

# Airwell

# Technical Manual

## DLS series

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Indoor Units	Outdoor Units
DLS 18	GC18 NRC
DLS 24	GC24 NRC
DLS 30	GCN30 NRC
DLS 37	GCN37 NRC
DLS 44	GCN40 NRC



REFRIGERANT	
R410A	HEAT PUMP

LIST OF EFFECTIVE PAGES

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**LIST OF EFFECTIVE PAGES**

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

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\*\*Photos are not contractual.

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# 1. INTRODUCTION

## 1.1 General

The new **DLS** ducted split unit range comprises the ST (cooling only) as well as RC (heat pump) models, it is available at 1PH, 3PH as follow:

- **1PH** DLS 18, 24, 30, 37
- **3PH** DLS 18, 24, 30, 37, 44

### Remote control compatibility

- The DLS unit is compatible with remote controls RC3, RC4, RCW1, RCW2

## 1.2 Main Features

The DLS series benefits from the most advanced technological innovations, namely:

- R410A refrigerant for all the range.
- The only Single Fan, medium capacity, low silhouette ducted unit
- High Static Pressure in the low silhouette category.
- Low indoor and outdoor sound level
- Low Silhouette 260-300mm height that simplify the false ceiling construction.
- Small volume, easy for installation (require small space for installation)
- Water drainage capability without siphon near the unit.
- Built in over-flow protection against condensate water
- 50 meters pipes installation in charge-less system
- High COP by switching to R 410A and enlarging indoor coil sizes
- Complies with M1 regulations
- Compatible with Saginomya “all season kit” that permits operation in cooling mode up to -5°C outdoor temperature.
- Easy service access by removing the drain pan.
- Microprocessor control.
- Infrared remote control with liquid crystal display.

### 1.3 Indoor Unit

The indoor unit can fit easily 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 that stops compressor operation in case drainage tube is blocked.
- A bended coil with treated aluminium fins.
- 3-speed fan motor with internal protection with extra speed for higher external static pressure.
- Advanced electronic control box assembly with 1.8-meter cable to allow installation at a more accessible area.
- 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) Electrical Heaters for 2005
  - (2) External water pump
  - (3) Airconet connection
  - (4) Plenum kit for connection of flexible hoses at air outlet.

### 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 Ioniser (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, provides complete operating function and programming. For further details, please refer to the Operation Manual,

## 1.7 Outdoor Unit

It includes:

- Compressor mounted in a soundproofed compartment :  
**Rotary** – for DLS 18, 24, 30, 37  
**Scroll** – for DLS 44
- Improved 3- blades axial fans for noise reduction.
- Outdoor coil with hydrophilic fins for RC units optimised for operation with R 410A refrigerant.
- Fan grill air outlet.
- Service valves” flare” type connection.
- Service ports for high/ low pressure measurement.
- Interconnecting wiring terminal block.

## 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 pipe length and 25 meter height difference without oil traps.

For further details, please refer to the Installation Manual.

## 1.9 Accessories

ASK (All Season Kit):

For low ambient working conditions in cooling, an ASK can be installed inside the outdoor unit. This kit allows cooling operation down to outdoor temperature of -10 °C by gradually controlling the outdoor fan speed motor.

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 includes its own installation and operation manuals.

## 2. PRODUCT DATA SHEET

### 2.1 R410C

Model Indoor Unit			DLS 18			
Model Outdoor Unit			GC 18NRC			
Installation Method			DUCTED			
<b>Characteristics</b>		<b>Units</b>	<b>Cooling</b>		<b>Heating</b>	
Capacity <sup>(1)</sup>		Btu/hr	19100	18000		
		kW	5.6	5.3		
Power Input <sup>(1)</sup>		kW	1.8	1.7		
COP <sup>(1)</sup>		W/W	3.05	3.12		
Energy Efficiency Class			B	D		
Power Supply		V/Ph/Hz	230/50/1			
Rated Current		A	8.2	7.5		
Starting Current		A	43			
Circuit Breaker Rating		A	20			
<b>INDOOR</b>	Fan Type & Quantity		CENTRIFUGAL X1			
	Fan Speed	H/M/L	RPM	630	530	425
	Airflow <sup>(2)</sup>	H/M/L	m <sup>3</sup> /hr	1150	875	730
	External Static Pressure	Min-Max	Pa	25-60		
	Sound Power Level <sup>(3)</sup>	H/M/L	dB (A)	55	53	50
	Sound Pressure Level <sup>(4)</sup>	H/M/L	dB (A)	45	42	40
	Moisture Removal		L/hr	2.0		
	Condensate Drain Tube I.D.		mm	22		
	Dimensions	W/H/D	mm	770	260	690
	Weight		kg	29		
	Package Dimensions	W/H/D	mm	959	315	854
	Packaged Weight		kg	31		
	Units per Pallet		Units	6		
	Stacking Height		Units	6		
<b>OUTDOOR</b>	Refrigerant Control		Capillary			
	Compressor Type, Model		Rotary			
	Fan Type & Quantity		Axial & 1			
	Fan Speeds	H/L	RPM	815		
	Airflow	H/L	m <sup>3</sup> /hr	2480		
	Sound Power Level	H/L	dB (A)	68		
	Sound Pressure Level <sup>(4)</sup>	H/L	dB (A)	58		
	Dimensions	W/H/D	mm	846	690	302
	Weight		kg	56		
	Package Dimensions	W/H/D	mm	990	770	430
	Packaged Weight		kg	61		
	Units per Pallet		Units	9		
	Stacking Height		Units	3		
	Refrigerant Type		R 410A			
	Refrigerant Chargeless Distance		kg/m	1.75/10		
	Additional Charge Per 1 Meter		g/m	25		
	Connections Between Units	Liquid Line	In	1/4		
Suction Line		In	1/2			
Max. Tubing Length		m	25			
Max. Height Difference		m	15			
Operation Control Type		LCD Remote Control				
Heating Elements		kW				
Others						

1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN14511.

(2) Airflow in ducted units; at nominal external static pressure.

(3) Sound power in ducted units is measured at air discharge.

(4) Sound pressure level measured at 1 meter distance from unit.

PRODUCT DATA SHEET

Model Indoor Unit			DLS 18			
Model Outdoor Unit			GC 18 NRC (3PH)			
Installation Method			DUCTED			
<b>Characteristics</b>		<b>Units</b>	<b>Cooling</b>		<b>Heating</b>	
Capacity <sup>(1)</sup>	Btu/hr		19100		18000	
	kW		5.6		5.3	
Power Input <sup>(1)</sup>	kW		1.8		1.7	
COP <sup>(1)</sup>	W/W		3.05		3.12	
Energy Efficiency Class			B		D	
Power Supply		V/Ph/Hz	400/50/1			
Rated Current		A	3*3.5		3*3.1	
Starting Current		A	26			
Circuit Breaker Rating		A	3*10			
<b>INDOOR</b>	Fan Type & Quantity		CENTRIFUGAL X1			
	Fan Speed	H/M/L	RPM	630	530	425
	Airflow <sup>(2)</sup>	H/M/L	m <sup>3</sup> /hr	1150	875	730
	External Static Pressure		Min-Max	Pa		
				25-60		
	Sound Power Level <sup>(3)</sup>	H/M/L	dB (A)	55	53	50
	Sound Pressure Level <sup>(4)</sup>	H/M/L	dB (A)	45	42	40
	Moisture Removal		L/hr	2.0		
	Condensate Drain Tube I.D.		mm	22		
	Dimensions	W/H/D	mm	770	260	690
	Weight		kg	29		
	Package Dimensions	W/H/D	mm	959	315	854
	Packaged Weight		kg	31		
	Units per Pallet		Units	6		
Stacking Height		Units	6			
<b>OUTDOOR</b>	Refrigerant Control		Capillary			
	Compressor Type, Model		Rotary			
	Fan Type & Quantity		Axial & 1			
	Fan Speeds	H/L	RPM	815		
	Airflow	H/L	m <sup>3</sup> /hr	2480		
	Sound Power Level	H/L	dB (A)	68		
	Sound Pressure Level <sup>(4)</sup>	H/L	dB (A)	58		
	Dimensions	W/H/D	mm	846	690	302
	Weight		kg	56		
	Package Dimensions	W/H/D	mm	990	770	430
	Packaged Weight		kg	61		
	Units per Pallet		Units	9		
	Stacking Height		Units	3		
	Refrigerant Type		R 410A			
	Refrigerant Chargeless Distance		kg/m	1.98/10		
	Additional Charge Per 1 Meter		g/m	25		
Connections Between Units	Liquid Line		In			
	Suction Line		In			
	Max. Tubing Length		m			
	Max. Height Difference		m			
Operation Control Type		LCD Remote Control				
Heating Elements		kW				
Others						

- 1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN14511.
- 2) Airflow in ducted units; at nominal external static pressure.
- 3) Sound power in ducted units is measured at air discharge.
- 4) Sound pressure level measured at 1 meter distance from unit.



Model Indoor Unit			DLS 24					
Model Outdoor Unit			GC 24 NRC					
Installation Method			DUCTED					
<b>Characteristics</b>		<b>Units</b>	<b>Cooling</b>		<b>Heating</b>			
Capacity <sup>(1)</sup>		Btu/hr	23500		23850			
		kW	6.9		7.0			
Power Input <sup>(1)</sup>		kW	2.4		2.3			
COP <sup>(1)</sup>		W/W	2.9		3.04			
Energy Efficiency Class			C		D			
Power Supply		V/Ph/Hz	230/50/1					
Rated Current		A	10.8		10.5			
Starting Current		A	66					
Circuit Breaker Rating		A	20					
<b>INDOOR</b>	Fan Type & Quantity		CENTRIFUGAL X1					
	Fan Speed	H/M/L	RPM	680	630	530		
	Airflow <sup>(2)</sup>	H/M/L	m <sup>3</sup> /hr	1210	1100	840		
	External Static Pressure		Min-Max	Pa				
	Sound Power Level <sup>(3)</sup>		H/M/L	dB (A)		60	58	55
	Sound Pressure Level <sup>(4)</sup>		H/M/L	dB (A)		48	45	43
	Moisture Removal			L/hr				
	Condensate Drain Tube I.D.			mm				
	Dimensions		W/H/D	mm	770	260	690	
	Weight			kg				
	Package Dimensions		W/H/D	mm	959	315	854	
	Packaged Weight			kg				
	Units per Pallet			Units				
	Stacking Height			Units				
<b>OUTDOOR</b>	Refrigerant Control		Capillary					
	Compressor Type, Model		Rotary					
	Fan Type & Quantity		Axial & 1					
	Fan Speeds		H/L	RPM	850			
	Airflow		H/L	m <sup>3</sup> /hr	3100			
	Sound Power Level		H/L	dB (A)		67		
	Sound Pressure Level <sup>(4)</sup>		H/L	dB (A)		58		
	Dimensions		W/H/D	mm	900	680	340	
	Weight			kg				
	Package Dimensions		W/H/D	mm	985	730	435	
	Packaged Weight			kg				
	Units per Pallet			Units				
	Stacking Height			Units				
	Refrigerant Type			R 410A				
	Refrigerant Chargeless Distance		kg/m	2,16/ 12.5				
	Additional Charge Per 1 Meter		g/m	25				
	Connections Between Units	Liquid Line		In		3/8		
Suction Line		In		5/8				
Max. Tubing Length		m		50				
Max. Height Difference		m		25				
Operation Control Type			LCD Remote Control					
Heating Elements		kW						
Others			Crankcase heater (50W)					

- 1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN14511.
- 2) Airflow in ducted units; at nominal external static pressure.
- 3) Sound power in ducted units is measured at air discharge.
- 4) Sound pressure level measured at 1 meter distance from unit.

PRODUCT DATA SHEET

Model Indoor Unit				DLS 24			
Model Outdoor Unit				GC 24 NRC (3 PH)			
Installation Method				DUCTED			
<b>Characteristics</b>			<b>Units</b>	<b>Cooling</b>		<b>Heating</b>	
Capacity <sup>(1)</sup>			Btu/hr	23500		23850	
			kW	6.9		7.0	
Power Input <sup>(1)</sup>			kW	2.4		2.3	
COP <sup>(1)</sup>			W/W	2.9		3.03	
Energy Efficiency Class				C		D	
Power Supply			V/Ph/Hz	400/50/3			
Rated Current			A	3*6.0		3*5.4	
Starting Current			A				
Circuit Breaker Rating			A	3*10			
<b>INDOOR</b>	Fan Type & Quantity			CENTRIFUGAL X1			
	Fan Speed		H/M/L	RPM	680	630	530
	Airflow <sup>(2)</sup>		H/M/L	m <sup>3</sup> /hr	1210	1100	840
	External Static Pressure		Min-Max	Pa	25-60		
	Sound Power Level <sup>(3)</sup>		H/M/L	dB (A)	60	58	55
	Sound Pressure Level <sup>(4)</sup>		H/M/L	dB (A)	48	45	43
	Moisture Removal			L/hr	2.3		
	Condensate Drain Tube I.D.			mm	22		
	Dimensions		W/H/D	mm	770	260	690
	Weight			kg	29		
	Package Dimensions		W/H/D	mm	959	315	854
	Packaged Weight			kg	31		
	Units per Pallet			Units	6		
	Stacking Height			Units	6		
<b>OUTDOOR</b>	Refrigerant Control			Capillary			
	Compressor Type, Model			Rotary			
	Fan Type & Quantity			Axial & 1			
	Fan Speeds		H/L	RPM	850		
	Airflow		H/L	m <sup>3</sup> /hr	3100		
	Sound Power Level		H/L	dB (A)	67		
	Sound Pressure Level <sup>(4)</sup>		H/L	dB (A)	58		
	Dimensions		W/H/D	mm	900	680	340
	Weight			kg	78		
	Package Dimensions		W/H/D	mm	985	730	435
	Packaged Weight			kg	82		
	Units per Pallet			Units	6		
	Stacking Height			Units	2		
	Refrigerant Type				R 410A		
	Refrigerant Chargeless Distance			kg/m	2,16/ 12.5		
	Additional Charge Per 1 Meter			g/m	25		
	Connections Between Units		Liquid Line	In	3/8		
Suction Line			In	5/8			
Max. Tubing Length			m	50			
Max. Height Difference			m	25			
Operation Control Type				LCD Remote Control			
Heating Elements			kW				
Others				Crankcase heater (50W), 3 Phase Protector			

- 1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN14511.
- 2) Airflow in ducted units; at nominal external static pressure.
- 3) Sound power in ducted units is measured at air discharge.
- 4) Sound pressure level measured at 1 meter distance from unit.

