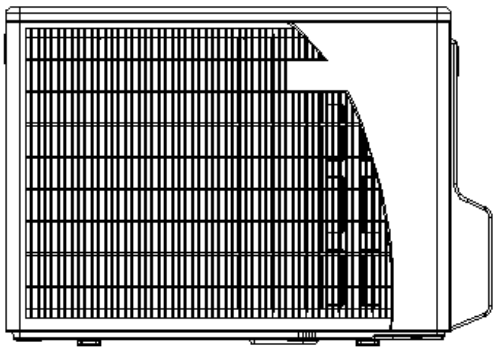
Airwell

Service Manual

YBD018 DCI

Indoor Units	Outdoor Units
Delta 50 DCI	***YBD018 DCI***
LEX/HAD 50DCI	
DNG 50 DCI	
SLS 50 DCI	
CN 50 DCI	
PXD 50 DCI	



REFRIGERANT

R410A

HEAT PUMP

SM YBD018 1-A.1 GB

DECEMBER– 2010

Version: 1

LIST OF EFFECTIVE PAGES

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

Dates of issue for original and changed pages are:

Original ..... 0 .....December 2010

Total number of pages in this publication is 148 consisting of the following:

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

** Photos are not contractual.

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1. INTRODUCTION

1.1 General

The ODU YBD018 product is based on finished DCI DCR 50. By using advanced variable AC fan control technology and DC compressor sine wave torque control technology, this product are very suitable for most residential and comercial uses. The indoors can be Airwell wall mounted type and duct type and floor type DCI indoor units of 5.0kW cooling capaciy.

- **Delta 50 DCI**
- **LEX/HAD 50 DCI**
- **DNG 50 DCI**
- **LSN 50 DCI**
- **CN 50 DCI**
- **PXD 50 DCI**

1.2 Main Features

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

- DC inverter technology.
- R410A models
- Microprocessor control.
- High COP,Energy efficiency class A in cooling/heating mode
- Torque control for compressor running in lower Freqency but with low vibration and little sound.
- Precharged refrigerant up to the max allowing tubing distance of 20m.
- Up to 10 m vertical high between indoor and outdoor units
- Motorized flaps(Wall mounted indoor units)
- Cooling operation at outdoor temperature down to -10ºC.
- Heating operation at outdoor temperature down to -15ºC.
- Easy installation and service.
- HMI- 3*7 Segments and IR receiver on outdoor controller can realize following functions controlled by RC-8

◊ Technicion Test

◊ Diagnostics

◊ Setup

1.3 Indoor Unit

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

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

1.4 Control

The microprocessor indoor controller, and an infrared remote control, supplied as standard, provide complete operating function and programming.
Remote control RC4 RC7
For further details please refer to the Operation Manual, Appendix A.
Remote control RC 8:
Execpt the same nominal function as RC7, it also can be used to realize the function of diagnostics tests for the technician convenient use. (Both select SPT+ and SPT- to enter or escape the diagnostic mode)
For further details please refer to the Control system.

1.5 Outdoor Unit

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

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

1.6 Tubing Connections

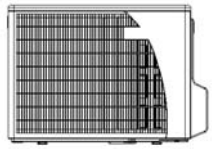
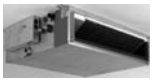
Flare type interconnecting tubing to be produced on site.
For further details please refer to the Installation Manual.

1.7 Inbox Documentation

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

1.10 Matching Table

1.10.1 R410A

OUTDOOR UNITS	INDOOR UNITS					
						
	Delta 50 DCI	LEX/HAD 50 DCI	DNG 50 DCI	SLS 50 DCI	CN 50 DCI	PXD 50 DCI
YBD018 DCI	√	√	√	√	√	√

2. PRODUCT DATA SHEET

2.1 Delta 50 DCI / YBD018

Model Indoor Unit				**DELTA 50 DCI**	
Model Outdoor Unit				**YBD 018**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (4)			Btu/hr	17060(5120-19790)	18080(4440-22520)
			kW	5.0(1.5-5.8)	5.3(1.3-6.6)
Power input (4)			kW	1.47(0.4-2.0)	1.47(0.36-2.1)
EER (Cooling) or COP(Heating) (4)			W/W	3.40	3.61
Energy efficiency class				A	A
Power supply			V	220-240	
			Ph	1	
			Hz	50/60	
Rated current			A	6.6	6.6
Power factor				0.97	0.97
Prated (IDU)			W	35	
Prated (IDU+ODU)			W	2400	
Starting current			A	10.5	
Circuit breaker rating			A	20	
INDOOR	Fan type & quantity			Crossflow x 1	
	Fan speeds	H/M/L	RPM	1230/1100/900	
	Air flow (1)	H/M/L	m3/hr	720/620/480	
	External static pressure	Min	Pa	0	
	Sound power level (2)	H/M/L	dB(A)	56/54/47	
	Sound pressure level(3)	H/M/L	dB(A)	44/41/34	
	Moisture removal		l/hr	2	
	Condenstate drain tube I.D		mm	16	
	Dimensions	WxHxD	mm	900x295x205	
	Net Weight		kg	11	
	Package dimensions	WxHxD	mm	960x360x270	
	Packaged weight		kg	14	
	Units per pallet		units	24 units per pallet	
	Stacking height		units	8 levels	
OUTDOOR	Refrigerant control			EEV	
	Compressor type,model			Rotary,Panasonic 5RS132ZAD21	
	Fan type & quantity			Propeller(direct) x 1	
	Fan speeds	H	RPM	910	
	Air flow	H	m3/hr	2160	
	Sound power level	H	dB(A)	63	
	Sound pressure level(3)	H	dB(A)	53	
	Dimensions	WxHxD	mm	795x610x290	
	Net Weight		kg	38	
	Package dimensions	WxHxD	mm	945x655x395	
	Packaged weight		kg	41	
	Units per pallet		Units	9 units per pallet	
	Stacking height		units	3 levels	
	Refrigerant type			R410A	
	Standard charge		kg(7.5m)	1.26	
	Additional charge			No need	
	Connections between units	Liquid line	In.(mm)	1/4"(6.35)	
		Suction line	In.(mm)	1/2"(12.7)	
		Max.tubing length	m.	Max. 20	
		Max.height difference	m.	Max. 10	
Operation control type				Remote control	
Heating elements (Option)			kW		
Others					

(1)Rating conditions in accordance to ISO 5151 and ISO 13253 (for ducted units).
(2)Airflow without external static pressure.
(3)Sound power in ducted units is measured at air discharge.
(4)Sound pressure level measured at 1-meter distance from unit.

2.2 LEX 50 DCI / YBD018

Model Indoor Unit				**LEX 50 DCI**	
Model Outdoor Unit				**YBD 018**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (4)			Btu/hr	17060(5120-20470)	19110(4440-23200)
			kW	5.0(1.5-6.0)	5.6(1.3-6.8)
Power input (4)			kW	1.37(0.4-2.0)	1.46(0.35-2.0)
EER (Cooling) or COP(Heating) (4)			W/W	3.65	3.84
Energy efficiency class				A	A
Power supply			V	220-240	
			Ph	1	
			Hz	50/60	
Rated current			A	6.1	6.5
Power factor				0.97	0.97
Prated (IDU)			W	56	
Prated (IDU+ODU)			W	2400	
Starting current			A	10.5	
Circuit breaker rating			A	20	
INDOOR	Fan type & quantity			Crossflow x 1	
	Fan speeds	H/M/L	RPM	1200/1050/900	
	Air flow (1)	H/M/L	m3/hr	850/700/550	
	External static pressure	Min	Pa	0	
	Sound power level (2)	H/M/L	dB(A)	55/51/47	
	Sound pressure level(3)	H/M/L	dB(A)	43/39/34	
	Moisture removal		l/hr	2	
	Condenstate drain tube I.D		mm	16	
	Dimensions	WxHxD	mm	1060x295x221	
	Net Weight		kg	15	
	Package dimensions	WxHxD	mm	1125x360x295	
	Packaged weight		kg	18	
	Units per pallet		units	14 units per pallet	
	Stacking height		units	7 levels	
OUTDOOR	Refrigerant control			EEV	
	Compressor type,model			Rotary,Panasonic 5RS132ZAD21	
	Fan type & quantity			Propeller(direct) x 1	
	Fan speeds	H	RPM	910	
	Air flow	H	m3/hr	2160	
	Sound power level	H	dB(A)	63	
	Sound pressure level(3)	H	dB(A)	53	
	Dimensions	WxHxD	mm	795x610x290	
	Net Weight		kg	38	
	Package dimensions	WxHxD	mm	945x655x395	
	Packaged weight		kg	41	
	Units per pallet		Units	9 units per pallet	
	Stacking height		units	3 levels	
	Refrigerant type			R410A	
	Standard charge		kg(7.5m)	1.26	
	Additional charge			No need	
	Connections between units	Liquid line	In.(mm)	1/4"(6.35)	
		Suction line	In.(mm)	1/2"(12.7)	
		Max.tubing length	m.	Max. 20	
		Max.height difference	m.	Max. 10	
Operation control type				Remote control	
Heating elements (Option)			kW		
Others					

(1)Rating conditions in accordance to ISO 5151 and ISO 13253 (for ducted units).
(2)Airflow without external static pressure.
(3)Sound power in ducted units is measured at air discharge.
(4)Sound pressure level measured at 1-meter distance from unit.

2.3 HAD 50 DCI / YBD018

Model Indoor Unit				**HAD 50 DCI**	
Model Outdoor Unit				**YBD 018**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (4)			Btu/hr	17060(5120-20470)	19110(4440-23200)
			kW	5.0(1.5-6.0)	5.6(1.3-6.8)
Power input (4)			kW	1.37(0.4-2.0)	1.46(0.35-2.0)
EER (Cooling) or COP(Heating) (4)			W/W	3.65	3.84
Energy efficiency class				A	A
Power supply			V	220-240	
			Ph	1	
			Hz	50/60	
Rated current			A	6.1	6.5
Power factor				0.97	0.97
Prated (IDU)			W	56	
Prated (IDU+ODU)			W	2400	
Starting current			A	10.5	
Circuit breaker rating			A	20	
INDOOR	Fan type & quantity			Crossflow x 1	
	Fan speeds	H/M/L	RPM	1200/1050/900	
	Air flow (1)	H/M/L	m3/hr	850/700/550	
	External static pressure	Min	Pa	0	
	Sound power level (2)	H/M/L	dB(A)	58/54/50	
	Sound pressure level(3)	H/M/L	dB(A)	44/39/34	
	Moisture removal		l/hr	2	
	Condenstate drain tube I.D		mm	16	
	Dimensions	WxHxD	mm	1060x295x221	
	Net Weight		kg	15	
	Package dimensions	WxHxD	mm	1125x360x295	
	Packaged weight		kg	18	
	Units per pallet		units	14 units per pallet	
	Stacking height		units	7 levels	
OUTDOOR	Refrigerant control			EEV	
	Compressor type,model			Rotary,Panasonic 5RS132ZAD21	
	Fan type & quantity			Propeller(direct) x 1	
	Fan speeds	H	RPM	910	
	Air flow	H	m3/hr	2160	
	Sound power level	H	dB(A)	63	
	Sound pressure level(3)	H	dB(A)	53	
	Dimensions	WxHxD	mm	795x610x290	
	Net Weight		kg	38	
	Package dimensions	WxHxD	mm	945x655x395	
	Packaged weight		kg	41	
	Units per pallet		Units	9 units per pallet	
	Stacking height		units	3 levels	
	Refrigerant type			R410A	
	Standard charge		kg(7.5m)	1.26	
	Additional charge			No need	
	Connections between units	Liquid line	In.(mm)	1/4"(6.35)	
		Suction line	In.(mm)	1/2"(12.7)	
		Max.tubing length	m.	Max. 20	
		Max.height difference	m.	Max. 10	
Operation control type				Remote control	
Heating elements (Option)			kW		
Others					

(1)Rating conditions in accordance to ISO 5151 and ISO 13253 (for ducted units).
(2)Airflow without external static pressure.
(3)Sound power in ducted units is measured at air discharge.
(4)Sound pressure level measured at 1-meter distance from unit..

2.4 CN 50 DCI / YBD018

Model Indoor Unit				**CN 50 DCI**	
Model Outdoor Unit				**YBD 018**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (4)			Btu/hr	17060(5120-19790)	19110(4440-23200)
			kW	5.0(1.5-5.8)	5.6(1.3-6.8)
Power input (4)			kW	1.51(0.4-2.0)	1.53(0.34-2.0)
EER (Cooling) or COP(Heating) (4)			W/W	3.31	3.66
Energy efficiency class				A	A
Power supply			V	220-240	
			Ph	1	
			Hz	50/60	
Rated current			A	6.8	6.9
Power factor				0.97	0.97
Prated (IDU)			W	80	
Prated (IDU+ODU)			W	2400	
Starting current			A	10.5	
Circuit breaker rating			A	20	
INDOOR	Fan type & quantity			Centrifugal x 1	
	Fan speeds	H/M/L	RPM	680/620/550	
	Air flow (1)	H/M/L	m3/hr	620/560/500	
	External static pressure	Min	Pa	0	
	Sound power level (2)	H/M/L	dB(A)	54	
	Sound pressure level(3)	H/M/L	dB(A)	36/33/30	
	Moisture removal		l/hr	2	
	Condenstate drain tube I.D		mm	20	
	Dimensions	WxHxD	mm	575X575X270(625X625X40/725X725X40)	
	Net Weight		kg	15.2(2.2/2.7)	
	Package dimensions	WxHxD	mm	681X681X348(700X700X103/800X800X103)	
	Packaged weight		kg	18.7(3.4/4.2)	
	Units per pallet		units	12 units per pallet	
	Stacking height		units	6 levels	
OUTDOOR	Refrigerant control			EEV	
	Compressor type,model			Rotary,Panasonic 5RS132ZAD21	
	Fan type & quantity			Propeller(direct) x 1	
	Fan speeds	H	RPM	910	
	Air flow	H	m3/hr	2160	
	Sound power level	H	dB(A)	63	
	Sound pressure level(3)	H	dB(A)	53	
	Dimensions	WxHxD	mm	795x610x290	
	Net Weight		kg	38	
	Package dimensions	WxHxD	mm	945x655x395	
	Packaged weight		kg	41	
	Units per pallet		Units	9 units per pallet	
	Stacking height		units	3 levels	
	Refrigerant type			R410A	
	Standard charge		kg(7.5m)	1.26	
	Additional charge			No need	
	Connections between units	Liquid line	In.(mm)	1/4"(6.35)	
		Suction line	In.(mm)	1/2"(12.7)	
		Max.tubing length	m.	Max. 20	
		Max.height difference	m.	Max. 10	
Operation control type				Remote control	
Heating elements (Option)			kW		
Others					

(1)Rating conditions in accordance to ISO 5151 and ISO 13253 (for ducted units).
(2)Airflow without external static pressure.
(3)Sound power in ducted units is measured at air discharge.
(4)Sound pressure level measured at 1-meter distance from unit.

