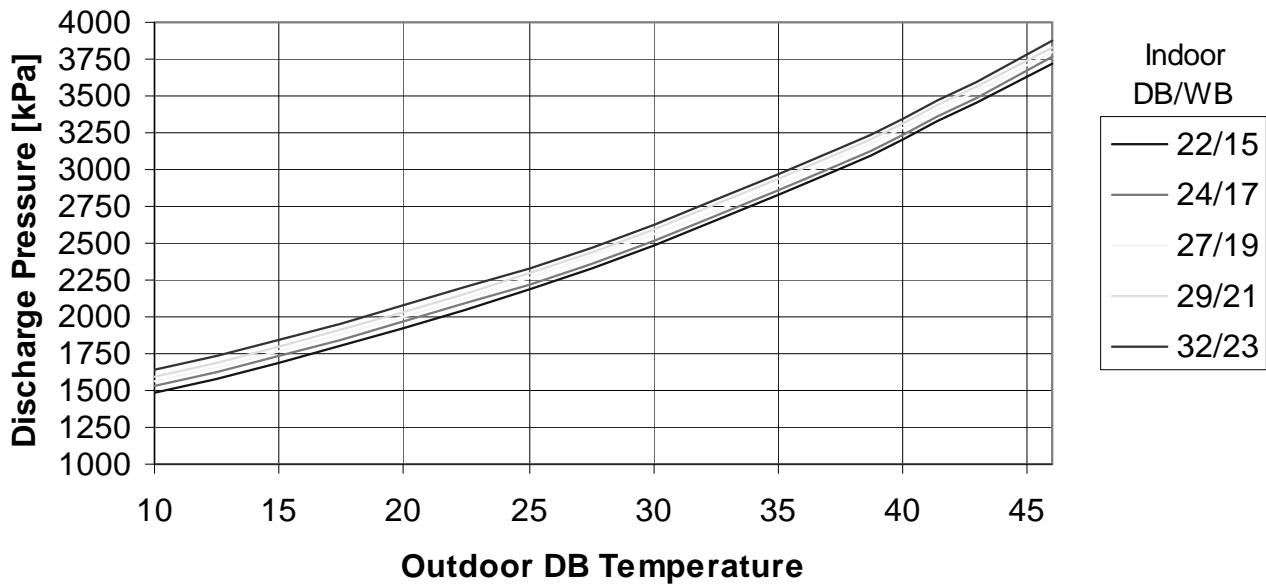
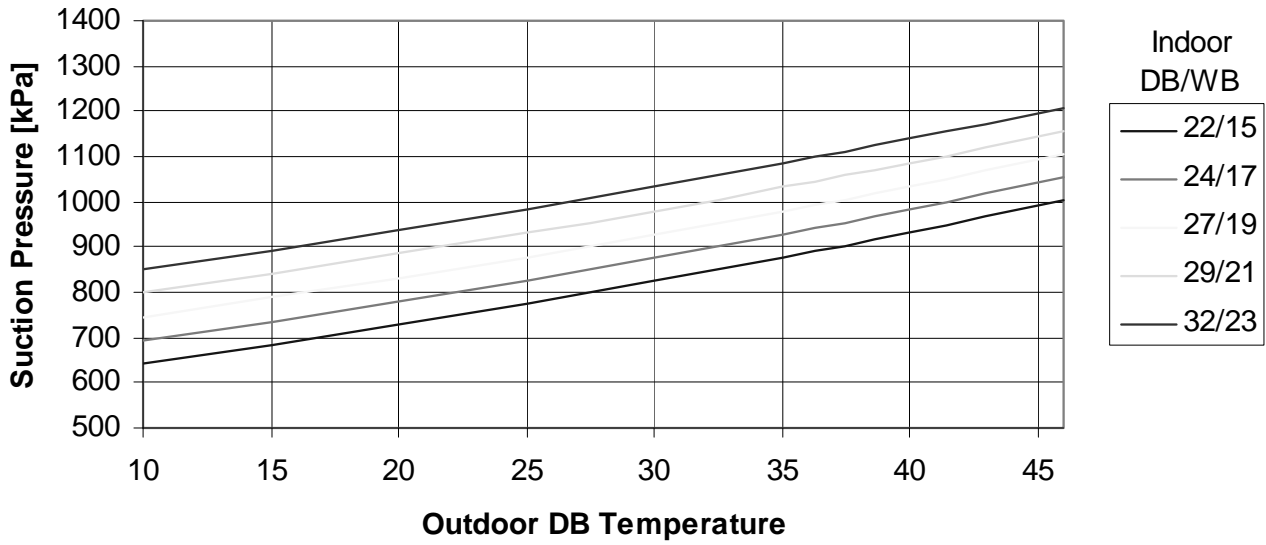
LEGEND

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

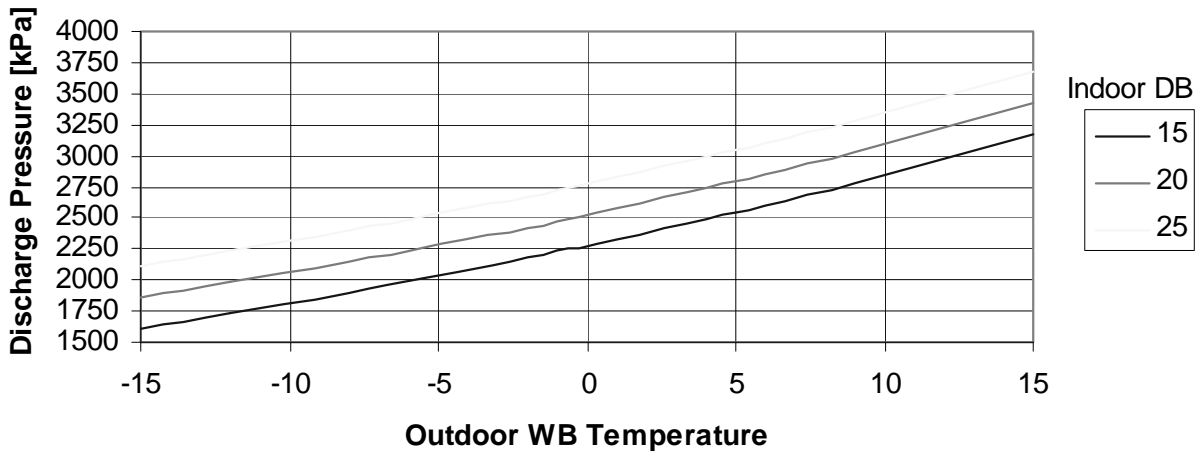
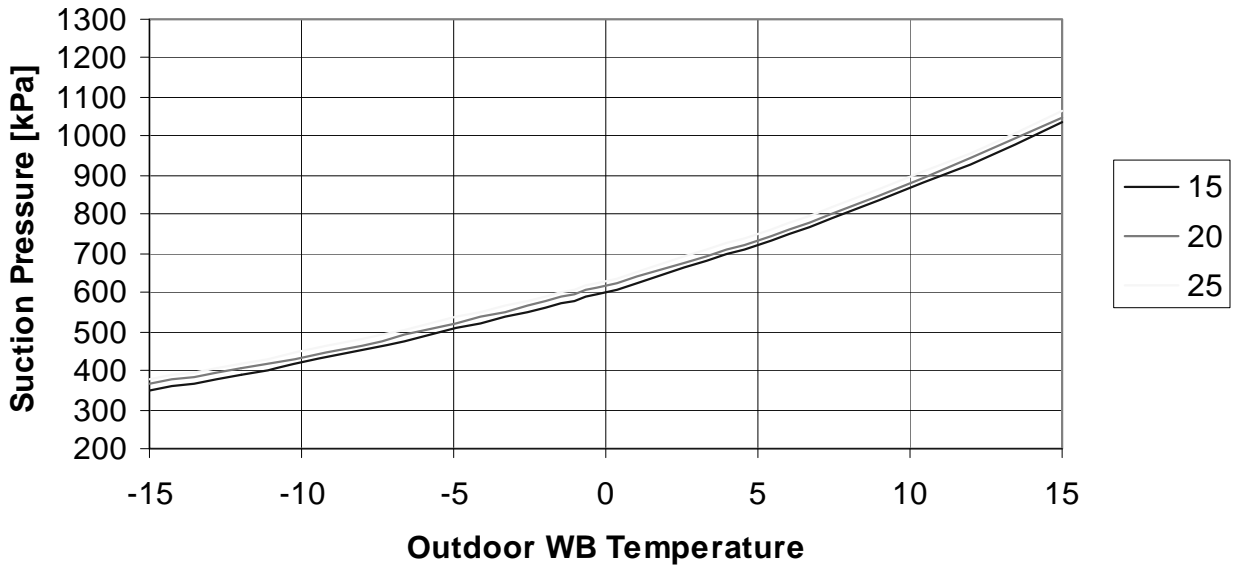
5.2.4 Capacity Correction Factors (Heating)



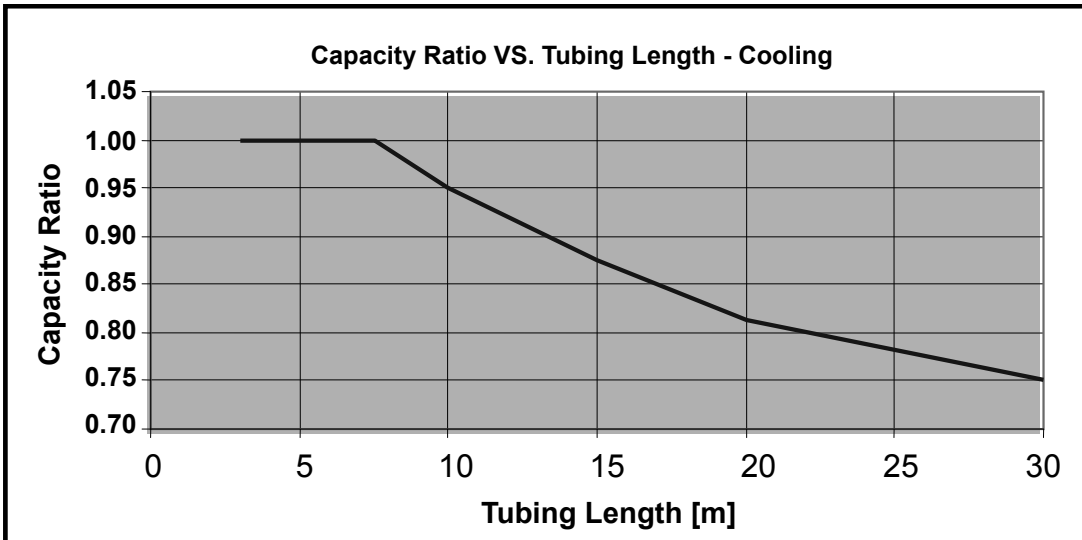
5.2.5 Pressure Curves (Cooling – Test Mode)



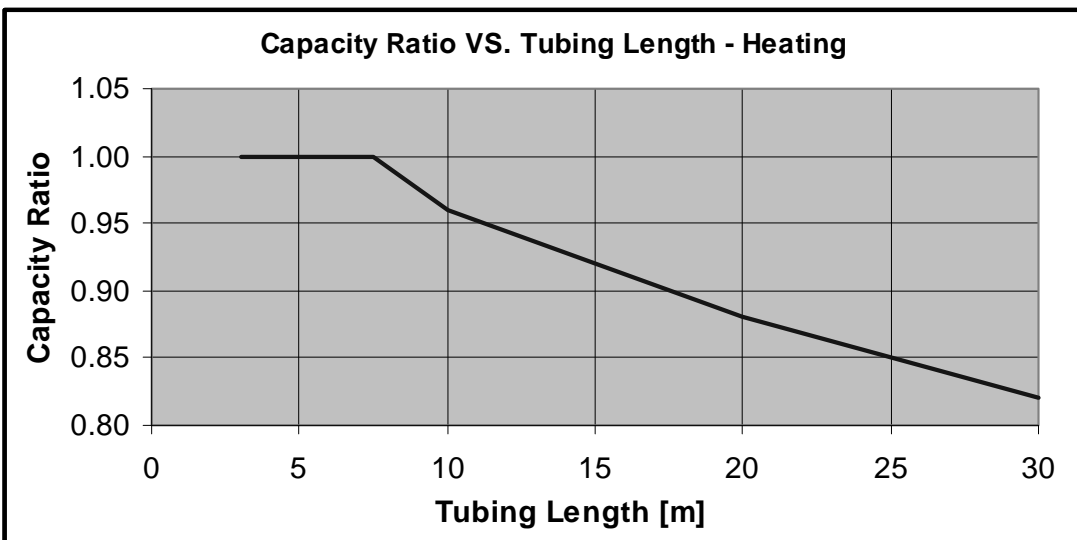
5.2.6 Pressure Curves (Heating – Test Mode)



**5.2.7 Capacity Correction Factor Due to Tubing Length
Cooling**



Heating



5.3 CKD 30 DCI / GCD 030

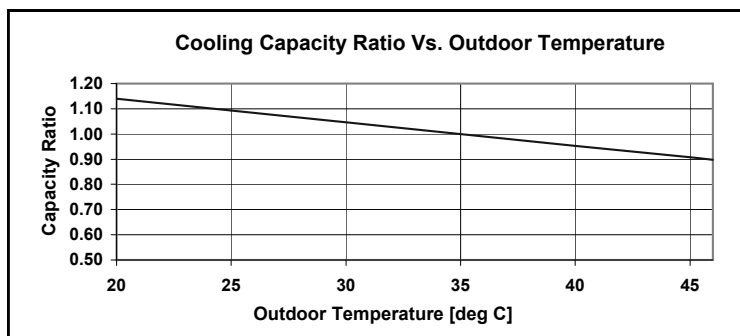
5.3.1 Cooling Capacity (kW)

OD COIL ENTERING AIR DB TEMPERATURE [C°]		DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [C°]				
			22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal					
	SC	80 - 105 % of nominal					
	PI	25 - 50 % of nominal					
25	TC	7.73	8.24	8.74	9.25	9.76	
	SC	5.49	5.61	5.72	5.83	5.94	
	PI	1.96	1.99	2.03	2.07	2.11	
30	TC	7.36	7.87	8.37	8.88	9.38	
	SC	5.35	5.47	5.58	5.69	5.80	
	PI	2.19	2.22	2.26	2.30	2.34	
35	TC	6.99	7.49	8.00	8.51	9.01	
	SC	5.22	5.33	5.44	5.55	5.66	
	PI	2.42	2.45	2.49	2.53	2.56	
40	TC	6.62	7.12	7.63	8.13	8.64	
	SC	5.08	5.19	5.30	5.41	5.53	
	PI	2.64	2.68	2.72	2.76	2.79	
46	TC	6.17	6.68	7.18	7.69	8.19	
	SC	4.91	5.02	5.13	5.25	5.36	
	PI	2.92	2.96	2.99	3.03	3.07	

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 (Cooling)



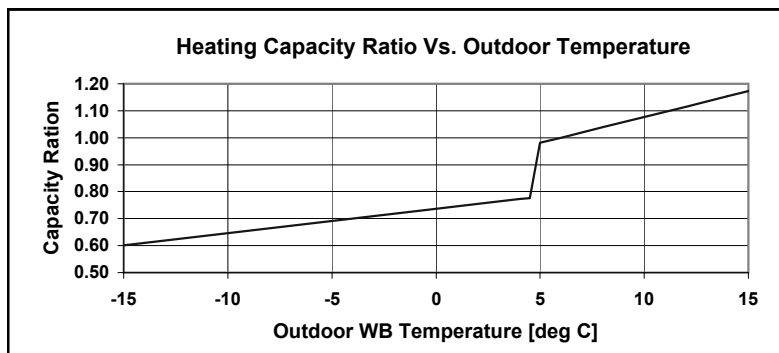
5.3.3 Heating

OD COIL ENTERING AIR DB/WB TEMPERATURE [C°]	DATA	ID COIL ENTERING AIR DB TEMPERATURE [C°]		
		15	20	25
-15/-16	TC	5.73	5.33	4.93
	PI	1.49	1.65	1.80
-10/-12	TC	6.38	5.98	5.58
	PI	1.80	1.95	2.11
-7/-8	TC	6.86	6.46	6.06
	PI	2.03	2.18	2.34
-1/-2	TC	7.11	6.71	6.30
	PI	2.15	2.30	2.45
2/1	TC	7.27	6.87	6.47
	PI	2.22	2.37	2.53
7/6	TC	9.40	9.00	8.60
	PI	2.34	2.49	2.64
10/9	TC	9.92	9.52	9.12
	PI	2.48	2.63	2.78
15/12	TC	10.44	10.04	9.64
	PI	2.62	2.77	2.92
15-24 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

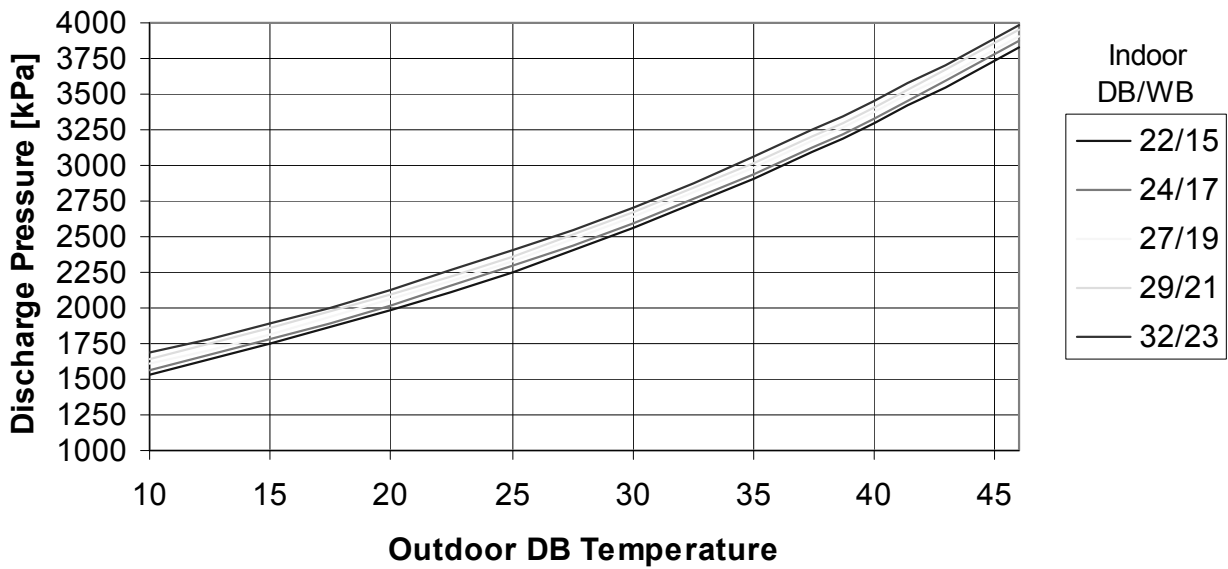
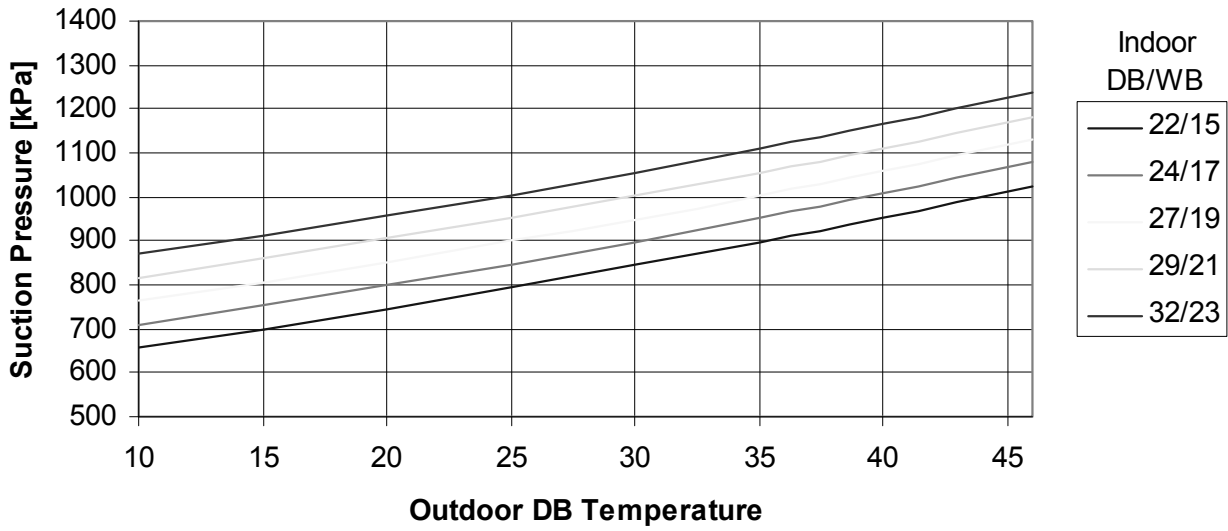
LEGEND

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

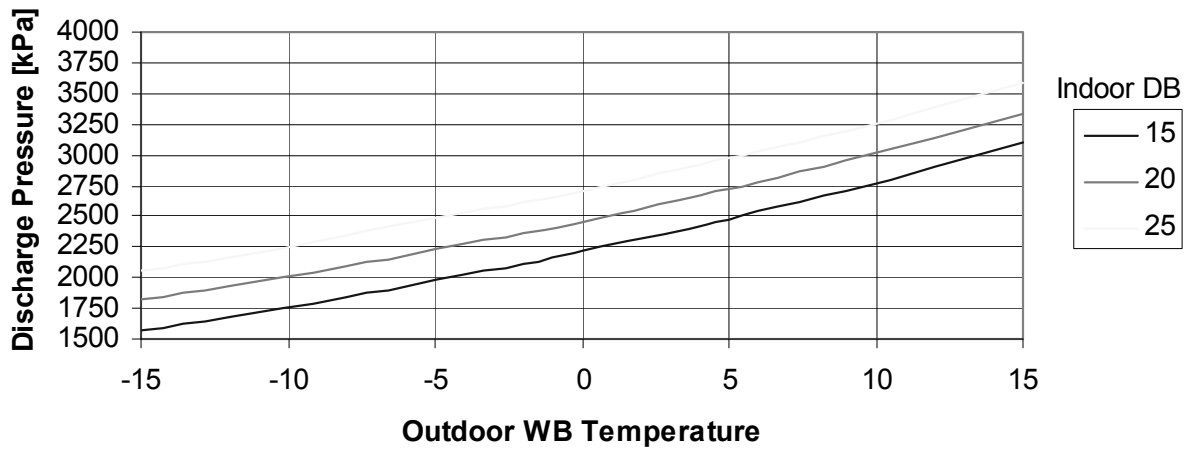
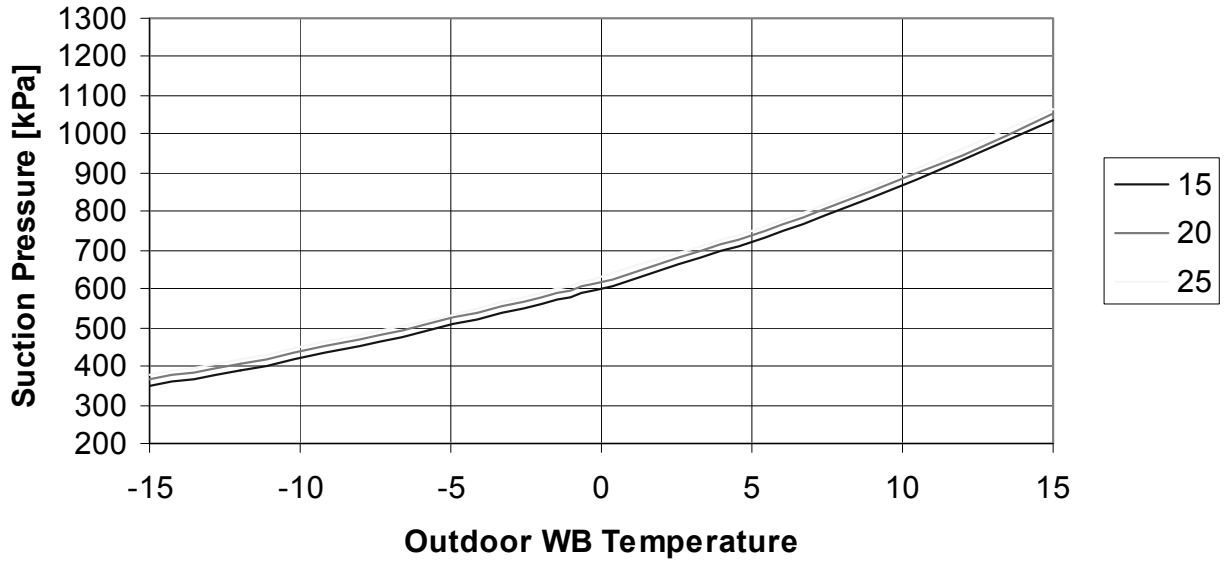
5.3.4 Capacity Correction Factors (Heating)