Model Indoor Unit			DLS 30			
Model Outdoor Unit			GCN 30 NRC			
Installation Method			DUCTED			
<b>Characteristics</b>		<b>Units</b>	<b>Cooling</b>		<b>Heating</b>	
Capacity <sup>(1)</sup>	Btu/hr		29000		30700	
	kW		8.5		9.0	
Power Input <sup>(1)</sup>	kW		3.0		2.8	
COP <sup>(1)</sup>	W/W		2.81		3.22	
Energy Efficiency Class			C		C	
Power Supply		V/Ph/Hz	230/50/1			
Rated Current		A	13.7		12.5	
Starting Current		A	80			
Circuit Breaker Rating		A	25			
<b>INDOOR</b>	Fan Type & Quantity		CENTRIFUGAL X1			
	Fan Speed	H/M/L	RPM	800	670	550
	Airflow <sup>(2)</sup>	H/M/L	M <sup>3</sup> /hr	1420	1150	935
	External Static Pressure		Min-Max	Pa		
				37-80		
	Sound Power Level <sup>(3)</sup>	H/M/L	dB (A)	64	61	58
	Sound Pressure Level <sup>(4)</sup>	H/M/L	dB (A)	49	46	44
	Moisture Removal		L/hr	3.0		
	Condensate Drain Tube I.D.		mm	22		
	Dimensions	W/H/D	mm	770	260	690
	Weight		kg	31		
	Package Dimensions	W/H/D	mm	959	315	854
	Packaged Weight		kg	33		
	Units per Pallet		Units	6		
Stacking Height		Units	6			
<b>OUTDOOR</b>	Refrigerant Control		Capillary			
	Compressor Type, Model		Rotary			
	Fan Type & Quantity		Axial & 1			
	Fan Speeds	H/L	RPM	850		
	Airflow	H/L	M <sup>3</sup> /hr	3150		
	Sound Power Level	H/L	dB (A)	66		
	Sound Pressure Level <sup>(4)</sup>	H/L	dB (A)	58		
	Dimensions	W/H/D	mm	900	860	340
	Weight		kg	78		
	Package Dimensions	W/H/D	mm	985	907	435
	Packaged Weight		kg	82		
	Units per Pallet		Units	6		
	Stacking Height		Units	2		
	Refrigerant Type		R 410A			
	Refrigerant Chargeless Distance		kg/m	2.42/ 15		
Additional Charge Per 1 Meter		g/m	25			
Connections Between Units	Liquid Line		In			
	Suction Line		In			
	Max. Tubing Length		m			
	Max. Height Difference		m			
Operation Control Type		LCD Remote Control				
Heating Elements		kW				
Others		Crankcase heater (50W)				

- 1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN14511.
- 2) Airflow in ducted units; at nominal external static pressure.
- 3) Sound power in ducted units is measured at air discharge.
- 4) Sound pressure level measured at 1 meter distance from unit.

# PRODUCT DATA SHEET

Model Indoor Unit			DLS 30			
Model Outdoor Unit			GCN 30 NRC (3PH)			
Installation Method			DUCTED			
<b>Characteristics</b>		<b>Units</b>	<b>Cooling</b>		<b>Heating</b>	
Capacity <sup>(1)</sup>		Btu/hr	29000		30700	
		kW	8.5		9.0	
Power Input <sup>(1)</sup>		kW	3.0		2.8	
COP <sup>(1)</sup>		W/W	2.82		3.24	
Energy Efficiency Class			C		C	
Power Supply		V/Ph/Hz	400/50/3			
Rated Current		A	3*7.5		3*7.1	
Starting Current		A	35			
Circuit Breaker Rating		A	3*16			
<b>INDOOR</b>	Fan Type & Quantity		CENTRIFUGAL X1			
	Fan Speed	H/M/L	RPM	800	670	550
	Airflow <sup>(2)</sup>	H/M/L	M <sup>3</sup> /hr	1420	1150	935
	External Static Pressure		Min-Max	Pa		
				37-80		
	Sound Power Level <sup>(3)</sup>	H/M/L	dB (A)	64	61	58
	Sound Pressure Level <sup>(4)</sup>	H/M/L	dB (A)	49	46	44
	Moisture Removal		L/hr	3.0		
	Condensate Drain Tube I.D.		mm	22		
	Dimensions	W/H/D	mm	770	260	690
	Weight		kg	31		
	Package Dimensions	W/H/D	mm	959	315	854
	Packaged Weight		kg	33		
	Units per Pallet		Units	6		
Stacking Height		Units	6			
<b>OUTDOOR</b>	Refrigerant Control		Capillary			
	Compressor Type, Model		Rotary			
	Fan Type & Quantity		Axial & 1			
	Fan Speeds	H/L	RPM	850		
	Airflow	H/L	M <sup>3</sup> /hr	3150		
	Sound Power Level	H/L	dB (A)	66		
	Sound Pressure Level <sup>(4)</sup>	H/L	dB (A)	58		
	Dimensions	W/H/D	mm	900	860	340
	Weight		kg	78		
	Package Dimensions	W/H/D	mm	985	907	435
	Packaged Weight		kg	82		
	Units per Pallet		Units	6		
	Stacking Height		Units	2		
	Refrigerant Type		R 410A			
	Refrigerant Chargeless Distance		kg/m	2.42/ 15		
	Additional Charge Per 1 Meter		g/m	25		
	Connections Between Units	Liquid Line	In	3/8		
Suction Line		In	5/8			
Max. Tubing Length		m	50			
Max. Height Difference		m	25			
Operation Control Type		LCD Remote Control				
Heating Elements		kW				
Others		Crankcase heater (50W), 3 Phase Protector				

- 1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN14511.
- 2) Airflow in ducted units; at nominal external static pressure.
- 3) Sound power in ducted units is measured at air discharge.
- 4) Sound pressure level measured at 1 meter distance from unit.

Model Indoor Unit			DLS 37			
Model Outdoor Unit			GCN 37 NRC			
Installation Method			DUCTED			
<b>Characteristics</b>		<b>Units</b>	<b>Cooling</b>		<b>Heating</b>	
Capacity <sup>(1)</sup>	Btu/hr		36350		38200	
	kW		10.6		11.2	
Power Input <sup>(1)</sup>	kW		3.8		3.7	
COP <sup>(1)</sup>	W/W		2.81		3.05	
Energy Efficiency Class			C		D	
Power Supply		V/Ph/Hz	230/50/1			
Rated Current		A	16.9		16.3	
Starting Current		A	92			
Circuit Breaker Rating		A	25			
<b>INDOOR</b>	Fan Type & Quantity		CENTRIFUGAL X1			
	Fan Speed	H/M/L	RPM	775	650	
	Airflow <sup>(2)</sup>	H/M/L	M <sup>3</sup> /hr	1840	1520	
	External Static Pressure		Min-Max	Pa		
	Sound Power Level <sup>(3)</sup>		H/M/L	dB (A)		67
	Sound Pressure Level <sup>(4)</sup>		H/M/L	dB (A)		51
	Moisture Removal		L/hr	3.7		
	Condensate Drain Tube I.D.		mm	22		
	Dimensions		W/H/D	mm	835	300
	Weight		kg	33		
	Package Dimensions		W/H/D	mm	1010	342
	Packaged Weight		kg	35		
	Units per Pallet		Units	6		
	Stacking Height		Units	6		
<b>OUTDOOR</b>	Refrigerant Control		Capillary			
	Compressor Type, Model		Rotary			
	Fan Type & Quantity		Axial & 1			
	Fan Speeds	H/L	RPM	1125		
	Airflow	H/L	M <sup>3</sup> /hr	4150		
	Sound Power Level	H/L	dB (A)	70.9		
	Sound Pressure Level <sup>(4)</sup>	H/L	dB (A)	63		
	Dimensions		W/H/D	mm	900	970
	Weight		kg	87		
	Package Dimensions		W/H/D	mm	985	1020
	Packaged Weight		kg	91		
	Units per Pallet		Units	6		
	Stacking Height		Units	2		
	Refrigerant Type		R 410A			
	Refrigerant Chargeless Distance		kg/m	2.55/ 15		
	Additional Charge Per 1 Meter		g/m	25		
	Connections Between Units	Liquid Line		In		
Suction Line		In				
Max. Tubing Length		m				
Max. Height Difference		m				
Operation Control Type		LCD Remote Control				
Heating Elements		kW				
Others		Crankcase heater (50W)				

- 1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN14511.
- 2) Airflow in ducted units; at nominal external static pressure.
- 3) Sound power in ducted units is measured at air discharge.
- 4) Sound pressure level measured at 1 meter distance from unit.

PRODUCT DATA SHEET

Model Indoor Unit			DLS 37			
Model Outdoor Unit			GC N 37 NRC (3PH)			
Installation Method			DUCTED			
<b>Characteristics</b>		<b>Units</b>	<b>Cooling</b>		<b>Heating</b>	
Capacity <sup>(1)</sup>		Btu/hr	35480	37870		
		kW	10.4	11.1		
Power Input <sup>(1)</sup>		kW	3.7	3.6		
COP <sup>(1)</sup>		W/W	2.83	3.1		
Energy Efficiency Class			C	D		
Power Supply		V/Ph/Hz	400/50/3			
Rated Current		A	3*10	3*9.6		
Starting Current		A	43			
Circuit Breaker Rating		A	3*16			
<b>INDOOR</b>	Fan Type & Quantity		CENTRIFUGAL X1			
	Fan Speed	H/M/L	RPM	775	650 540	
	Airflow <sup>(2)</sup>	H/M/L	M <sup>3</sup> /hr	1840	1520 1210	
	External Static Pressure	Min-Max	Pa	37-100		
	Sound Power Level <sup>(3)</sup>	H/M/L	dB (A)	67	63 60	
	Sound Pressure Level <sup>(4)</sup>	H/M/L	dB (A)	51	48 45	
	Moisture Removal		L/hr	3.7		
	Condensate Drain Tube I.D.		mm	22		
	Dimensions	W/H/D	mm	835	300 755	
	Weight		kg	33		
	Package Dimensions	W/H/D	mm	1010	342 917	
	Packaged Weight		kg	35		
	Units per Pallet		Units	6		
	Stacking Height		Units	6		
<b>OUTDOOR</b>	Refrigerant Control		Capillary			
	Compressor Type, Model		Rotary			
	Fan Type & Quantity		Axial & 1			
	Fan Speeds	H/L	RPM	1125		
	Airflow	H/L	M <sup>3</sup> /hr	4150		
	Sound Power Level	H/L	dB (A)	70.9		
	Sound Pressure Level <sup>(4)</sup>	H/L	dB (A)	63		
	Dimensions	W/H/D	mm	900	970 340	
	Weight		kg	87		
	Package Dimensions	W/H/D	mm	985	1020 435	
	Packaged Weight		kg	91		
	Units per Pallet		Units	6		
	Stacking Height		Units	2		
	Refrigerant Type		R 410A			
	Refrigerant Chargeless Distance		kg/m	2.45/ 15		
	Additional Charge Per 1 Meter		g/m	25		
	Connections Between Units	Liquid Line	in	3/8		
Suction Line		in	3/4			
Max. Tubing Length		m	50			
Max. Height Difference		m	25			
Operation Control Type		LCD Remote Control				
Heating Elements		kW				
Others		Crankcase heater (50W), 3 Phase Protector				

- 1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN14511.
- 2) Airflow in ducted units; at nominal external static pressure.
- 3) Sound power in ducted units is measured at air discharge.
- 4) Sound pressure level measured at 1 meter distance from unit.