2.5 PXD 50 DCI / YBD018

Model Indoor Unit				**PXD 50 DCI**	
Model Outdoor Unit				**YBD 018**	
Installation Method of Pipe				Flared	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (4)			Btu/hr	17060(5120-19790)	19110(4440-22180)
			kW	5.0(1.5-5.8)	5.6(1.3-6.5)
Power input (4)			kW	1.51(0.4-2.0)	1.59(0.36-2.0)
EER (Cooling) or COP(Heating) (4)			W/W	3.31	3.52
Energy efficiency class				A	B
Power supply			V	220-240	
			Ph	1	
			Hz	50/60	
Rated current			A	6.8	7.1
Power factor				0.97	0.97
Prated (IDU)			W	104	
Prated (IDU+ODU)			W	2400	
Starting current			A	10.5	
Circuit breaker rating			A	20	
INDOOR	Fan type & quantity			Centrifugal x 2	
	Fan speeds	H/M/L	RPM	1050/950/700	
	Air flow (1)	H/M/L	m3/hr	870/750/600	
	External static pressure	Min	Pa	0	
	Sound power level (2)	H/M/L	dB(A)	65/60/53	
	Sound pressure level(3)	H/M/L	dB(A)	51/48/40	
	Moisture removal		l/hr	2	
	Condenstate drain tube I.D		mm	16	
	Dimensions	WxHxD	mm	1200x630x190	
	Net Weight		kg	30	
	Package dimensions	WxHxD	mm	1300x726x273	
	Packaged weight		kg	35	
	Units per pallet		units	7 units per pallet	
	Stacking height		units	7 levels	
OUTDOOR	Refrigerant control			EEV	
	Compressor type,model			Rotary,Panasonic 5RS132ZAD21	
	Fan type & quantity			Propeller(direct) x 1	
	Fan speeds	H	RPM	910	
	Air flow	H	m3/hr	2160	
	Sound power level	H	dB(A)	63	
	Sound pressure level(3)	H	dB(A)	53	
	Dimensions	WxHxD	mm	795x610x290	
	Net Weight		kg	38	
	Package dimensions	WxHxD	mm	945x655x395	
	Packaged weight		kg	41	
	Units per pallet		Units	9 units per pallet	
	Stacking height		units	3 levels	
	Refrigerant type			R410A	
	Standard charge		kg(7.5m)	1.26	
	Additional charge			No need	
	Connections between units	Liquid line	In.(mm)	1/4"(6.35)	
		Suction line	In.(mm)	1/2"(12.7)	
		Max.tubing length	m.	Max. 20	
		Max.height difference	m.	Max. 10	
Operation control type				Remote control	
Heating elements (Option)			kW		
Others					

(1)Rating conditions in accordance to ISO 5151 and ISO 13253 (for ducted units).
(2)Airflow without external static pressure.
(3)Sound power in ducted units is measured at air discharge.
(4)Sound pressure level measured at 1-meter distance from unit.

2.6 SLS 50 DCI / YBD018

Model Indoor Unit				**SLS 50 DCI**	
Model Outdoor Unit				**YBD 018**	
Installation Method of Pipe				Ducted	
Characteristics			**Units**	**Cooling**	**Heating**
Capacity (4)			Btu/hr	17060(5120-19790)	19110(4440-23200)
			kW	5.0(1.5-5.8)	5.6(1.3-6.8)
Power input (4)			kW	1.51(0.4-2.0)	1.55(0.34-2.0)
EER (Cooling) or COP(Heating) (4)			W/W	3.31	3.61
Energy efficiency class				A	A
Power supply			V	220-240	
			Ph	1	
			Hz	50/60	
Rated current			A	6.8	6.9
Power factor				0.97	0.97
Prated (IDU)			W		
Prated (IDU+ODU)			W	2400	
Starting current			A	10.5	
Circuit breaker rating			A	20	
INDOOR	Fan type & quantity			Centrifugal x 2	
	Fan speeds	H/M/L	RPM	1100/980/860	
	Air flow (1)	H/M/L	m3/hr	710/600/540	
	External static pressure	Min	Pa	0	
	Sound power level (2)	H/M/L	dB(A)	54/51/48	
	Sound pressure level(3)	H/M/L	dB(A)	35/32/29	
	Moisture removal		l/hr	1.5	
	Condenstate drain tube I.D		mm	19	
	Dimensions	WxHxD	mm	750x630x200	
	Net Weight		kg	30	
	Package dimensions	WxHxD	mm	885x695x226	
	Packaged weight		kg	24	
	Units per pallet		units	14 units per pallet	
	Stacking height		units	7 levels	
OUTDOOR	Refrigerant control			EEV	
	Compressor type,model			Rotary,Panasonic 5RS132ZAD21	
	Fan type & quantity			Propeller(direct) x 1	
	Fan speeds	H	RPM	910	
	Air flow	H	m3/hr	2160	
	Sound power level	H	dB(A)	63	
	Sound pressure level(3)	H	dB(A)	53	
	Dimensions	WxHxD	mm	795x610x290	
	Net Weight		kg	38	
	Package dimensions	WxHxD	mm	945x655x395	
	Packaged weight		kg	41	
	Units per pallet		Units	9 units per pallet	
	Stacking height		units	3 levels	
	Refrigerant type			R410A	
	Standard charge		kg(7.5m)	1.26	
	Additional charge			No need	
	Connections between units	Liquid line	In.(mm)	1/4"(6.35)	
		Suction line	In.(mm)	1/2"(12.7)	
		Max.tubing length	m.	Max. 20	
		Max.height difference	m.	Max. 10	
Operation control type				Remote control	
Heating elements (Option)			kW		
Others					

(1)Rating conditions in accordance to ISO 5151 and ISO 13253 (for ducted units).
(2)Airflow without external static pressure.
(3)Sound power in ducted units is measured at air discharge.
(4)Sound pressure level measured at 1-meter distance from unit.

3. RATING CONDITIONS

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

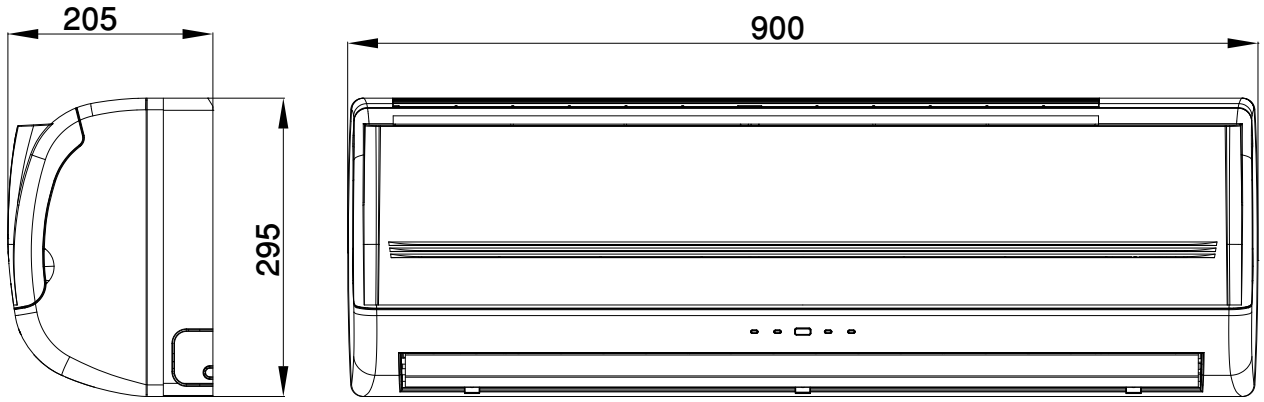
Heating:
Indoor: 20°C DB
Outdoor: 7°C DB 6°C WB

3.1 Operating Limits

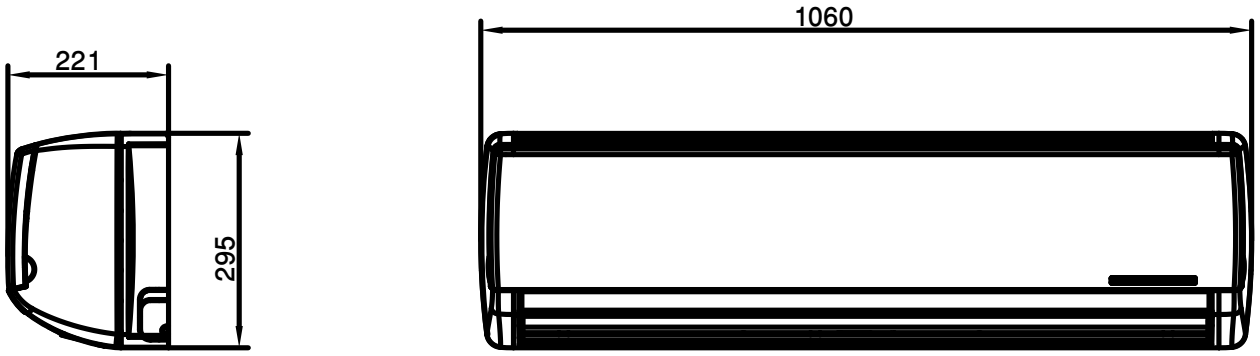
		Indoor	Outdoor
Cooling	Upper limit	32°C DB 23°C WB	46°C DB
	Lower limit	21°C DB 15°C WB	-10°C DB
Heating	Upper limit	27°C DB	24°C DB 18°C WB
	Lower limit	10°C DB	-15°C DB -16°C WB
Voltage		**1-PH 50/60Hz 198 – 264 V**	