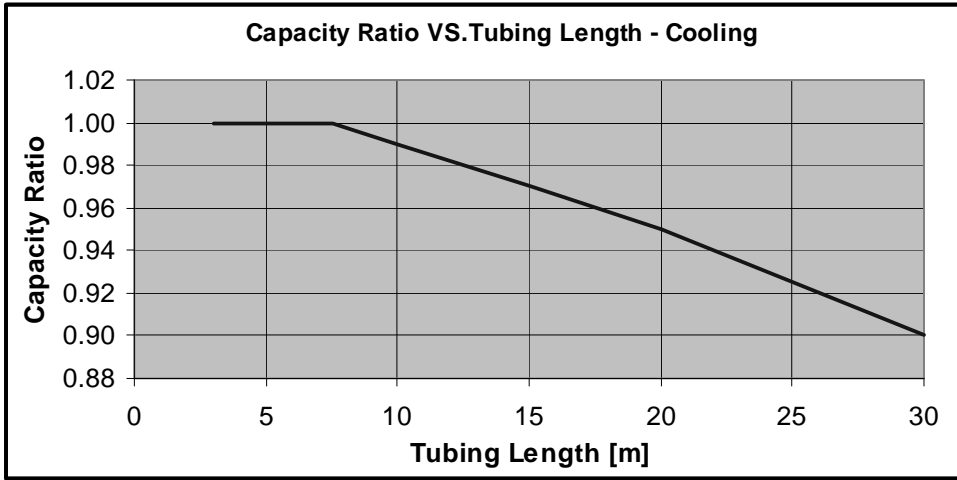
5.3.5 Pressure Curves (Cooling – Test Mode)



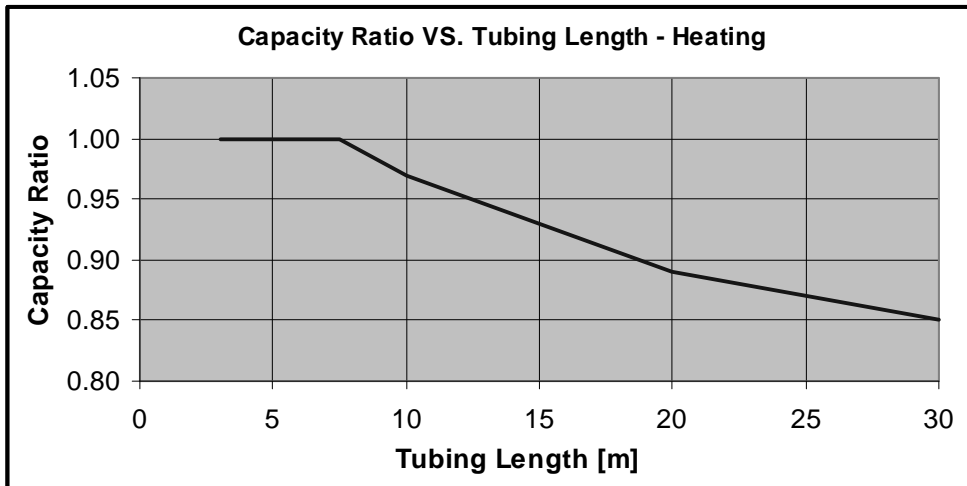
5.3.6 Pressure Curves (Heating – Test Mode)



5.3.7 Capacity Correction Factor Due to Tubing Length Cooling



Heating



5.4 DLS 30 DCI / GCD 030

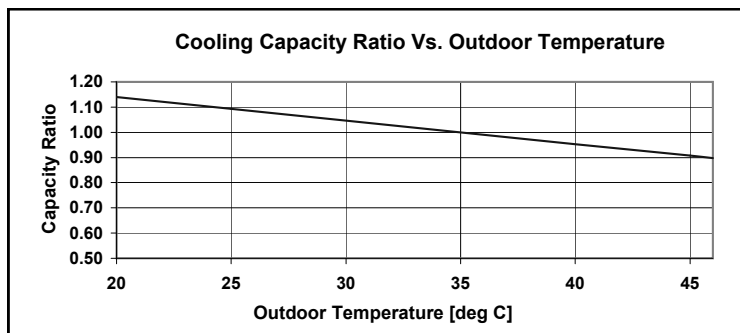
5.4.1 Cooling Capacity (kW)

OD COIL ENTERING AIR DB TEMPERATURE [C°]		DATA	ID COIL ENTERING AIR DB/WB TEMPERATURE [C°]				
			22/15	24/17	27/19	29/21	32/23
-10 - 20 (protection range)	TC	80 - 110 % of nominal					
	SC	80 - 105 % of nominal					
	PI	25 - 50 % of nominal					
25	TC	7.25	7.72	8.20	8.67	9.15	
	SC	5.15	5.26	5.36	5.47	5.57	
	PI	1.95	1.99	2.02	2.06	2.10	
30	TC	6.90	7.37	7.85	8.32	8.80	
	SC	5.02	5.12	5.23	5.34	5.44	
	PI	2.18	2.21	2.25	2.29	2.33	
35	TC	6.55	7.03	7.50	7.97	8.45	
	SC	4.89	4.99	5.10	5.21	5.31	
	PI	2.41	2.44	2.48	2.52	2.55	
40	TC	6.20	6.68	7.15	7.63	8.10	
	SC	4.76	4.86	4.97	5.08	5.18	
	PI	2.63	2.67	2.71	2.75	2.78	
46	TC	5.78	6.26	6.73	7.21	7.68	
	SC	4.60	4.71	4.81	4.92	5.02	
	PI	2.91	2.94	2.98	3.02	3.06	

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

5.4.2 Capacity Correction Factors (Cooling)



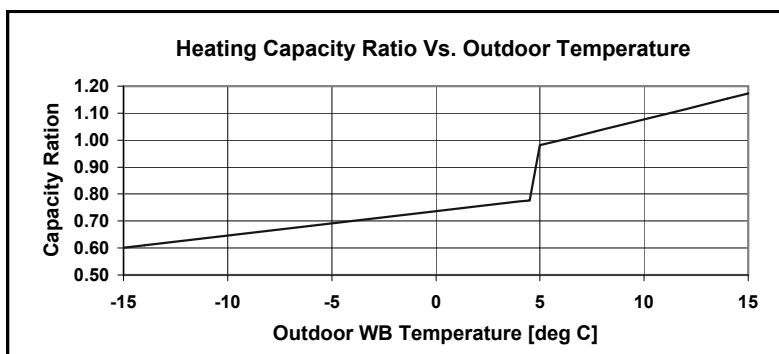
5.4.3 Heating

OD COIL ENTERING AIR DB/WB TEMPERATURE [C°]		ID COIL ENTERING AIR DB TEMPERATURE [C°]		
		15	20	25
-15/-16	TH	5.47	5.09	4.71
	PI	1.61	1.77	1.94
-10/-12	TH	6.09	5.71	5.33
	PI	1.94	2.10	2.27
-7/-8	TH	6.56	6.17	5.79
	PI	2.19	2.35	2.51
-1/-2	TH	6.79	6.41	6.02
	PI	2.31	2.47	2.64
2/1	TH	6.94	6.56	6.18
	PI	2.39	2.56	2.72
7/6	TH	8.98	8.60	8.22
	PI	2.52	2.68	2.84
10/9	TH	9.48	9.10	8.71
	PI	2.67	2.83	2.99
15/12	TH	9.97	9.59	9.21
	PI	2.82	2.98	3.14
15-24 (Protection Range)	TH	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

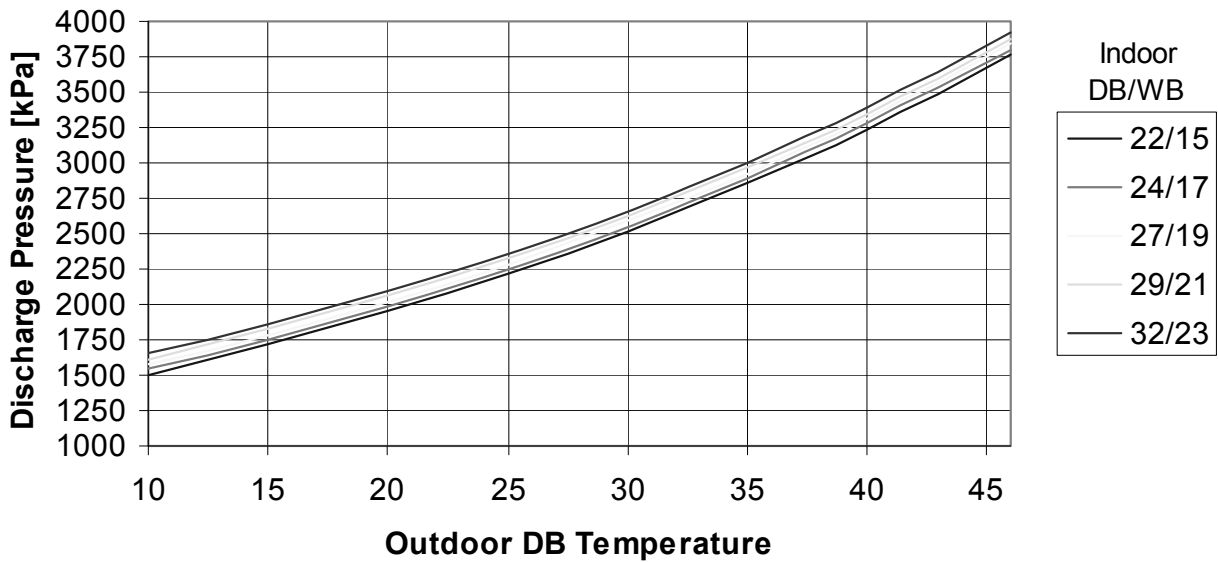
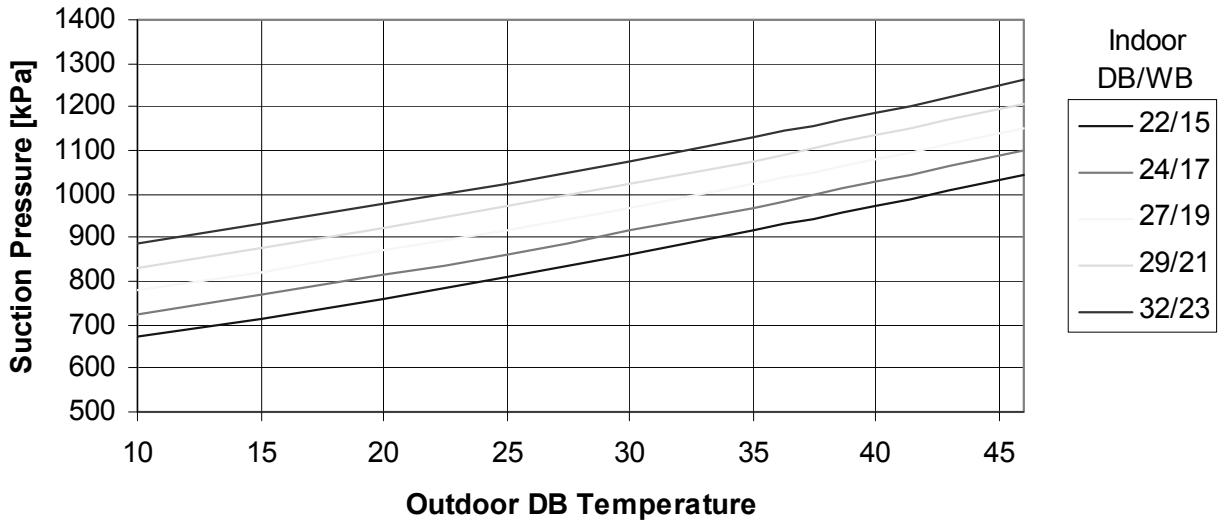
LEGEND

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

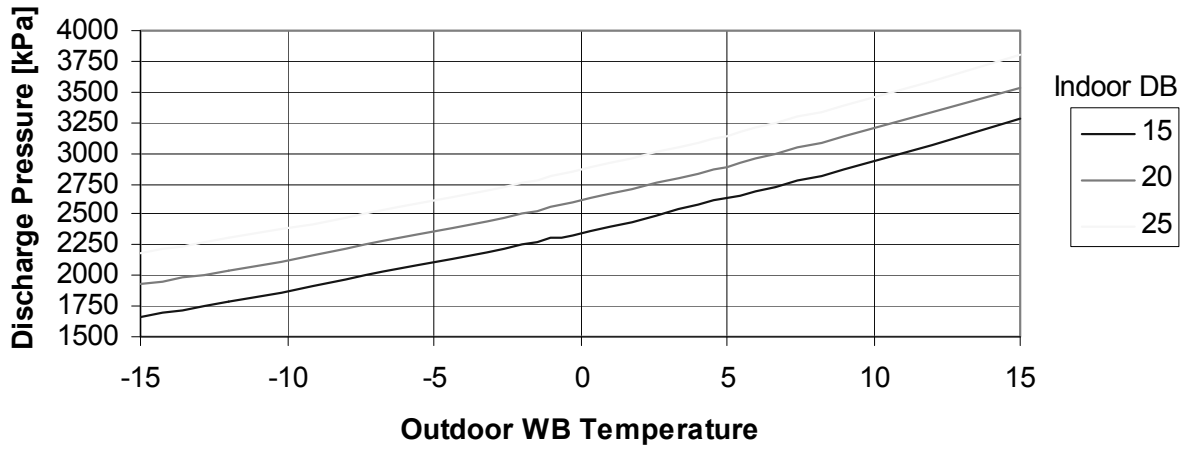
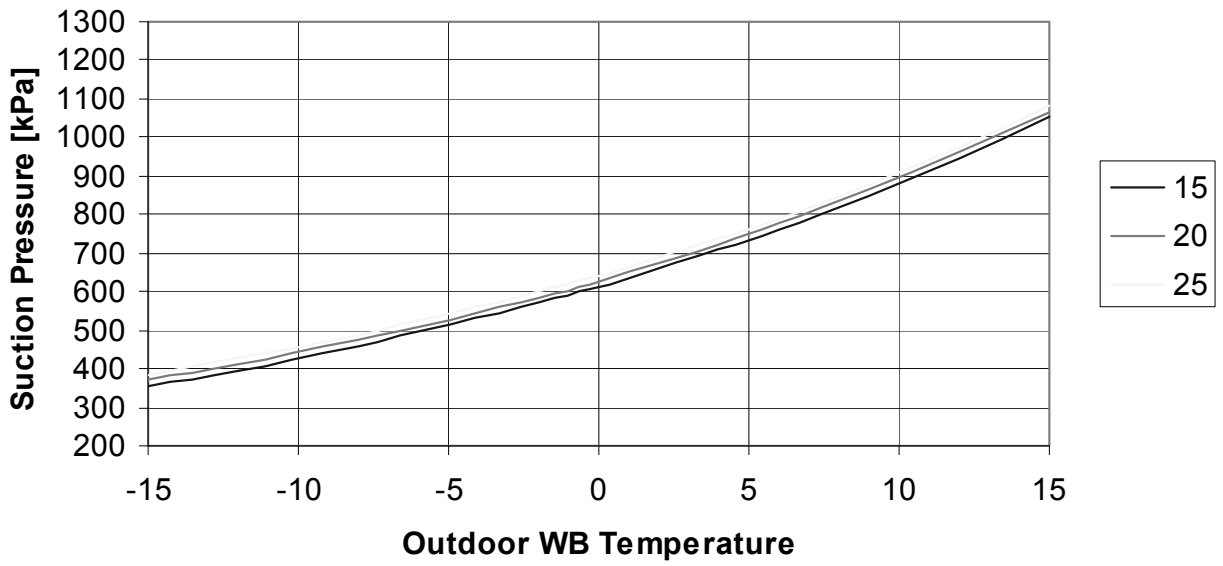
5.4.4 Capacity Correction Factors (Heating)



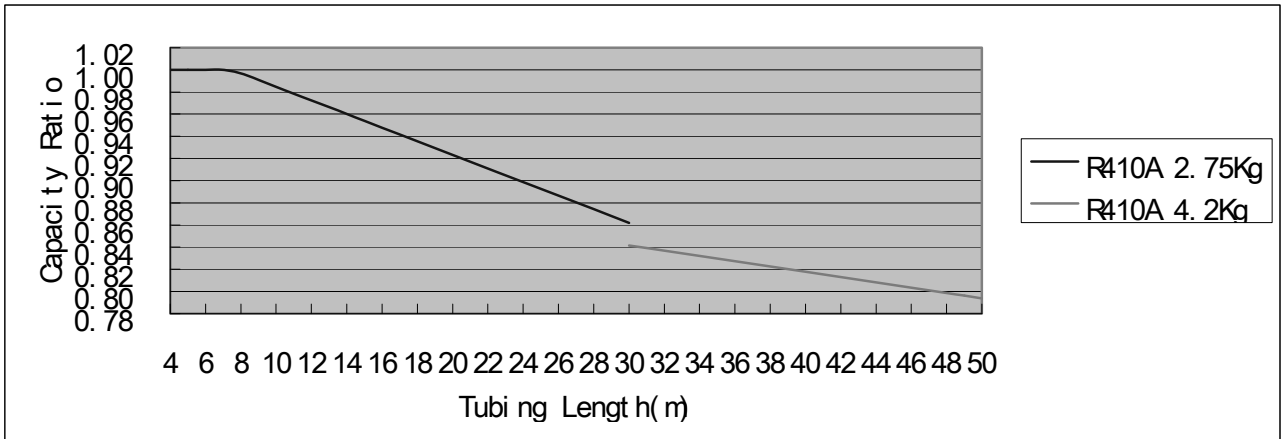
5.4.5 Pressure Curves (Cooling – Test Mode)



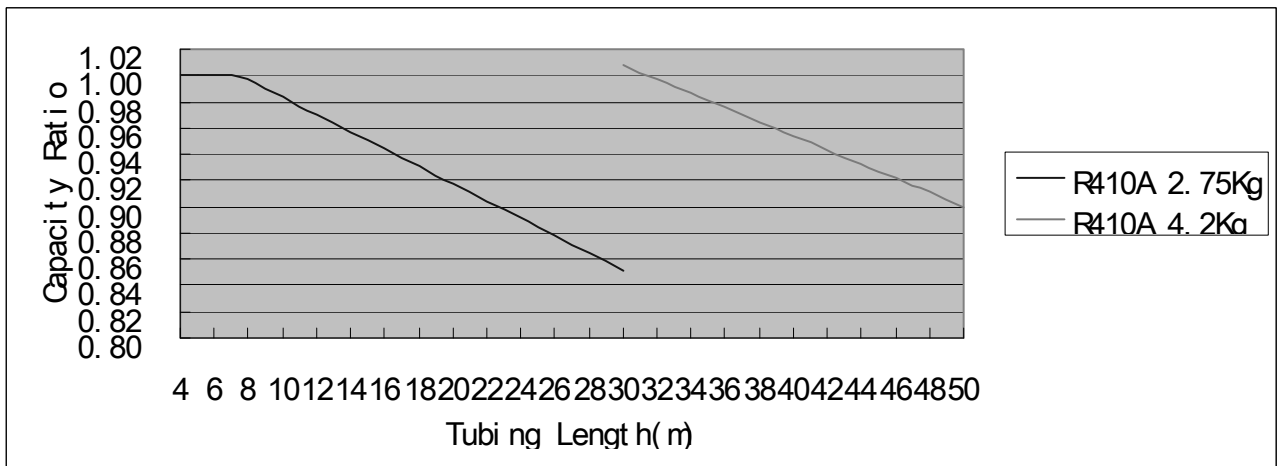
5.4.6 Pressure Curves (Heating – Test Mode)



5.4.7 Capacity Correction Factor Due to Tubing Length
Cooling

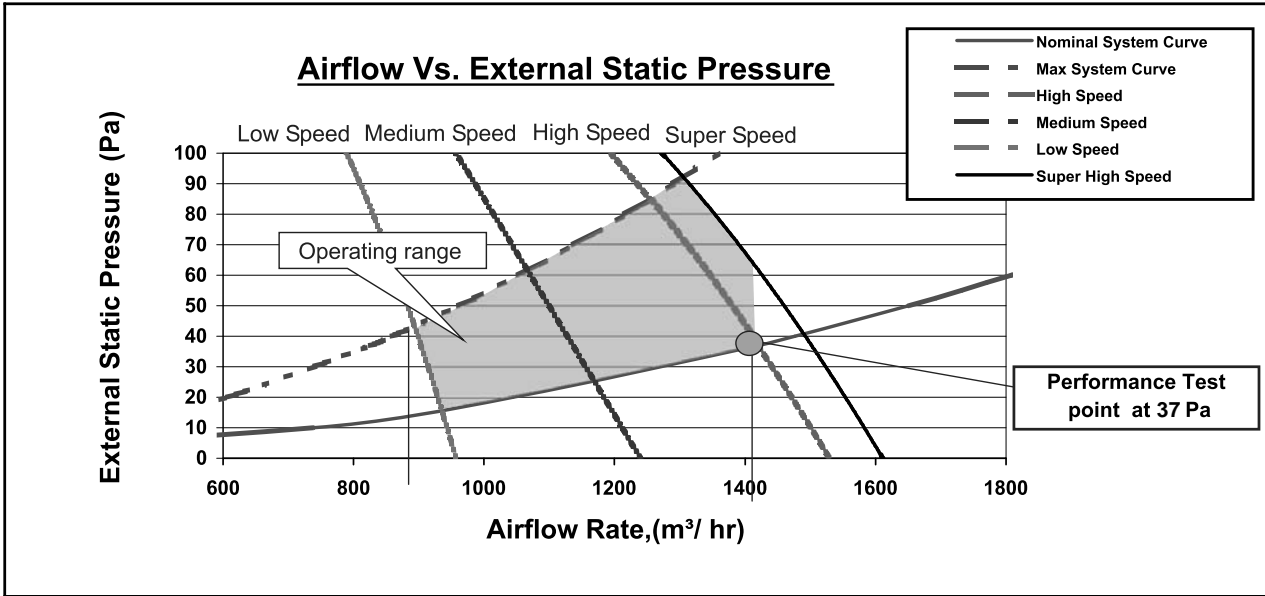


Heating



6. AIRFLOW CURVES

6.1 Model: DLS 30 DCI



6.2 DLS UNITS RANGE AIR FLOW CORRECTION FACTORS

(at nominal rating conditions — Test mode).