Model Indoor Unit			DLS 44			
Model Outdoor Unit			GCN 40 NRC (3PH)			
Installation Method			DUCTED			
<b>Characteristics</b>		<b>Units</b>	<b>Cooling</b>		<b>Heating</b>	
Capacity <sup>(1)</sup>	Btu/hr		42300		47000	
	kW		12.4		13.8	
Power Input <sup>(1)</sup>	kW		4.6		4.5	
COP <sup>(1)</sup>	W/W		2.7		3.03	
Energy Efficiency Class			D		D	
Power Supply		V/Ph/Hz	400/50/3			
Rated Current		A	3*13.7		3*13.0	
Starting Current		A				
Circuit Breaker Rating		A	3*16			
<b>INDOOR</b>	Fan Type & Quantity		CENTRIFUGAL X1			
	Fan Speed	H/M/L	RPM	870	665	
	Airflow <sup>(2)</sup>	H/M/L	M <sup>3</sup> /hr	2040	1490	
	External Static Pressure	Min-Max	Pa	50-100		
	Sound Power Level <sup>(3)</sup>	H/M/L	dB (A)	71	67	
	Sound Pressure Level <sup>(4)</sup>	H/M/L	dB (A)	52	49	
	Moisture Removal		L/hr	4.4		
	Condensate Drain Tube I.D.		mm	22		
	Dimensions	W/H/D	mm	835	300	
	Weight		kg	33		
	Package Dimensions	W/H/D	mm	1010	342	
	Packaged Weight		kg	38		
	Units per Pallet		Units	6		
	Stacking Height		Units	6		
<b>OUTDOOR</b>	Refrigerant Control		Capillary			
	Compressor Type, Model		Scroll			
	Fan Type & Quantity		Axial & 1			
	Fan Speeds	H/L	RPM	1240		
	Airflow	H/L	M <sup>3</sup> /hr	4500		
	Sound Power Level	H/L	dB (A)	72		
	Sound Pressure Level <sup>(4)</sup>	H/L	dB (A)	64		
	Dimensions	W/H/D	mm	900	970	
	Weight		kg	87		
	Package Dimensions	W/H/D	mm	985	1020	
	Packaged Weight		kg	94		
	Units per Pallet		Units	6		
	Stacking Height		Units	2		
	Refrigerant Type		R 410A			
	Refrigerant Chargeless Distance		kg/m	2.92/ 15		
	Additional Charge Per 1 Meter		g/m	25		
Connections Between Units	Liquid Line	In	3/8			
	Suction Line	In	3/4			
	Max. Tubing Length	m	50			
	Max. Height Difference	m	25			
Operation Control Type		LCD Remote Control				
Heating Elements		kW				
Others		Crankcase heater (50W), 3 Phase Protector				

- 1) Rating conditions in accordance with ISO 5151 and ISO 13253 (for ducted units) and EN14511.
- 2) Airflow in ducted units; at nominal external static pressure.
- 3) Sound power in ducted units is measured at air discharge.
- 4) Sound pressure level measured at 1 meter distance from unit.

### 3. RATING CONDITIONS

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

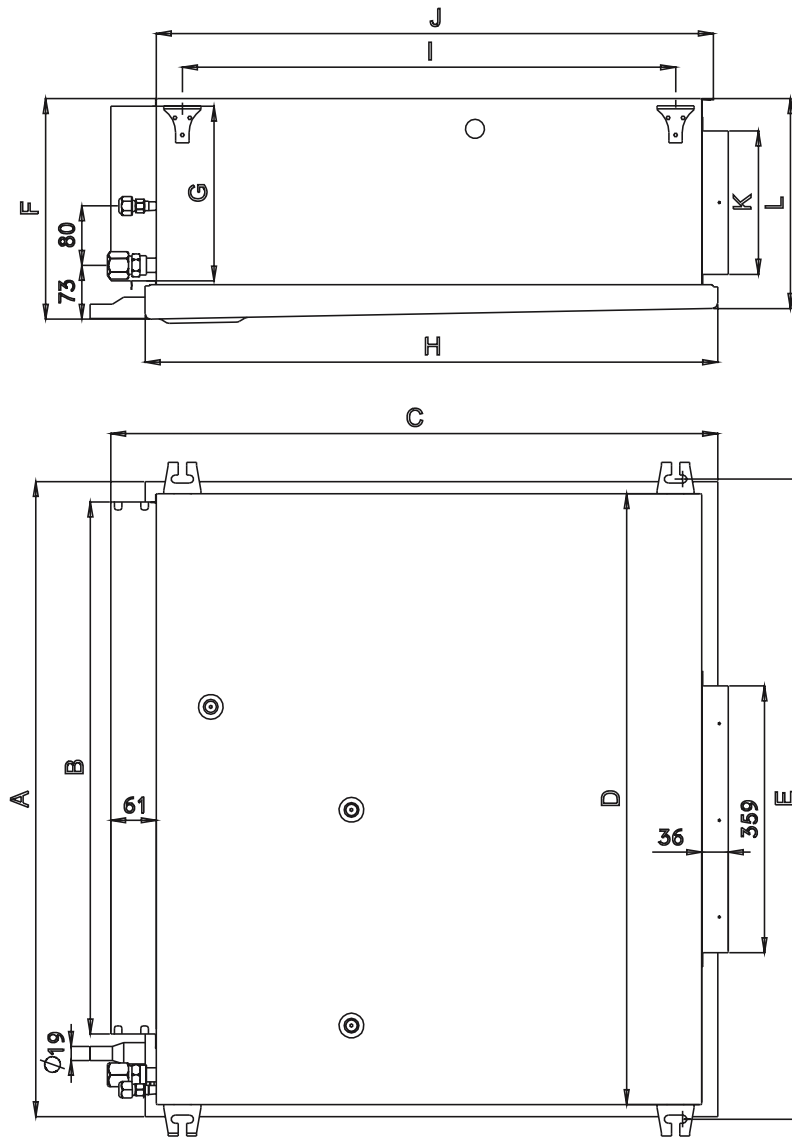
#### 3.1 Operating Limits

		Indoor	Outdoor
<b>Cooling</b>	Upper limit	32°C DB 23°C WB	46°C DB
	Lower limit	21°C DB 15°C WB	21°C DB
<b>Heating</b>	Upper limit	27°C DB	24°C DB 18°C WB
	Lower limit	20°C DB	-9°C DB -10°C WB
<b>Voltage</b>	1PH	198 – 242 V	
	3PH	360 – 440 V	



## 4. OUTLINE DIMENSIONS

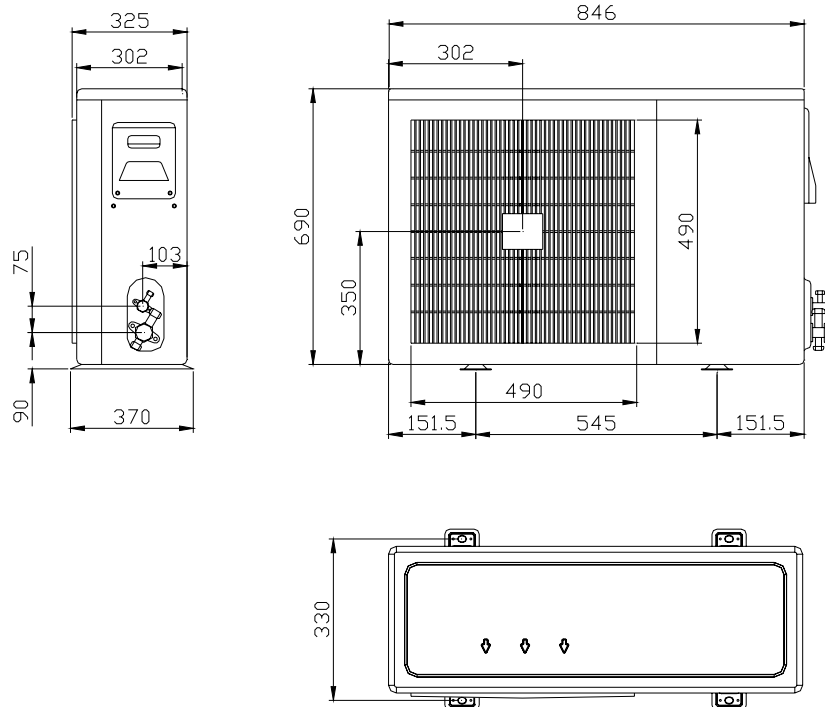
### 4.1 Indoor Unit: DLS 18, 24, 30, 37, 44



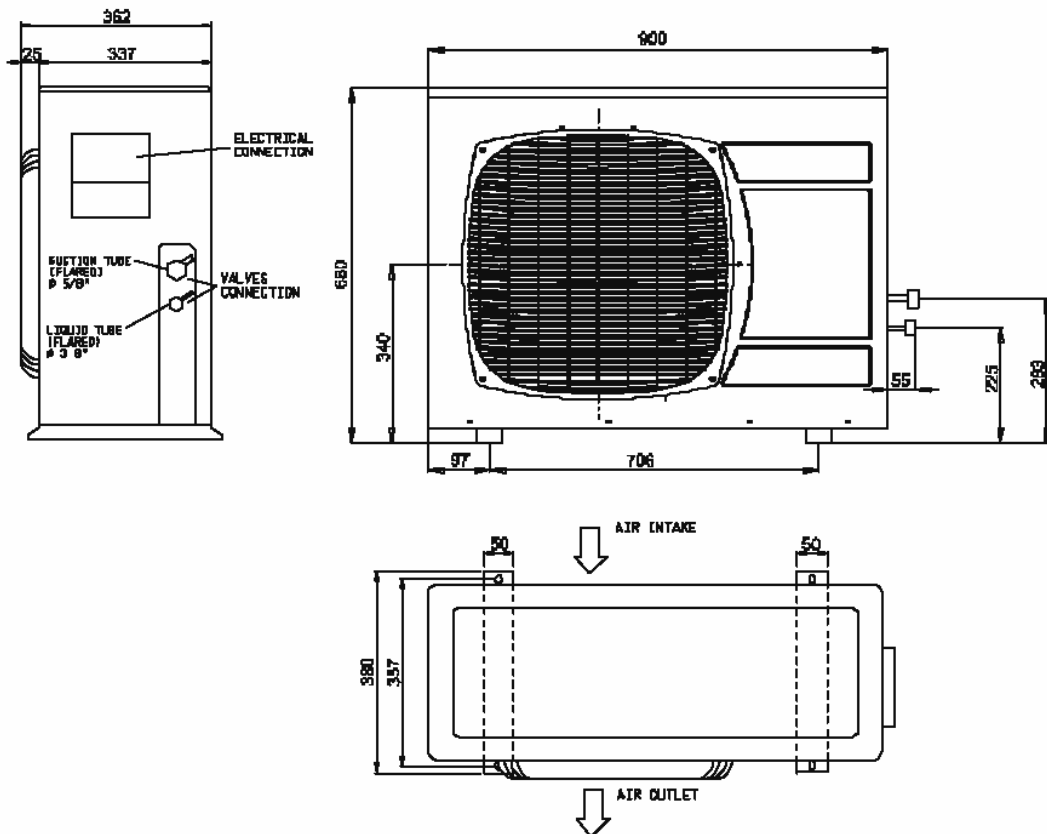
Model	A	B	C	D	E	F	G	H	I	J	K	L
DLS 18,24,30	790	653	749	758	797	256	195	702	599	684	162	242
DLS 37,44	854	715	816	822	861	297	235	770	663	749	193	282