4. OUTLINE DIMENSIONS

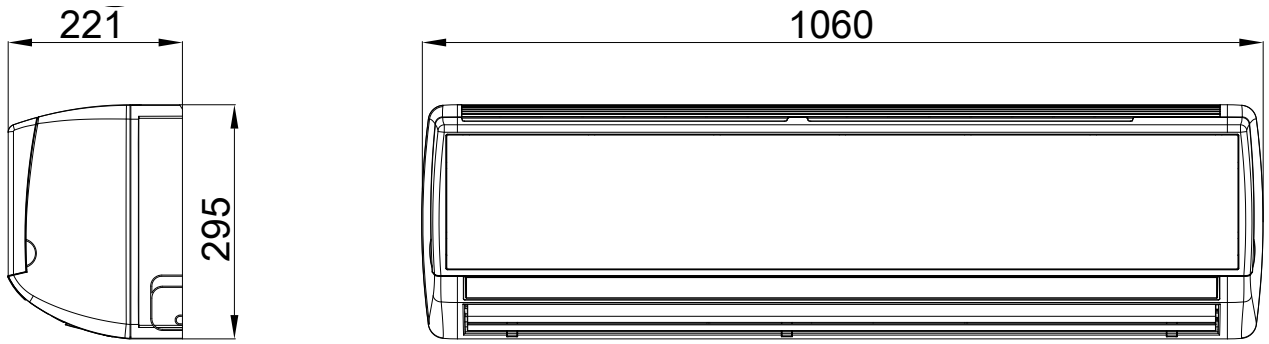
4.1 Indoor Unit: DELTA 50 DCI



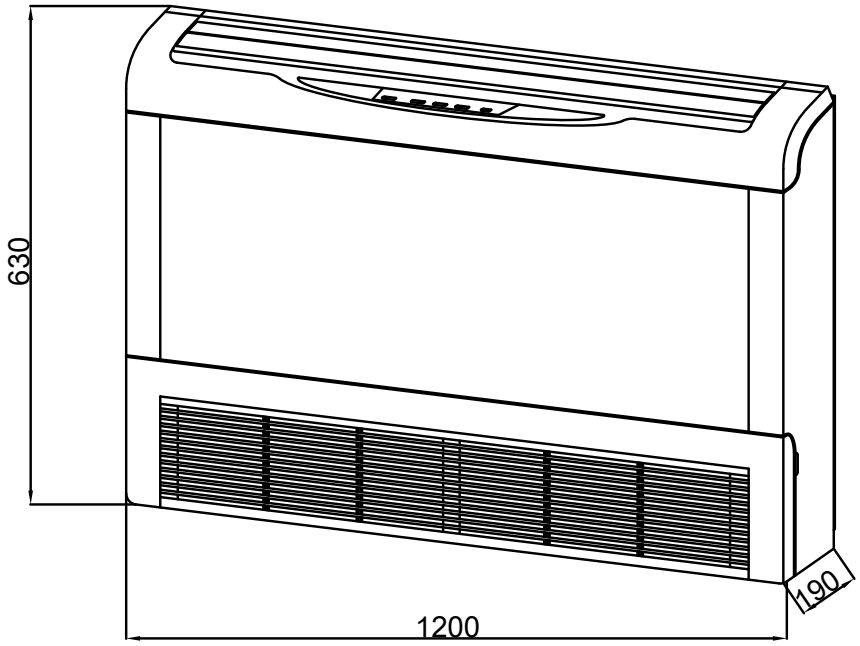
4.2 Indoor Unit: LEX 50 DCI



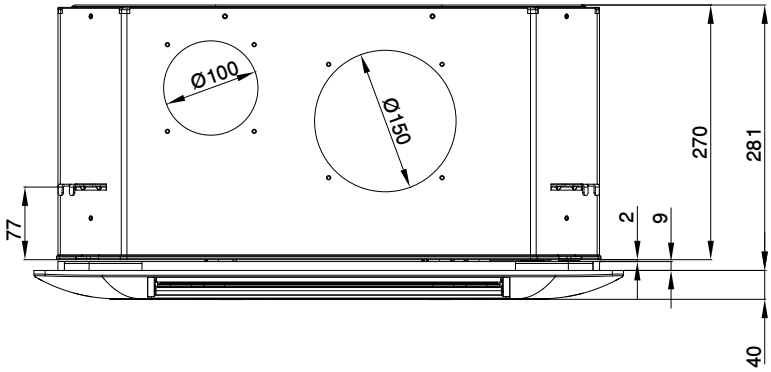
4.3 Indoor Unit: HAD 50 DCI

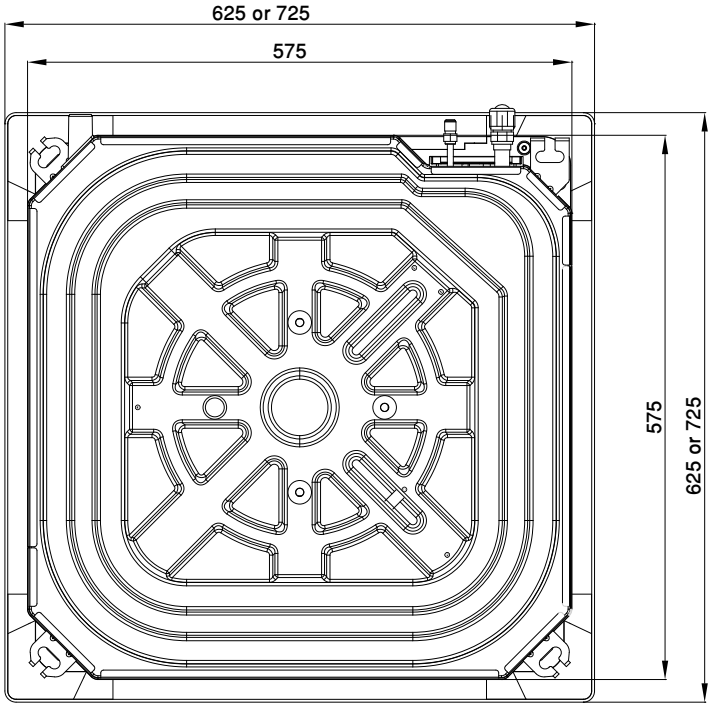


4.4 Indoor Unit: PXD 50 DCI

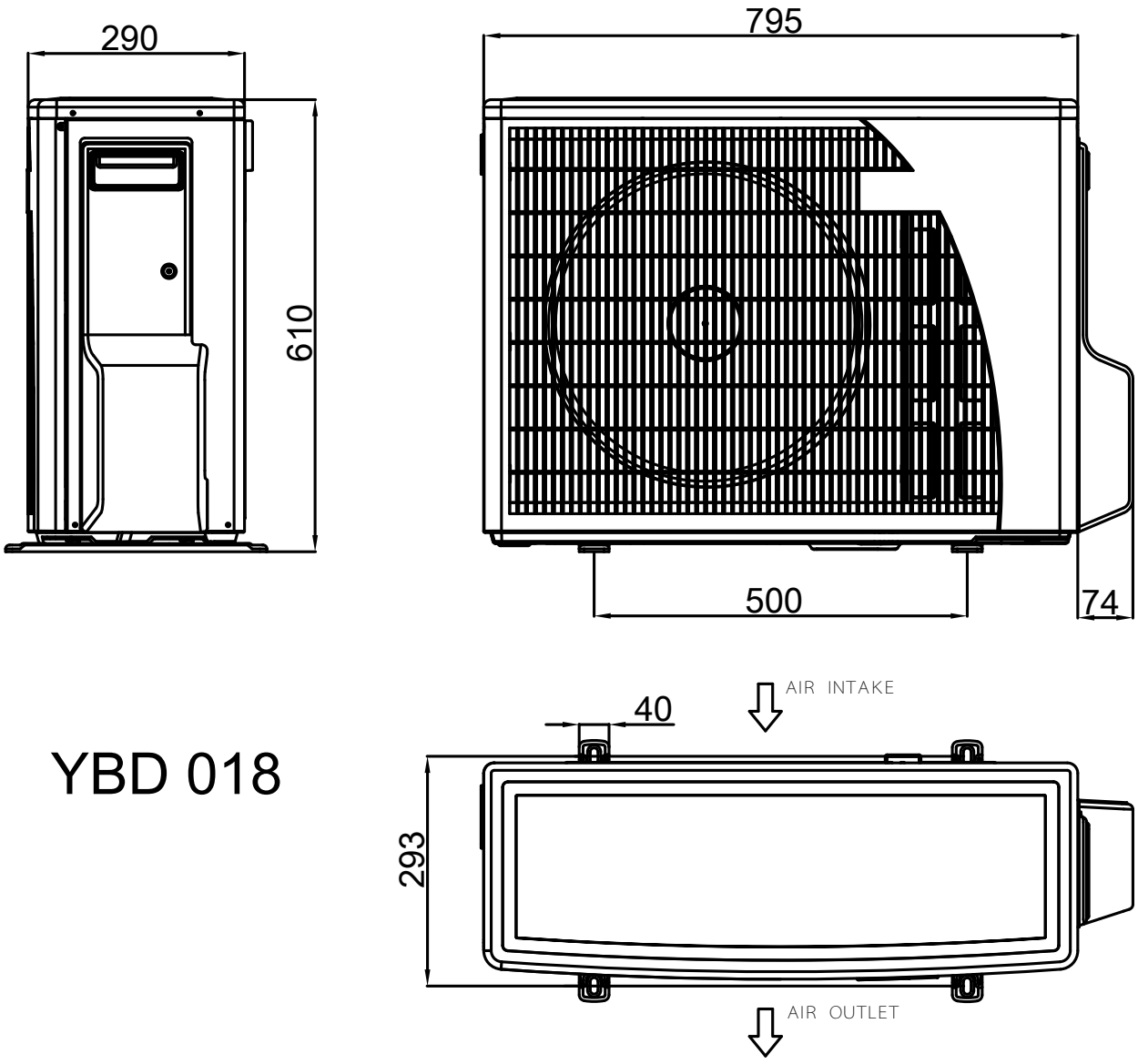


4.5 Indoor Unit: CN 50 DCI





4.6 Outdoor Unit: YBD018



YBD 018

5. PERFORMANCE DATA & PRESSURE CURVES

5.1 Delta 50 DCI

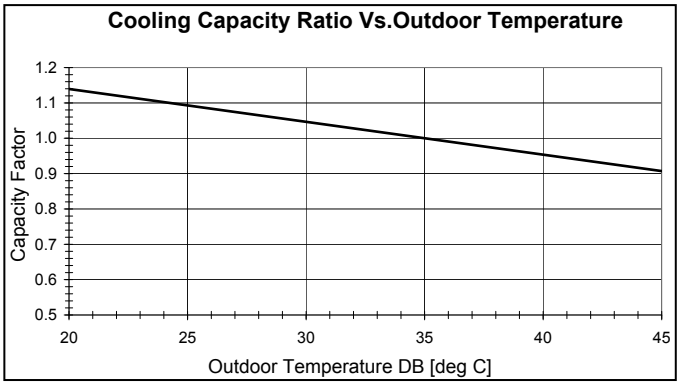
5.1.1 Cooling Capacity (kW)

Entering Air DB OD Coil(°C)	Data	Entering Air WB/DB ID Coil(°C)				
		15/21	17/24	19/27	21/29	23/32
15	TC	5.10	5.40	5.65	5.90	6.10
	SC	3.32	3.52	3.71	3.62	3.68
	PI	1.04	1.05	1.05	1.05	1.06
20	TC	5.05	5.35	5.60	5.85	6.05
	SC	3.60	3.83	4.04	3.93	4.01
	PI	1.13	1.13	1.14	1.15	1.15
25	TC	4.85	5.20	5.50	5.75	5.95
	SC	3.22	3.45	3.65	3.59	3.68
	PI	1.22	1.23	1.24	1.25	1.25
30	TC	4.55	4.90	5.30	5.50	5.70
	SC	3.06	3.31	3.57	3.50	3.64
	PI	1.32	1.33	1.35	1.36	1.37
35	TC	4.20	4.55	5.00	5.25	5.45
	SC	2.89	3.14	3.43	3.39	3.53
	PI	1.42	1.45	1.47	1.48	1.49
40	TC	3.80	4.15	4.60	4.85	5.05
	SC	2.68	2.95	3.24	3.19	3.35
	PI	1.53	1.56	1.59	1.60	1.61
46	TC	3.30	3.65	4.10	4.35	4.55
	SC	2.44	2.70	3.04	2.98	3.13
	PI	1.68	1.71	1.74	1.76	1.78

LEGEND

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

5.1.2 Capacity Correction Factors (Cooling)



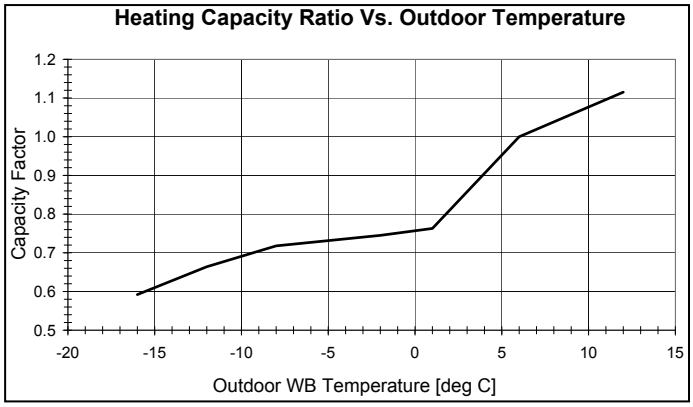
5.1.3 Heating

	ENTERING AIR DB ID COIL(°c)					
	15		20		25	
ENTERING WB OD COIL(°C)	TH	PI	TH	PI	TH	PI
-10	2.78	1.18	2.68	1.25	2.57	1.32
-7	2.99	1.21	2.89	1.27	2.78	1.34
-2	3.18	1.22	3.07	1.29	2.97	1.37
2	3.87	1.28	3.71	1.36	3.55	1.44
6	5.46	1.37	**5.30**	**1.47**	5.11	1.56
10	5.94	1.45	5.78	1.55	5.62	1.66
15	6.41	1.51	6.25	1.63	6.10	1.73
20	6.76	1.56	6.60	1.69	6.41	1.82

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)



5.2 LEX 50 DCI

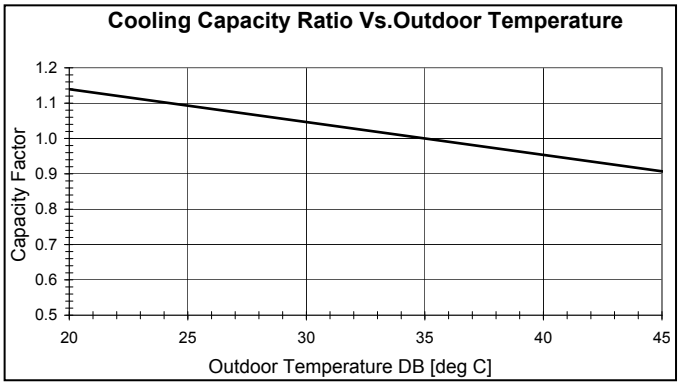
5.2.1 Cooling Capacity (kW)

Entering Air DB OD Coil(°C)	Data	Entering Air WB/DB ID Coil(°C)				
		15/21	17/24	19/27	21/29	23/32
15	TC	5.10	5.40	5.65	5.90	6.10
	SC	3.69	3.92	4.13	4.03	4.10
	PI	0.97	0.97	0.98	0.98	0.98
20	TC	5.05	5.35	5.60	5.85	6.05
	SC	3.60	3.83	4.04	3.93	4.01
	PI	1.05	1.06	1.06	1.07	1.07
25	TC	4.85	5.20	5.50	5.75	5.95
	SC	3.59	3.85	4.07	3.99	4.10
	PI	1.13	1.14	1.15	1.16	1.17
30	TC	4.55	4.90	5.30	5.50	5.70
	SC	3.41	3.68	3.98	3.90	4.06
	PI	1.23	1.24	1.26	1.27	1.27
35	TC	4.20	4.55	5.00	5.25	5.45
	SC	3.21	3.49	3.82	3.78	3.93
	PI	1.33	1.35	1.37	1.38	1.39
40	TC	3.80	4.15	4.60	4.85	5.05
	SC	2.98	3.28	3.61	3.56	3.73
	PI	1.43	1.45	1.48	1.49	1.50
46	TC	3.30	3.65	4.10	4.35	4.55
	SC	2.71	3.01	3.39	3.32	3.48
	PI	1.57	1.59	1.62	1.64	1.66

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)



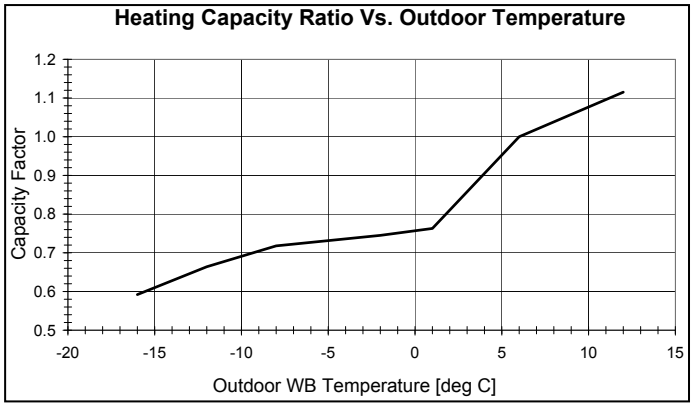
5.2.3 Heating

	ENTERING AIR DB ID COIL(^{O}c)					
	15		20		25	
ENTERING WB OD COIL(^{O}C)	TH	PI	TH	PI	TH	PI
-10	2.94	1.17	2.83	1.24	2.72	1.31
-7	3.16	1.20	3.05	1.26	2.94	1.33
-2	3.36	1.21	3.25	1.28	3.14	1.36
2	4.09	1.27	3.92	1.35	3.75	1.43
6	5.77	1.37	**5.60**	**1.46**	5.40	1.55
10	6.27	1.44	6.10	1.54	5.94	1.65
15	6.78	1.50	6.61	1.62	6.44	1.72
20	7.14	1.55	6.97	1.68	6.78	1.81