		Air Flow Rate [% of nominal]				
		60%	70%	80%	90%	100%
Cooling	TC	0.88	0.91	0.94	0.97	1
	SC	0.78	0.84	0.89	0.95	1
	PI	0.95	0.97	0.98	0.99	1
Heating	PI	1.07	1.05	1.03	1.02	1
	TC	0.90	0.92	0.95	0.97	1

* Permissible Air flow Rate - according to model Air Flow Curves

7. SOUND LEVEL CHARACTERISTICS

7.1 Sound Pressure Level

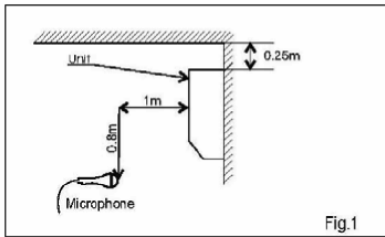


Figure 1. Wall Mounted

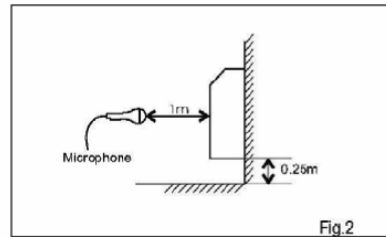


Figure 2. Floor Mounted

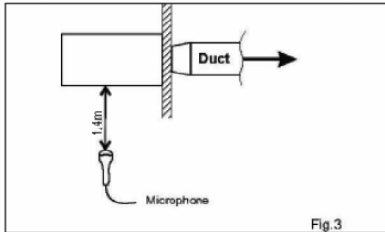


Figure 3. Ducted

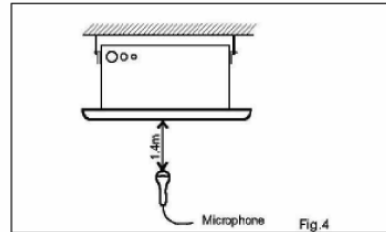
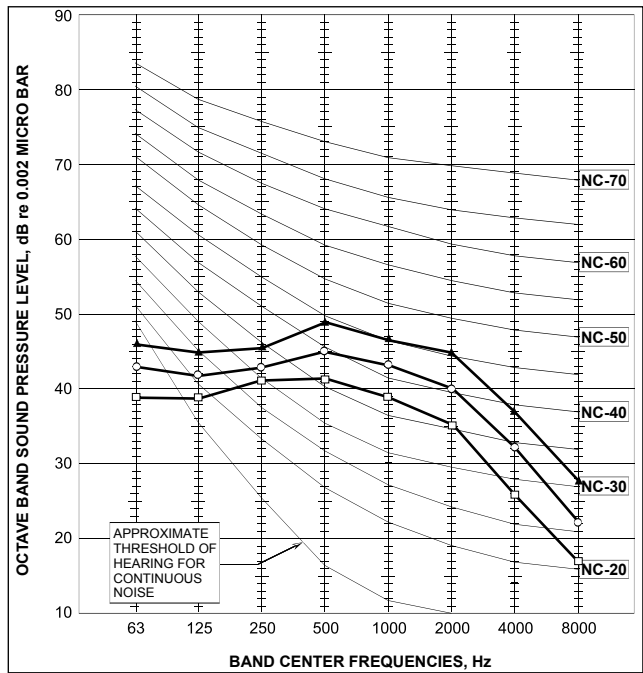
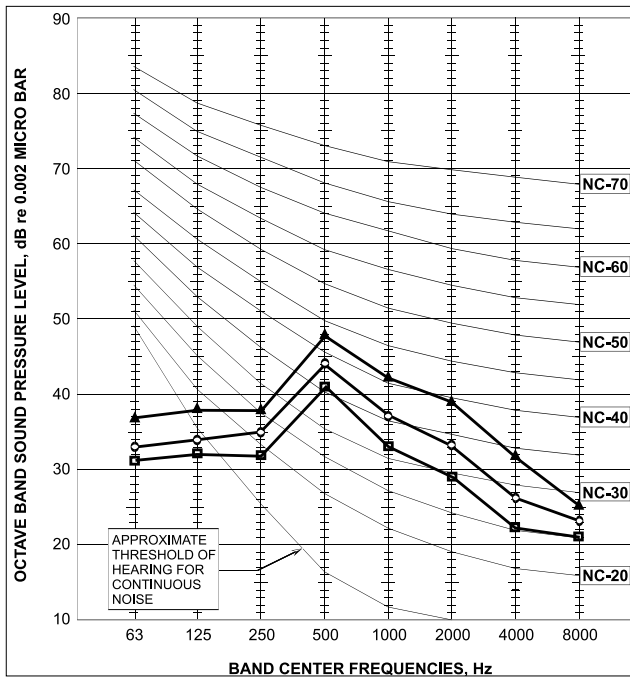


Figure 4. Cassette

7.2 Sound Pressure Level Spectrum

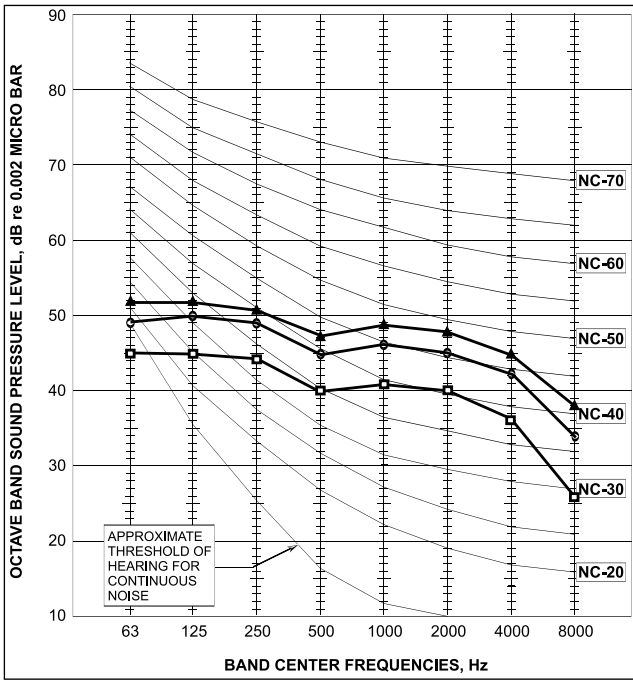
DLS 30

PNX 30

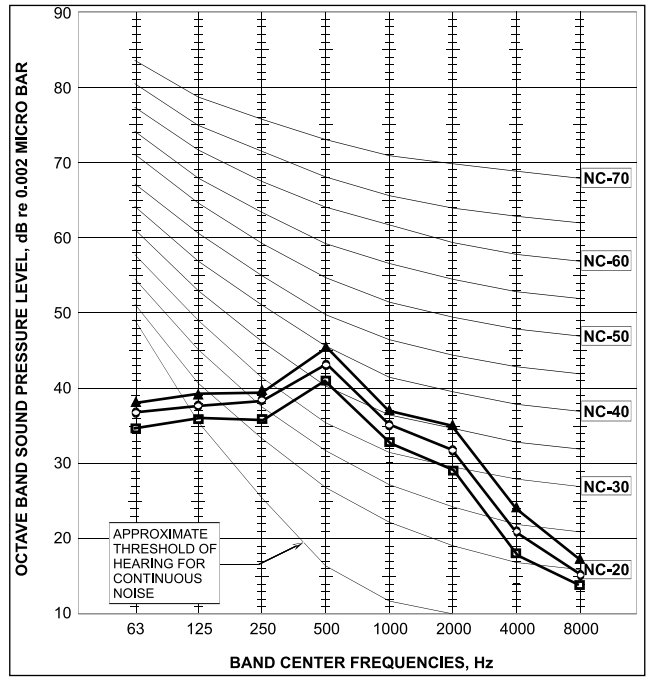


FAN SPEED	LINE
HI	—▲—
ME	—○—
LO	—□—

SX 30



CKD 30



FAN SPEED	LINE
HI	—▲—
ME	—○—
LO	—□—

7.3 Outdoor units

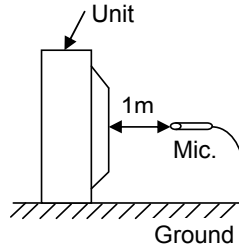
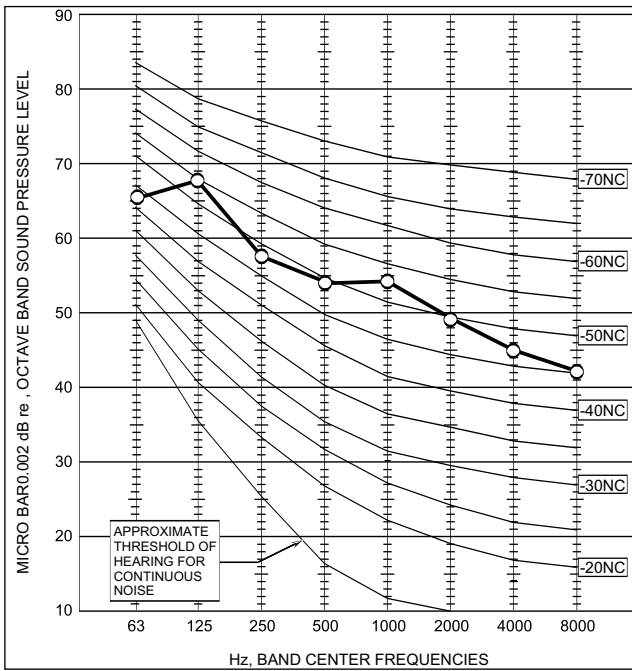


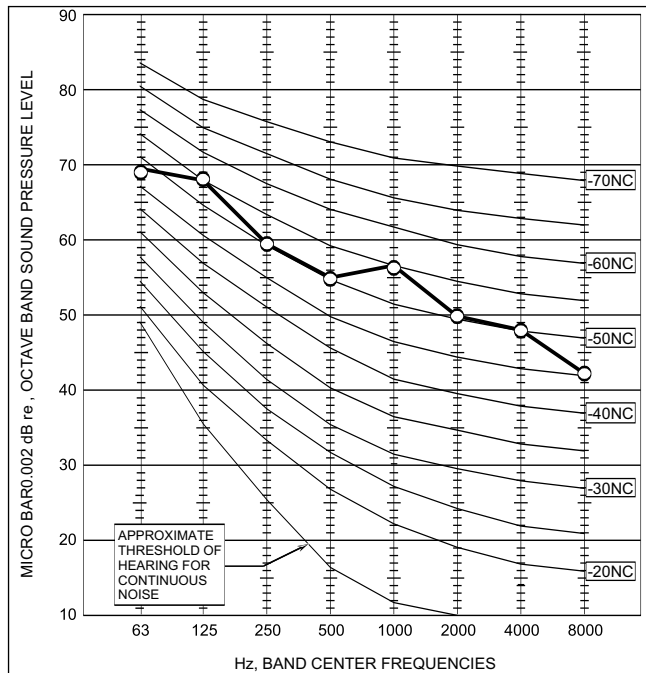
Figure 2

7.4 Sound Pressure Level Spectrum (Measured as Figure 2)

GCD 030 Cooling



GCD 030 Heating



8. ELECTRICAL DATA

8.1 Single Phase Units

Model	PNX 30	SX 30	CKD 30	DLS 30
Power Supply	1 PH ,220-240VAC ,50HZ			
Connected to	Outdoor			
Maximum Current	15A	15A	15A	15A
Inrush Current	45 A			
Starting Current	15 A	15A	15A	15A
Circuit Breaker	25 A			
Power Supply Wiring no x cross section	3 X 2.5 mm ²			
Interconnecting cable no x cross section	4X 2.5 mm ²			

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

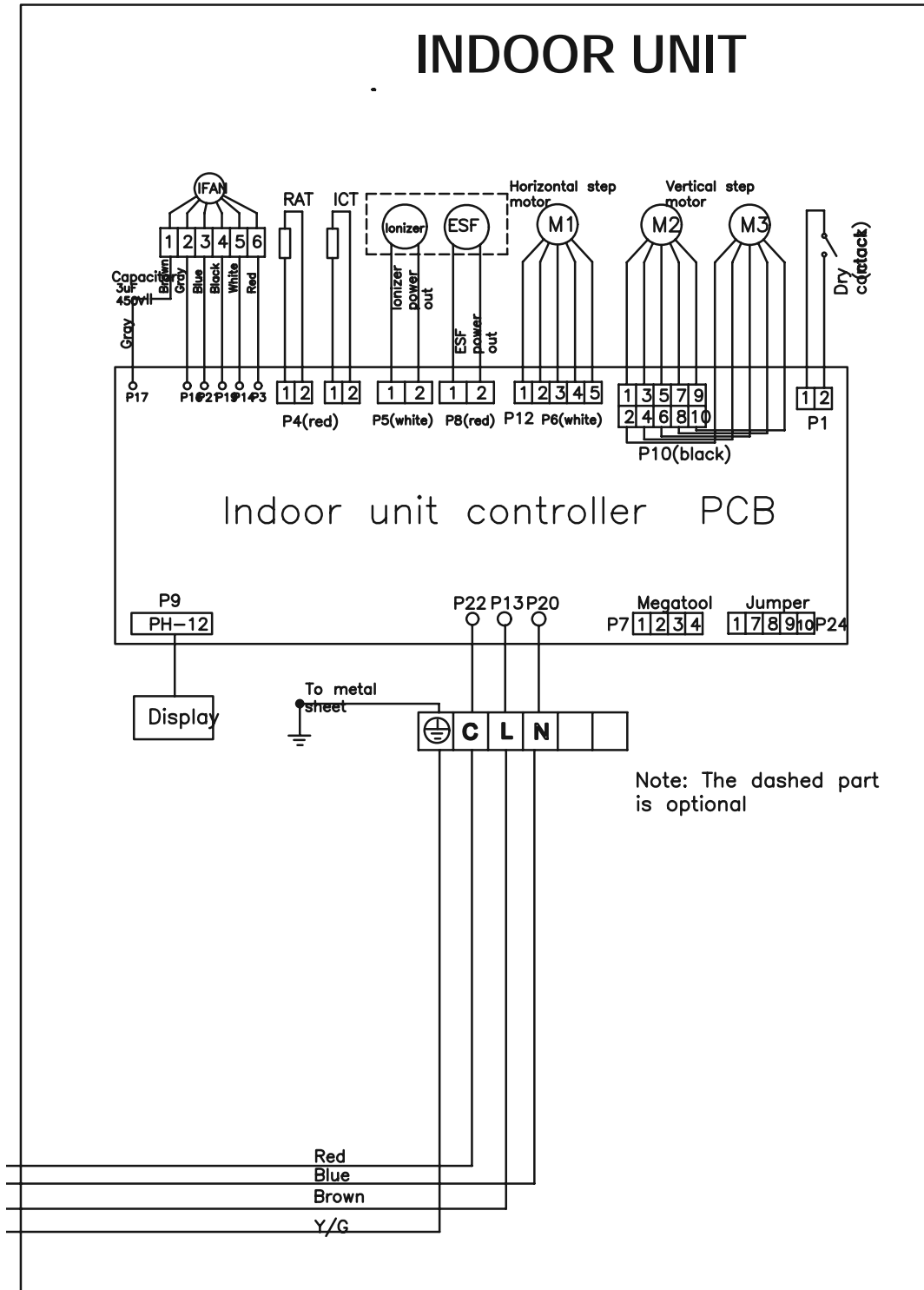
(b) Starting current is the current when starting the compressor.

NOTE:

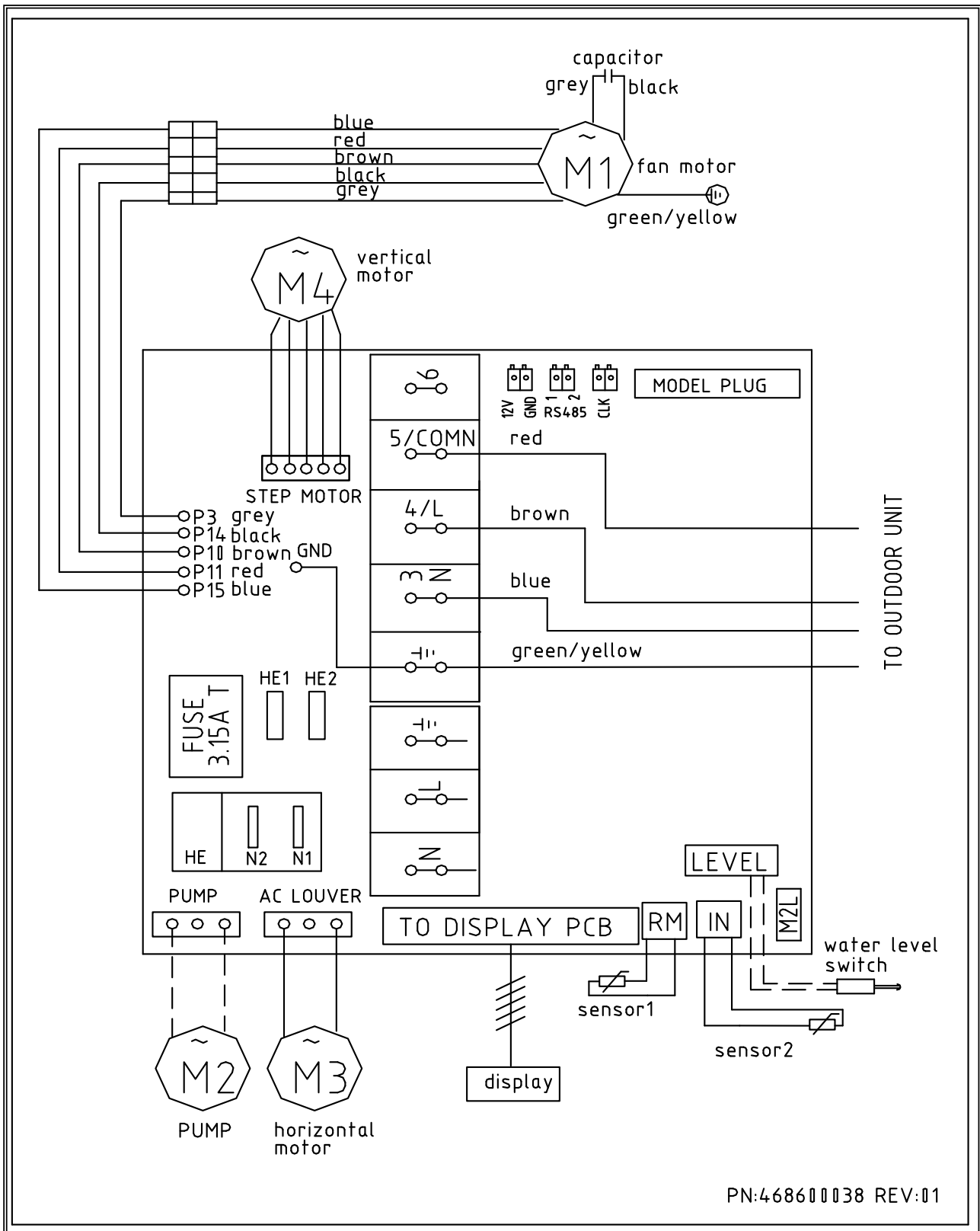
Power wiring cord should comply with local laws and electrical regulations requirements.