# OUTLINE DIMENSIONS

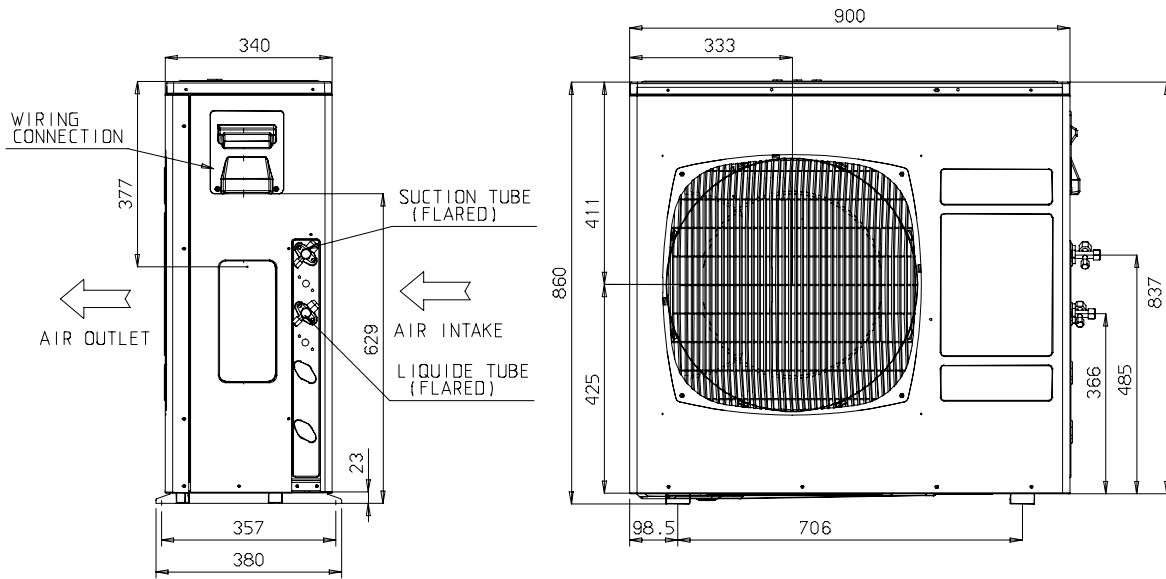
## 4.2 Outdoor Unit: GC 18 NRC



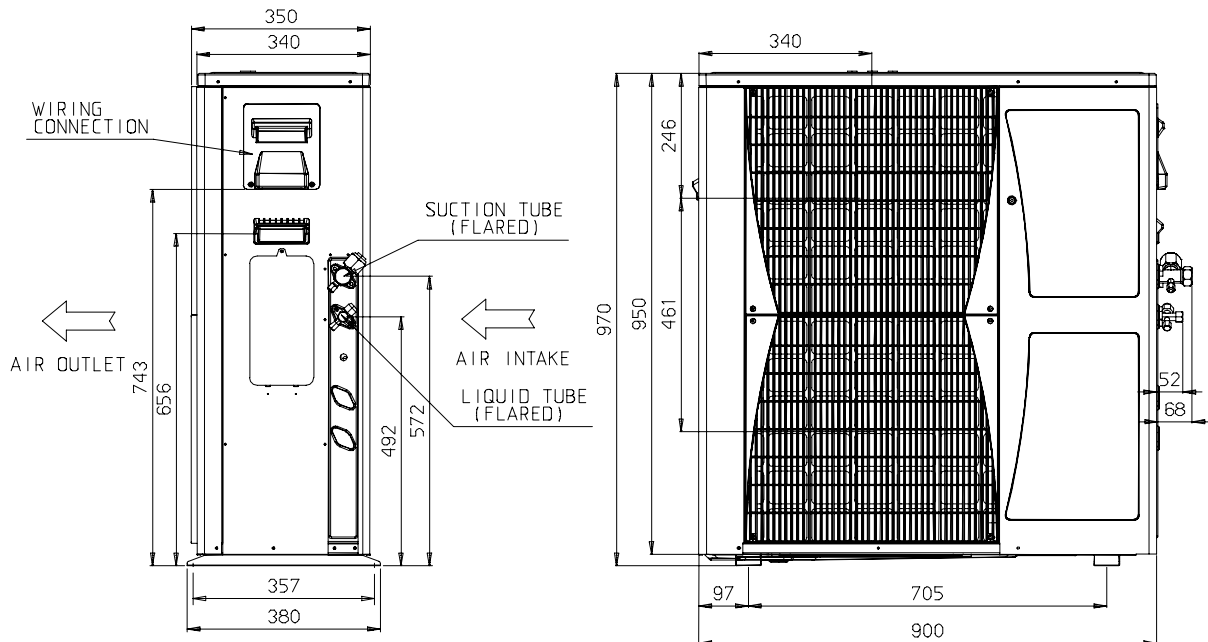
## 4.3 Outdoor Unit: GC 24 NRC



**4.4 Outdoor Unit: GCN 30NRC**



**4.5 Outdoor Unit: GCN 37 NRC , GCN 40 NRC**



**5. PERFORMANCE DATA & PRESSURE CURVES**

**5.1 DLS 18, GC18 NRC (1PH / 3PH)**

**5.1.1 Cooling Capacity (kW)**

ENTERING AIR DB OU COIL (°C)	DATA	ENTERING AIR WB/DB ID COIL ( °C)				
		15/21	17/24	19/27	21/29	23/32
15 <sup>(1)</sup>	TC	5.90	6.11	6.26	6.41	6.50
	SC	3.82	3.98	4.14	4.24	4.32
	PI	1.28	1.28	1.28	1.28	1.29
20 <sup>(1)</sup>	TC	5.71	6.02	6.21	6.36	6.46
	SC	3.74	3.95	4.11	4.23	4.31
	PI	1.39	1.39	1.39	1.40	1.41
25	TC	5.40	5.83	6.13	6.32	6.47
	SC	3.65	3.87	4.08	4.20	4.28
	PI	1.50	1.51	1.52	1.53	1.54
30	TC	5.05	5.50	5.94	6.16	6.34
	SC	3.53	3.75	3.99	4.11	4.19
	PI	1.62	1.64	1.65	1.67	1.68
35	TC	4.68	5.08	5.60	5.88	6.16
	SC	3.36	3.60	3.90	4.01	4.09
	PI	1.74	1.77	1.80	1.81	1.82
40	TC	4.25	4.63	5.05	5.53	5.81
	SC	3.17	3.41	3.69	3.81	3.88
	PI	1.88	1.91	1.94	1.96	1.98
46	TC	3.69	4.04	4.44	4.90	5.28
	SC	2.92	3.12	3.36	3.48	3.56
	PI	2.05	2.08	2.13	2.16	2.19

**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 Heating**

ENTERING WB OD COIL(°C)	ENTERING AIR DB ID COIL(°C)					
	15		20		25	
	TH	PI	TH	PI	TH	PI
-10	3.06	1.36	2.94	1.45	2.83	1.52
-7	3.29	1.39	3.18	1.47	3.06	1.55
-2	3.50	1.41	3.38	1.50	3.26	1.58
2	4.26	1.48	4.08	1.57	3.91	1.67
6	5.46	1.59	<b>5.30</b>	<b>1.70</b>	5.11	1.81
10	5.94	1.68	5.78	1.79	5.62	1.92
15	6.41	1.75	6.25	1.89	6.10	2.01
20	6.76	1.80	6.60	1.96	6.41	2.11

**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 Capacity Correction Factor Due to Tubing Length**

**5.2.1 Cooling**

TOTAL TUBING LENGTH (One Way)								
3m	7.5m	10m	15m	20m	25m	30m	40m	50m
1.01	<b>1</b>	0.97	0.96	0.95	0.94	---	---	---

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

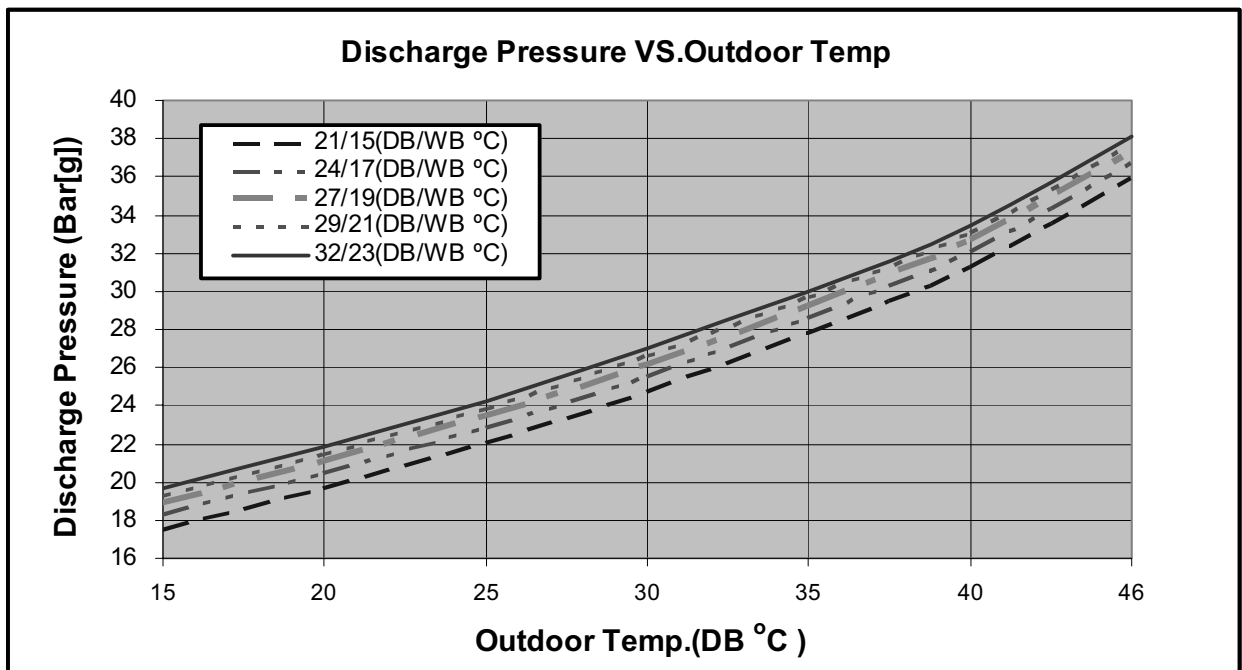
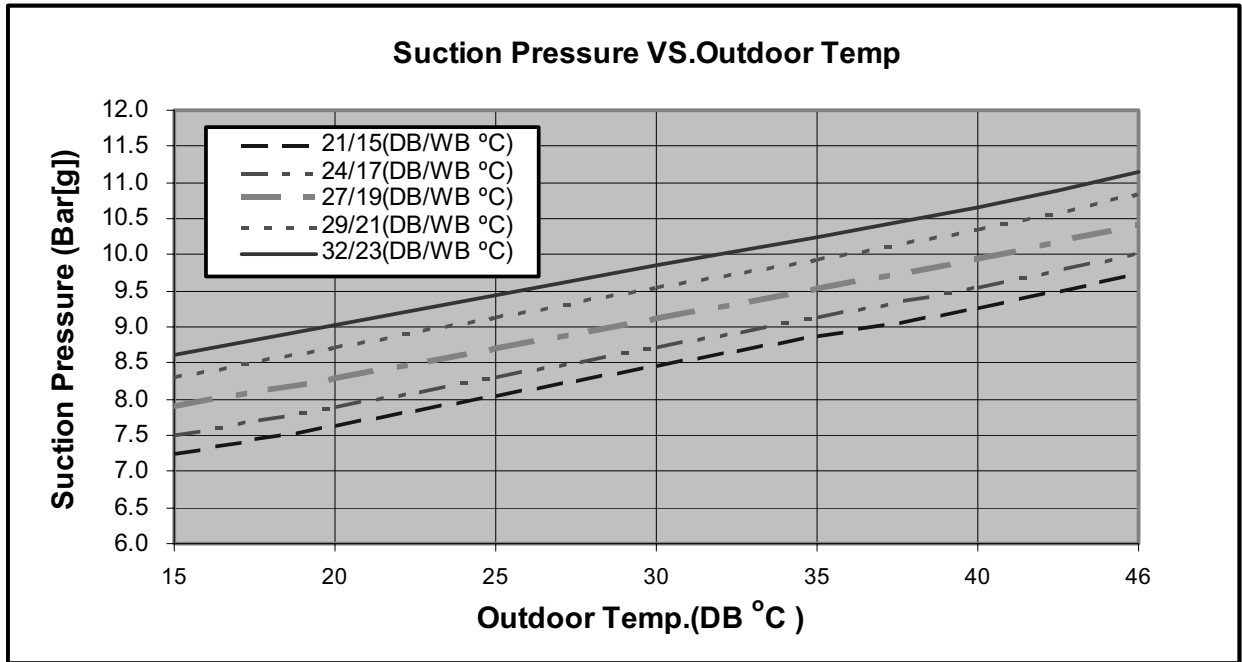
**5.2.2 Heating**

TOTAL TUBING LENGTH (One Way)								
3m	7.5m	10m	15m	20m	25m	30m	40m	50m
1.02	<b>1</b>	0.98	0.97	0.95	0.93	---	---	---

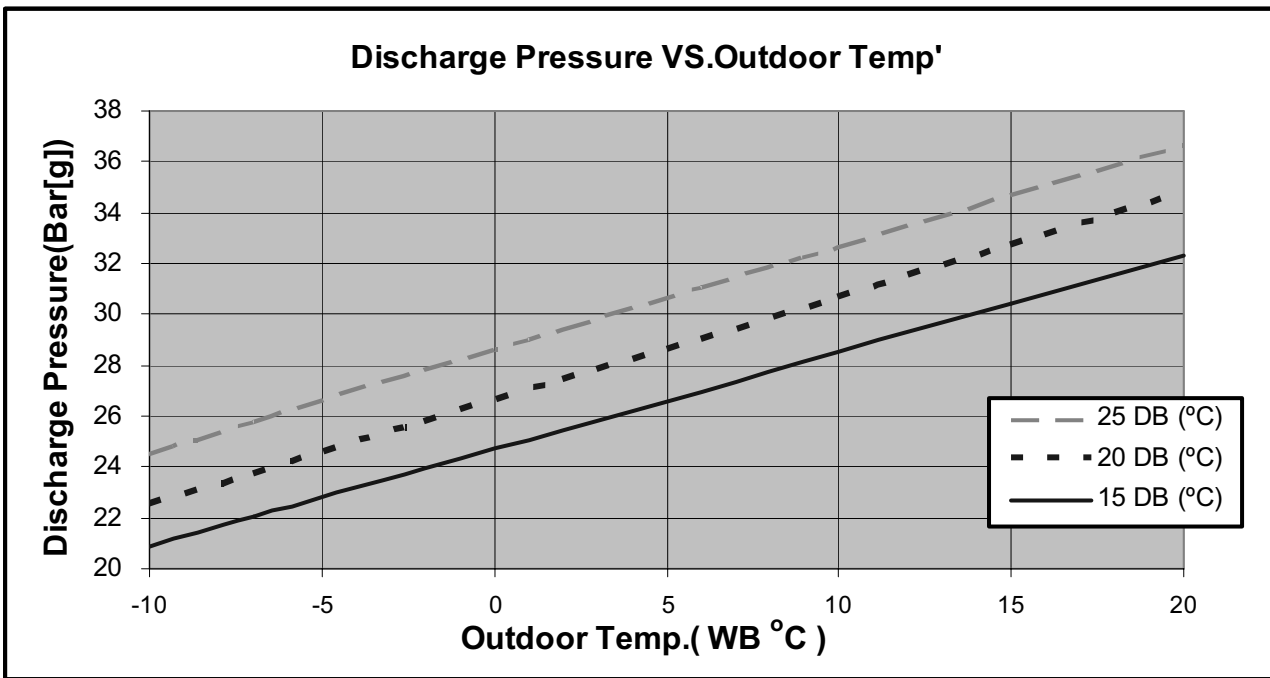
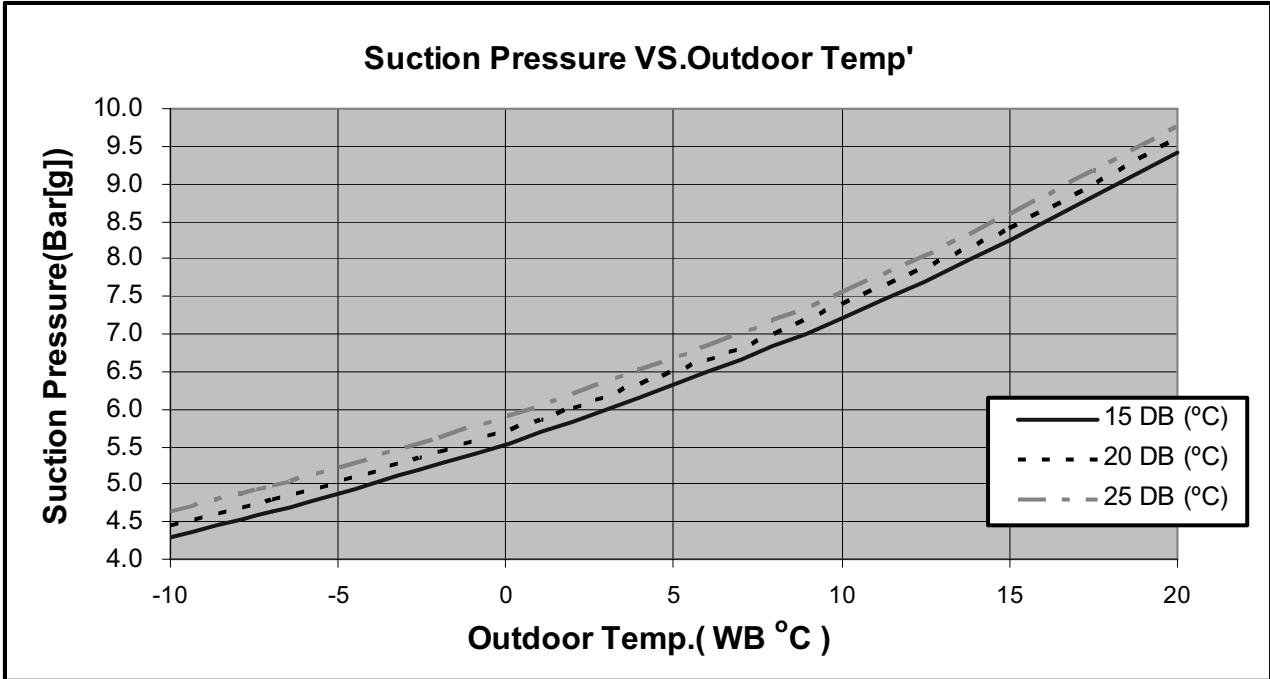
\* Minimum recommended tubing length between indoor and outdoor units is 3m.