LEGEND

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

5.2.4 Capacity Correction Factors (Heating)



5.3 CN 50 DCI

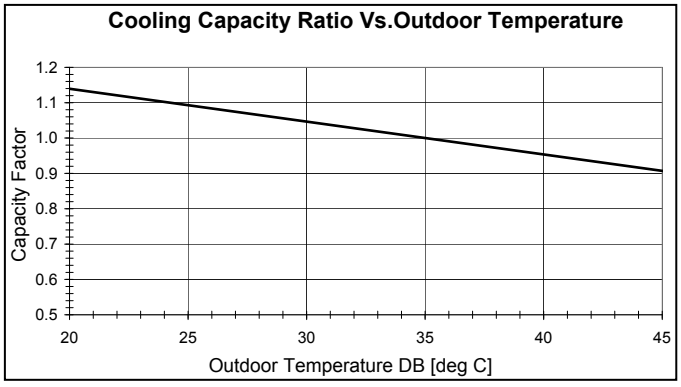
5.3.1 Cooling Capacity (kW)

Entering Air DB OD Coil(°C)	Data	Entering Air WB/DB ID Coil(°C)				
		15/21	17/24	19/27	21/29	23/32
15	TC	5.10	5.40	5.65	5.90	6.10
	SC	3.35	3.55	3.74	3.65	3.71
	PI	1.07	1.07	1.08	1.08	1.08
20	TC	5.05	5.35	5.60	5.85	6.05
	SC	3.60	3.83	4.04	3.93	4.01
	PI	1.16	1.16	1.17	1.18	1.18
25	TC	4.85	5.20	5.50	5.75	5.95
	SC	3.25	3.48	3.68	3.62	3.71
	PI	1.25	1.26	1.27	1.28	1.29
30	TC	4.55	4.90	5.30	5.50	5.70
	SC	3.09	3.34	3.60	3.53	3.68
	PI	1.35	1.37	1.39	1.40	1.40
35	TC	4.20	4.55	5.00	5.25	5.45
	SC	2.91	3.17	3.46	3.42	3.56
	PI	1.46	1.49	1.51	1.52	1.53
40	TC	3.80	4.15	4.60	4.85	5.05
	SC	2.70	2.98	3.27	3.22	3.38
	PI	1.58	1.60	1.63	1.65	1.66
46	TC	3.30	3.65	4.10	4.35	4.55
	SC	2.46	2.72	3.07	3.01	3.15
	PI	1.73	1.76	1.79	1.81	1.83

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)



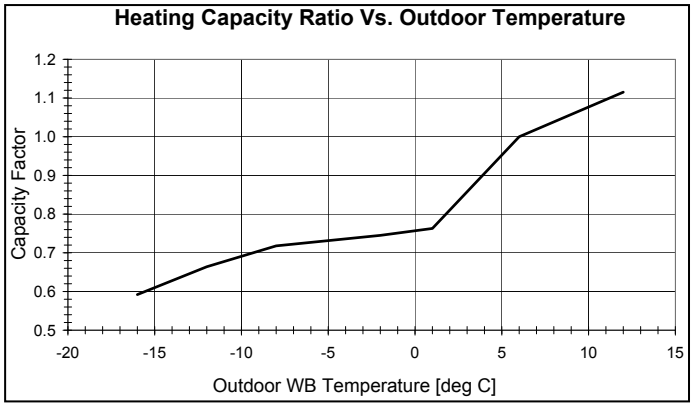
5.3.3 Heating

	ENTERING AIR DB ID COIL(^{O}c)					
	15		20		25	
ENTERING WB OD COIL(^{O}C)	TH	PI	TH	PI	TH	PI
-10	2.94	1.22	2.83	1.30	2.72	1.37
-7	3.16	1.25	3.05	1.32	2.94	1.40
-2	3.36	1.27	3.25	1.35	3.14	1.42
2	4.09	1.33	3.92	1.42	3.75	1.50
6	5.77	1.43	**5.60**	**1.53**	5.40	1.62
10	6.27	1.51	6.10	1.61	5.94	1.73
15	6.78	1.58	6.61	1.70	6.44	1.81
20	7.14	1.62	6.97	1.76	6.78	1.90

LEGEND

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

5.3.4 Capacity Correction Factors (Heating)



5.4 PXD 50 DCI

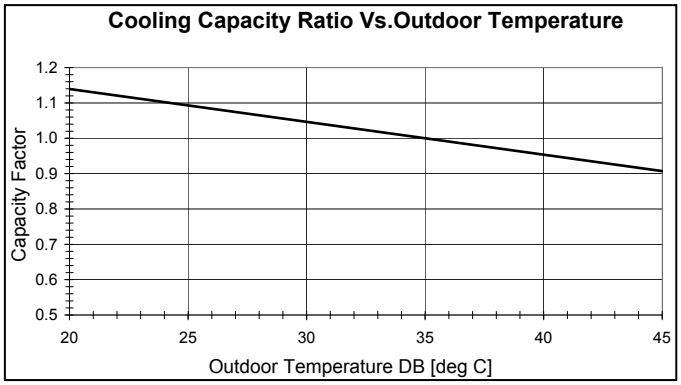
5.4.1 Cooling Capacity (kW)

Entering Air DB OD Coil(°C)	Data	Entering Air WB/DB ID Coil(°C)				
		15/21	17/24	19/27	21/29	23/32
15	TC	5.10	5.40	5.65	5.90	6.10
	SC	3.69	3.92	4.13	4.03	4.10
	PI	1.07	1.07	1.08	1.08	1.08
20	TC	5.05	5.35	5.60	5.85	6.05
	SC	3.60	3.83	4.04	3.93	4.01
	PI	1.16	1.16	1.17	1.18	1.18
25	TC	4.85	5.20	5.50	5.75	5.95
	SC	3.59	3.85	4.07	3.99	4.10
	PI	1.25	1.26	1.27	1.28	1.29
30	TC	4.55	4.90	5.30	5.50	5.70
	SC	3.41	3.68	3.98	3.90	4.06
	PI	1.35	1.37	1.39	1.40	1.40
35	TC	4.20	4.55	5.00	5.25	5.45
	SC	3.21	3.49	3.82	3.78	3.93
	PI	1.46	1.49	1.51	1.52	1.53
40	TC	3.80	4.15	4.60	4.85	5.05
	SC	2.98	3.28	3.61	3.56	3.73
	PI	1.58	1.60	1.63	1.65	1.66
46	TC	3.30	3.65	4.10	4.35	4.55
	SC	2.71	3.01	3.39	3.32	3.48
	PI	1.73	1.76	1.79	1.81	1.83

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)



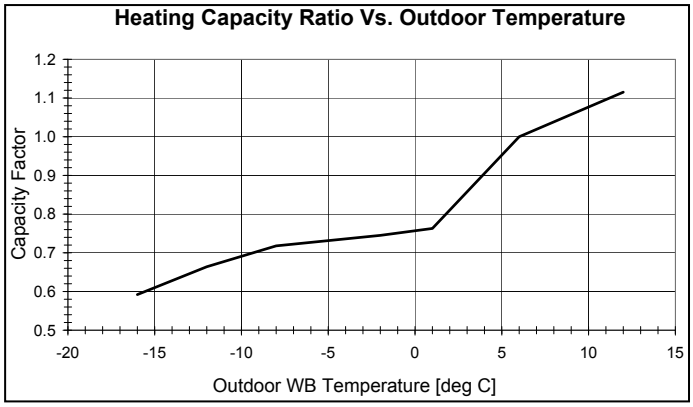
5.4.3 Heating

	ENTERING AIR DB ID COIL(°c)					
	15		20		25	
ENTERING WB OD COIL(°C)	TH	PI	TH	PI	TH	PI
-10	2.94	1.27	2.83	1.35	2.72	1.42
-7	3.16	1.30	3.05	1.38	2.94	1.45
-2	3.36	1.32	3.25	1.40	3.14	1.48
2	4.09	1.38	3.92	1.47	3.75	1.56
6	5.77	1.49	**5.60**	**1.59**	5.40	1.69
10	6.27	1.57	6.10	1.68	5.94	1.79
15	6.78	1.64	6.61	1.76	6.44	1.88
20	7.14	1.69	6.97	1.83	6.78	1.97

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)



5.5 DNG 50 DCI

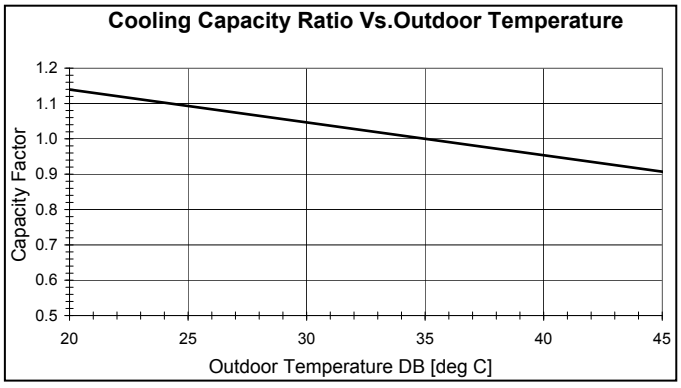
5.5.1 Cooling Capacity (kW)

Entering Air DB OD Coil(°C)	Data	Entering Air WB/DB ID Coil(°C)				
		15/21	17/24	19/27	21/29	23/32
15	TC	5.10	5.40	5.65	5.90	6.10
	SC	4.18	4.43	4.67	4.56	4.64
	PI	1.10	1.10	1.10	1.11	1.11
20	TC	5.05	5.35	5.60	5.85	6.05
	SC	3.60	3.83	4.04	3.93	4.01
	PI	1.19	1.20	1.20	1.21	1.21
25	TC	4.85	5.20	5.50	5.75	5.95
	SC	4.06	4.35	4.60	4.52	4.63
	PI	1.28	1.29	1.31	1.32	1.32
30	TC	4.55	4.90	5.30	5.50	5.70
	SC	3.86	4.17	4.50	4.41	4.59
	PI	1.39	1.41	1.42	1.44	1.44
35	TC	4.20	4.55	5.00	5.25	5.45
	SC	3.63	3.95	4.32	4.27	4.44
	PI	1.50	1.53	1.55	1.56	1.57
40	TC	3.80	4.15	4.60	4.85	5.05
	SC	3.38	3.71	4.09	4.02	4.22
	PI	1.62	1.64	1.67	1.69	1.70
46	TC	3.30	3.65	4.10	4.35	4.55
	SC	3.07	3.40	3.83	3.76	3.94
	PI	1.77	1.80	1.84	1.86	1.88

LEGEND

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

5.5.2 Capacity Correction Factors (Cooling)



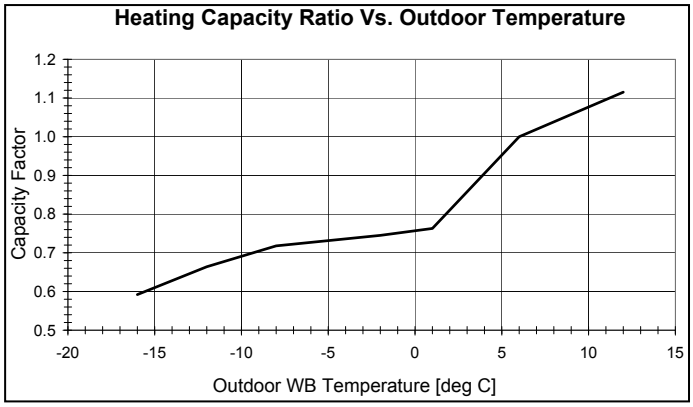
5.5.3 Heating

	ENTERING AIR DB ID COIL(^{O}c)					
	15		20		25	
ENTERING WB OD COIL(^{O}C)	TH	PI	TH	PI	TH	PI
-10	3.15	1.29	3.03	1.37	2.91	1.44
-7	3.39	1.32	3.27	1.39	3.15	1.47
-2	3.60	1.34	3.48	1.42	3.36	1.50
2	4.38	1.40	4.20	1.49	4.02	1.58
6	6.18	1.51	**6.00**	**1.61**	5.79	1.71
10	6.72	1.59	6.54	1.70	6.36	1.82
15	7.26	1.66	7.08	1.79	6.90	1.90
20	7.65	1.71	7.47	1.85	7.26	2.00

LEGEND

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

5.5.4 Capacity Correction Factors (Heating)



5.6 LSN 50 DCI

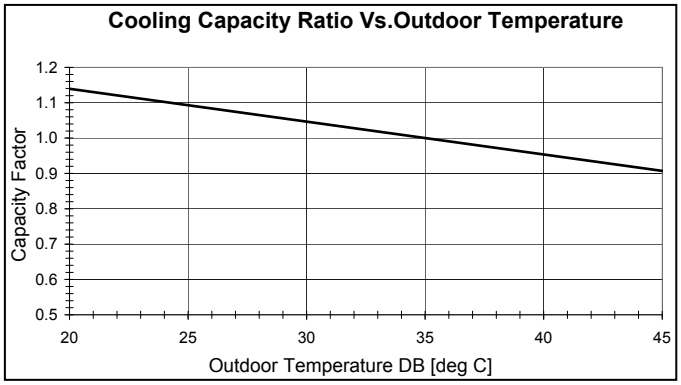
5.6.1 Cooling Capacity (kW)

Entering Air DB OD Coil(°C)	Data	Entering Air WB/DB ID Coil(°C)				
		15/21	17/24	19/27	21/29	23/32
15	TC	5.10	5.40	5.65	5.90	6.10
	SC	3.42	3.63	3.82	3.74	3.80
	PI	1.07	1.07	1.08	1.08	1.08
20	TC	5.05	5.35	5.60	5.85	6.05
	SC	3.60	3.83	4.04	3.93	4.01
	PI	1.16	1.16	1.17	1.18	1.18
25	TC	4.85	5.20	5.50	5.75	5.95
	SC	3.33	3.56	3.77	3.70	3.80
	PI	1.25	1.26	1.27	1.28	1.29
30	TC	4.55	4.90	5.30	5.50	5.70
	SC	3.16	3.41	3.69	3.61	3.76
	PI	1.35	1.37	1.39	1.40	1.40
35	TC	4.20	4.55	5.00	5.25	5.45
	SC	2.98	3.24	3.54	3.50	3.64
	PI	1.46	1.49	1.51	1.52	1.53
40	TC	3.80	4.15	4.60	4.85	5.05
	SC	2.77	3.04	3.35	3.30	3.46
	PI	1.58	1.60	1.63	1.65	1.66
46	TC	3.30	3.65	4.10	4.35	4.55
	SC	2.51	2.79	3.14	3.08	3.23
	PI	1.73	1.76	1.79	1.81	1.83