9. WIRING DIAGRAMS

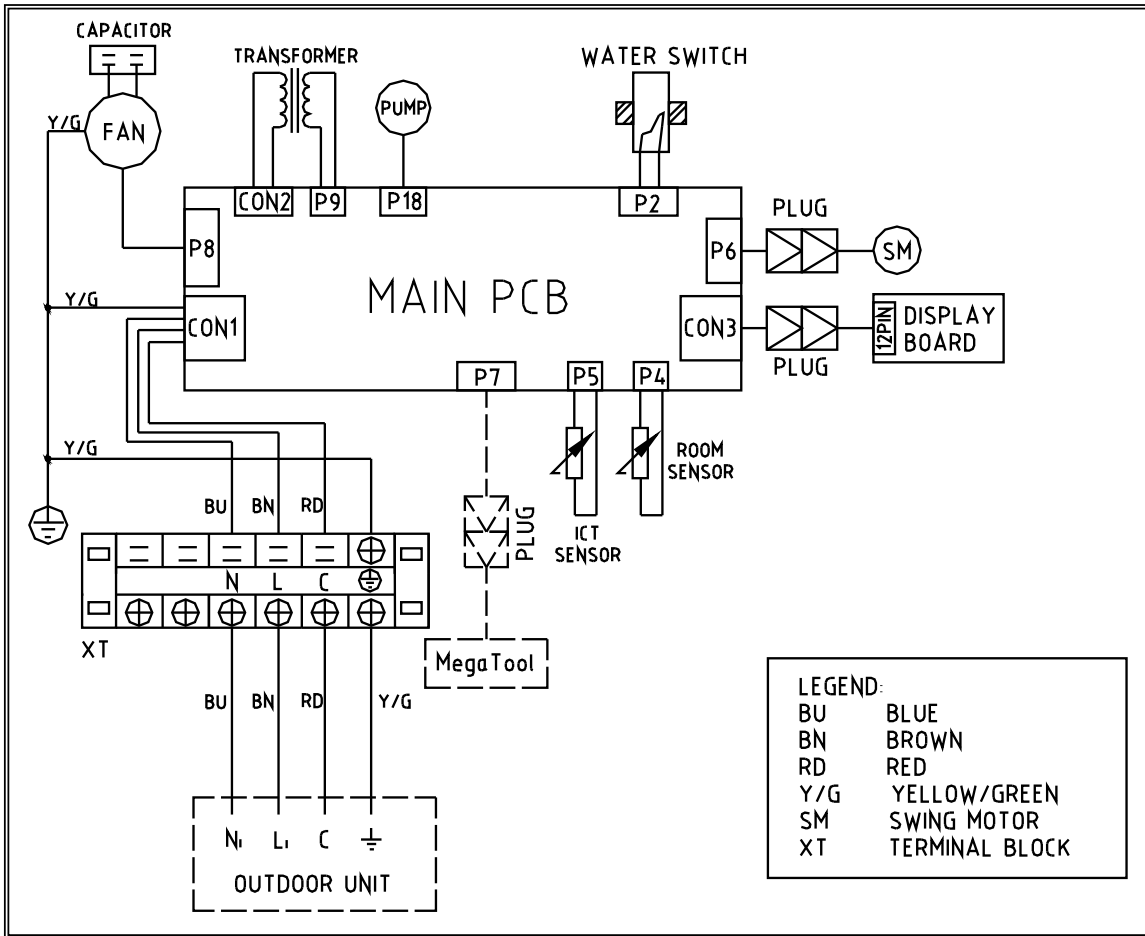
9.1 Indoor Unit: PNX 30 DCI



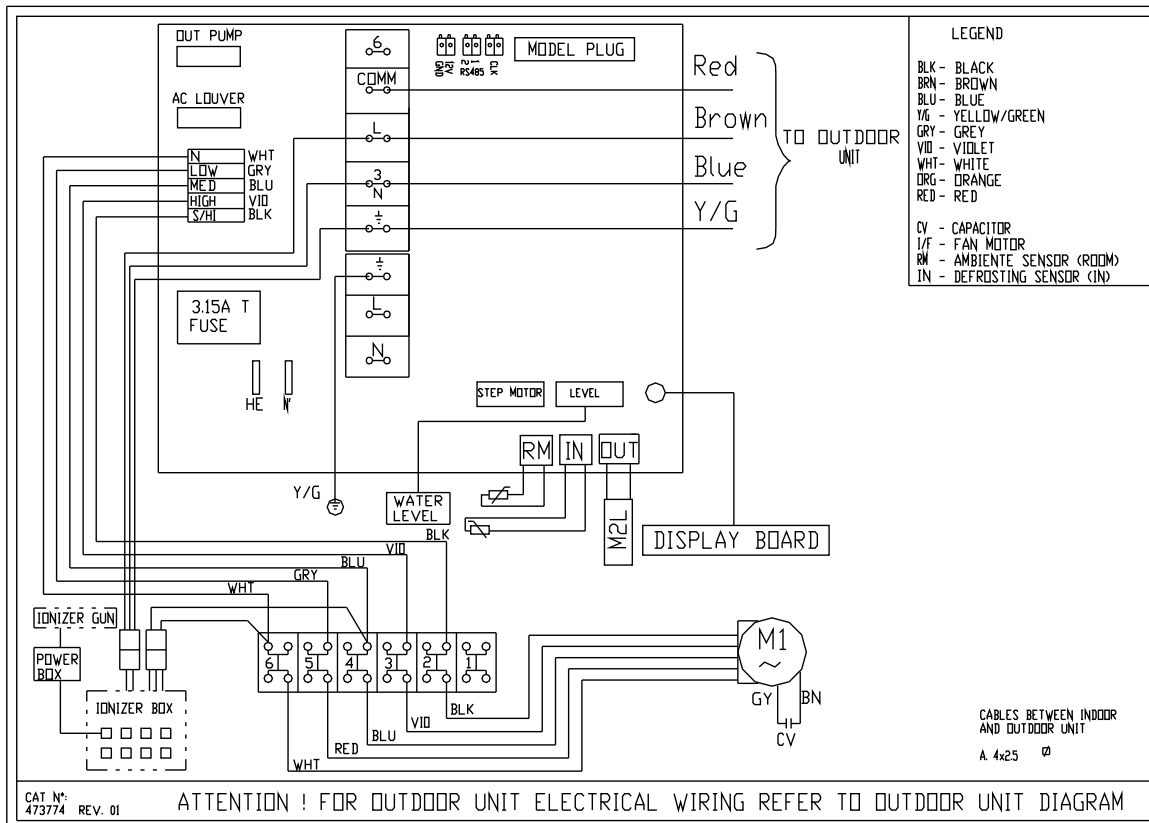
9.2 Indoor Unit: SX 30 DCI



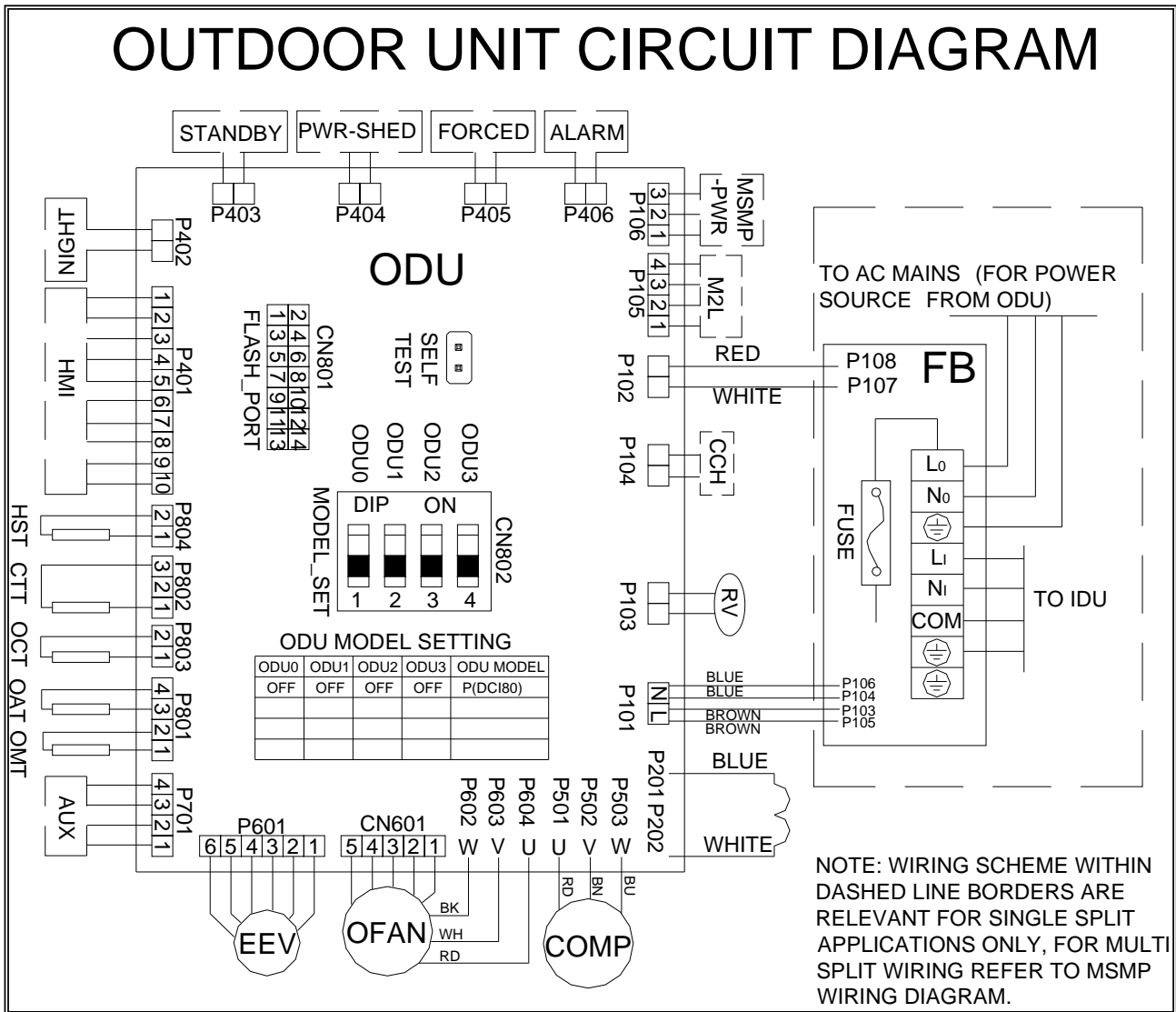
9.3 Indoor Unit: CKD 30 DCI



9.4 Indoor Unit: DLS 30 DCI



9.5 Outdoor Unit: GCD 030

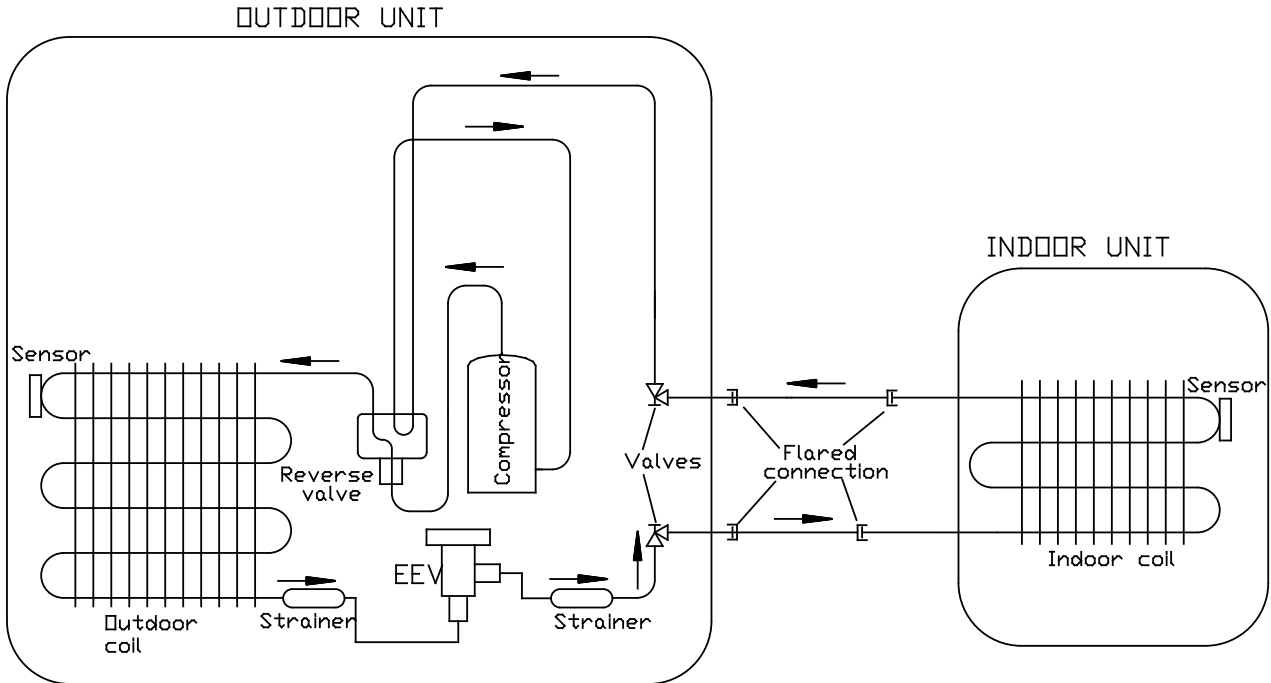


10. REFRIGERATION DIAGRAMS

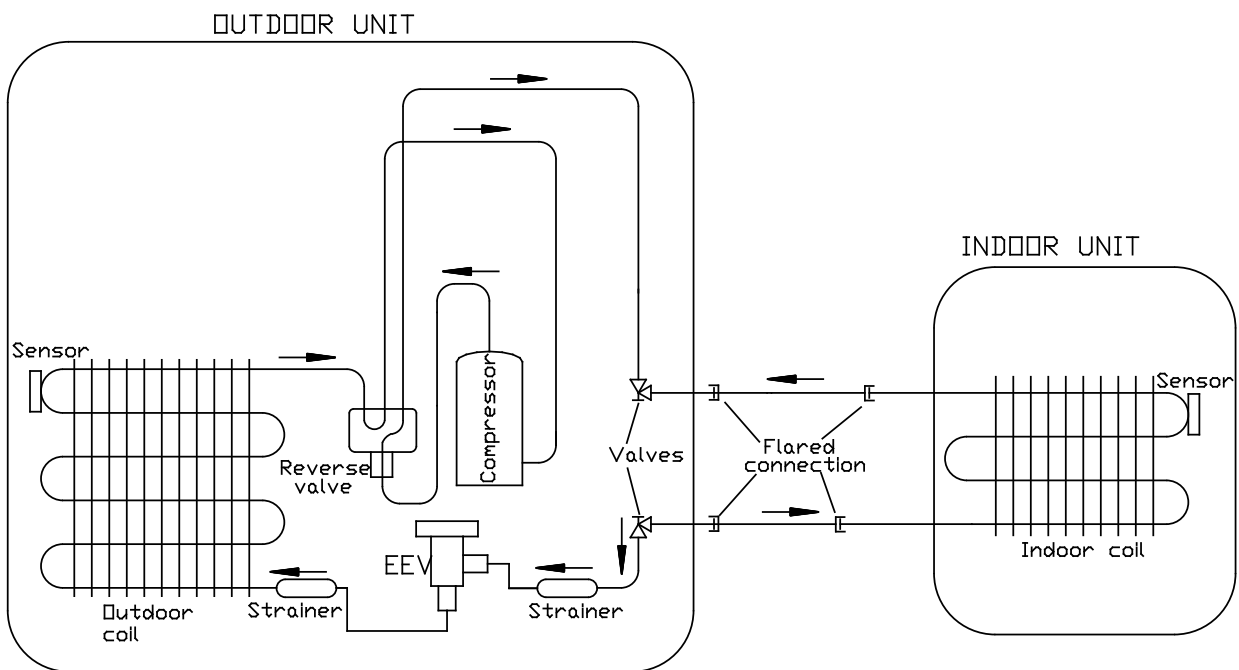
10.1 Heat Pump Models

10.1.1 PNX 30 DCI

Cooling mode



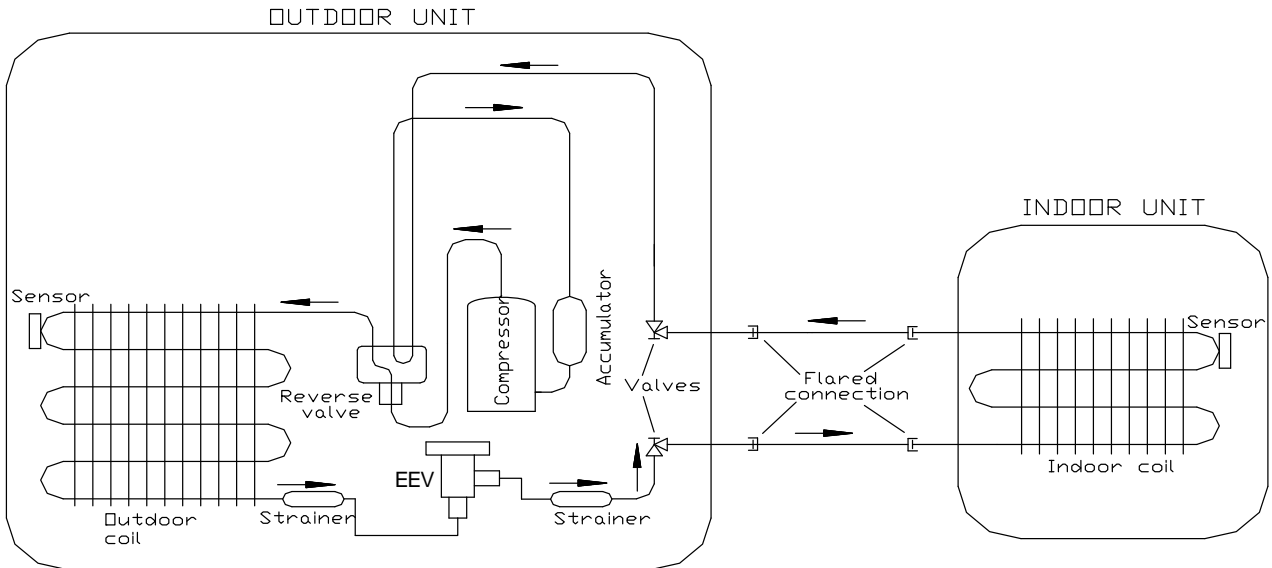
Heating mode



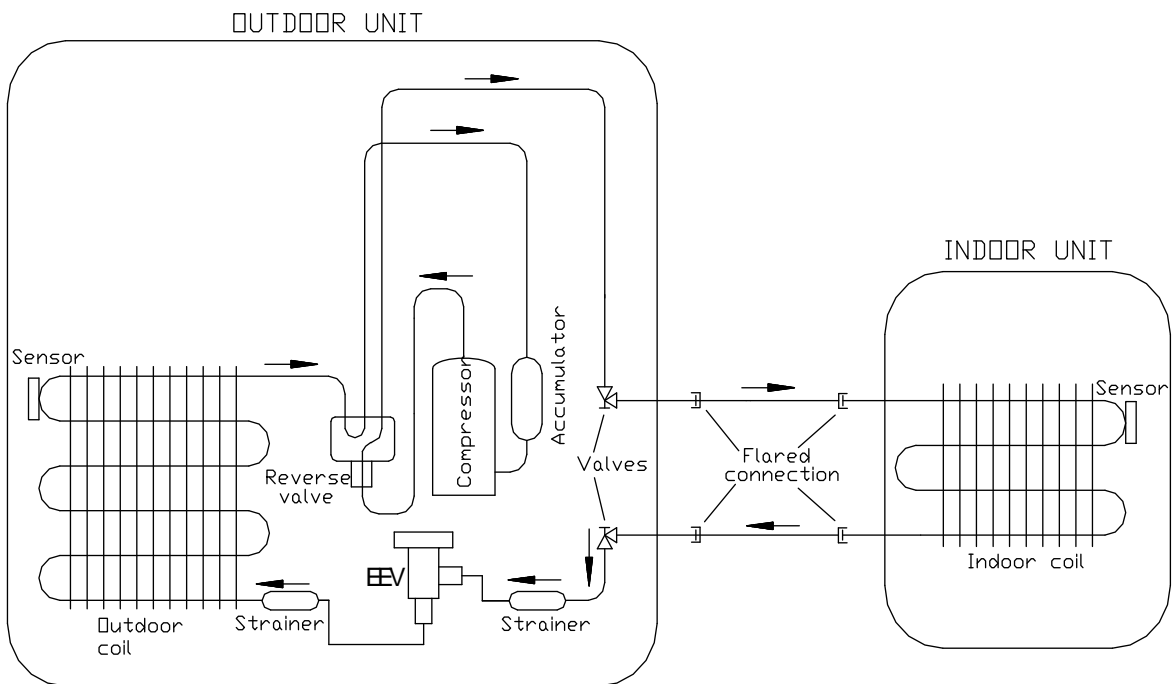
10.2 Heat Pump Models

10.2.1 SX 30 DCI

Cooling mode



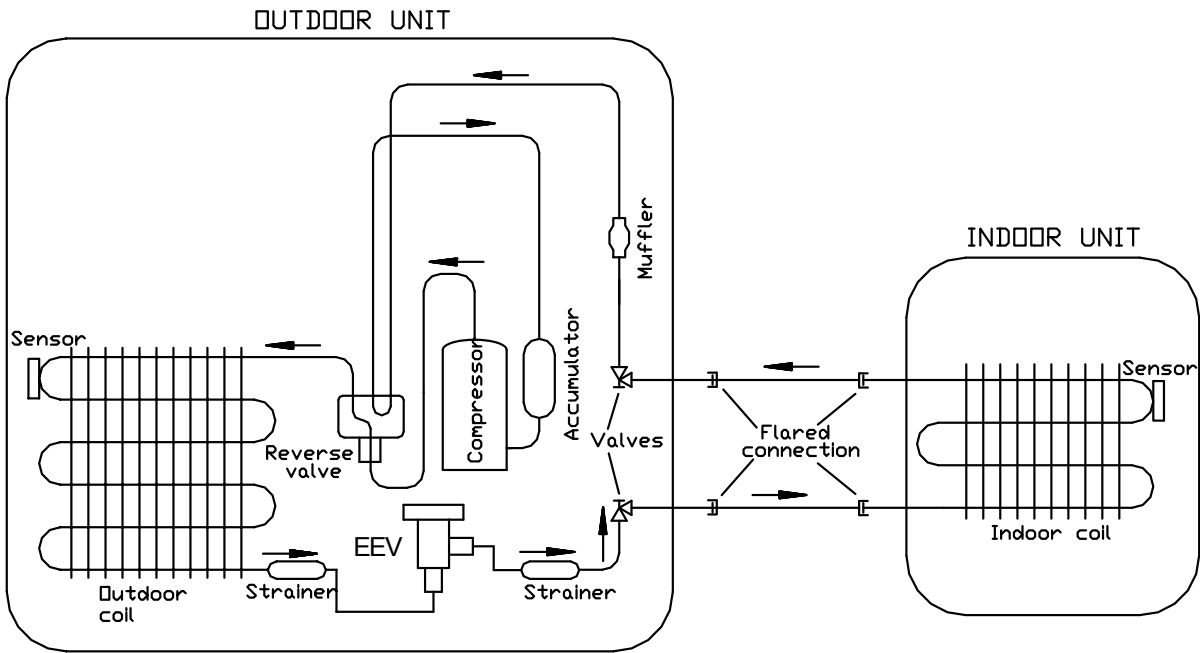
Heating mode



10.3 Heat Pump Models

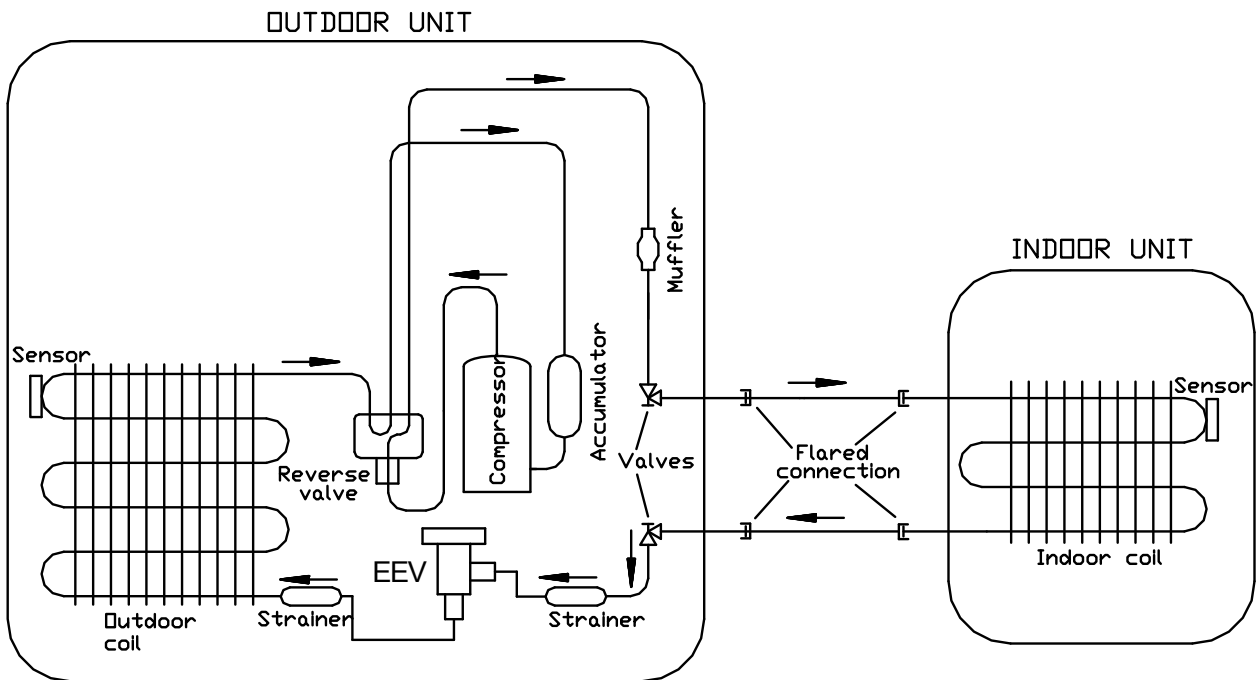
10.3.1 CKD 30 DCI

Cooling mode



COOLING & DRY MODE

Heating mode

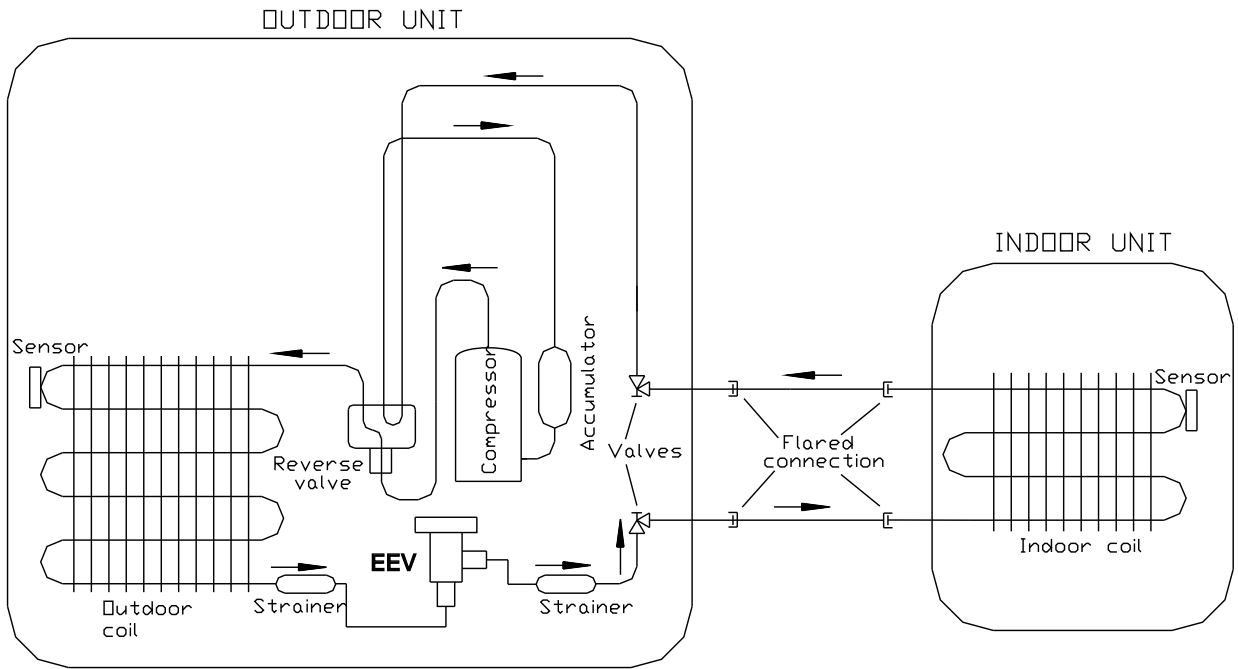


HEATING & DRY MODE

10.4 Heat Pump Models

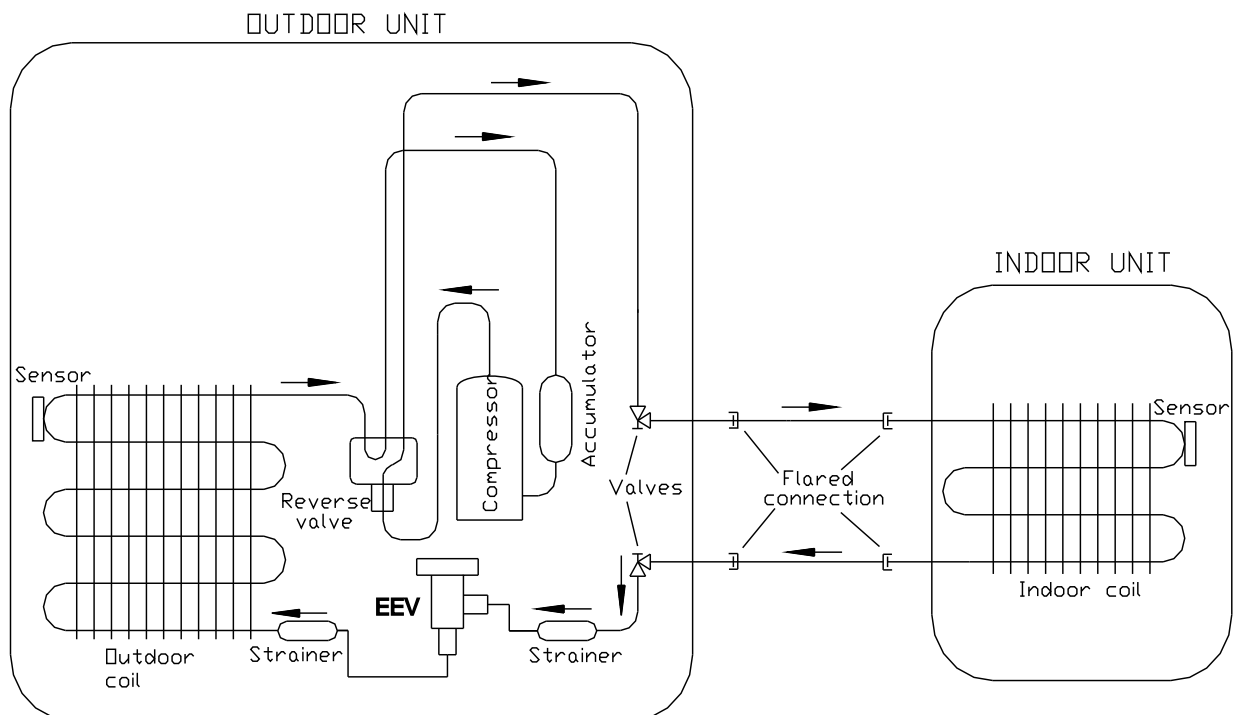
10.4.1 DLS 30 DCI

Cooling mode



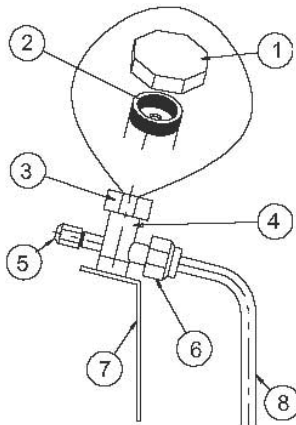
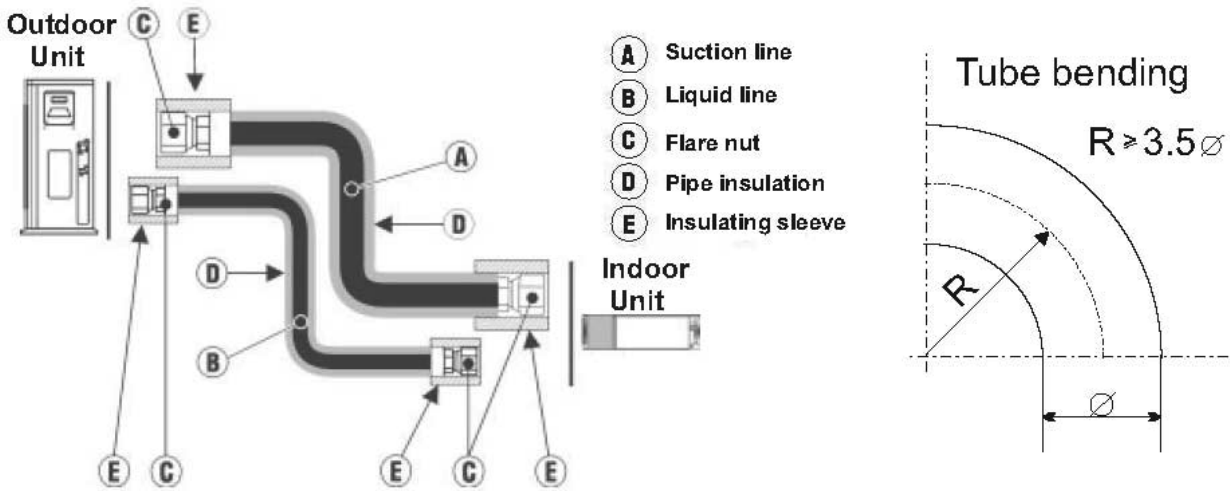
COOLING & DRY MODE

Heating mode



HEATING MODE

11. TUBING CONNECTIONS

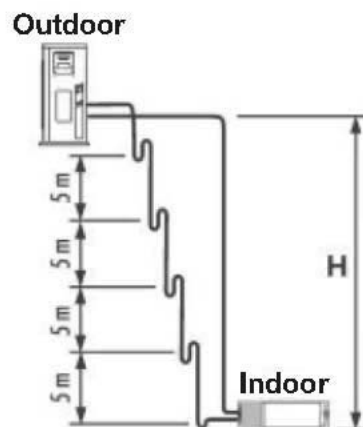


TUBE (Inch)	1/4"	3/8"	1/2"	5/8"	3/4"
TORQUE (Nm)					
Flare Nuts	15-18	40-45	60-65	70-75	80-85
Valve Cap	13-20	13-20	18-25	18-25	40-50
Service Port Cap	11-13	11-13	11-13	11-13	11-13

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

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

*Applicable for DLS18 only, for DLS24 – 44 oil traps are not required.



12. CONTROL SYSTEM

12.1 General Functions and Operating Rules

The DCI software is fully parametric.

All the model dependent parameters are shown in Blue color and with Italic style [*parameter*].

The parameters values are given in the last section of this control logic chapter of the service manual.

12.1.1 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.

12.1.2 Compressor Frequency Control

12.1.2.1 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:

12.1.3 Target Frequency Setting

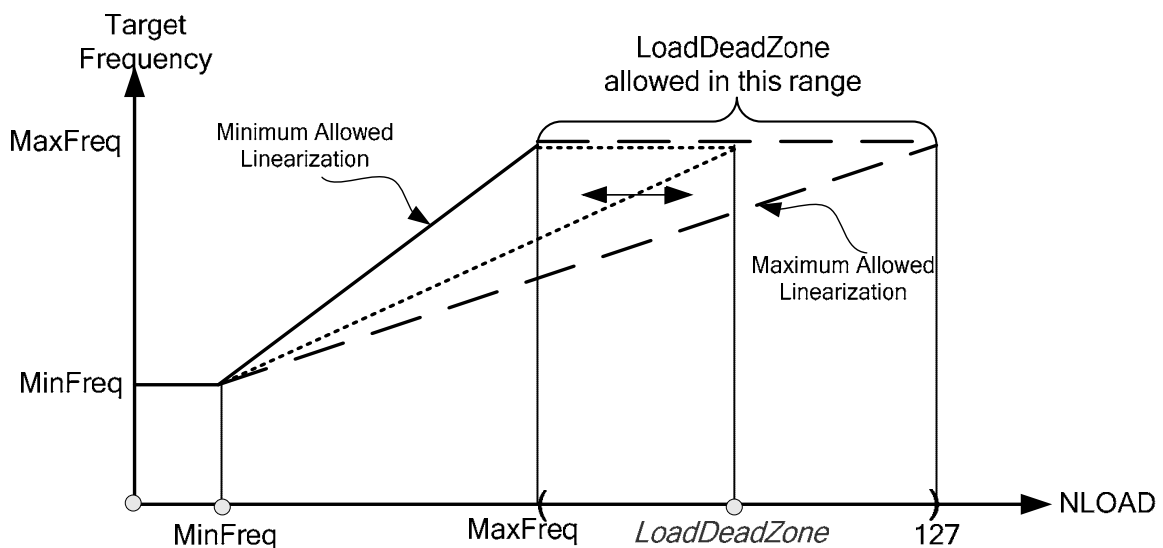
12.1.3.1 Target Frequency Setting for GCD 030

During normal operation (excluding protections) the compressor target frequency is set according to the ODU NLOAD number received from the indoor unit.

For single split channel the ODU NLOAD = IDU NLOAD

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

Refer to the following diagram for the above description:



LoadDeadZone Setting:

Communication Channel	Model P (DCI80)	
	Cooling	Heating
Single Spit Channel	127	127
Multi Split Channel	90	127

12.1.4 Frequency Changes Control

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

12.1.5 Compressor Starting Control**12.1.5.1 Compressor starting control for GCD 030**

When started, compressor frequency must reach 30 Hz, and not go down below 30 Hz during the first 5 minutes of compressor operation, except when compressor should be stopped (see next sections for explanation).

When Reaching *Step1Freq* Hz and *Step2Freq* Hz (for the first time during one continuous compressor operation) during compressor acceleration, compressor acceleration will be stopped for one minute and then continue.

Note: If compressor is working constantly at a frequency between the step frequency and step frequency – 10 Hz, then it will remain in its current frequency until one minute is over. After that minute is over, there is no need to stop compressor acceleration again at the step frequency.

When compressor frequency is equal or higher than *Step2Freq* Hz, further increasing of compressor frequency will be done in steps of *HzDown1* Hz every one minute.

The Normal acceleration/deceleration rate will be kept during these steps.

Deceleration does not require steps.

The steps limitation is ignored during Deicing protection.

This logic should be followed every time frequency should be increased over *Step2Freq*, and not only once.

Compressor frequency can not go over *Step3Freq* Hz during the first 10 minutes of continuous compressor operation (excluding Deicing).

12.1.6 Minimum On and Off Time

3 minutes

12.1.7 Indoor Fan Control

8 Indoor fan speeds are determined for each model. 4 speeds for cool/dry/fan modes and 4 speeds for heat mode.

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

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

12.1.7.1 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 than 3 degrees.

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

12.1.8 Outdoor Fan Control**12.1.8.1 Outdoor Fan Control for DCI80 Z**

OFAN operates between *OFMinRPM* to *OFMaxRPM*.

The OFAN will be off when the compressor is off.

when compressor is OFF, and HST>55 or faulty, OFAN will remain ON in 500 rpm for up to three minutes.

IF HST falls below 55, OFAN will be switched off immediately.

The fan speed level (to be set for h-com), is defined according to the following table:

OFAN Speed range	OFAN speed level	h-com
1 ~ 250	Low	1
251 ~ 500	Med	2
501~ 750	High	3
751 ~	Max	4

In cooling mode:

The OFAN speed is controlled according to the following objectives:

Mdoe	OFAN Target	Implementation
Cool Mode	Keep the condensation temperature to the minimum possible value	Keep OMT as low as possible down to 27°C.

The following table describes the open loop of outdoor fan speed, at cool mode, related to the 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	730
40	160	210	330	730	730	750	750
60	250	310	550	730	730	750	750
80	300	400	730	730	730	750	750
100~	350	490	730	730	730	750	750

In heating mode:

The outdoor fan will always be running at *OFANoiseMaxRPM* during heating operation mode.

12.1.9 EEV (Electronic Expansion Valve) Control

12.1.9.1 EEV Control for GCD 030

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

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