### 5.3 Pressure Curves

#### 5.3.1 Cooling



5.3.2 Heating



**5.4 DLS 24, GC 24 NRC (1PH / 3PH)**

**5.4.1 Cooling Capacity (kW)**

ENTERING AIR DB OU COIL (°C)	DATA	ENTERING AIR WB/DB ID COIL ( °C)				
		15/21	17/24	19/27	21/29	23/32
15 <sup>(1)</sup>	TC	7.27	7.53	7.71	7.89	8.01
	SC	5.24	5.46	5.68	5.82	5.93
	PI	1.70	1.71	1.71	1.71	1.72
20 <sup>(1)</sup>	TC	7.04	7.42	7.65	7.83	7.97
	SC	5.13	5.41	5.64	5.80	5.91
	PI	1.85	1.85	1.86	1.87	1.87
25	TC	6.66	7.19	7.56	7.79	7.98
	SC	5.00	5.31	5.60	5.76	5.87
	PI	2.00	2.01	2.02	2.04	2.05
30	TC	6.23	6.78	7.32	7.58	7.81
	SC	4.85	5.15	5.48	5.64	5.74
	PI	2.15	2.19	2.20	2.22	2.24
35	TC	5.76	6.26	6.90	7.25	7.59
	SC	4.61	4.94	5.35	5.51	5.61
	PI	2.32	2.36	2.40	2.42	2.43
40	TC	5.24	5.71	6.23	6.81	7.16
	SC	4.34	4.67	5.06	5.22	5.33
	PI	2.51	2.54	2.59	2.62	2.65
46	TC	4.55	4.97	5.47	6.04	6.51
	SC	4.00	4.29	4.61	4.78	4.88
	PI	2.74	2.78	2.84	2.88	2.91

**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 Heating**

ENTERING WB OD COIL(°C)	ENTERING AIR DB ID COIL(°C)					
	15		20		25	
	TH	PI	TH	PI	TH	PI
-10	4.04	1.84	3.89	1.96	3.73	2.06
-7	4.35	1.89	4.20	1.99	4.04	2.10
-2	4.62	1.91	4.47	2.02	4.31	2.14
2	5.62	2.00	5.39	2.13	5.16	2.25
6	7.21	2.15	<b>7.00</b>	<b>2.30</b>	6.76	2.44
10	7.84	2.27	7.63	2.43	7.42	2.59
15	8.47	2.37	8.26	2.55	8.05	2.71
20	8.93	2.44	8.72	2.65	8.47	2.85

**LEGEND**

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

**5.5 Capacity Correction Factor Due to Tubing Length**

**5.5.1 Cooling**

TOTAL TUBING LENGTH (One Way)								
3m	7.5m	10m	15m	20m	25m	30m	40m	50m
1.01	<b>1</b>	0.98	0.97	0.96	0.95	0.94	0.93	0.9

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

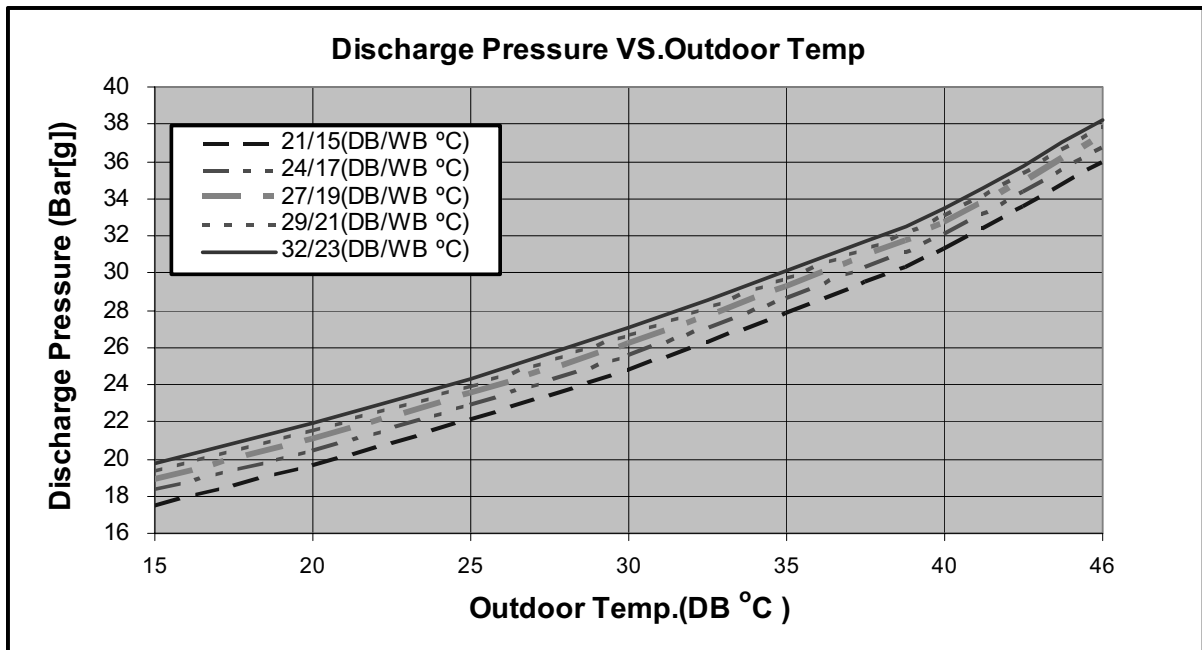
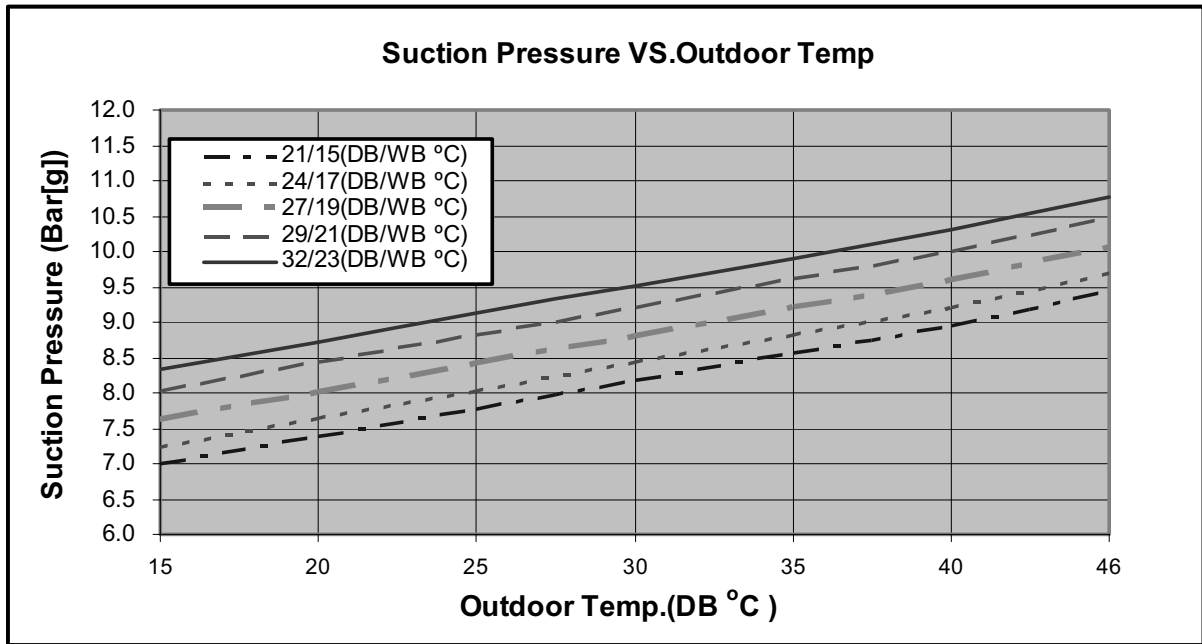
**5.5.2 Heating**

TOTAL TUBING LENGTH (One Way)								
3m	7.5m	10m	15m	20m	25m	30m	40m	50m
1.02	<b>1</b>	0.99	0.99	0.98	0.97	0.97	0.96	0.95

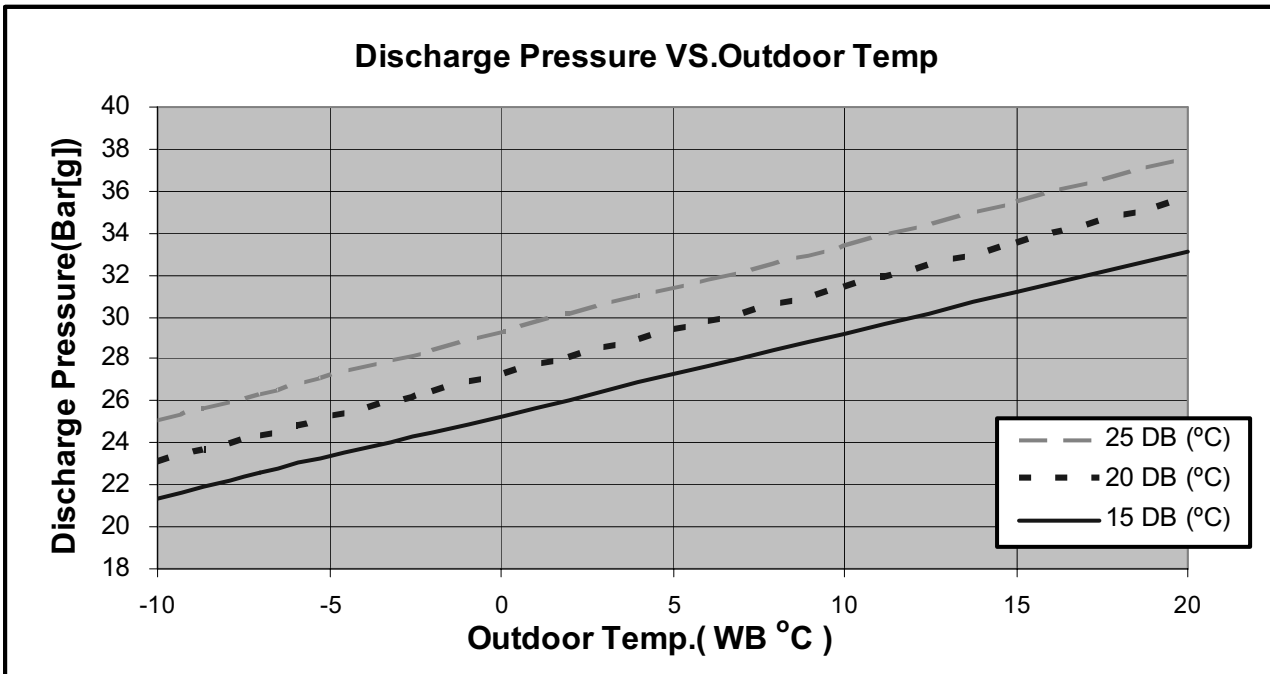
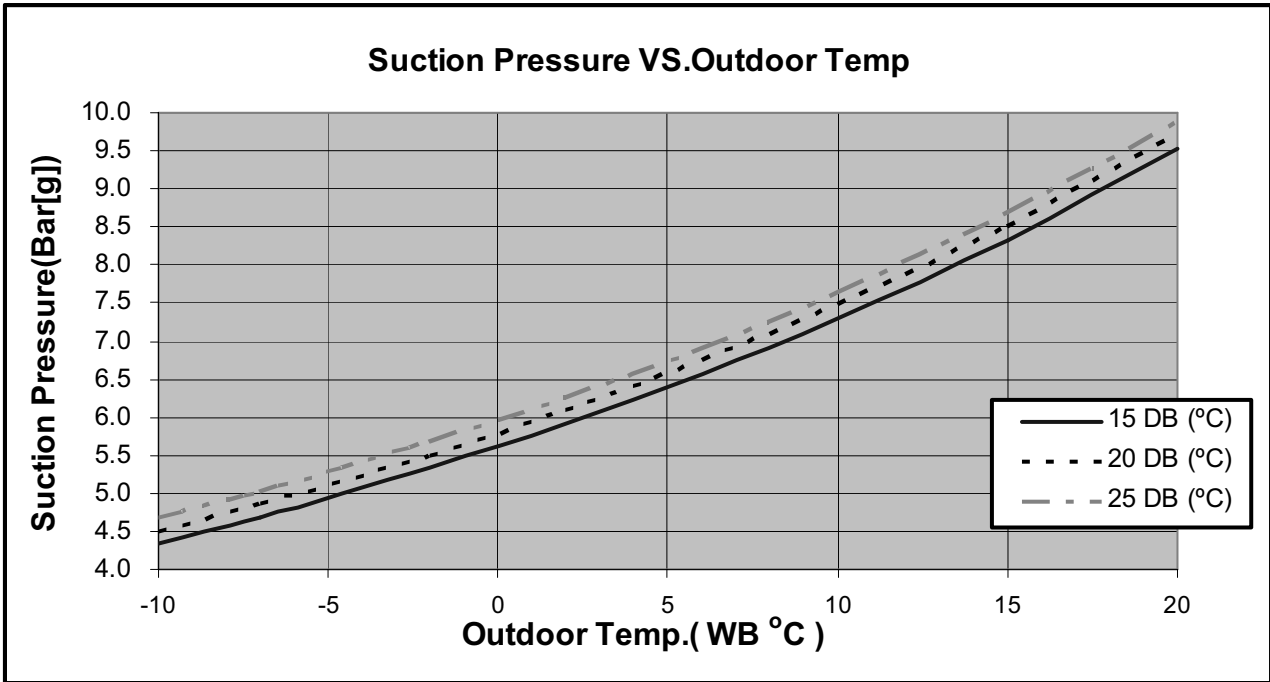
\* Minimum recommended tubing length between indoor and outdoor units is 3m.