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

5.6.2 Capacity Correction Factors (Cooling)



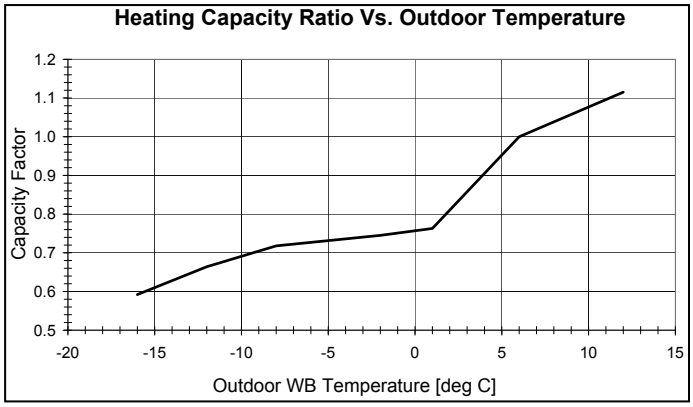
5.6.3 Heating

	ENTERING AIR DB ID COIL(^{O}c)					
	15		20		25	
ENTERING WB OD COIL(^{O}C)	TH	PI	TH	PI	TH	PI
-10	2.94	1.24	2.83	1.32	2.72	1.39
-7	3.16	1.27	3.05	1.34	2.94	1.41
-2	3.36	1.29	3.25	1.36	3.14	1.44
2	4.09	1.35	3.92	1.43	3.75	1.52
6	5.77	1.45	**5.60**	**1.55**	5.40	1.65
10	6.27	1.53	6.10	1.64	5.94	1.75
15	6.78	1.60	6.61	1.72	6.44	1.83
20	7.14	1.64	6.97	1.78	6.78	1.92

LEGEND

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

5.6.4 Capacity Correction Factors (Heating)



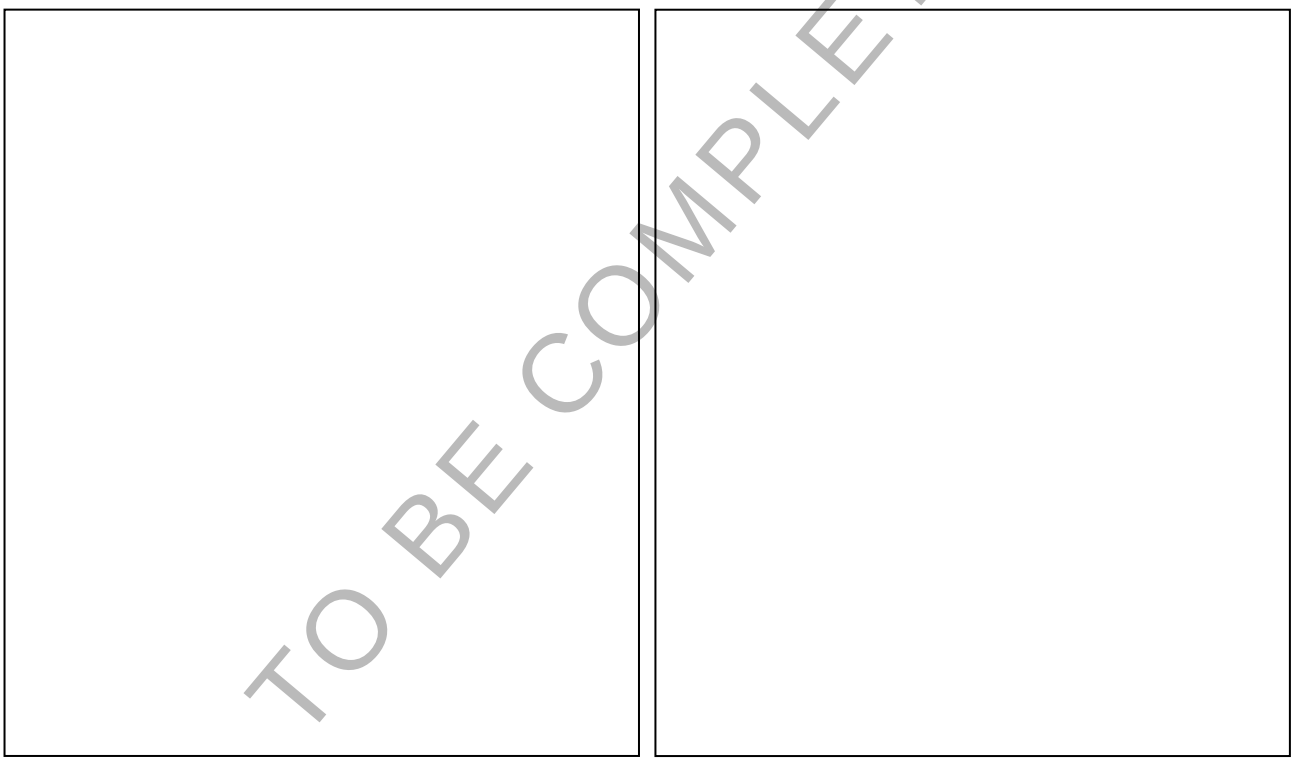
6. SOUND LEVEL CHARACTERISTICS

6.1 Sound Pressure Level

Figure 1

6.2 Soud Pressure Level Spectrum (Measured as Figure 1)

****** ******



FAN SPEED	LINE
HI	—▲—
ME	—○—
LO	—□—

7. ELECTRICAL DATA

7.1 YBD018

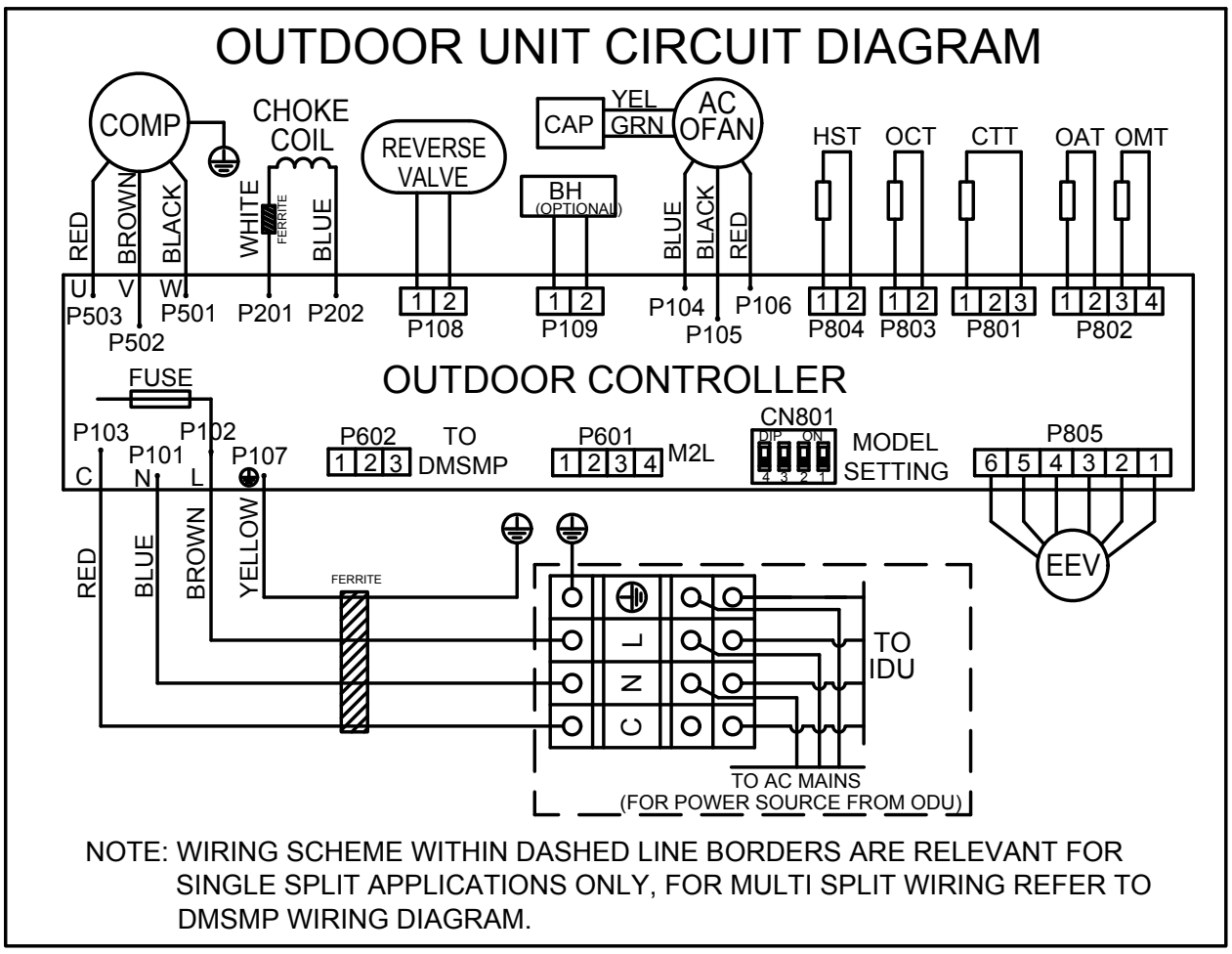
MODEL	YBD018
Power Supply	To indoor
	1PH-230V-50/60Hz
Max Current, A	15
Circuit Breaker,A	20
Power Supply Wiring No. X Cross Section mm^2	3x2.5 mm^2
Interconnecting Cable Model No. X Cross Section mm^2	4x2.5 mm^2

NOTE

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

8. WIRING DIAGRAMS

8.1 Outdoor Unit:



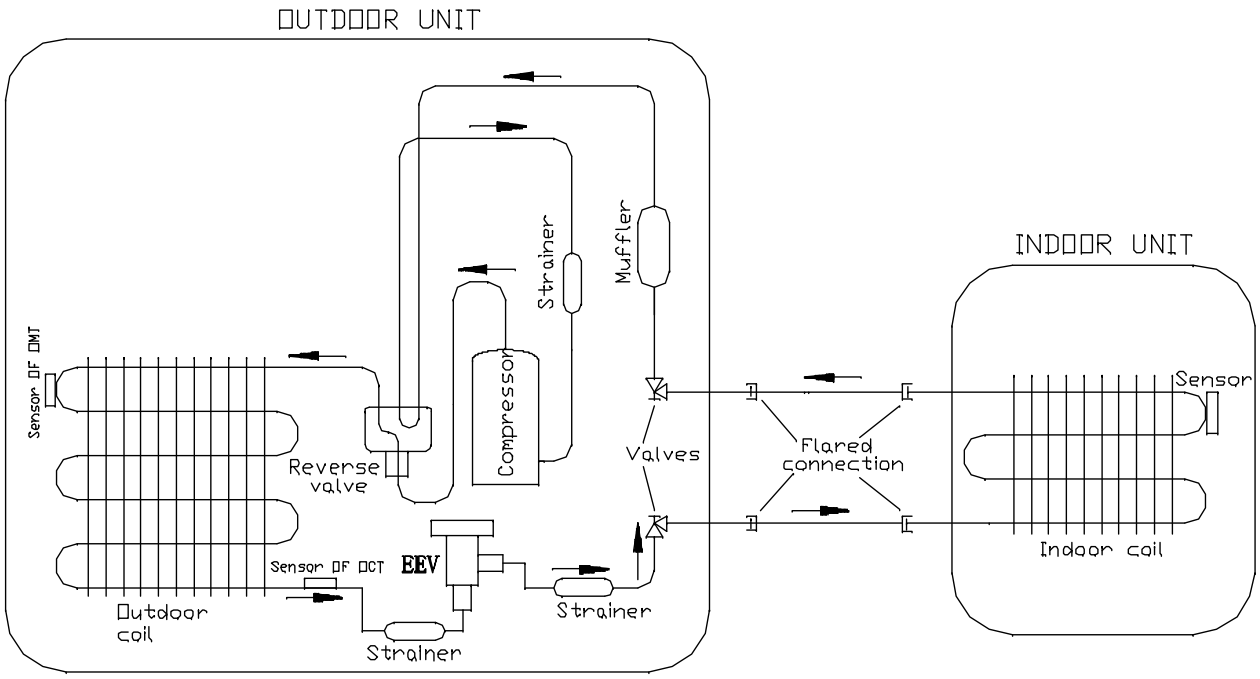
NOTE: WIRING SCHEME WITHIN DASHED LINE BORDERS ARE RELEVANT FOR SINGLE SPLIT APPLICATIONS ONLY, FOR MULTI SPLIT WIRING REFER TO DMSMP WIRING DIAGRAM.