The EEV initial value (open loop) is determined according the following:

$$EEV_{OLi} = EEV_{Base} + EEV_{CpctyCrct} + 0 * EEV_{OATCrct} + EEV_{FreqCrct}$$

EEVBase Base open loop (Nominal Conditions/Capacity Code=1/MaxFrequency)		
Single	Cool	250
	Heat	200

Correction by OAT (EEVOATCrct):

ODU Mode	OAT	EEVOATCrct	
		Single Split	Multi Split
Cool	> 35	3*(OAT-35)	5*(OAT-35)
	<=35	1*(OAT-35)	2*(OAT-35)
	Faulty	0	0
Heat	>7	3*(OAT-7)	3*(OAT-7)
	<=7	2*(OAT-7)	2*(OAT-7)
	Faulty	0	0

Correction by actual compressor frequency:

ODU Mode	EEVFreqCrct (Single)	EEVFreqCrct (multi)
Cool	-1*(MaxFreqC-Actual Frequency)	0*(MaxFreqC-Actual Frequency)
Heat	-1*(MaxFreqH-Actual Frequency)	0*(MaxFreqH-Actual Frequency)

The following table describes the time calculations for the Open loop and the Correction value:

		During <i>BalanceTime</i> minutes after compressor starts up	After <i>BalanceTime</i> minutes
EEV Open Loop		Yes, continuously (always)	Yes, continuously (always)
EEV_{cv}	Single	No (set to 0)	Yes, every EEVTime seconds from the last calculation point.
	Multi		Yes, every EEVTime seconds <u>from the last calculation point</u> , OR whenever the number of active IDUs is changed
For EEVTime parameter refer to the relevant each section described below.			

The following table represents the EEV correction according to the discharge superheat:

The discharge super heat correction for cooling mode (ROM table)												
		Der SH _{DischargeC}										
		~-5	-4	-3	-2	-1	0	1	2	3	4	5~
SH _{DischargeC}	58~	10	12	14	16	18	20	22	24	26	28	30
	56,57	8	10	12	14	16	18	20	22	24	26	28
	54,55	6	8	10	12	14	16	18	20	22	24	26
	52,53	5	6	8	10	12	14	16	18	20	22	24
	50,51	4	5	6	8	10	12	14	16	18	20	22
	48,49	3	4	5	6	8	10	12	14	16	18	20
	46,47	2	3	4	5	6	8	10	12	14	16	18
	44,45	1	2	3	4	5	6	8	10	12	14	16
	42,43	0	1	2	3	4	5	7	9	11	13	15
	40,41	-1	0	1	2	3	4	6	8	10	12	14
	38,39	-2	-1	0	1	2	3	5	7	9	11	13
	36,37	-3	-2	-1	0	1	2	4	6	8	10	12
	34,35	-4	-3	-2	0	0	1	3	5	7	9	11
	32,33	-4	-3	-2	0	0	0	2	4	6	8	10
	30,31	-4	-3	-2	-1	0	0	2	3	5	7	9
	28,29	-4	-3	-2	-1	0	0	1	2	4	6	8
	26,27	-5	-4	-3	-2	-1	0	1	1	3	5	7
	24,25	-5	-4	-3	-2	-1	0	0	1	2	4	6
	22,23	-5	-4	-3	-2	-2	0	0	1	1	3	5
	20,21	-6	-5	-4	-3	-2	0	0	1	1	2	4
18,19	-6	-5	-4	-3	-2	0	0	0	1	1	3	
16,17	-6	-5	-4	-3	-2	-1	-1	0	0	0	2	
14,15	-7	-6	-5	-4	-3	-2	-1	0	0	0	1	
12,13	-8	-7	-6	-5	-4	-3	-2	0	0	0	0	
10,11	-9	-8	-7	-6	-5	-4	-3	-1	0	0	0	
8,9	-9	-8	-7	-6	-6	-5	-3	-2	0	0	0	
6,7	-10	-9	-8	-7	-6	-6	-4	-2	-1	0	0	
4,5	-10	-9	-8	-7	-6	-6	-4	-2	-2	0	0	
2,3	-10	-9	-8	-7	-6	-6	-4	-2	-2	-1	0	
~1	-11	-10	-9	-8	-7	-6	-5	-3	-2	-1	-1	

The discharge superheat correction for heating mode (ROM table)												
		Der SH _{DischxargeH}										
		~-5	-4	-3	-2	-1	0	1	2	3	4	5~
SH _{DischargeH}	57~	12	14	16	18	20	22	24	26	28	30	32
	55,56	10	12	14	16	18	20	22	24	26	28	30
	53,54	8	10	12	14	16	18	20	22	24	26	28
	51,52	6	8	10	12	14	16	18	20	22	24	26
	49,50	5	6	8	10	12	14	16	18	20	22	24
	47,48	4	5	6	8	10	12	14	16	18	20	22
	45,46	3	4	5	6	8	10	12	14	16	18	20
	43,44	2	3	4	5	6	8	10	12	14	16	18
	41,42	1	2	3	4	5	6	8	10	12	14	16
	39,40	0	1	2	3	4	5	7	9	11	13	15
	37,38	-1	0	1	2	3	4	6	8	10	12	14
	35,36	-2	-1	0	1	2	3	5	7	9	11	13
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	31,32	-4	-3	-2	0	0	1	3	5	7	9	11
	29,30	-4	-3	-2	0	0	0	2	4	6	8	10
	27,28	-4	-3	-2	-1	0	0	2	3	5	7	9
	25,26	-4	-3	-2	-1	0	0	1	2	4	6	8
	23,24	-5	-4	-3	-2	-1	0	1	1	3	5	7
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15,16	-6	-5	-4	-3	-2	0	0	0	1	1	3	
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5,6	-9	-8	-7	-6	-6	-5	-3	-2	0	0	0	
3,4	-10	-9	-8	-7	-6	-6	-4	-2	-1	0	0	
1,2	-10	-9	-8	-7	-6	-6	-4	-2	-2	0	0	
~0	-10	-9	-8	-7	-6	-6	-4	-2	-2	-1	0	

12.1.10 RV(Reversing Valve) Control

Reversing valve is on in heat mode.

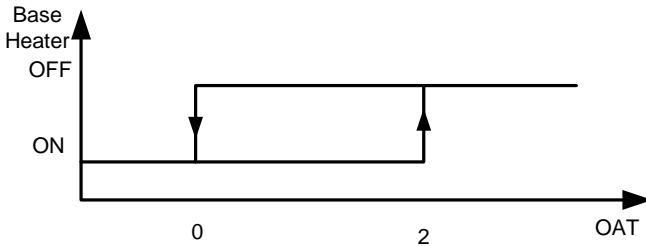
Switching of RV state is done only after compressor is off for over 3 minutes.

12.1.11 Ioniser Control

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

12.1.12 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.

12.2 Fan Mode

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

12.3 Cool Mode

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

12.4 Heat Mode

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

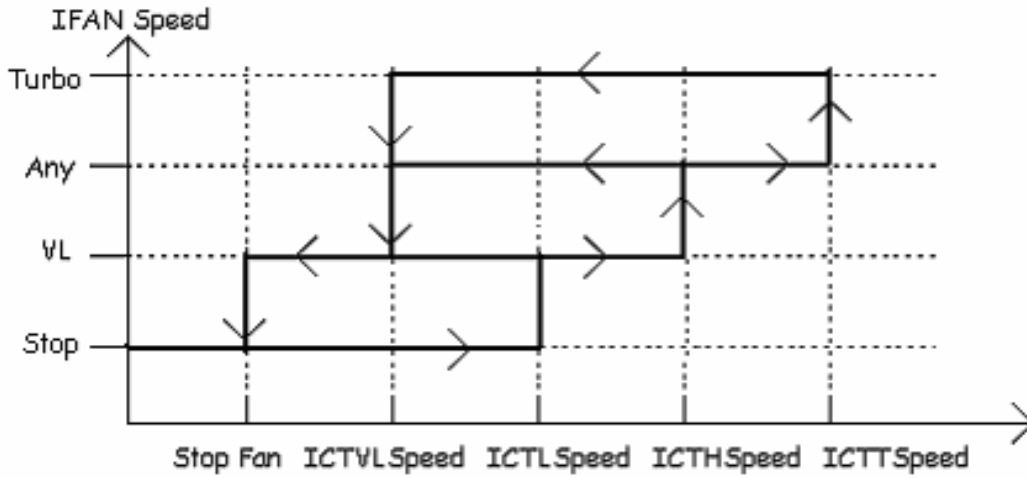
12.4.1 Temperature Compensation

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

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

12.4.2 Indoor Fan Control in Heating Mode

Indoor fan speed depends on the indoor coil temperature:



12.5 Auto Cool/Heat Mode

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

12.6 Dry Mode

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

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

12.7 Protections

There are 5 protection codes.

Normal (Norm) – unit operate normally.

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

HzDown1 (D1) – Compressor frequency is reduced by 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.

12.7.1 Indoor Coil Defrost Protection

12.7.1 Indoor Coil Defrost Protection

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

12.7.2 Indoor Coil Overheating Protection

12.7.2.1 Indoor Coil Overheating Protection

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

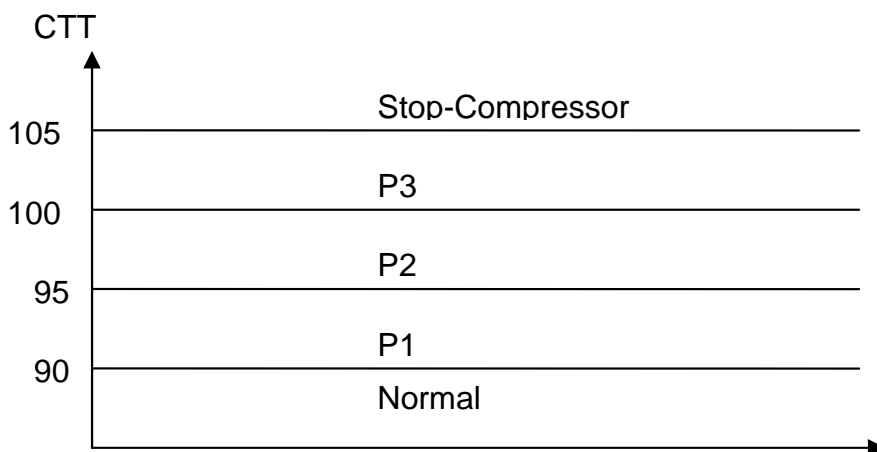
12.7.2.2 Indoor Coil Overheating Protection

ICT	ICT Trend				
	<-2	-2	-1,0,1	2	>2
ICT >62	SC	SC	SC	SC	SC
60 ≤ ICT < 62	D1	D1	D2	D2	D2
58 ≤ ICT < 60	SR	SR	D1	D2	D2
56 ≤ ICT < 58	SR	SR	SR	D1	D2
54 ≤ ICT < 56	Norm	Norm	SR	SR	D1
52 ≤ ICT ≤ 54	Norm	Norm	Norm	SR	SR
ICT < 52	Norm				

12.7.3 Compressor Overheating Protection

12.7.3.1 Compressor Overheating Protection for GCD 030

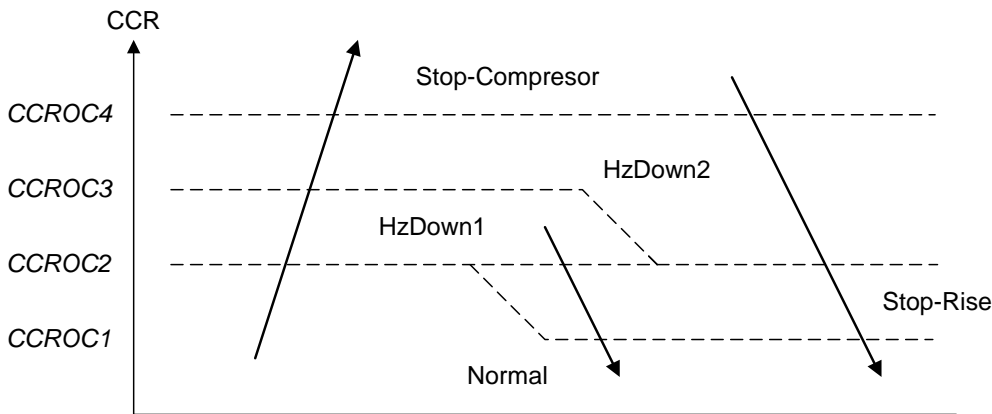
There are 4 control statuses for the protection: P1, P2, P3, Stop Compressor according to the following chart.