5.6 Pressure Curves

5.6.1 Cooling



5.6.2 Heating



**5.7 DLS 30, GCN 30 NRC (1PH / 3PH)**

**5.7.1 Cooling Capacity (kW)**

ENTERING AIR DB OU COIL (°C)	DATA	ENTERING AIR WB/DB ID COIL ( °C)				
		15/21	17/24	19/27	21/29	23/32
15 <sup>(1)</sup>	TC	8.96	9.28	9.50	9.72	9.87
	SC	6.36	6.63	6.89	7.06	7.19
	PI	2.13	2.13	2.14	2.14	2.15
20 <sup>(1)</sup>	TC	8.67	9.14	9.42	9.65	9.81
	SC	6.23	6.57	6.84	7.04	7.17
	PI	2.31	2.32	2.32	2.34	2.34
25	TC	8.20	8.85	9.31	9.59	9.83
	SC	6.07	6.44	6.79	6.99	7.12
	PI	2.50	2.51	2.53	2.55	2.56
30	TC	7.67	8.35	9.02	9.34	9.62
	SC	5.88	6.25	6.64	6.84	6.97
	PI	2.69	2.73	2.75	2.78	2.80
35	TC	7.10	7.71	8.50	8.93	9.35
	SC	5.59	5.99	6.49	6.68	6.81
	PI	2.90	2.95	3.00	3.02	3.04
40	TC	6.46	7.03	7.67	8.39	8.82
	SC	5.27	5.67	6.14	6.33	6.46
	PI	3.13	3.18	3.23	3.27	3.31
46	TC	5.60	6.13	6.74	7.44	8.02
	SC	4.85	5.20	5.60	5.79	5.92
	PI	3.42	3.47	3.55	3.60	3.64

**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

**5.7.2 Heating**

ENTERING WB OD COIL(°C)	ENTERING AIR DB ID COIL(°C)					
	15		20		25	
	TH	PI	TH	PI	TH	PI
-10	5.20	2.24	5.00	2.39	4.80	2.51
-7	5.59	2.30	5.40	2.42	5.20	2.55
-2	5.94	2.32	5.74	2.46	5.54	2.60
2	7.23	2.44	6.93	2.59	6.63	2.74
6	9.27	2.62	<b>9.00</b>	<b>2.80</b>	8.69	2.97
10	10.08	2.76	9.81	2.95	9.54	3.16
15	10.89	2.88	10.62	3.11	10.35	3.30
20	11.48	2.97	11.21	3.22	10.89	3.47

**LEGEND**

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

**5.8 Capacity Correction Factor Due to Tubing Length**

**5.8.1 Cooling**

TOTAL TUBING LENGTH (One Way)								
3m	7.5m	10m	15m	20m	25m	30m	40m	50m
1.01	<b>1</b>	0.98	0.97	0.96	0.95	0.94	0.93	0.9

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

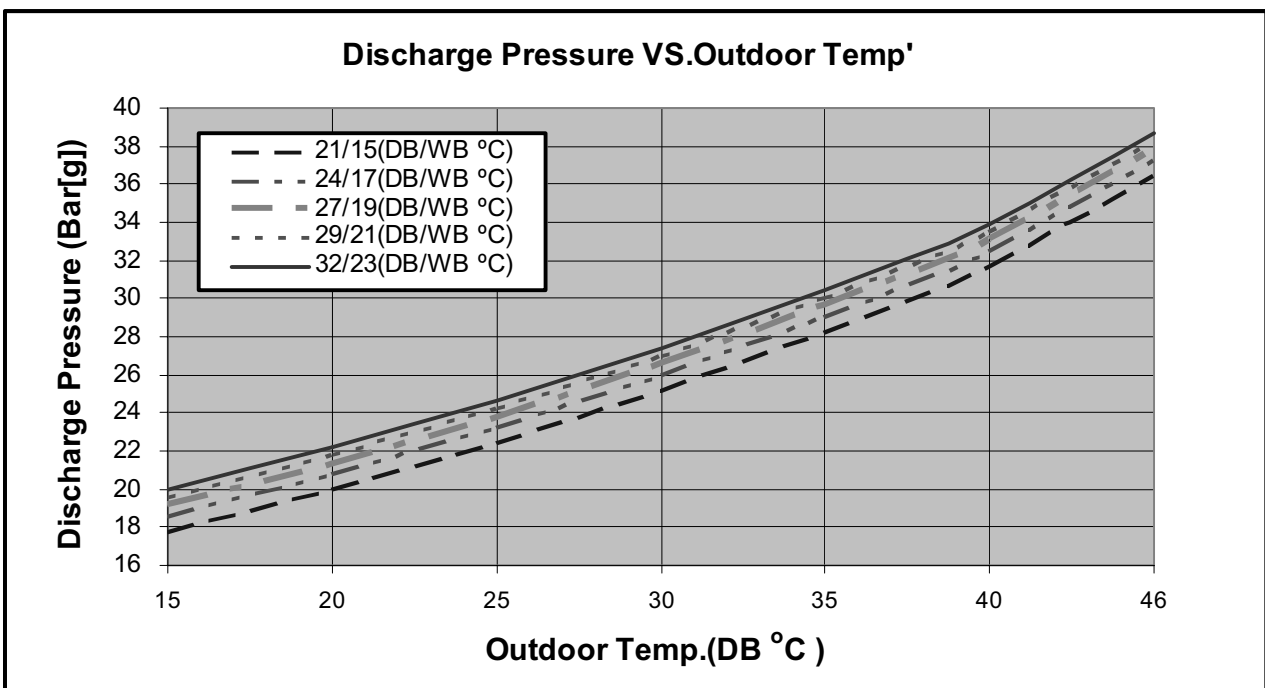
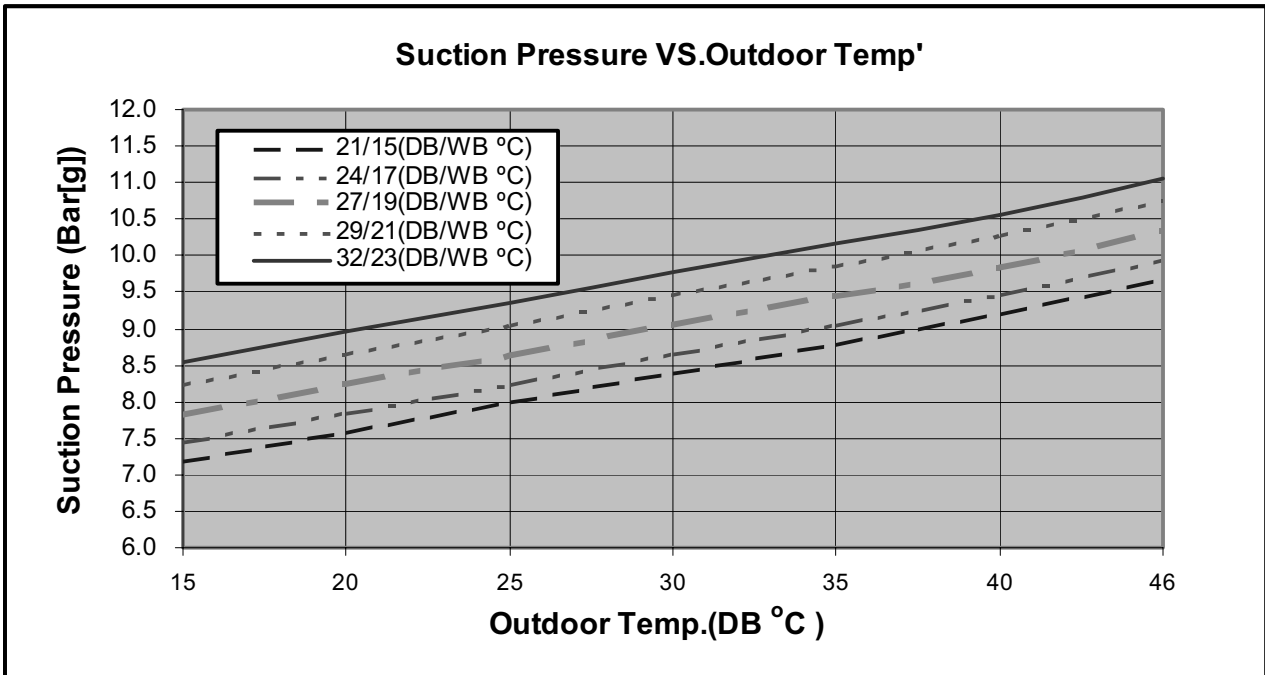
**5.8.2 Heating**

TOTAL TUBING LENGTH (One Way)								
3m	7.5m	10m	15m	20m	25m	30m	40m	50m
1.02	<b>1</b>	0.99	0.99	0.98	0.97	0.97	0.96	0.95

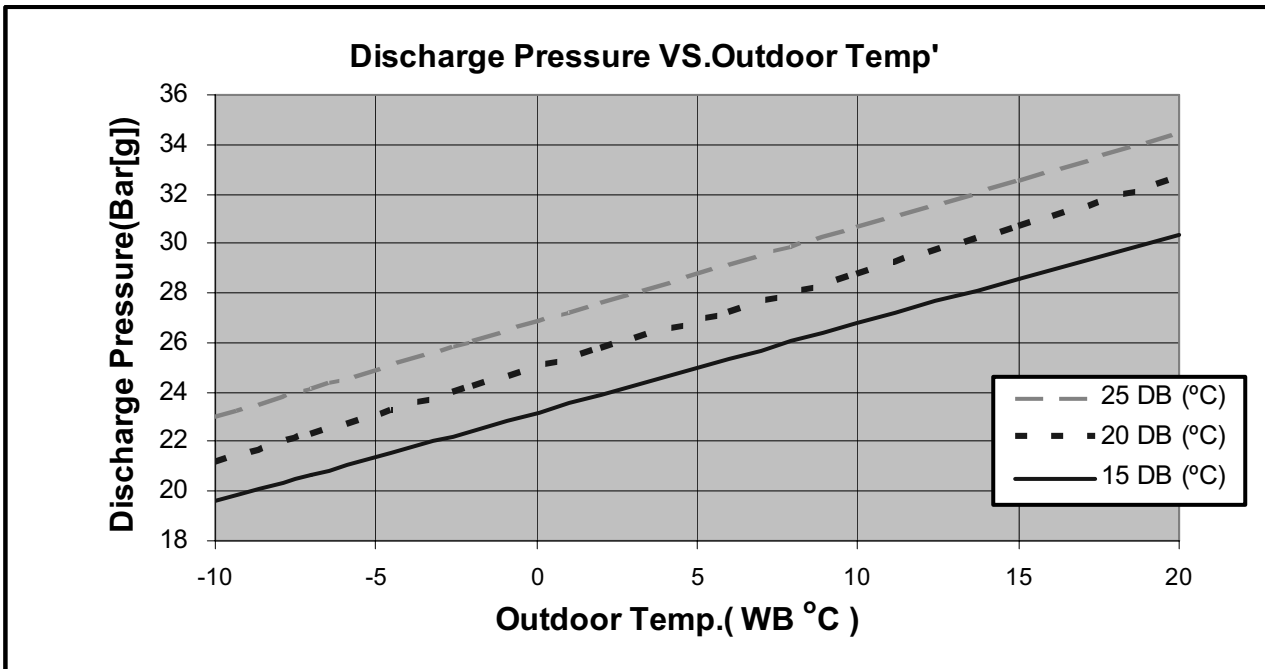
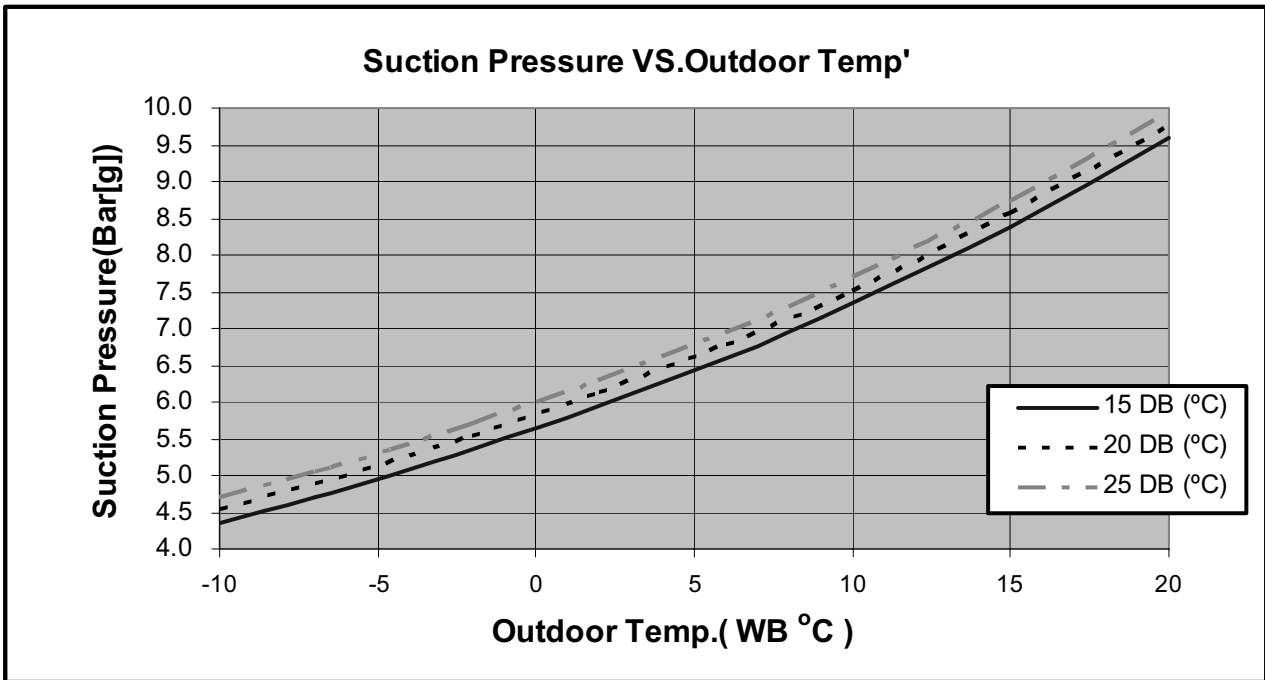
\* Minimum recommended tubing length between indoor and outdoor units is 3m.