9. ELECTRICAL CONNECTIONS

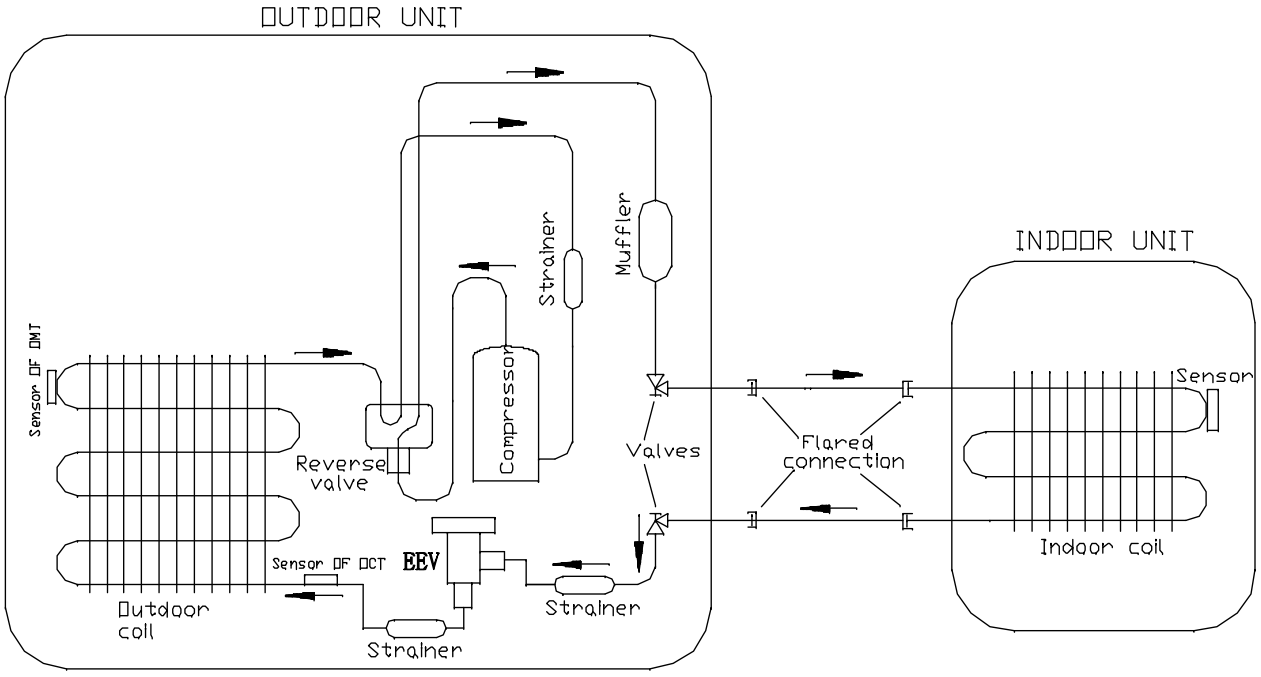
9.1 Wiring Diagram between Indoor Unit and Outdoor Unit

10. REFRIGERATION DIAGRAMS

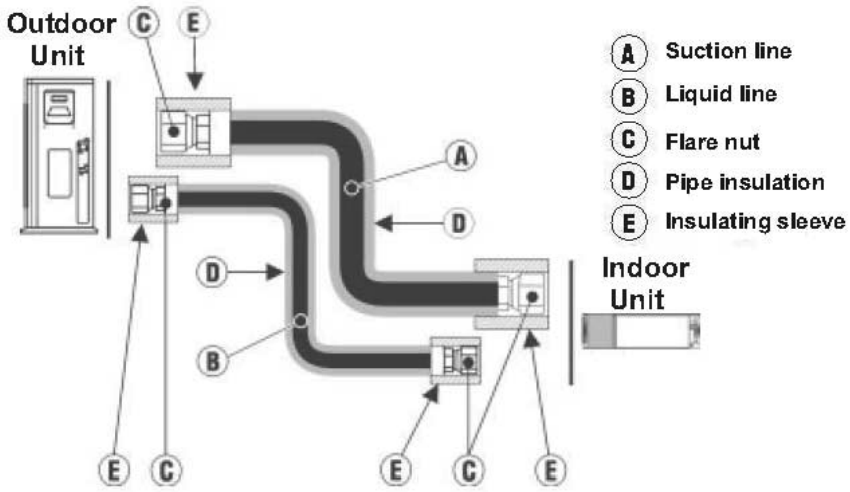
10.1 Cooling and Dry Mode

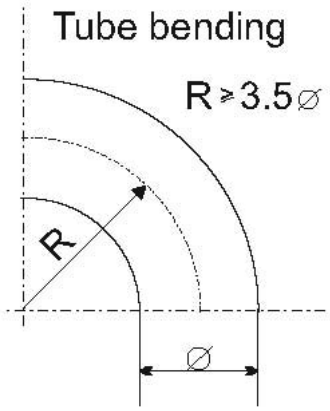


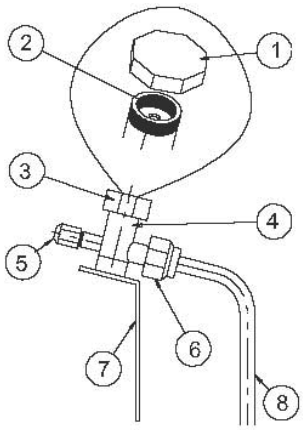
10.2 Heating Mode



11. TUBING CONNECTIONS







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

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

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

12. CONTROL SYSTEM

12.1 Electronic Control

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

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

12.1.2 System Operation Concept

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

12.1.3 Compressor Frequency Control

12.1.1.1 NLOAD setting

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

NLOAD limits as a function of indoor fan speed:

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

12.1.1.1 Target Frequency Setting

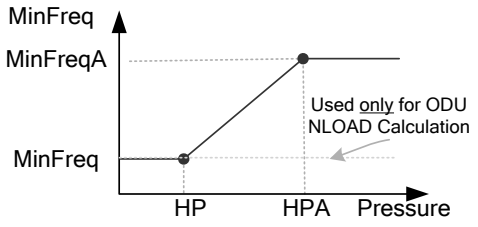
The compressor target frequency is set by the following table, according to the NLOAD number received from the indoor unit.

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

Definitions		
	Cool	**Heat**
MinFreq	*MinFreqC*	*MinFreqH*
MaxFreq	*MaxFreqC*	*MaxFreqH*
LoadDeadZone	*LoadDeadZoneC*	*LoadDeadZoneH*

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

The lower allowed frequency is extracted from the following:



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

Notes:

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

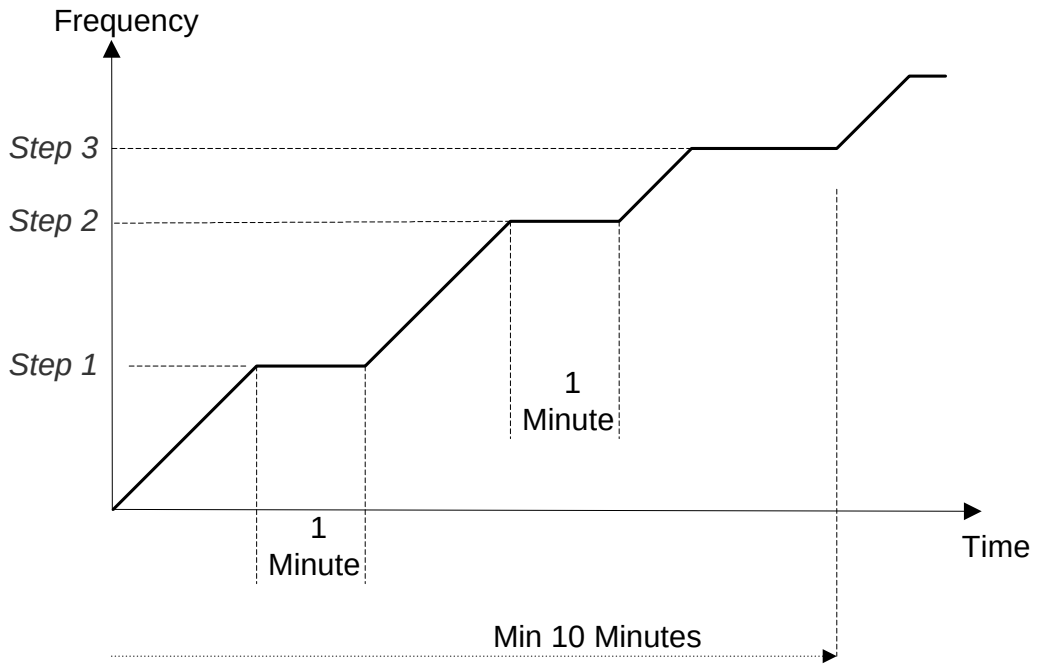
The higher allowed frequency is extracted from the following:

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

12.1.1.1 Frequency Changes Control

Frequency change rate is 1 Hz/sec.

12.1.1.1 Compressor Starting Control



12.1.1.1 Minimum On and Off Time

3 minutes.

12.1.4 Indoor Fan Control

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

12.1.1.1 Turbo Speed

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

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

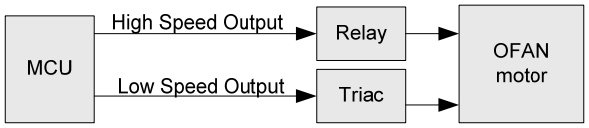
12.1.5 Heating Element Control

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

12.1.6

12.1.7 Outdoor Fan Control

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



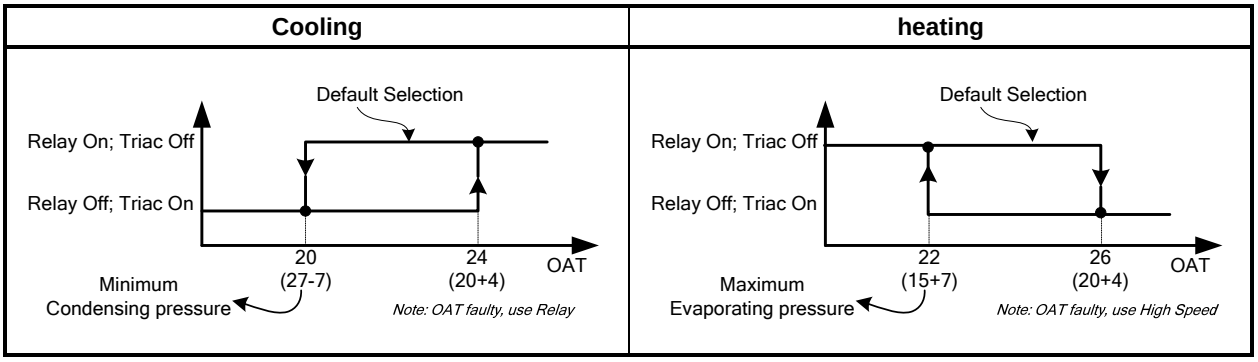
Speed	Controlled by
High	Relay
Low	Triac (27% to 85% effective voltage)

12.1.1.1 OFAN Speed Type

			AC Motor (*OFANType*=2)	
			Triac	Relay
Metric			Effective voltage R.M.S (V%)	
Speed Variable	'A': - Lower Speed	Cool	*OFMinPercentC*	NA
		Heat	*OFMinPercentH*	NA
	'B': - Higher Speed		*OFNNoiseMaxPercent*	NA
	'C': - Protection Speed		*OFNNoiseMaxPercent*	NA
	'D': (Night Mode Speed)		*NightPercent*	NA
	'E': - End of Deicer - When Compressor changes to off (Ventilation) - OMT and OCT fault in heat mode		Off	On
	'F': - Test Mode		Off	On

12.1.1.1 OFAN Operation

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



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

12.1.8 EEV (electronic Expansion valve) Control

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

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

12.1.9 Reversing Valve (RV) Control

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

12.2 Fan Mode

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

12.3 Cool Mode

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

12.4 Heat Mode

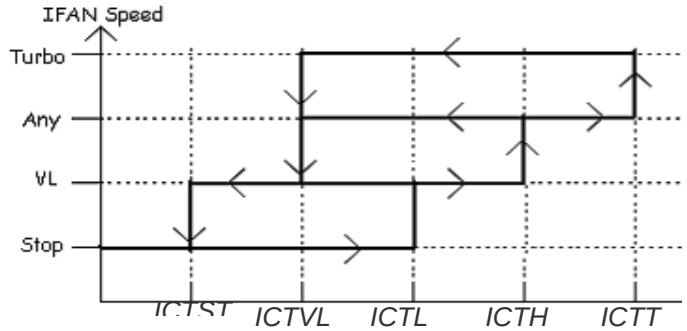
NLOAD is calculated according to the difference between actual room temperature and user set point temperature by PI control.
In high/ medium/ low indoor fan user setting, unit will operate fan in selected speed.
In AutoFan user setting, fan speed will be adjusted automatically according to the calculated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

12.4.1 Temperature Compensation

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

12.4.2 Indoor Fan Control in Heat Mode

Indoor fan speed depends on the indoor coil temperature:



12.5 Auto Cool/Heat Mode

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

12.6 Dry Mode

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

12.7 Protections

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

12.7.1 Indoor Coil Defrost Protection

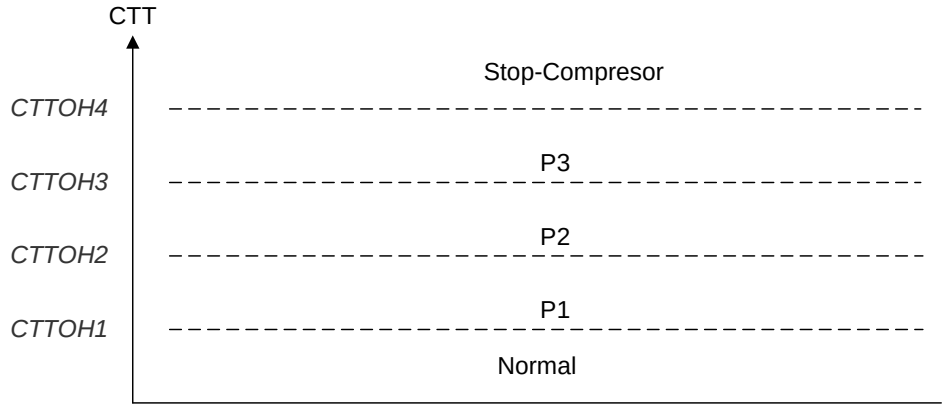
ICT	ICT Trend				
	Fast Increasing	Increasing	No change	Decreasing	Fast Decreasing
ICT < -2	SC	SC	SC	SC	SC
-2 ≤ ICT < 0	D1	D1	D2	D2	D2
0 ≤ ICT < 2	SR	SR	D1	D2	D2
2 ≤ ICT < 4	SR	SR	SR	D1	D2
4 ≤ ICT < 6	Norm	Norm	SR	SR	D1
6 ≤ ICT < 8	Norm	Norm	Norm	SR	SR
8 ≤ ICT	Normal				

12.7.2 Indoor Coil over Heating Protection

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

12.7.3 Compressor over Heating Protection

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

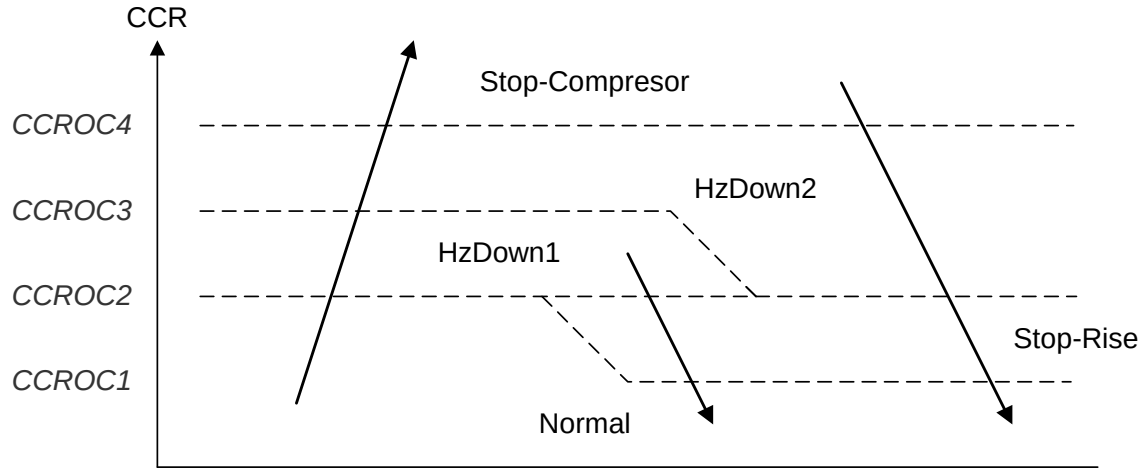


Control Status	Compressor Temperature Increases	Else
P1	Norm	SR
P2	D1	SR
P3	D2	D1
Stop Compressor	SC	

12.7.4 Outdoor Coil Overheating Protection

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

12.7.5 Compressor over Current Protection



12.7.6 Heat Sink Over Heating Protection

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

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

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

(*) Normal (Norm) – No protection status is ON.
Stop-Rise (SR) – System is in protection.
HzDown1 (D1) - System is in protection.
HzDown2 (D2) - System is in protection.