DerCTT = current CTT – CTT of last decision time point

Control Status	DerCTT>1 or when protection status is increased	Else
P1	Normal	Stop Rise
P2	HzDown 1	Stop Rise
P3	HzDown 2	HzDown 1
Stop Compressor	Stop Compressor	

12.7.4 Compressor Over Current Protection



12.7.5 Heat Sink Overheating Protection

12.7.5.1 Heat Sink Overheating Protection For GCD 030

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

HST _n	HST _n -HST _{n-1}				
	<-1	<0 ≥ -1	0	>0 ≤1	> 1
HST _n ≥ 88	SC	SC	SC	SC	SC
84 ≤ HST _n < 88	D1	D1	D2	D2	D2
80 ≤ HST _n < 84	SR	SR	D1	D2	D2
76 ≤ HST _n < 80	SR	SR	SR	D1	D1
72 ≤ HST _n < 76	Norm	Norm	Norm	SR	SR
HST _n < 72	Norm				

12.7.6 Outdoor Coil Overheating Protection For GCD 030

OMT_n is the current reading of OMT and OMT_{n-1} is the last reading of OMT.

OMT _n	OMT _n -OMT _{n-1}				
	<-1	-1	0	1	>1
OMT _n ≥ 66	SC	SC	SC	SC	SC
64 ≤ OMT _n < 66	D2	D2	D2	D2	D2
62 ≤ OMT _n < 64	D1	D1	D1	D1	D1
60 ≤ OMT _n < 62	SR	SR	SR	SR	SR
58 ≤ OMT _n < 60	Norm	Norm	Norm	Norm	Norm
OMT _n < 58	Norm				

12.7.7 System Over Power Protection Only For GCD 030

A new control status will be set according to the following graph every **5 seconds**

Power_n is the current reading of system power and Power_{n-1} is the last reading of System Power.

Power _n	Power _n -Power _{n-1}				
	<-50	[-50,-1]	0	[1,50]	>50
Power _n > OVRPWR5	SC	SC	SC	SC	SC
OVRPWR4 ≤ Power _n < OVRPWR5	D1	D1	D2	D2	D2
OVRPWR3 ≤ Power _n < OVRPWR4	SR	SR	D1	D2	D2
OVRPWR2 ≤ Power _n < OVRPWR3	SR	SR	SR	D1	D1
OVRPWR1 ≤ Power _n < OVRPWR2	Norm	Norm	Norm	SR	SR
Power _n < OVRPWR1	Norm				

There are two sets of OVRPWR values, the selection of the values are set according to the state of the Power-Shed input:

Variable	Parameter (Power Shedding input is open)	Parameter (Power Shedding input is close)
OVRPWR1 =	3050	2300
OVRPWR2 =	3150	2450
OVRPWR3 =	3200	2600
OVRPWR4 =	3300	2750
OVRPWR5 =	3400	2900

12.7.8 Outdoor Coil Deicing Protection

12.7.8.1 Outdoor coil Deicing Protection For GCD 030

• **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 < -4 AND TLD > 100 minutes

All this condition will exist during 10 seconds

OCT – Outdoor Coil Temperature

OAT – Outdoor Air Temperature

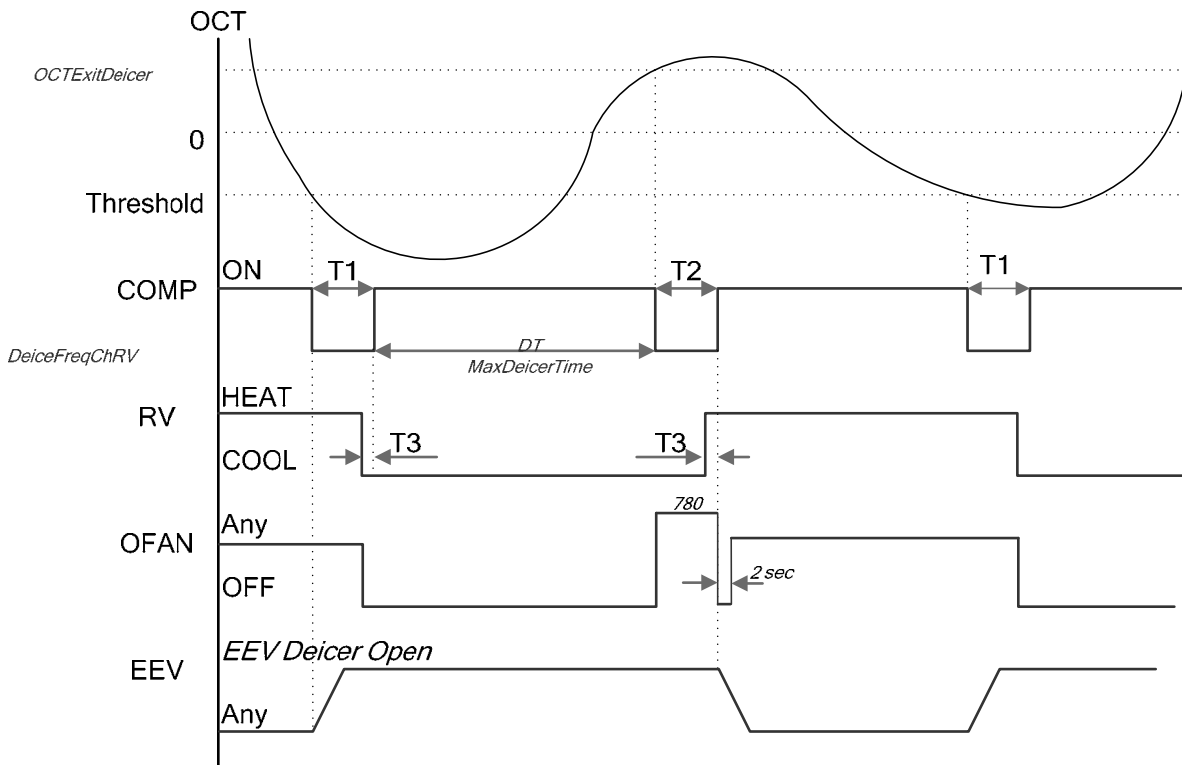
TLD – Time from Last Deicing

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

12.7.9 Condensate Water Over Flow Protection

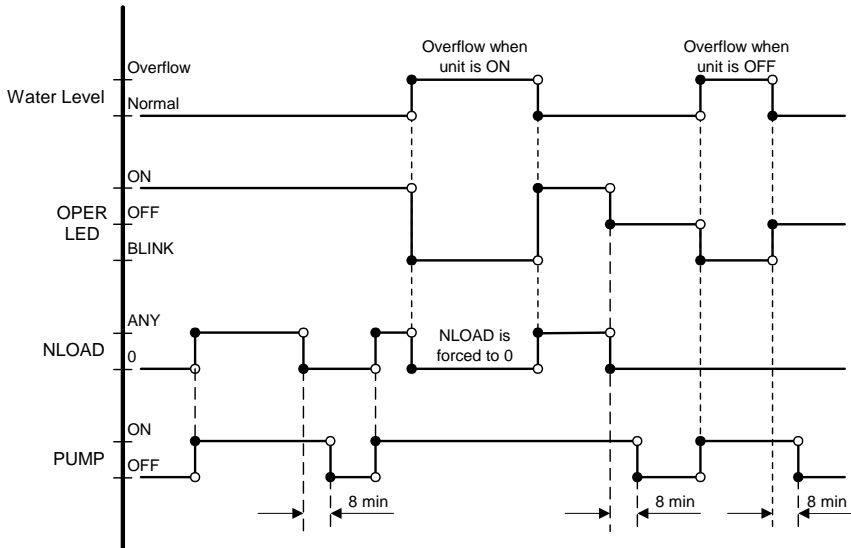


Each of the pins P1, P2, P3 can have two options:

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

- **Water Level Protection-1 level**

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



12.8 Indoor Unit Dry Contact

Indoor unit Dry contact has two alternative functions that are selected by J9.

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

12.9 Operating the Unit from Mode Button

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

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

12.10 Exceeding operation conditions For DCI 80Z

In order to protect the compressor from exceeding its normal operation range, the system will behave according to the following whenever operation range is exceeded:

Indoor Mode request	Exceeding limits state			Normal state (default) Outdoor mode
	Outdoor conditions	0		
		1	0 (or OAT faulty)	
Cooling	A=47	Idle	Cooling	Cool
Cooling	B=-11	Idle	Cooling	Cool
Heating	B=-18	Idle	Heating	Heat
Heating	A=30	Idle	Heating	Heat

12.11 On Unit Controls and Indicators

12.11.1 Indoor Unit controller Controls and Indicators 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 INDICATOR	1. Lights up when the Air Conditioner is connected to power and ready to receive the R/C commands
OPERATION INDICATOR	<ol style="list-style-type: none"> 1. Lights up during operation. 2. Blinks for 300 msec., to announce that a R/C infrared signal has been received and stored. 3. Blinks continuously during protections (according to the relevant spec section).
TIMER INDICATOR	Lights up during Timer and Sleep operation.
FILTER INDICATOR	Lights up when Air Filter needs to be cleaned.
COOLING INDICATOR	Lights up when system is switched to Cool Mode by using the Mode Switch <u>on the unit</u> .
HEATING INDICATOR	Lights up when system is switched Heat Mode by using the Mode Switch <u>on the unit</u> .
Mode SWITCH (COOL/HEAT/OFF)	Every short pressing , the next operation mode is selected, in this order : SB → Cool Mode → Heat Mode → SB → ... In long pressing system enters diagnostic mode.
RESET / FILTER SWITCH	<p>For short pressing:</p> <p>When Filter LED is on - turn off the FILTER INDICATOR after a clean filter has been reinstalled.</p> <p>When Filter LED is off – enable/disable the buzzer announcer, if selected.</p> <p>In long pressing system enters set up mode (if in SB).</p>

12.11.2 Outdoor Unit controller Indicators

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.

12.12 Jumper Settings

12.12.1 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
PNX/PNX18/PNX30/WSA	0	Activated
SX/AC/NSX	1	Deactivated
LS/K/KS/AS/AD/DLS/KN	1	Activated

DLS series are defined by “family+ model”:

Family + model	Jumper setting						New family definition	Model definition
	J8	J7	J6	J5	J4	J3		
KS+A	0	0	0	1	0	1	DLS	A
LS+A	0	0	0	1	1	0	DLS	B
KS+C	1	0	0	1	0	1	DLS	C
KS+D	1	1	0	1	0	1	DLS	D

Model selection Jumper – J7, J8

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

J9- Presence Detector /Power Shedding

OPERATION	J9
Presence Detector	0
Power Shedding	1

Jumper – J10

OPERATION	J10
PNX DCI LCD	0
LED	1

12.12.2 Outdoor Unit Controller

12.12.2.1 Outdoor Unit Controller For DCI80Z

JP9 Jumper Layout

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

ODU Model Selection

ODU4	ODU3	ODU2	ODU1	ODU0	ODU Model	Compressor Type	
						Single Split	Multi Split
ON	OFF	OFF	OFF	OFF	P (DCI80)	Sanyo	Mitsubishi
ON	OFF	OFF	OFF	ON	Q		
ON	OFF	OFF	ON	OFF	R		
ON	OFF	OFF	ON	ON	S		
ON	OFF	ON	OFF	OFF	T		
ON	OFF	ON	OFF	ON	U		
ON	OFF	ON	ON	OFF	V		
ON	OFF	ON	ON	ON	W		
ON	ON	OFF	OFF	OFF	X		
ON	ON	OFF	OFF	ON	Y		
ON	ON	OFF	ON	OFF	Z		
ON	ON	OFF	ON	ON	AA		
ON	ON	ON	OFF	OFF	AB		
ON	ON	ON	OFF	ON	AC		
ON	ON	ON	ON	OFF	AD		
ON	ON	ON	ON	ON	AE		

12.13 Test Mode

12.13.1 Entering Test Mode

System can enter Test mode in two ways:

Automatically when the following conditions exists for 30 minutes continuously:

Mode = Cool, Set point = 16, Room temperature = 27(+1/-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

12.13.2 Unit Operation in Test Mod

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.

12.14 SW Parameters

12.14.1 Indoor Units SW Parameters

Model dependent parameters - KLX

	A (KLX 24)	B (KLX 30)
Cap_Group	4	4
NomLoadC	61	67
NomLoadH	59	67
MaxNLOADIF1C	44	85
MaxNLOADIF2C	50	102
MaxNLOADIF3C	120	120
MaxNLOADIF4C	127	127
MaxNLOADIF5C	127	127
MinRTC	20	20
MaxNLOADRTC	127	127
MaxNLOADIF1H	127	127
MaxNLOADIF2H	127	127
MaxNLOADIF3H	127	127
MaxNLOADIF4H	127	127
MaxNLOADIF5H	127	127
MaxNLOADRTH	127	127
MaxRTH	27	27
MaxNLOADPSC	61	67
MaxNLOADPSH	59	67

Model dependent parameters - DLS

Unit	A (DLS50)	B (DLS60)	C (DLS72)	D (DLS80)
Cap_Group	3	3	4	4
NomLoadC	62	77	57	60
NomLoadH	74	80	55	63
ICTSTSpeed	22	22	22	22
ICTVLSpeed	28	28	28	28
ICTLSpeed	30	30	30	30
ICTHSpeed	32	32	32	32
ICTTSpeed	40	40	40	40
MaxNLOADIF1C	50	50	63	78
MaxNLOADIF2C	63	63	85	100
MaxNLOADIF3C	120	120	115	127
MaxNLOADIF4C	127	127	127	127
MaxNLOADIF5C	127	127	127	127
MinRTC	20	20	20	20
MaxNLOADRTC	127	127	127	127
MaxNLOADIF1H	127	127	127	127
MaxNLOADIF2H	127	127	127	127
MaxNLOADIF3H	127	127	127	127
MaxNLOADIF4H	127	127	127	127
MaxNLOADIF5H	127	127	127	127
MaxNLOADRTH	127	127	127	127
MaxRTH	27	27	27	27
MaxNLOADPSC	62	77	57	60
MaxNLOADPSH	74	80	55	63

Model dependent parameters - PNX

Parameter name	(PNX) Wall Mounted Models					
	25	35	50	60	72	80
NLOAD limits as a function of selected indoor fan speed						
MaxNLOADIF1C	40	40	45	50	53	68
MaxNLOADIF2C	53	53	62	85	75	90
MaxNLOADIF3C	120	120	120	120	105	120
MaxNLOADIF4C	127	127	127	127	127	127
MaxNLOADIF5C	127	127	127	127	127	127
Indoor Fan speeds						
IFVLOWC	700	700	700	800	850	850
IFLOWC	800	800	900	1000	1000	1000
IFMEDC	900	950	1050	1100	1150	1150
IFHIGHC	1050	1100	1200	1250	1350	1300
IFTURBOC	1150	1200	1250	1300	1400	1350
IFVLOWH	700	700	700	800	900	900
IFLOWH	800	850	900	950	1050	1050
IFMEDH	950	1000	1100	1150	1200	1200
IFHIGHH	1100	1150	1250	1250	1350	1300
IFTURBOH	1200	1250	1300	1300	1400	1350

Model dependent parameters - SX

Unit	A (SX50)	B (SX60)	C (SX72)	D (SX80)
Cap .Group	3	3	4	4
NomLoadC	68	80	60	63
NomLoadH	77	82	60	67
MaxNLOADIF1C	40	50	127	127
MaxNLOADIF2C	60	85	127	127
MaxNLOADIF3C	90	127	127	127
MaxNLOADIF4C	90	127	127	127
MaxNLOADIF5C	90	127	127	127
MinRTC	20	20	20	20
MaxNLOADRTC	127	127	127	127
MaxNLOADIF1H	127	127	127	127
MaxNLOADIF2H	127	127	127	127
MaxNLOADIF3H	127	127	127	127
MaxNLOADIF4H	127	127	127	127
MaxNLOADIF5H	127	127	127	127
MaxNLOADRTH	127	127	127	127
MaxRTH	27	27	27	27
MaxNLOADPSC	68	80	60	63
MaxNLOADPSH	77	82	60	67

12.14.2 Outdoor Units SW Parameters

Model dependent parameters for *GCD 030*

#	Name	P (DCI 80)
1.	<i>MinFreqC</i>	15
2.	<i>MaxFreqC</i>	75
3.	<i>MinFreqH</i>	15
4.	<i>MaxFreqH</i>	90
5.	<i>LoadDeadZone</i>	In Text
6.	<i>ODUCodeC</i>	In Text
7.	<i>ODUCodeH</i>	In Text
8.	<i>EEVBase</i>	In Text
9.	<i>EEVCpctyCrct</i>	In Text
10.	<i>Step1Freq</i>	40
11.	<i>Step2Freq</i>	60
12.	<i>Step3Freq</i>	75
13.	<i>OFMinRPM</i>	16
14.	<i>OFMaxRPM</i>	90
15.	<i>NightRPM</i>	60
16.	<i>OFNNoiseMaxRPM</i>	78
17.	<i>CTTOH1</i>	90
18.	<i>CTTOH2</i>	95
19.	<i>CTTOH3</i>	100
20.	<i>CTTOH4</i>	105
21.	<i>CCROC1</i>	13.5
22.	<i>CCROC2</i>	14
23.	<i>CCROC3</i>	15.0
24.	<i>CCROC4</i>	15.6
25.	<i>EEVMinOperOpenC</i>	50
26.	<i>EEVMaxOperOpenC</i>	480
27.	<i>EEVMinOperOpenH</i>	50
28.	<i>EEVMaxOperOpenH</i>	480
29.	<i>EEVMinOperOpenHInactive</i>	130
30.	<i>EEVMaxOperOpenHInactive</i>	130
31.	<i>HeaterDisableFlag</i>	0
32.	<i>NormAccel</i>	1
33.	<i>NormDecel</i>	1
34.	<i>OCTExitDeicer</i>	12
35.	<i>MaxDeicerTime</i>	15
36.	<i>EEVDecierOpenSingle</i>	480
37.	<i>EEVDecierOpenMulti</i>	160
38.	<i>DeicerCoef</i>	0.8
39.	<i>EEV_Active_H_Isotherm</i>	4
40.	<i>EEV_Active_H_SC</i>	10
41.	<i>EEV_Active_H_SC_Crct</i>	1
42.	<i>EnableExceedCond</i>	0
43.	<i>OVRPWR1</i>	3050
44.	<i>OVRPWR2</i>	3150
45.	<i>OVRPWR3</i>	3200
46.	<i>OVRPWR4</i>	3300
47.	<i>OVRPWR5</i>	3400
48.	<i>OVRPWRPS1</i>	2300
49.	<i>OVRPWRPS2</i>	2450
50.	<i>OVRPWRPS3</i>	2600
51.	<i>OVRPWRPS4</i>	2750
52.	<i>OVRPWRPS5</i>	2900
53.	<i>OVRPWRTcnst</i>	5
54.	<i>MinSumCapCode1</i>	2
55.	<i>MinSumCapCode2</i>	2
56.	<i>MinSumCapCode3</i>	2
57.	<i>MinSumCapCode4</i>	2
58.	<i>MaxSumCapCode1e</i>	2
59.	<i>MaxSumCapCode2</i>	4
60.	<i>MaxSumCapCode3</i>	5
61.	<i>MaxSumCapCode4</i>	6
62.	<i>Max_IDU_Number</i>	4
63.	<i>InstTestCompSpeed</i>	35
64.	<i>InstTestEEV</i>	180

13 TROUBLESHOOTING FOR GC030

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 1 Min. to discharge the system.

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

For safe handling of the controller please refer to section 14.1.5 below

13.1 General System Failures and Corrective Actions

No	Symptom	Probable Cause	Corrective Action
1	Indoor unit power supply indicator (Red LED) does not light up.	No power supply	Check power supply. If OK, check display and display wiring. if OK, replace controller
2	Indoor unit does not respond to remote control message	Remote control message not reached the indoor unit	Check remote control batteries, if OK, check display and display wiring, if OK, replace display PCB. If still not OK replace controller
3	Indoor 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 is ON)	Unit in heat mode and coil is still not warm	Change to cool mode
		Outdoor unit is in opposite mode	Change operation mode
		Problem with controller 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.	Controller problem	Replace controller
6	Water leakage from indoor unit	Indoor unit drainage tube is blocked	Check and open drainage tube

No	Symptom	Probable Cause	Corrective Action
7	Outdoor unit display board and leds are off	No power supply	Check the connections and the wiring on the main terminal - Repair if needed.
		PFC Chock coil	Check the PFC Chock coil
		Burnt fuse	Check 20A fuse on the Filter
8	Compressor operates but no capacity	EEV problem	Check EEV
		Refrigerant leakage	Check refrigeration system
		Indoor coil block	Clean filters and/or remove block
		Outdoor coil block	Remove block and/or avoid air by-pass
9	Compressor is over heated and unit does not generate capacity	EEV problem	Check EEV
		Refrigerant leakage	Check refrigeration system)
		Indoor coil block	Clean filters and/or remove block
		Outdoor coil block	Remove block and/or avoid air by-pass
10	Compressor stops during operation	Electronic control	Check diagnostics
		Refrigerant leakage	Check refrigeration system
11	Unit is not operating	Communication problems	Check diagnostics
12	Compressor does not start	Electronics control problem or protection	
13	Unit works in wrong mode (cool instead of heat or heat instead of cool)	Electronics or RV problem	Check RV
14	All components are operating properly but no cooling or no heating	Refrigerant leak	Check refrigeration system
15	Compressor motor is generating noise and no suction occurs	Phase order to compressor is wrong	Check compressor phase order
16	Freezing of outdoor unit in heat mode and outdoor unit base is blocked with ice		Connect base heater
17	The unit stop suddenly during operation	EMC interference to the A/C unit	Check for EMC problems
18	Indoor unit(s) Indicator(s) leds may flicker		

No	Symptom	Probable Cause	Corrective Action
21	Other home appliances operation is faulty such as noise appears in the television picture, or the picture is distorted or static occurs in the radio sound	EMC interference by the A/C unit	Check for EMC problems
22	All others	Specific problems of indoor or outdoor units	Check diagnostics

13.1.2 Checking the refrigeration system

Checking system pressures and other thermodynamic measures should be done when system is in technician Mode where the system operates as in fixed settings. The performance curves given in this manual are given for unit performance in Technician mode when high indoor fan speed is selected.

13.1.3 Diagnostics

13.1.3.1 Outdoor unit diagnostics

If any fault exists in the system, it will be shown according to tlf no fault exists in the system, no fault code will be displayed during normal operation mode, and the status led will be on while the compressor is enable.he following coding method.

Two LEDs display the system diagnostics on real time as follows:

STATUS LED is blinking 5 times in 5 seconds, and shut off for the next 5 seconds.

FAULT LED will blink during the same 5 seconds according to the following table:

13.1.3.1.1 LED's Indicators - single split only

If any fault exists in the system, its fault will be shown according to the following coding method.

The last fault occurred in the system will be stored in the EEPROM.

If no fault exist in the system, no fault code will be displayed during normal operation mode.

When system enters diagnostics mode(through IDU communication), the last fault code will be displayed even if the system has recover from that fault. The last fault will be deleted from the EEPROM after the system has exit diagnostics mode (through IDU communication). The current system operation mode (cool/ heat/ off) will not be changed when system enters diagnostics.

The coding method is as follow:

STATUS LED is blinking 5 times in 5 seconds, and shut off for the next 5 seconds.

FAULT LED will blink during the same 5 seconds according to the following table.