5.9 Pressure Curves

5.9.1 Cooling



5.9.2 Heating



**5.10 DLS 37, GCN 37 NRC (1PH)**

**5.10.1 Cooling Capacity (kW)**

ENTERING AIR DB OU COIL (°C)	DATA	ENTERING AIR WB/DB ID COIL ( °C)				
		15/21	17/24	19/27	21/29	23/32
15 <sup>(1)</sup>	TC	11.17	11.57	11.85	12.12	12.31
	SC	8.02	8.36	8.69	8.91	9.07
	PI	2.69	2.70	2.71	2.71	2.72
20 <sup>(1)</sup>	TC	10.81	11.39	11.75	12.03	12.24
	SC	7.86	8.29	8.64	8.88	9.05
	PI	2.93	2.94	2.94	2.96	2.97
25	TC	10.23	11.04	11.61	11.96	12.25
	SC	7.66	8.13	8.57	8.82	8.98
	PI	3.16	3.18	3.20	3.23	3.25
30	TC	9.57	10.41	11.25	11.65	12.00
	SC	7.42	7.89	8.38	8.63	8.79
	PI	3.41	3.46	3.49	3.52	3.55
35	TC	8.86	9.61	10.60	11.13	11.66
	SC	7.05	7.56	8.19	8.43	8.59
	PI	3.68	3.74	3.80	3.83	3.85
40	TC	8.05	8.77	9.57	10.46	11.00
	SC	6.65	7.16	7.75	7.99	8.16
	PI	3.97	4.03	4.10	4.15	4.19
46	TC	6.99	7.64	8.40	9.28	10.00
	SC	6.12	6.56	7.06	7.31	7.47
	PI	4.33	4.40	4.50	4.56	4.61

**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



**5.10.2 Heating**

ENTERING WB OD COIL(°C)	ENTERING AIR DB ID COIL(°C)					
	15		20		25	
	TH	PI	TH	PI	TH	PI
-10	6.47	2.94	6.22	3.13	5.98	3.28
-7	6.96	3.01	6.71	3.17	6.47	3.35
-2	7.39	3.05	7.15	3.23	6.90	3.41
2	8.99	3.19	8.62	3.39	8.25	3.60
6	11.54	3.43	<b>11.20</b>	<b>3.67</b>	10.81	3.90
10	12.54	3.62	12.21	3.87	11.87	4.14
15	13.55	3.78	13.22	4.07	12.88	4.33
20	14.28	3.89	13.94	4.22	13.55	4.55

**LEGEND**

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

**5.11 Capacity Correction Factor Due to Tubing Length**

**5.11.1 Cooling**

TOTAL TUBING LENGTH (One Way)								
3m	7.5m	10m	15m	20m	25m	30m	40m	50m
1.02	<b>1</b>	0.99	0.98	0.98	0.97	0.96	0.95	0.92

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

**5.11.2 Heating**

TOTAL TUBING LENGTH (One Way)								
3m	7.5m	10m	15m	20m	25m	30m	40m	50m
1.03	<b>1</b>	0.99	0.99	0.98	0.98	0.97	0.96	0.95

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

**5.12 DLS 37, GCN 37 NRC (3PH)**

**5.12.1 Cooling Capacity (kW)**

ENTERING AIR DB OU COIL (°C)	DATA	ENTERING AIR WB/DB ID COIL ( °C)				
		15/21	17/24	19/27	21/29	23/32
15 <sup>(1)</sup>	TC	10.96	11.35	11.62	11.90	12.08
	SC	7.87	8.21	8.53	8.74	8.91
	PI	2.60	2.61	2.61	2.62	2.63
20 <sup>(1)</sup>	TC	10.61	11.18	11.53	11.80	12.01
	SC	7.72	8.13	8.48	8.72	8.88
	PI	2.83	2.83	2.84	2.86	2.86
25	TC	10.03	10.83	11.39	11.74	12.02
	SC	7.52	7.98	8.41	8.66	8.82
	PI	3.05	3.07	3.09	3.11	3.14
30	TC	9.38	10.22	11.04	11.43	11.77
	SC	7.28	7.74	8.23	8.47	8.63
	PI	3.29	3.34	3.37	3.40	3.43
35	TC	8.69	9.43	10.40	10.92	11.44
	SC	6.92	7.42	8.04	8.27	8.43
	PI	3.55	3.61	3.67	3.70	3.72
40	TC	7.90	8.60	9.38	10.26	10.79
	SC	6.53	7.03	7.61	7.85	8.01
	PI	3.83	3.89	3.96	4.01	4.05
46	TC	6.85	7.49	8.24	9.11	9.81
	SC	6.01	6.44	6.94	7.18	7.34
	PI	4.19	4.25	4.35	4.41	4.46

**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

**5.12.2 Heating**

ENTERING WB OD COIL(°C)	ENTERING AIR DB ID COIL(°C)					
	15		20		25	
	TH	PI	TH	PI	TH	PI
-10	6.41	2.86	6.17	3.05	5.92	3.20
-7	6.90	2.94	6.65	3.10	6.41	3.26
-2	7.33	2.97	7.08	3.15	6.84	3.33
2	8.91	3.11	8.55	3.31	8.18	3.51
6	11.43	3.35	<b>11.10</b>	<b>3.58</b>	10.71	3.80
10	12.43	3.53	12.10	3.78	11.77	4.04
15	13.43	3.69	13.10	3.97	12.77	4.22
20	14.15	3.79	13.82	4.12	13.43	4.44

**LEGEND**

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

**5.13 Capacity Correction Factor Due to Tubing Length**

**5.13.1 Cooling**

TOTAL TUBING LENGTH (One Way)								
3m	7.5m	10m	15m	20m	25m	30m	40m	50m
1.02	<b>1</b>	0.99	0.98	0.98	0.97	0.96	0.95	0.92

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

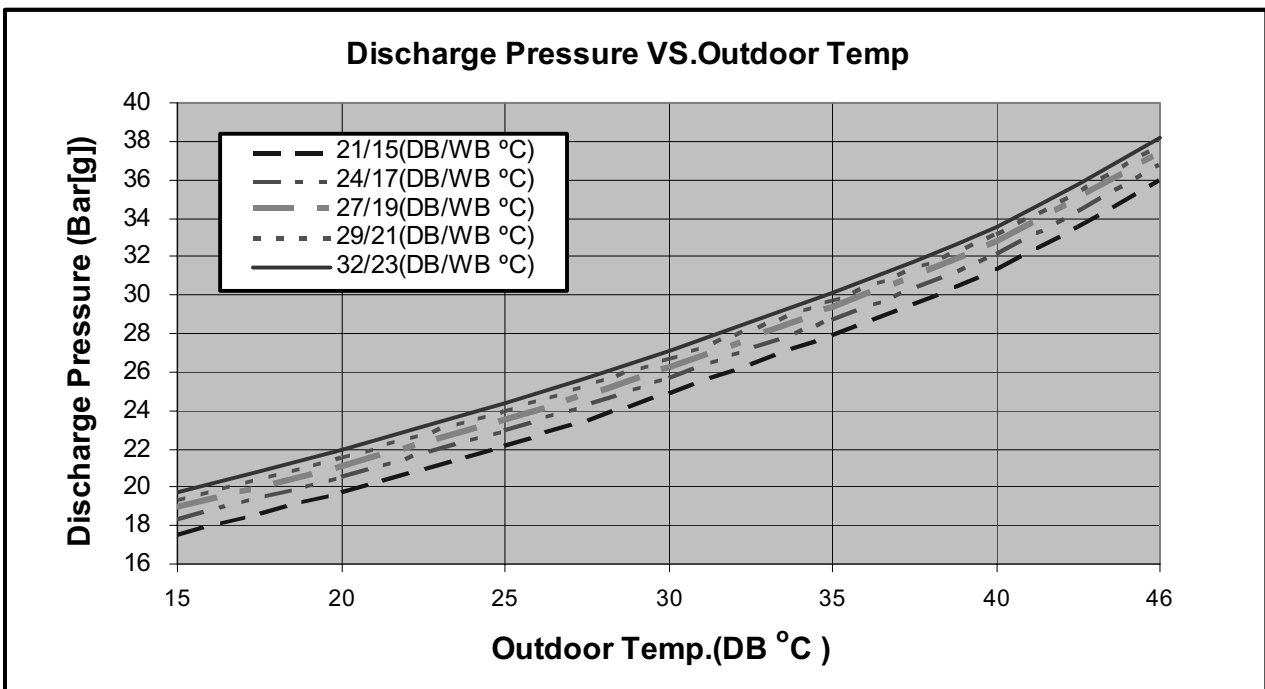
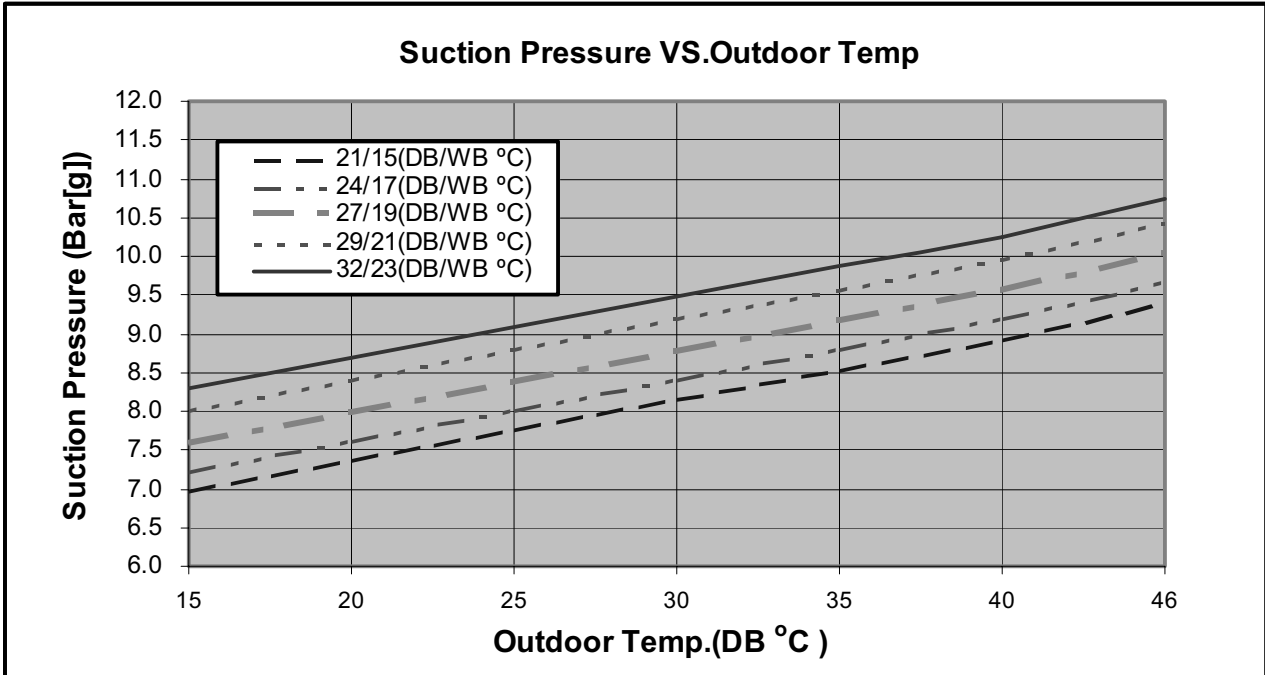
**5.13.2 Heating**

TOTAL TUBING LENGTH (One Way)								
3m	7.5m	10m	15m	20m	25m	30m	40m	50m
1.03	<b>1</b>	0.99	0.99	0.98	0.98	0.97	0.96	0.95