12.7.7 System Over Power Protection

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

12.7.8 Outdoor Coil Deicing Protection

In the deicing protection, IFAN is forced OFF.

12.7.1.1 Deicing Starting Conditions

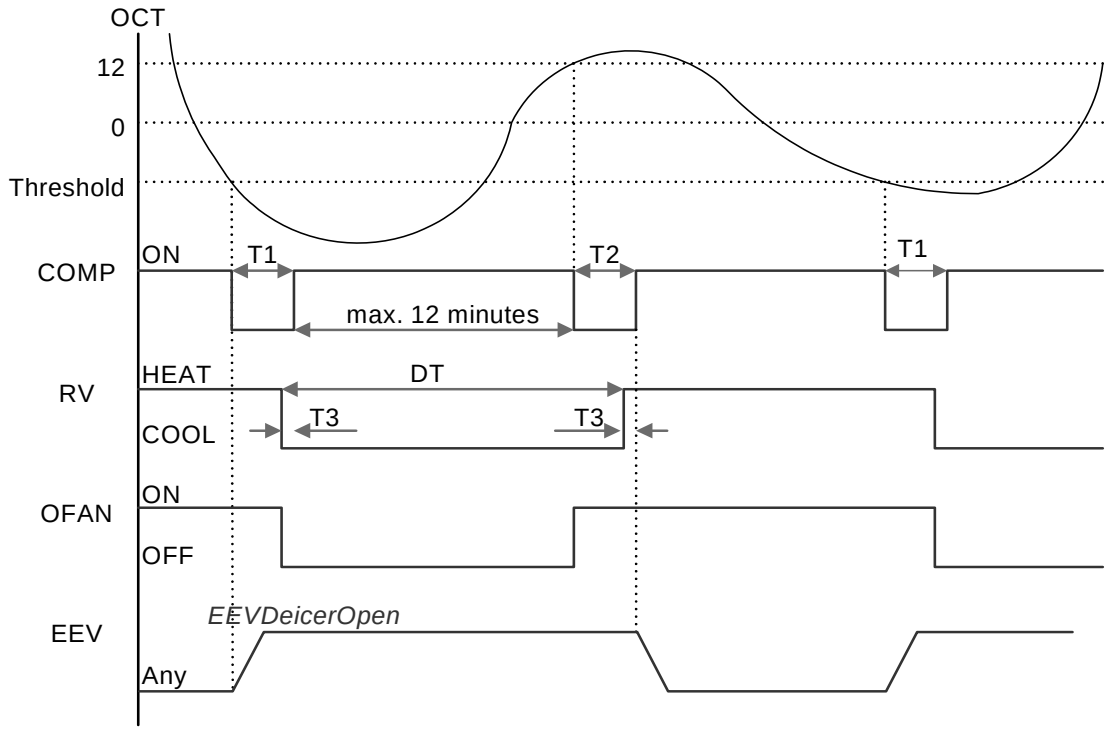
Deicing operation will start when either one of the following conditions exist:

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

OCT – Outdoor Coil Temperature
OAT – Outdoor Air Temperature
TLD – Time from Last Deicing
DI – Deicing Interval (Time Interval Between Two Deicing)
DT- Deicing Time
DST is defined as:
When OAT>0 or OAT is invalid; then DST=8
When OAT≤0; then DST= round down (-*DeicerCoef* * OAT) + 8

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

12.7.1.1 Deicing Protection Procedure



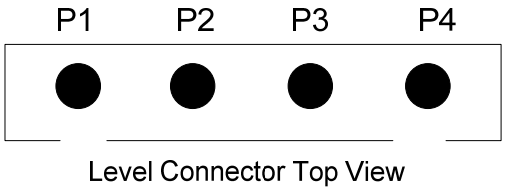
T1 = *DEICT1* seconds, T2 = *DEICT2* seconds, T3 = *DEICT3* seconds

12.7.1.1 Exiting Deicing

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

12.7.9 Condensate Water Over Flow Protection

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

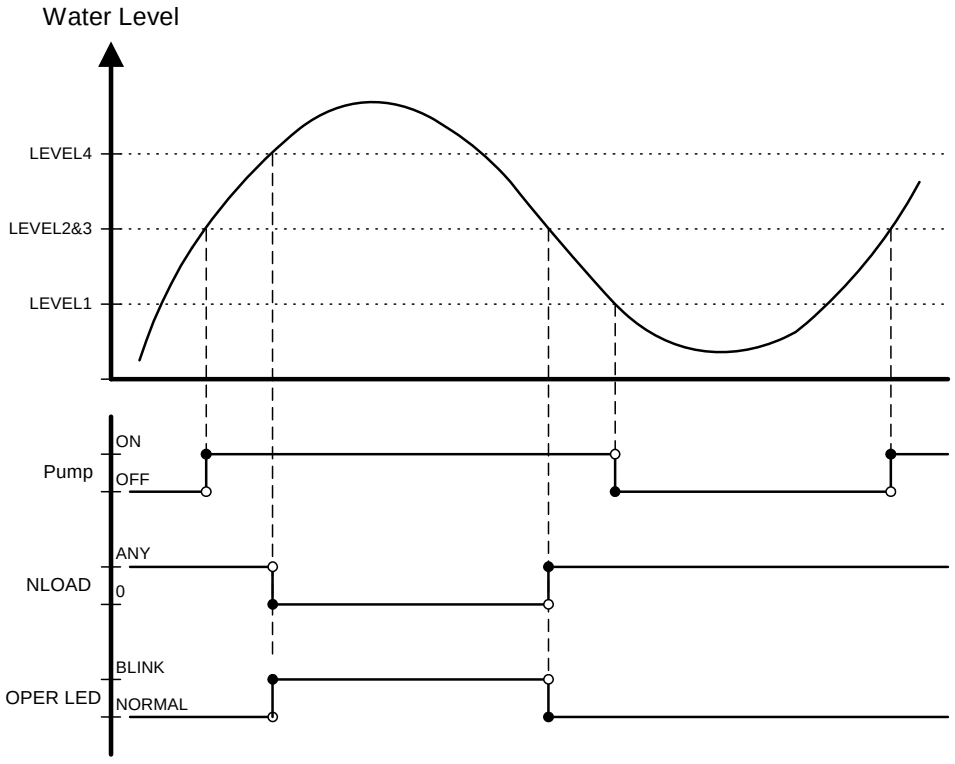


Level Connector Top View

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

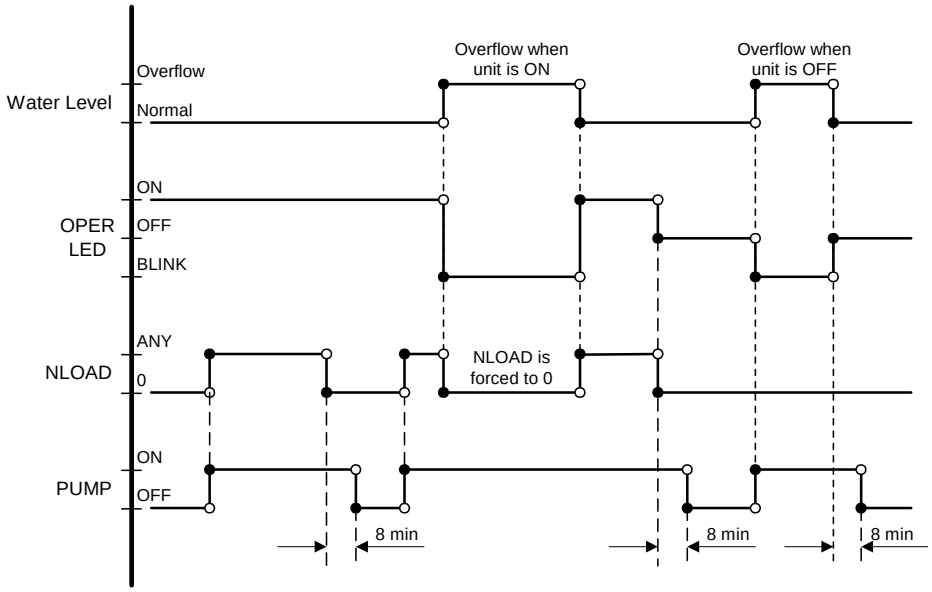
12.7.1.1 3 Levels Logic (used in floor/ceiling models)

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



12.7.1.1 1 Level Logic (used in all models except for floor/ceiling models)

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



12.7.10 Exceeding operation conditions

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

12.8 Indoor Unit Dry Contact

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

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

12.9 Operating the Unit from the Mode Button

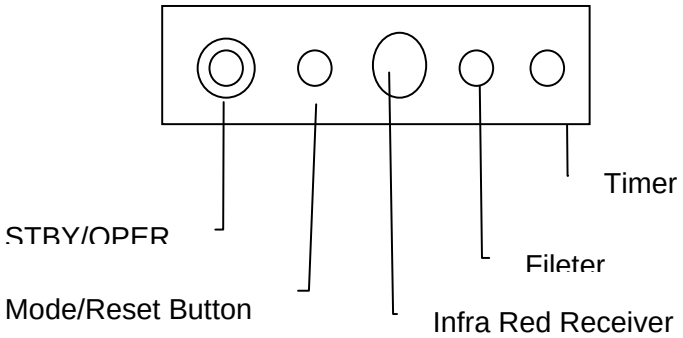
Forced operation allows to start, stop and operate in Cooling or Heating, in pre-set temperature according to the following table:

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

12.10 Indoor Unit Controllers and Indicators

For Delta IDU

The following is schematic drawing for the display:



STAND BY INDICATOR	1. Lights up when the Air Conditioner is connected to power and the mode is STBY. 2. Blinks for 3 seconds, when the system is switched to Heat Mode by using the Mode/Reset Switch on the unit (the operation indicator will be off during this blinking time).
OPERATION INDICATOR	1. Lights up during operation mode (except for item in STBY indicator). 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).

	4. Blinks for 3 seconds when the system is switched to Cool Mode by using the Mode/Reset Switch on the unit.
TIMER INDICATOR	Lights up during Timer and Sleep operation.
FILTER INDICATOR	Lights up when Air Filter needs to be cleaned.
Mode/Reset Button	As long as the filter Led is off, the Mode/Reset button functions as Mode switch. Once filter Led is on, the Mode/Reset button functions as Reset switch. Mode Function: 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 (refer to diagnostic mode Sect.) Reset Function: For short pressing: When Filter LED is on, it turns off the filter indicator.

Notes

1. Pressing time is defined as the time between press and release.
2. If pressing time is one second or less – press is considered as short pressing.
3. If pressing time is three seconds or longer – pressing is considered as long pressing. In between, pressing is undetermined and system will not respond to pressing.
4. For the LED functionality during diagnostics, refer to the diagnostics Sect.
5.

For other models except PXD

STAND BY INDICATOR	3. Lights up when the Air Conditioner is connected to power and ready to receive the R/C commands
OPERATION INDICATOR	5. Lights up during operation. 6. Blinks for 300 msec., to announce that a R/C infrared signal has been received and stored. 7. Blinks continuously during protections (according to the relevant spec section).
TIMER INDICATOR	Lights up during Timer and Sleep operation.

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

For PXD models

STANDBY INDICATOR	1. Lights up when the Air Conditioner is connected to power and is ready for operation
OPERATE INDICATOR (4)	1. Lights up during operation. 2. Blinks for 300 msec., to announce that a R/C infrared signal has been received and stored. 3. Blinks continuously during protections (according to the relevant spec section).
TIMER INDICATOR	Lights up during Timer and Sleep operation.
FILTER INDICATOR	1. Lights up when Air Filter needs to be cleaned. 2. Blinks during Water Over Flow in PXD models. (Cf. Sect. 7.3)
COOLING INDICATOR	Lights up when system is switched to Cool Mode by using the Mode Switch on the unit.
HEATING INDICATOR	Lights up when system is switched Heat Mode by using the Mode Switch on the unit.
FAN MODE INDICATOR (4)	Lights up in Fan Mode activated by local switches.
FAN SPEED INDICATORS	L -- Lights up when IFAN setting is Low. M -- Lights up when IFAN setting is Medium. H -- Lights up when IFAN setting is High.

	A -- Lights up when IFAN setting is Auto.
TEMP. SETTING INDICATORS	Each one of the seven indicators indicates the following SPT: 18, 20, 22, 24, 26, 28, 30 [^{o}c]. The odd number temperatures are indicated by turning on the two adjacent indicators.
FAN SPEED BUTTON	Press this button to change the speed of the IFAN. Each pressing change the speed in the sequence of: ..... L → M → H → Auto → L → ...
TEMP. SETTING UP BUTTON	Pressing this button increases the SPT by 1^{o}c. Note: The Max SPT is 30^{o}c.
TEMP. SETTING DOWN BUTTON	Pressing this button decreases the SPT by 1^{o}c. Note: The Min SPT is 18^{o}c.
MODE BUTTON	Every short pressing , the next operation mode is selected, in this order : SB → Cool Mode → Heat Mode → SB → … In long pressing system enters diagnostic mode.
POWER BUTTON	Toggle the unit between OPER & STBY modes.
RESET / FILTER BUTTON	For short pressing: When Filter LED is on - turn off the FILTER INDICATOR after a clean filter has been reinstalled. When Filter LED is off – enable/disable the buzzer announcer, if selected. In long pressing system enters set up mode (if in SB).