No	Problem	AO	5	4	3	2	1
1	OCT is shorted/disconnected	Yes	0	0	0	0	1
2	CTT is shorted/disconnected	Yes	0	0	0	1	0
3	HST is shorted/disconnected	Yes	0	0	0	1	1
4	OAT is shorted/disconnected	Yes	0	0	1	0	0
5	OMT is shorted/disconnected	Yes	0	0	1	0	1
6	RGT is shorted/disconnected	Yes	0	0	1	1	0
7	RLT is shorted/disconnected	Yes	0	0	1	1	1
8	Reserved	No	0	1	0	0	0
9	Reserved	No	0	1	0	0	1
10	Reserved	No	0	1	0	1	0
11	Compressor IPM Fault / IPM Driver Pin / Compressor Current Sensor 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/AC over Voltage/Zero Crossing detection	Yes	0	1	1	1	1
16	Mismatch between IDU & ODU models	Yes	1	0	0	0	0
17	No Communication	Yes	1	0	0	0	1
18	System Over Power	Yes	1	0	0	1	0

No	Problem	AO	5	4	3	2	1
19	PFC Current sensor	Yes	1	0	0	1	1
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 Feedback	Yes	1	1	0	0	0
25	OFAN IPM fault / OFAN IPM Driver Pin	Yes	1	1	0	0	1
26	Compressor Lock	Yes	1	1	0	1	0
27	Bad Communication	No	1	1	0	1	1
28	Missing ODU configuration	Yes	1	1	1	0	0
29	Undefined ODU Model	Yes	1	1	1	0	1
30	Outdoor/Indoor Coil Overheating	No	1	1	1	1	0
31	Operation conditions are exceeded	Yes	1	1	1	1	1

1 – ON, 0 – OFF

Only one code is shown. Order of priority is 1-24. Diagnostics is continuously ON as long power is on.

13.1.3.1.2 ODU Alarm'

1. AO stands for 'Alarm Output
2. When a fault, marked with AO=Yes, occur, then the 'ODU Alarm' bit will be on. Otherwise it will be off.
3. For Faults that are marked with AO=No, even if these faults occur, then the 'ODU alarm' bit will be always Off.
4. For the multi split units, whenever the outdoor loses communication with any indoor unit loses communication, the alarm output will be on. When the communication is back it normal, the alarm will be off.

No	Problem	5	4	3	2	1
1	OCT is shorted/disconnected	0	0	0	0	1
2	CTT is shorted/disconnected	0	0	0	1	0
3	HST is shorted/disconnected	0	0	0	1	1
4	OAT is shorted/disconnected	0	0	1	0	0
5	OMT is shorted/disconnected	0	0	1	0	1
6	RGT is shorted/disconnected	0	0	1	1	0
7	RLT is shorted/disconnected	0	0	1	1	1
11	Compressor IPM Fault / IPM Driver Pin / Compressor Current Sensor Fault	0	1	0	1	1
13	DC under voltage	0	1	1	0	1
14	DC over voltage	0	1	1	1	0
15	AC under voltage/AC over Voltage/Zero Crossing detection	0	1	1	1	1
16	Mismatch between IDU & ODU models	1	0	0	0	0
17	No Communication	1	0	0	0	1
18	System Over Power	1	0	0	1	0
19	PFC Current sensor	1	0	0	1	1
24	No OFAN Feedback	1	1	0	0	0
25	OFAN IPM fault / OFAN IPM Driver Pin	1	1	0	0	1
26	Compressor Lock	1	1	0	1	0
28	Missing ODU configuration	1	1	1	0	0
29	Undefined ODU Model	1	1	1	0	1
31	Operation conditions are exceeded	1	1	1	1	1

Notes:

1 - ON, 0 - OFF

Whenever this table is updated, the installation test procedure, and the alarm output function should be updated.

Only one code is shown.

Order of priority is 1-32. Diagnostics is continuously ON as long as power is on.

Heat Sink Over Heating Protection, Compressor Over Heating Protection, and System Over Power Protection are declared only whenever in 'Stop-Compressor' status.

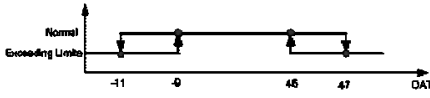
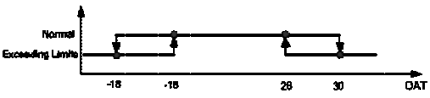
All faults, except the thermistor faults, will remain at least 10 seconds. This rule comes to serve the monitoring utilities, in a case the fault is released quickly it will be still shown under the monitoring utilities.

Thermistor faults are reported only when they are enabled.

When the outdoor unit is in fault (not protection), an in-fault signal is sent to the indoor. When all the outdoor unit faults are cleared, 'no-fault' signal is sent to the indoor.

13.1.3.2 Outdoor fault corrective actions

No	Fault Name	Fault Description	Corrective Action
1	OCT bad	Thermistor not connected or damaged	Check Thermistor (13.1.4.8)
2	CTT bad		
3	HST bad		
4	OAT bad		
5	OMT bad		
6	RGT bad		
7	RLT bad		
8	Reserved	NA	NA
9	Reserved	NA	NA
10	Reserved	NA	NA
11	Compressor IPM Fault / IPM Driver Pin / Compressor Current Sensor Fault	PM module detect shoot-through current / IPM driver control pin is unconditionally latch to high state / The quiescent reference voltage of sensor resistor is either too high or too low.	Disconnect the the compressor plug and measure between U-V, U-W for resistance using multimeter. Resistance value should be below 1 OHM. If multimeter display high resistance, replace compressor. Make sure the phase sequence of U-V-W is correctly plug into the compressor, otherwise replace controller if error is persistent
12	Bad EEPROM	Writing to EEPROM is impossible or EEPROM IC is damage	There is no electronic corrective action, just replace controller if error is persistent. Note: A/C still be able to operate, but no event logging and mode restore on power up
13	DC under voltage	The capacitor bank DC voltage supply for the compressor is below operable value	Check AC input line voltage RMS value, it should read above 198VAC. If voltage is above 198VAC, and DC under voltage error is continuous display, replace controller.
14	DC over voltage	The capacitor bank DC voltage supply for the compressor is too high value	Check AC input line voltage RMS value, it should read below 264VAC. If voltage is below 264VAC, and DC over voltage error is continuously display, replace controller.
15	AC under voltage/AC over Voltage/Zero Crossing detection	The AC input supply voltage is below the limit of 198V / The AC input supply voltage is above 264V / The AC line frequency is out of range from 45Hz to 55Hz.	Check AC input line voltage RMS value, it should read in the range of 198VAC – 264VAC. Check AC input line operating frequency, it should be in the range from 45Hz to 55Hz. If error is continuously being display, replace controller.
16	Mismatch between IDU & ODU models	Miss-match between the IDUs connected to port A,B,C or D, or the total capacity code of IDUs is higher than the ODU maximum capacity code	Change configuration if needed.
17	No Communication	No signals in lineA,B,C,D	Check communication (13.1.4.9)
18	System Over Power	Compressor stopped due to over power protection	No action required
19	PFC Current sensor	Controller cannot detect valid AC line current after compressor start	If error is continuously being display, replace controller.
20	Heat sink Over Heating	Compressor stopped due to heatsink protection	Check that the airflow around the ODU is free and the fan is running free. Check fan motor (13.1.4.4)

No	Fault Name	Fault Description	Corrective Action
21	Deicing	During deicing procedure	No action required
22	Compressor Over Heating	Compressor stopped due to over heat protection	Check if gas is missing in the system
23	Compressor Over Current	Compressor stopped due to over current protection	No action required
24	No OFAN Feedback	No encoder signal can be detected from the OFAN	Check DC-FAN hall sensor connection/ plug for damage. Check DC-FAN for any blockage. Measure between U-V, U-W for resistance using multimeter. Resistance value should be below 1 OHM. If multimeter display high resistance, replace DC-FAN motor, otherwise replace controller.
25	OFAN IPM fault / OFAN IPM Driver Pin	OFAN IPM module detect shoot-through current / OFAN IPM driver control pin is unconditionally latch to high state	Check DC-FAN hall sensor connection/ plug for damage. Check DC-FAN for any blockage. Measure between U-V, U-W for resistance using multimeter. Resistance value should be below 1 OHM. If multimeter display high resistance, replace DC-FAN motor. Return controller if error is persistent.
26	Compressor Lock	No correct drive current can be detected from the compressor	Check compressor cable or compressor wire assembly. Make sure the phase sequence of U-V-W is correctly plug into the compressor.
27	Bad Communication	Lost of communication from indoor unit	Check communication wire between indoor and outdoor unit
28	Missing ODU configuration	All the DIP is set to 0 (the DIP are not configured).	This problem cannot happen in DCI80. Previously, this fault is used to detect model plug that fall down.
29	Undefined ODU Model	The outdoor model is not defined in the software.	<ul style="list-style-type: none"> ● Wrong Outdoor DIP setting. ● Too old outdoor software. Update software
30	Outdoor/Indoor Coil Overheating	This protection combines the following: <ol style="list-style-type: none"> 1. Overheating in cooling mode (based on OMT reading). 2. Overheating in heating mode based on ICT. 	<ul style="list-style-type: none"> ● Improper ventilation of the coils ● Over charged system ● Problem with ICT sensors or OMT sensor (fake up). ● Illegal too small indoor unit's installation (heating).
31	Operation conditions are exceeded	For cooling:  For Heating: 	This is not a fault but information on the ambient operation: <ul style="list-style-type: none"> ● The unit operates outside the defined operation range. ● The OAT fakes and cause false alarm.

13.1.3.3 Fault Code for Indoor unit

Pressing Mode button for long will activate diagnostic mode by the acknowledgment of 3 short beeps and lighting of COOL and HEAT LED's.

Entering diagnostics in STBY mode allows only viewing of status (fault-display).

In diagnostic mode, system problems / information will be indicated by blinking of Heat & Cool LED's.

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 table:

No	Fault Name	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
...	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
...	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

1 - ON, 0 - OFF

Only one code is shown. Order of priority is lower to the higher number. Diagnostics is continuously ON as long power is on.

13.1.3.4 Indoor unit diagnostics and corrective actions

No.	Fault	Probable Cause	Corrective Action
1-4	Sensor failures	Sensors not connected or damaged	Check sensor connections or replace sensor
7	Communication mismatch	Indoor and Outdoor controllers are with different versions	Replace Indoor controller
8	No Communication	Communication or grounding wiring is not good	Check Indoor to Outdoor wiring and grounding
9	No Encoder	Indoor electronics or motor	Check motor wiring, if ok, replace motor, if still not ok, replace Indoor controller.
11	Outdoor Unit Fault	Outdoor controller problem	Switch to Outdoor diagnostics.
17-21	Protections	Indication	No action
24	EEPROM Not Updated	System is using ROM parameters and not EEPROM parameters	No action, unless special parameters are required for unit operation.
25	Bad EEPROM		No action, unless special parameters are required for unit operation.
26	Bad Communication	Communication quality is low reliability	Check Indoor to Outdoor wiring and grounding
27	Using EEPROM data	No problem	
28-31	IDU model		

13.1.4 Procedures for checking Main Parts**13.1.4.1 Checking Mains Voltage**

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

13.1.4.2 Checking Main fuse

Check 20A fuse on the Filter Board - If burnt – check the compressor, fan or any other peripheral that can cause a short. In case of a problematic peripheral - replace it.

In case no problematic peripheral, check the resistance on the DC bank (B+ & B- on the Power board), if it is less than 30 Ω , replace the controller. Otherwise replace the burnt fuse. In case of frequent burning fuse, replace the controller.

13.1.4.3 Checking PFC Chock coil

Check PFC chock connection – repair if needed.

Dis-connect the chock from the controller wire extensions, check if the 2 wires of the chock are shorted. If shorted (OK) check between each wire and the metal box. If shorted replace chock, if not (OK), open the controller top cover and check if the wire extensions are connected well and if shorted. If not shorted, replace wires, if shorted (OK) than might be a controller problem – replace controller.

13.1.4.4 Checking the Outdoor Fan Motor

Check FAN-Power and FAN-Halls connections - Repair if needed.

Rotate the fan slowly by hand. If the fan does not rotate easily, check whether something is obstructing the fan, or if the fan itself is coming into contact with the outer case, preventing it from rotating. Correct if necessary - otherwise, the fan motor bearings have seized. Replace the motor.

If the fan rotates easily, use a current probe ("Clamp") to assure AC current on each phase and it is less than 1A.

In case there is no current, check the resistance between the three poles. Assure the three coil resistances are almost the same.

The normal value should be between 10 Ω to 20 Ω .

Change to Stand-by or Power OFF and re-start - If the fault is still active - replace controller.

13.1.4.5 Checking the Compressor

Check Compressor connections - Repair if needed.

Use a current probe ("Clamp") to assure that there is an AC current on each phase – no more than 15A.

In case there is no current, check the resistance between the three poles. Assure the three coil resistances are almost the same (between 0.8 Ω to 1.5 Ω).

Change to Stand-by or Power OFF and re-start - If the fault is still "Active" - replace controller.

13.1.4.6 Checking the Reverse Valve (RV)

The RV has two parts, Solenoid and valve.

Solenoid - Running in heating mode, check the voltage between two pins of reverse valve connector, normal voltage is 230VAC. if no power supply to RV, Check RV operation with direct 230VAC power supply, if OK, replace outdoor controller.

Valve - if RV solenoid is OK (as above) but still no heating operation while compressor is On, replace the valve.

13.1.4.7 Checking the electrical expansion valve (EEV)

The EEV has two parts, drive and valve.

When Outdoor unit is powered on, EEV shall run and have click and vibration.

For assuring the problem is of the EEV parts, perform the installation test and if fails and no other indications in the diagnostics, than the problem is with the EEV (one or more).

Drive - a step motor; ringed on the valve. Check the drive voltage, should be 12VDC.

Valve – if drive is OK (as above) but still the indoor unit perform no conditioning replace the valve (no need to take out the refrigerant, just pump down and shut off the main valves).

13.1.4.8 Checking the thermistors

Check Thermistor connections and wiring - Repair if needed.

Check Thermistor resistance – between 0°C and 40°C should be between 35K Ω and 5K Ω .

13.1.4.9 Checking the communication

Change to Stand-by or Power OFF and re-start - If the fault is still "Active" check Indoor to Outdoor.

Communication wiring and grounding connections (should be less than 2.0 Ω) - Repair if needed.

If IDU failure – replace IDU controller that does not respond.

If ODU failure – replace ODU.

13.1.4.10 Checking for electromagnetic interference (EMC problems)

13.1.4.10.1 EMC troubles to the A/C unit

Locations most susceptible to noise :

1. Locations near broadcast stations where there are strong electromagnetic waves.
2. Locations near amateur radio (short wave) stations.
3. Locations near electronic sewing machines and arc-welding machines.

Trouble :

Either of the following trouble may occur:

1. The unit may stop suddenly during operation.
2. Indicator lamps may flicker

Correction :

The fundamental concept is to make the system less susceptible to noise (insulate for noise or distance from the noise source):

1. Use shielded wires.
2. Move unit away from the noise source.

13.1.4.10.2 EMC troubles to near by home appliances

Locations most susceptible to noise :

1. A television or radio is located near the A/C and A/C wiring.
2. The antenna cable for a television or radio is located close to the A/C and A/C wiring.
3. Locations where television and radio signals are weak.

Trouble :

1. Noise appears in the television picture, or the picture is distorted.
2. Static occurs in the radio sound.

Correction

1. Select a separate power source.
2. Keep the A/C and A/C wiring at least 1 meter away from wireless devices and antenna cables.
3. Change the wireless device's antenna to a high sensitivity antenna.
4. Change the antenna cable to a BS coaxial cable.
5. Use a noise filter (for the wireless device).
6. Use a signal booster.

13.1.5 Precaution, Advise and Notice Items

13.1.5.1 High voltage in Outdoor unit controller

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

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

13.1.5.2 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 one minute after turned off. Touching the Outdoor unit controller before discharging may cause an electrical shock. When open the Outdoor unit controller cover, don't touch the soldering pin by hand or by any conductive material.

13.1.6. Advise:

Open the Outdoor unit controller cover only after one minute from power off.

Measure the electrolytic capacitors voltage before farther checking controller.

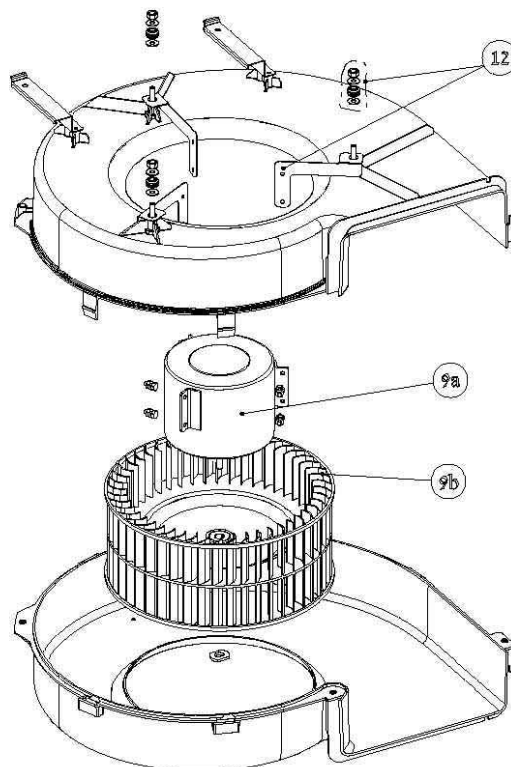
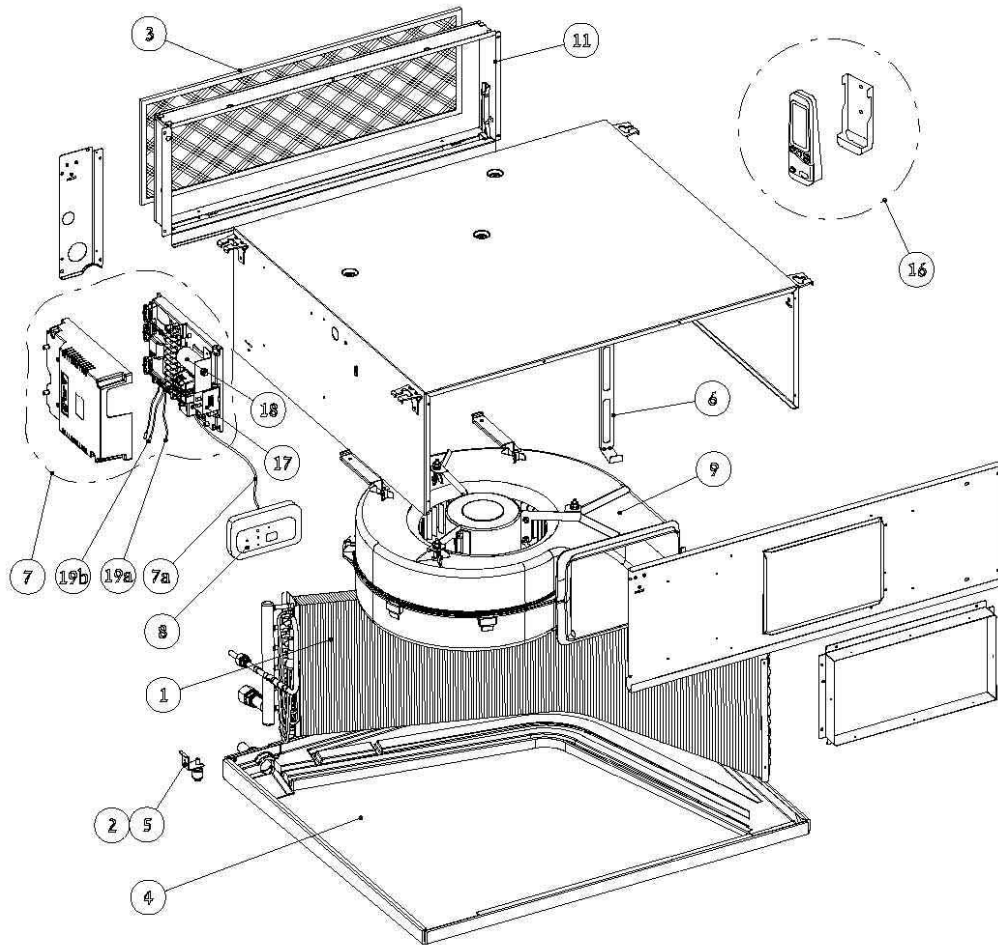
Additional advises

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.

14. EXPLODED VIEWS AND SPARE PARTS LISTS

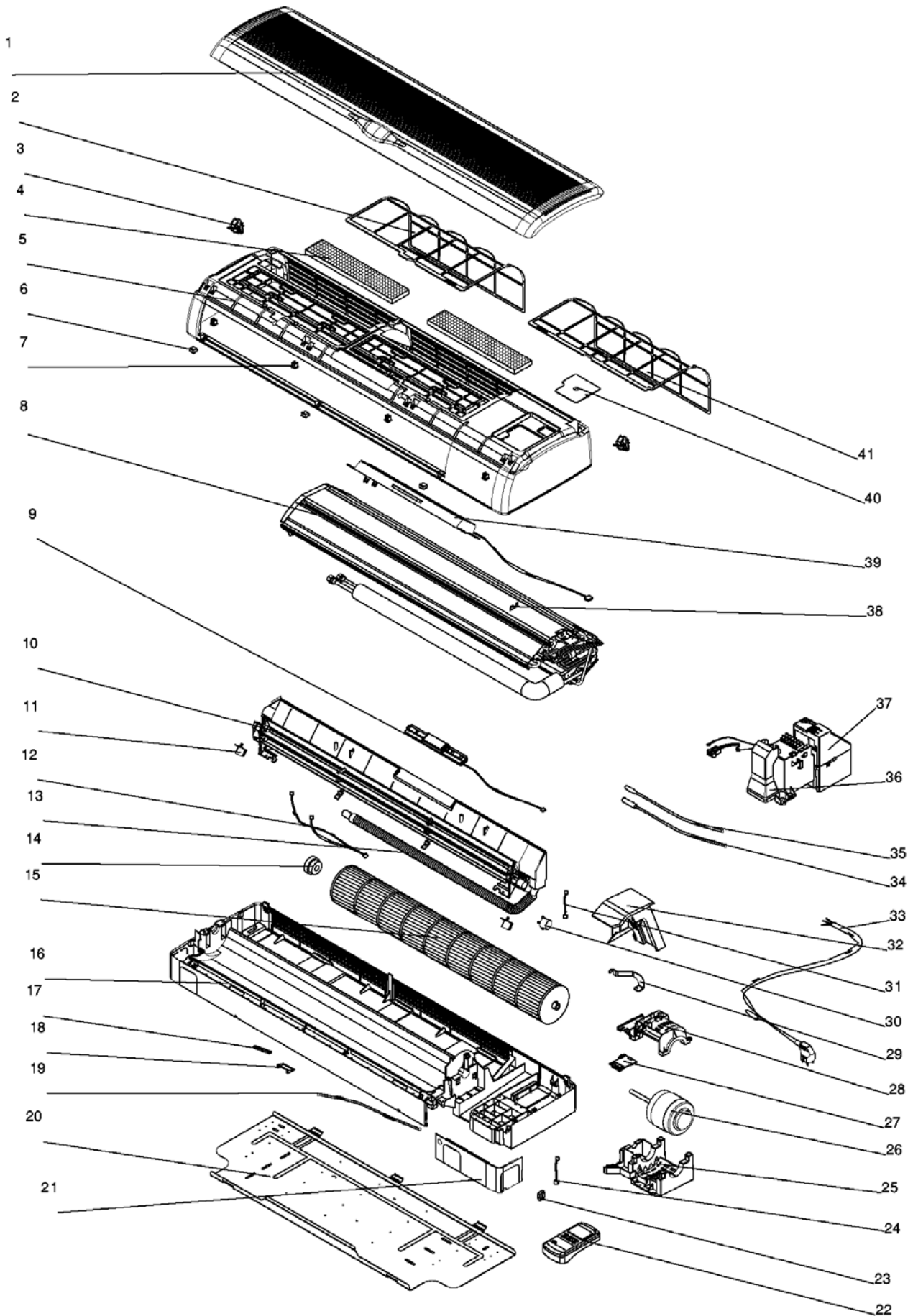
14.1 Indoor Unit: DLS 30 DCI



14.2 Indoor Unit: DLS 30 DCI

No.	Part No.	Description	Qty
1	473419	IU COIL GR/HDR	1
2	473231	FLOAT SUPPORT	1
3	473900	DLS METAL FILTER	1
4	473246	INSULATED DRAIN POOL ASSY	1
5	473700	DLS OVER FLOW SWITCH	1
6	473210	COIL SUPPORT	1
7	433605	DCI IDU CONTROL BOX	1
8	402713	WIRED DISPLAY BOX EMD/ELD	1
9	473905	FAN HOUSING ASSY	1
11	473248	AIR FILTER FRAME ASSY	1
12	473250	MOTOR LEG ASSY	3
16	436673	REMOTE CONTROL RC4/RC	1
17	430535	TERMINAL BLOCK P6/90	1
18	442019	CAPACITOR 8mF 400V P1/P2	1
19a	473720	THERMISTOR+CAP WITH CONNECTOR	1
19b	473710	THERMISTOR WITH CONNECTOR L235	1
7a	402730	CABLE 8 WIRES 7M WITH CONNECTOR	1
9a	473007	MOTOR	1
9b	473300	CENTRIFUGAL FAN DLS300/100	1
28	473415	ELECTRICAL COVER	1

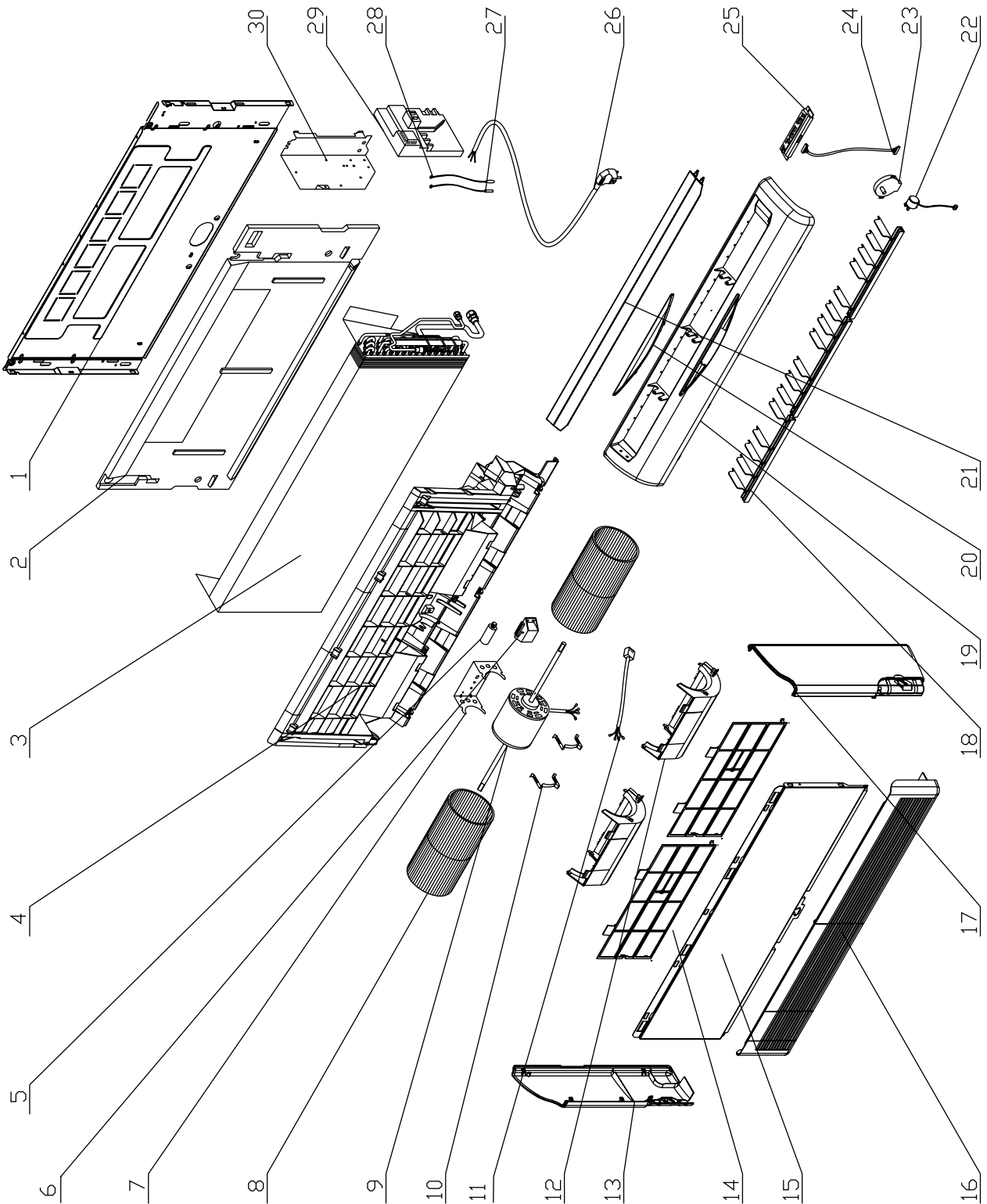
14.3 Indoor Unit: PNX 30 DCI



14.4 Indoor Unit: PNX 30 DCI

No.	Part No.	Description	Quan.
1	4525902	GRILLE ASSY	1
2	4523299	FILTER	1
3	4523303	SHAFT LOCKER	2
4	4518113	AIR FILTER ASSY	1
5	4525610	FRAME ASSY	1
6	4523301	SCREW COVER	3
7	4523302	FIX LOCKER	4
8	462350007	EVAPORATOR ASSY PNX80 R410A	1
9	4525112	DISPLAY ASSY. 901-255-30	1
10	4525612	AIR OUTLET ASSY	1
11	4524962	TEP MOTOR B	2
12	4524965	STEP MOTOR WIRE A	1
13	4518664	DRAIN HOSE	1
14	4516204	BEARING ASSY.,FAN	1
15	4524954	CROSS FAN	1
16	4525611	REAR PANEL ASSY	1
17	433133	IONIZER DISPLAY	1
18	4523306	IONIZER COVER(NO IONIZER)	1
	4523307	IONIZER WIRE COVER(WITH IONIZER)	1
19	4524967	IONIZER WIRE A	1
20	4523372	PNX-30 INSTALLATION PLATE	1
21	4523309	TUBE OUTLET	1
22	4525111	REMOTE CONTROL BOX 974-700-00	1
23	433134	IONIZER POWER	1
24	453109300	IONIZER CABLE B	1
25	4523311	MOTOR HOUSING	1
26	4524953	FAN MOTOR	1
27	4523313	MOTOR WATER BREAKER	1
28	4523312	MOTOR COVER	1
29	4524661	FIX PLATE	1
30	4524961	STEP MOTOR A	1
31	4524966	STEP MOTOR WIRE B	1
32	4523308	WATER BREAKER COVER	1
33	4525113	POWER CORD CABLE(optional)	1
34	438082	THERMISTOR INDOOR COIL BACK	1
35	4519813	THERMISTOR ROOM BLACK	1
36	4525831	WIRE TUBE	1
37	453161200	CONTROL BOX 916-514-00	1
38	4516263	SENSOR BASE	1
39	4524963	ESF (optional)	1
40	4523304	WIRING COVER	1
41	4523300	FILTER R	1

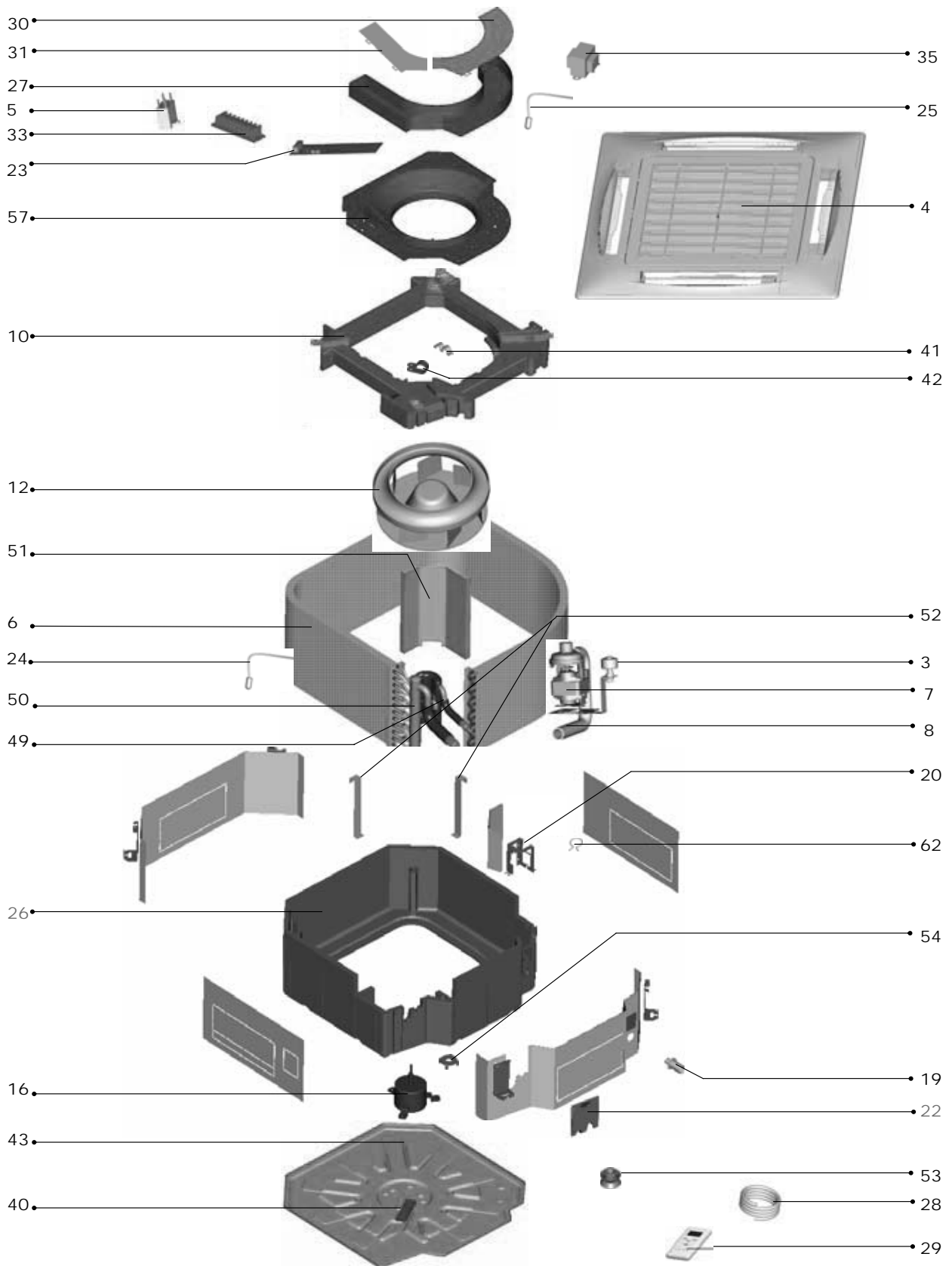
14.5 Indoor Unit: SX 30 DCI



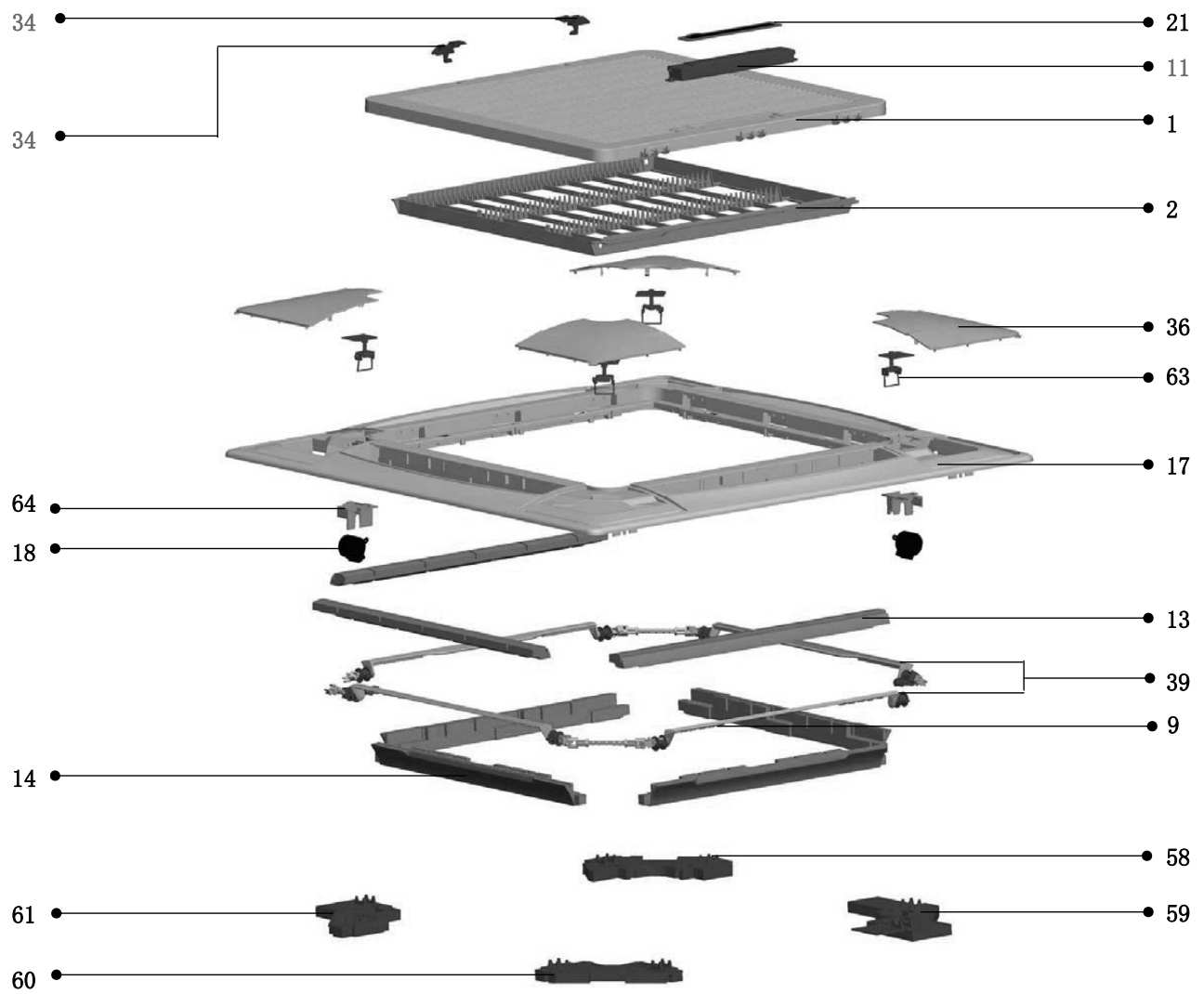
14.6 Indoor Unit: SX 30 DCI

No.	Part No.	Description	Qty
1	484002	Grille	1
2	221554	Air Filter	2
3	373244	Right panel	1
4	307982	Frame Assy	1
5	371071-72	Display panel	1
6	470680004	Evaporator Assy	1
7	370280	Air Outlet Assy	1
8	285032	Draining Hose	1
9	372336	Horizontal louver front	1
9	372337	Horizontal louver back	1
10	371255	Vert. Louver	12
11	372340	Fan cover	1
12	293322	Fan	1
13	307980	Back panel	1
14	466236	Installation Plate	1
15	382333	Base panel EPS	1
16	466100005	Motor	1
17	323422	Motor support	1
18	436665	Step Motor	1
18	263034	Swing motor	1
20	455000603	Capacitor	1
21	234213	Display	1
22	373246	Fan frame	1
23	452935900	DCI storm	1
24	438082	Thermistor indoor coil	1
25	438413	Thermistor	1
26	311036	Storm panel	1
27	391508	DConnect wire	1
29	436609R	Remote control	1
30	373245	Left panel	1
33	4521029	Spring clip	1

14.7 Indoor Unit: CKD 30 DCI (Exploded Unit's)



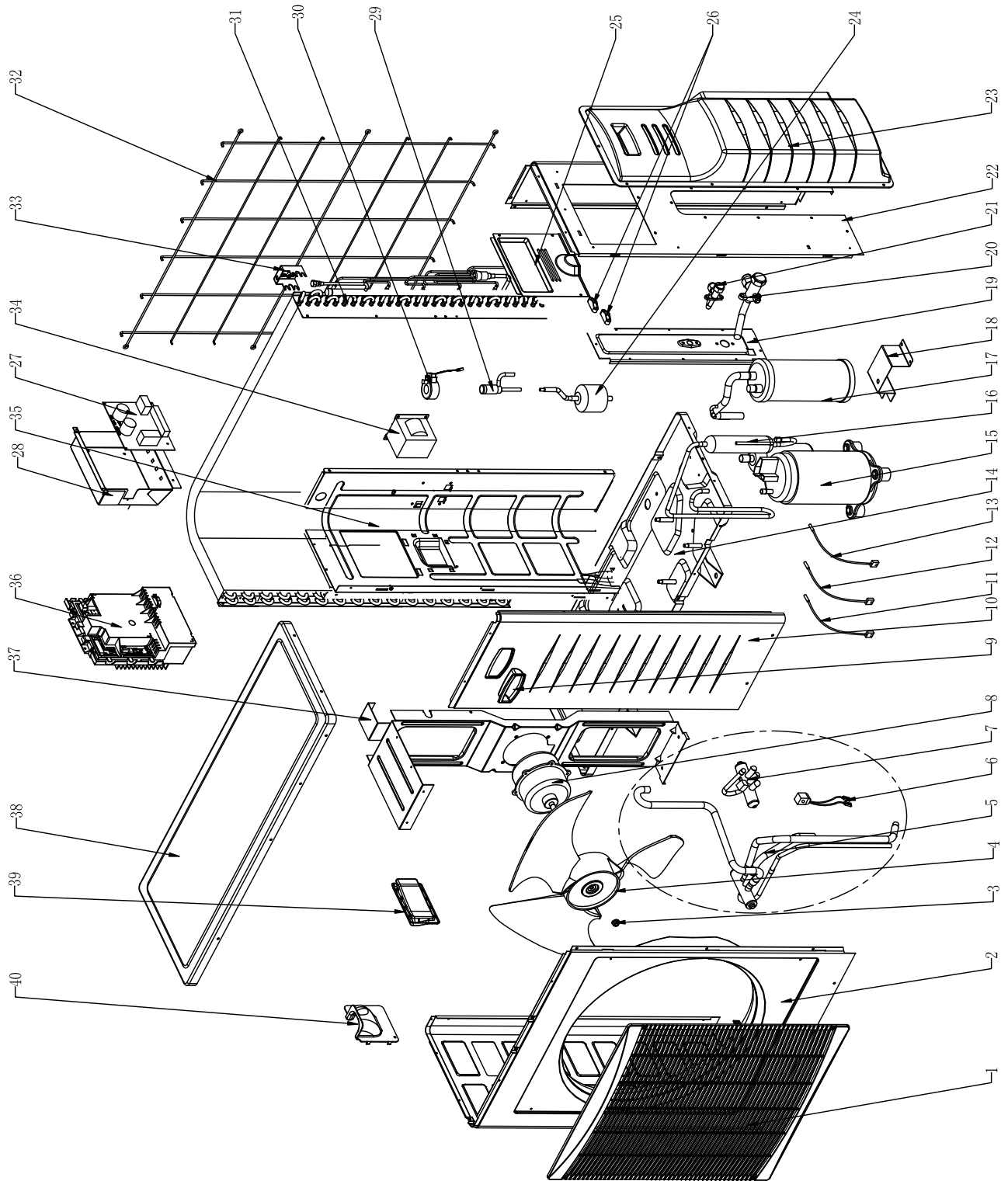
14.8 Indoor Unit: CKD 30 DCI (Exploded panel's)



14.9 Outdoor Unit: CKD 30 DCI

No.	Item	Description	Quan.
1	P0000371694	Grill/Airwell	1
2	P0000371695	Filter /CKD	1
3	202301300044	Water-Level Switch Assy.	1
4	201109990016	Front Panel/Airwell	1
5	202401100017	Capacitor For Fan Motor 3.5uF	1
6	201552390005	Evaporator Assy./CKD80	1
7	202400610001	Pump	1
8	202742000006	Drain Pipe	1
9	P0000146588	Flap	4
10	202242800075	Drain Pan Assy	1
11	P0000402822	Display Cover	1
12	201142000601	Centrifugal Fan	1
13	P0000146552	EPS 1 / Front Frame	4
14	P0000146553	EPS 2 / Front Frame	4
16	202400410850	Motor/Indoor Unit	1
17	P0000146543	Front Frame	1
18	202400100007	Step Motor	2
19	201142000002	Connecting Pipe/Drain Pipe	1
20	201242000605	Fixing Plate/Pump Assy.	1
21	467300128R	Display Board/CN	1
22	201242800078	Connection Support	1
23	467300222R	Controller/ DCI KN new	1
24	4523277	ICT SENSOR	1
25	4523278	RW SENSOR	1
26	202242800076	EPS/Air Housing Assy.	1
27	201242800091	Electric Control Box Welded Assembly	1
29	467200012R	Remote Controller	1
30	201242800085	Cover I/Electric Control Box	1
31	201242800084	Cover II/Electric Control Box	1
33	202301450029	Terminal Block(6 Pole)	1
35	4523162	Transformer ASSY.	1
34	P0000146568	Grill Clasp Switch 1	1
34	P0000146569	Grill Clasp Switch 2	1
36	P0000146557	Cover /Front Plate	4
39	P0000146556	Flap Swing Assy.	1
40	201242500081	Plate/Wire	1
41	201242800082	Tandem/Wire	1
42	201102020216	Bipitch Wire Clip	1
43	201242800081	Base Pan Welded Assembly	1
49	201652390017	Liquid Pipe Assy.	1
50	201652390018	Gas Pipe Assy./CKD80	1
51	201242800086	Fixing Plate/Evaporator	1
52	201242800087	Hook/Evaporator	3
53	202742000002	Cushion Rubber/Pump	3
54	201242000008	Fan Fixer	1
57	201142690001	Air Intake Assy.	1
58	P0000146558	Cover1 /Front Plate	1
59	P0000146559	Cover2 /Front Plate	1
60	P0000146560	Cover3 /Front Plate	1
61	P0000146561	Cover4 /Front Plate	1
62	201242000013	Grommet/Drain Pipe	1
63	P0000146555	Hook Assy.	4
64	P0000146594	Support/Step Motor	2

14.10 Outdoor Unit: GCD 030



14.11 Outdoor Unit: GCD 030

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	461030003	4-way Valve Coil	1
7	4526522	FOUR-WAY VALVE R410A	1
8	466110008R	DC Resin Motor	1
9	4522601	Right Handle	1
10	4523653	PAINTED RIGHT CABINET ASSY	1
11	467400200	Compressor Top Thermistor(CTT)	1
12	467400040	Condenser Middle Temperature Sensor/OAT & OMT	1
13	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	464080007	Right-Rear Plate/DCI 80 CR	1
23	4522602	Valve Cover	1
24	4518950	Filter Drier BFK-053S	1
25	464250093	Protecting Plate /controller	1
26	204107	Cable clip Nylon	2
27	467300185R	Controller / DCI 80 CR Filter Board	1
28	464280003	Terminal Plate/ DCI 80Z	1
29	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	467550002R	Choke / DCI 80 CR	1
35	464730010	Partition Plate Assy./DCI 80Z	1
36	467300184R	Controller / DCI 80 CR OUTDOOR BOX ASSY	1
37	452888500	Motor Support	1
38	4523657	PAINTED TOP COVER ASSY	1
39	4522600	Left Handle	1
40	465120013	Air Outlet Cover/DCI 80 CR R410a	1

APPENDIX A

INSTALLATION AND OPERATION MANUAL

- ▶ **INSTALLATION AND OPERATION MANUAL GCD 030**