Note:

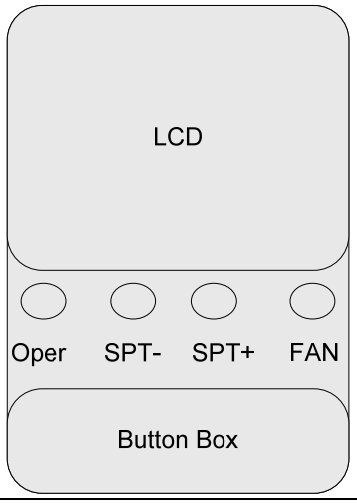
1. Pressing time is defined as the time between press and release.
2. If pressing time is one second or less – press is consider as short pressing.
3. If pressing time is three seconds or longer – pressing is considered as long pressing. In between, pressing is undetermined and system will not respond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

12.11 Outdoor Unit Controllers and Indicators

12.11.1 The user display uses three 7 segments.

12.11.1.1 The user interface concept is Tree menus.

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

Command Type	Function	Keypad	Remote controller	RC8 sketch:
Up or Down command	Scrolling among options (up and down).	Up or Down key button.	**Up:** Set Point '+' **Down:** Set Point '-'	
Selection command	Go down one level in the menu or select an option.	Select button	FAN mode	
Escaping command	Go up one level in the menu	Escape button	Oper/STBY	

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

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

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

Notes:

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

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

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

12.11.2 Keys functionality

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

12.11.3 Menus

12.11.1.1 General

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

12.11.1.1 Main Menu

Technician Test (tt)
Installation Test (it)
Diagnostics (dia)
Set Up (Stp)
Status (Stt)

Notes:

1. The default presentation will be alternation among:
   - the mode of the unit (Cl/Ht/Sb) shown for 2 sec.
   - ID + the detected IDUs number shown for 2 sec.
   - Active fault (among ODU or IDUs), each to be shown for 2 sec.
2. In diagnostics menu:
   - xx means failure code.
   - Maximum 5 faults are presented for each unit (each IDUs/ODU). When no faults “--“ sign will be shown.
   - The active faults have higher priority for presentation than non active ones.
   - Non active faults are presented according to their chronological order, starting from the latest one.
   - Whenever a new active fault occurs, it will be presented immediately.
   - Active faults are blinking, where non active ones do not.
3. Exiting ‘Status’ menu and its sub-menus back to the main menu is done by either pressing escape or after continuous 60 minutes out of any press.
4. Technician Test mode, once is selected, it cannot last more than predefined time. Refer to technician test for details, Sect. **Error! Reference source not found.**.
5. All the menus, except Status and its sub-menu, Technician Test once selected, are automatically exited to the main menu after 10 continuous minute out of any press.

6. When Technician test cool or heat menus are selected (operative), it will be blinking constantly until, this menu is escaped.
7. When the installation test begins, the system will show up count down based (refer to the installation test sect. **Error! Reference source not found.**. At the end of the installation test, the result will be presented.
8. For the indoor diagnostics, whenever there is no-communication with indoor unit or indoor unit is not detected, 'no-communication' will be shown under the relevant indoor unit diagnostics. In addition to the indoor diagnostics, these faults will be also shown as well under the default show.
9. When Alpha and numeric values are combined, they will be separated by dot.
10. For technician mode presentation, the active setting target compressor frequency will be presented directly upon entry. The active selected value will be blinking. The set target compressor frequency will be enabled to be scrolled up and down within the minimum and maximum operating frequency values (the values do depend on the outdoor model setting as well as the operation mode- cool or heat)
11. For technician mode presentation, whenever the system exit technician mode due any of the faults listed under Sect. **Error! Reference source not found.**, the HMI will show the fault in the same way to Diagnostics sub menu.

Fault Code:

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

21	Deicing
22	Compressor Over Heating
23	Compressor Over Current
24	No OFAN Feedback
25	OFAN IPM fault / OFAN IPM Driver Pin
26	Compressor Lock
27	Bad Communication
28	Missing ODU configuration
29	Undefined ODU Model
30	Outdoor/Indoor Coil Overheating
31	Operation conditions are exceeded

12.12 Jumper Settings

12.12.1 Indoor Unit Controller

12.12.1.1 Hardware Jumpers

0 = Open Jumper (disconnect jumper).

1 = Close Jumper (connect jumper).

Self test Jumper – J1

OPERATION	J1
SELF-TEST	1
NORMAL	0

Compensation Jumper – J2

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

Family selection Jumper – J3, J4 ,J5and J6

Family	J6	J5	J 4	J3
AS	0	0	0	0
AC	0	0	0	1
AD	0	0	1	0
WNG	0	0	1	1
PXD	0	1	0	0
KS	0	1	0	1
LS	0	1	1	0
K	0	1	1	1
WNG18	1	0	0	0
WNG30	1	0	0	1

Delta 50		NA		
WSA	1	0	1	1
DNG		NA		
KN	1	1	0	1
NPXD		NA		
Reserved	1	1	1	1

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

Model selection Jumper – J7, J8

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

12.12.1.1 ***Software Jumpers***

For Delta DCI

Property	0	1
EEPROM DATA (J1)	Use ROM*	Use EEPROM
'Thermostatic Stop- Heat' (J2)	Deactivated	Activated
'Heat to STBY' (J3)	Deactivated	Activated
Enable Test Mode (J4)	Deactivated	Activated*

** Default values (used in the ROM)*

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

Property	Delta 22/25/35
'Thermostatic Stop- Heat' (J2)	*1*
'Heat to STBY' (J3)	*1*

J1 – EEPROM/ROM setting

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

For other DCI

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

Enable Test Mode (J5)	Deactivated	Activated*	NA

** Default values (used in the ROM)*

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

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

J1 – EEPROM/ROM setting

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

12.12.2 Outdoor Unit Controller

12.12.1.1 Hardware Jumpers

JP9 JUMPER LAYOUT

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

ODU MODEL SELECTION

ODU4	ODU3	ODU2	ODU1	ODU0	ODU Model	Compressor Type (Manufacturer/Model/# poles)	
						Single Split	Multi Split
ON	OFF	OFF	OFF	ON	Q (DCR50)	Panasonic, 4 poles, 5RS132	

12.12.1.1 Software Jumpers

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

****** Default values (used in the ROM)*

J1 – EEPROM/ROM setting

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

12.13 Test Mode

12.13.1 Entering Test Mode

System can enter Test mode in two ways:

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

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

12.13.2 Unit Operation in Test Mode

When entering through indoor:

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

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

When entering through outdoor:

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

Notes:

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

Note:

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

13. TROUBLESHOOTING

13.1 ELECTRICAL & CONTROL TROUBLESHOOTING

WARNING!!!

When Power Up – the whole outdoor unit controller, including the wiring, is under HIGH VOLTAGE!!!

Never open the Outdoor unit before turning off the Power!!!

When turned off, the system is still charged (400V)!!!

It takes about 4 Min. to discharge the system.

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

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

13.1.1 Single Split system failures and corrective actions

No	SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
1	Power supply indicator (Red LED) does not light up.	No power supply	Check power supply. If power supply is OK, check display and display wiring. if OK, replace controller.
2	Unit does not respond to remote control message	Remote control message not reached the indoor unit	Check remote control batteries, if batteries are OK, check display and display wiring, if OK, replace display PCB. If still not OK replace controller.
3	Unit responds to remote control message but Operate indicator (Green LED) does not light up	Problem with display PCB	Replace display PCB. If still not OK replace controller.
4	Indoor fan does not start (louvers are opened and Green LED does light up)	Unit in heat mode and coil is still not warm.	Change to cool mode and check.
		Problem with PCB or capacitor	Change to high speed and Check power supply to motor is higher than 130VAC (for triack controlled motor) or higher than 220VAC for fixed speed motors, if OK replace capacitor, if not OK replace controller
5	Indoor fan works when unit is OFF, and indoor fan speed is not changed by remote control command.	PCB problem	Replace controller
6	Compressor does not start	Electronics control problem or protection	Perform diagnostics (See 13.1.3 below), and follow the actions described.
7	Compressor stops during operation and Green LED remains on	Electronic control or power supply problem	Perform diagnostics (See 13.1.3 below), and follow the actions described.
8	Compressor is on but outdoor fan does not work	Problem with outdoor electronics or outdoor fan	Check outdoor fan motor according to the procedure in section 13.2.3 below, if not OK replace controller

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

13.1.2 `Checking the refrigeration system

Checking system pressures and other thermodynamic measures should be done when system is in Test Mode (in Test mode, system operates in fixed settings). The performance curves given in this manual are given for unit performance in test mode when high indoor fan speed is selected.
Entering test mode:
Set unit to Cool/16 degrees/High indoor fan speed, or Heat/30 degrees/High indoor fan speed, and enter diagnostics.

13.1.3 Judgment by Indoor/Outdoor Unit Diagnostics

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

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

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

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

13.1.3.1 Indoor unit Diagnostics

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

13.1.3.2 Indoor unit diagnosis and corrective actions

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

No.	Fault	Probable Cause	Corrective Action
9	Using EEPROM data	No problem. System is using EEPRRRROM parameters	

13.1.3.3 Outdoor unit Diagnostics

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

13.1.3.4 Outdoor unit diagnosis and corrective actions

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

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

13.1.4 Judgement by MegaTool

MegaTool is a special tool to monitor the system states.
Using MegaTool requires:
- A computer with RS232C port.
- A connection wire for MegaTool.
- A special MegaTool software.

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

13.2 Simple procedures for checking the Main Parts

13.2.1 Checking Mains Voltage.

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

13.2.2 Checking Power Input.

If Indoor unit power LED is unlighted, power down the system and check the fuse of the Indoor unit. If the fuse is OK replace the Indoor unit controller. If the fuse has blown, replace the fuse and power up again.
Checking Power Input procedure for the Outdoor unit is the same as with the Indoor unit.

13.2.3 Checking the Outdoor Fan Motor.

Enter Test Mode (where the OFAN speed is high)
check the voltage between two pins(Hi and N) of connector Controller OFAN, normal voltage is 220VAC.

13.2.4 Checking the Compressor.

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

13.2.5 Checking the Reverse Valve (RV).

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

13.3 Precaution, Advise and Notice Items

13.3.1 High voltage in Outdoor unit controller.

Whole controller, including the wires that are connected to the Outdoor unit controller may have the potential hazard voltage when power is on. Touching the Outdoor unit controller may cause an electrical shock.
Advise: Don't touch the naked lead wire and don't insert finger, conductor or anything else into the controller when power is on.

13.3.2 Charged Capacitors

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

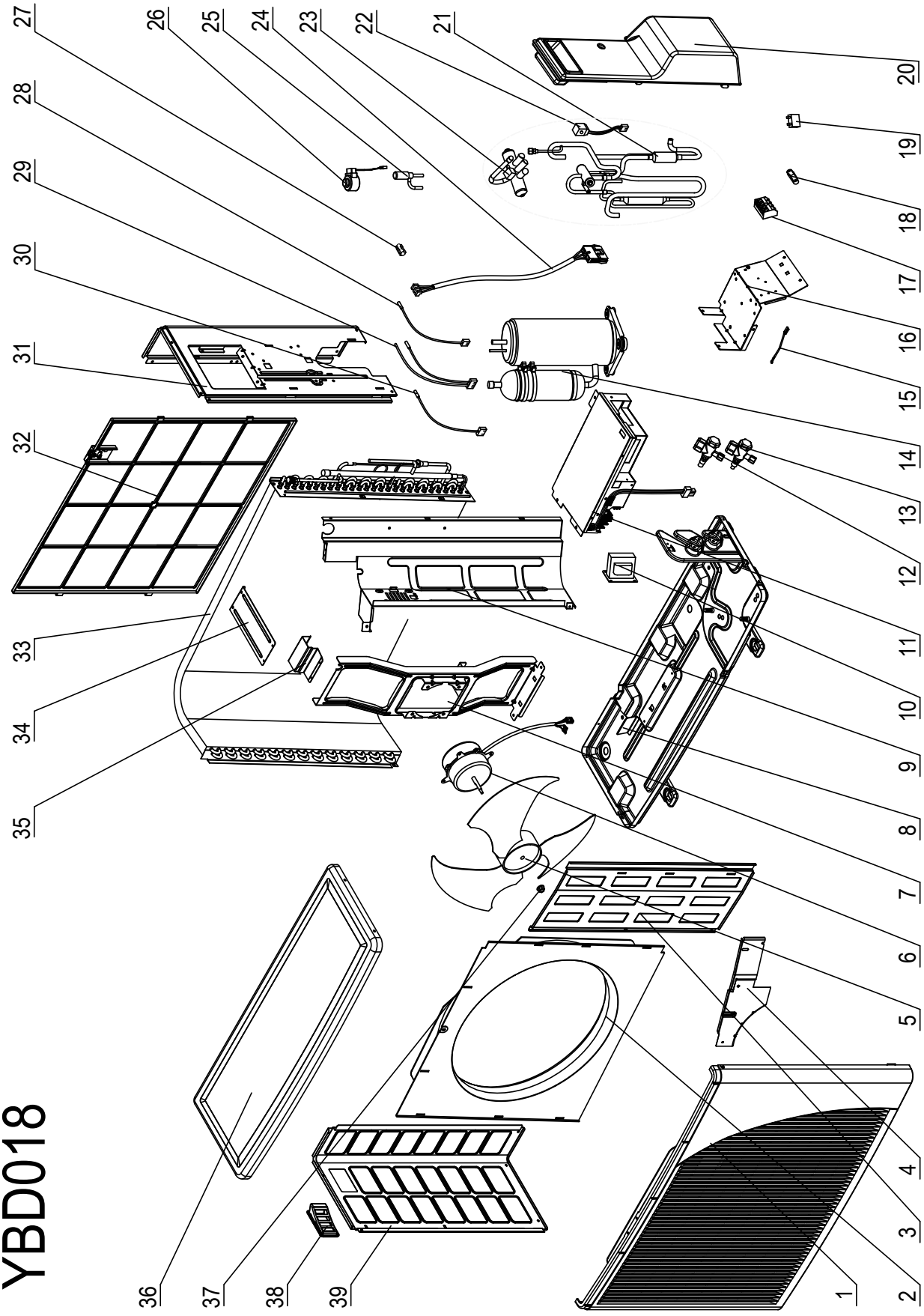
13.3.3 Additional advises

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

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

14. EXPLODED VIEWS AND SPARE PARTS LISTS

14.1 Outdoor Unit: YBD018



14.2 Outdoor Unit: YBD018

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

APPENDIX A

INSTALLATION AND OPERATION MANUAL

- **REMOTE CONTROL RC7**
- **INSTALLATION AND OPERATION MANUAL YIF018 DCI SERIES**