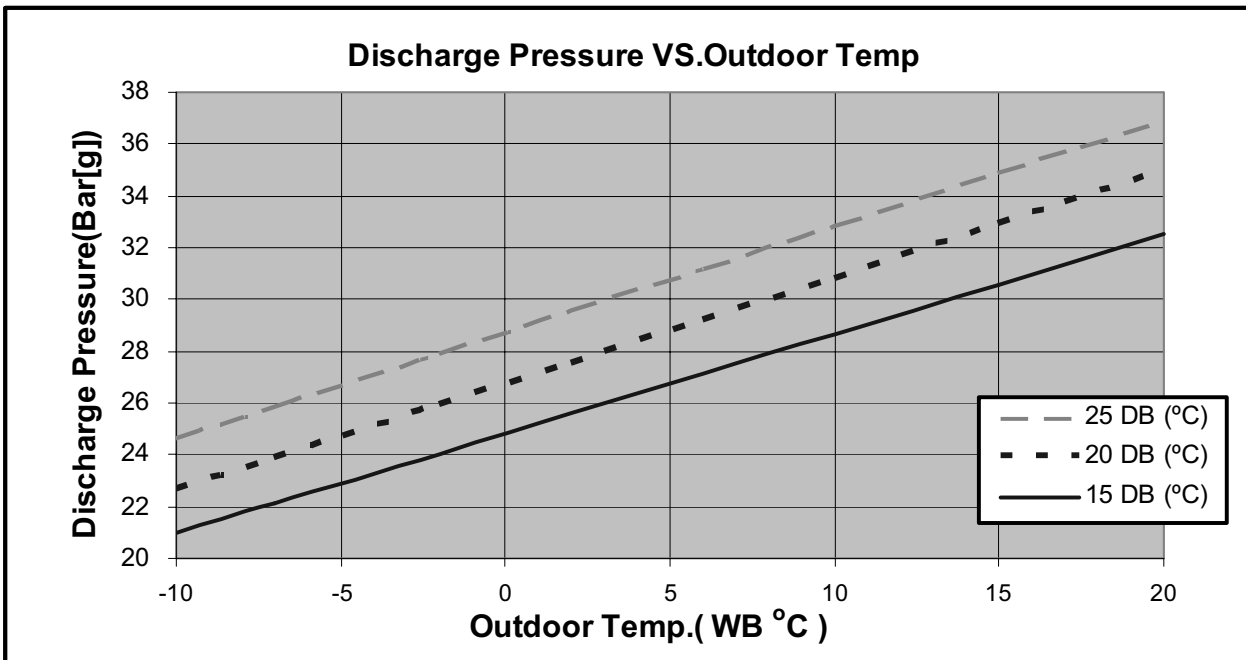
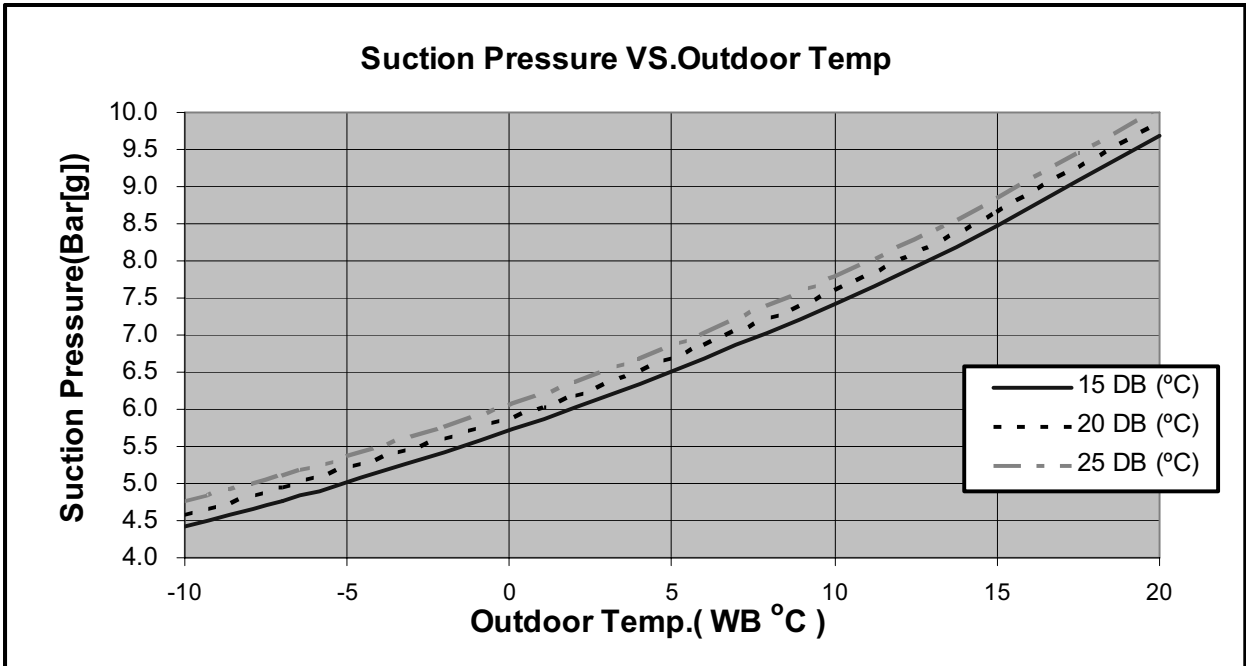
\* Minimum recommended tubing length between indoor and outdoor units is 3m.

5.14 Pressure Curves – DLS 37 (1PH/3PH)

5.14.1 Cooling



5.14.2 Heating



**5.15 DLS 44, GCN 40 (3PH)**

**5.15.1 Cooling Capacity (kW)**

ENTERING AIR DB OU COIL (°C)	DATA	ENTERING AIR WB/DB ID COIL ( °C)				
		15/21	17/24	19/27	21/29	23/32
15 <sup>(1)</sup>	TC	13.07	13.54	13.86	14.18	14.40
	SC	9.05	9.44	9.80	10.05	10.23
	PI	3.26	3.27	3.27	3.28	3.30
20 <sup>(1)</sup>	TC	12.65	13.33	13.75	14.07	14.31
	SC	8.87	9.35	9.74	10.02	10.21
	PI	3.54	3.55	3.56	3.58	3.59
25	TC	11.96	12.92	13.58	13.99	14.33
	SC	8.64	9.17	9.67	9.95	10.13
	PI	3.83	3.85	3.88	3.90	3.93
30	TC	11.19	12.18	13.16	13.63	14.03
	SC	8.37	8.90	9.46	9.74	9.92
	PI	4.13	4.19	4.22	4.26	4.30
35	TC	10.36	11.24	12.40	13.02	13.64
	SC	7.96	8.53	9.24	9.51	9.69
	PI	4.45	4.53	4.60	4.63	4.66
40	TC	9.42	10.26	11.19	12.24	12.86
	SC	7.50	8.07	8.74	9.02	9.20
	PI	4.80	4.88	4.96	5.02	5.07
46	TC	8.17	8.94	9.83	10.86	11.70
	SC	6.91	7.40	7.97	8.25	8.43
	PI	5.25	5.33	5.45	5.52	5.59

**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

**5.15.2 Heating**

ENTERING WB OD COIL(°C)	ENTERING AIR DB ID COIL(°C)					
	15		20		25	
	TH	PI	TH	PI	TH	PI
-10	7.97	3.64	7.67	3.88	7.36	4.07
-7	8.58	3.73	8.27	3.94	7.97	4.15
-2	9.11	3.78	8.80	4.00	8.50	4.23
2	11.08	3.96	10.63	4.21	10.17	4.46
6	14.21	4.25	<b>13.80</b>	<b>4.55</b>	13.32	4.83
10	15.46	4.49	15.04	4.80	14.63	5.13
15	16.70	4.69	16.28	5.05	15.87	5.37
20	17.60	4.82	17.18	5.23	16.70	5.64

**LEGEND**

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

**5.16 Capacity Correction Factor Due to Tubing Length**

**5.16.1 Cooling**

TOTAL TUBING LENGTH (One Way)								
3m	7.5m	10m	15m	20m	25m	30m	40m	50m
1.02	<b>1</b>	0.99	0.98	0.98	0.97	0.96	0.95	0.92

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

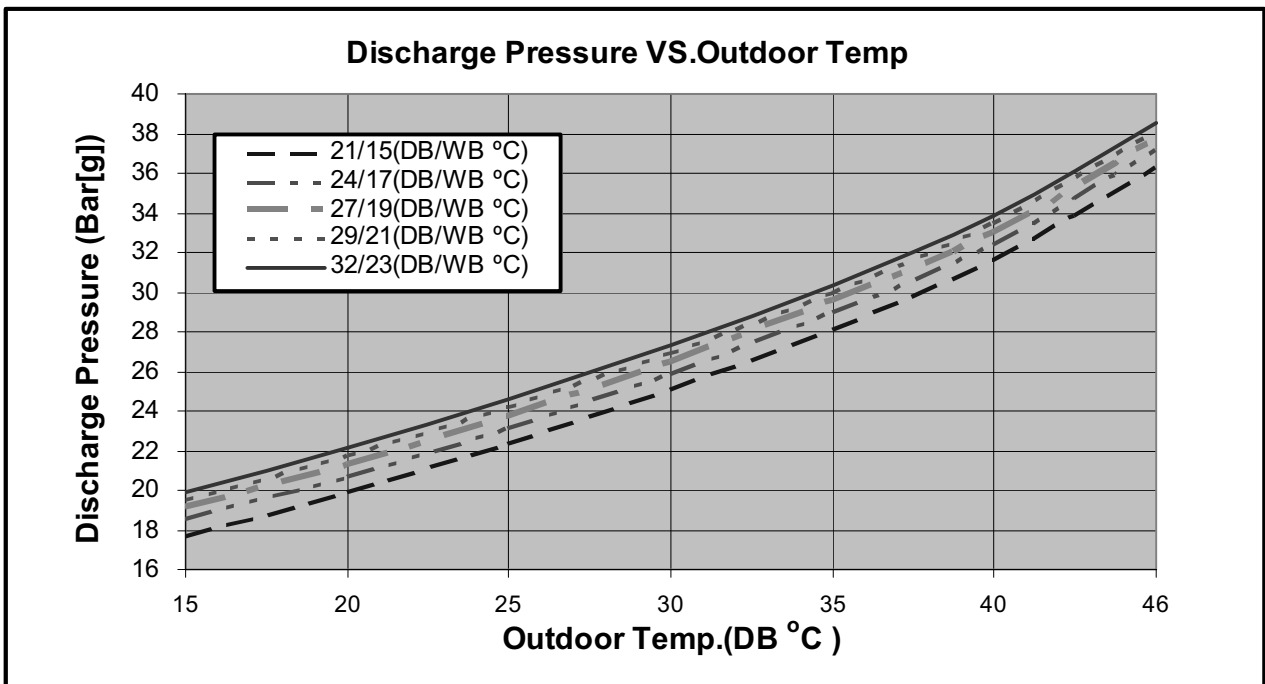
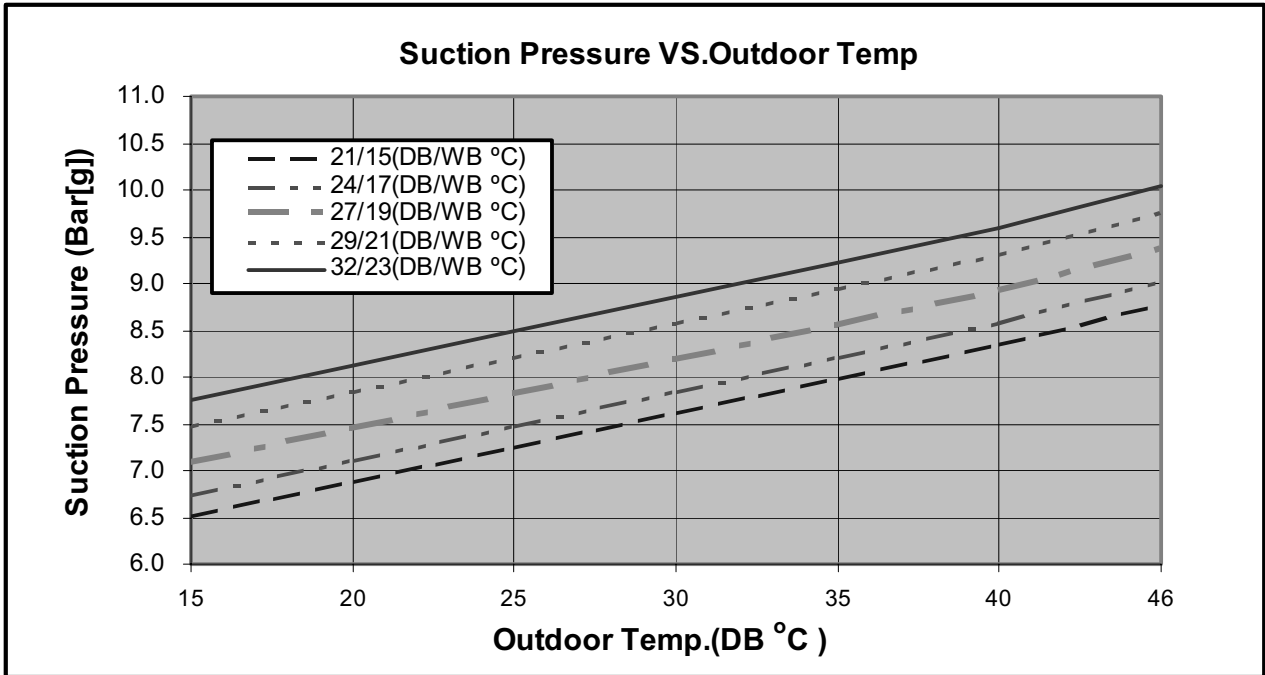
**5.16.2 Heating**

TOTAL TUBING LENGTH(One Way)								
3m	7.5m	10m	15m	20m	25m	30m	40m	50m
1.03	<b>1</b>	0.99	0.99	0.98	0.98	0.97	0.96	0.95

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

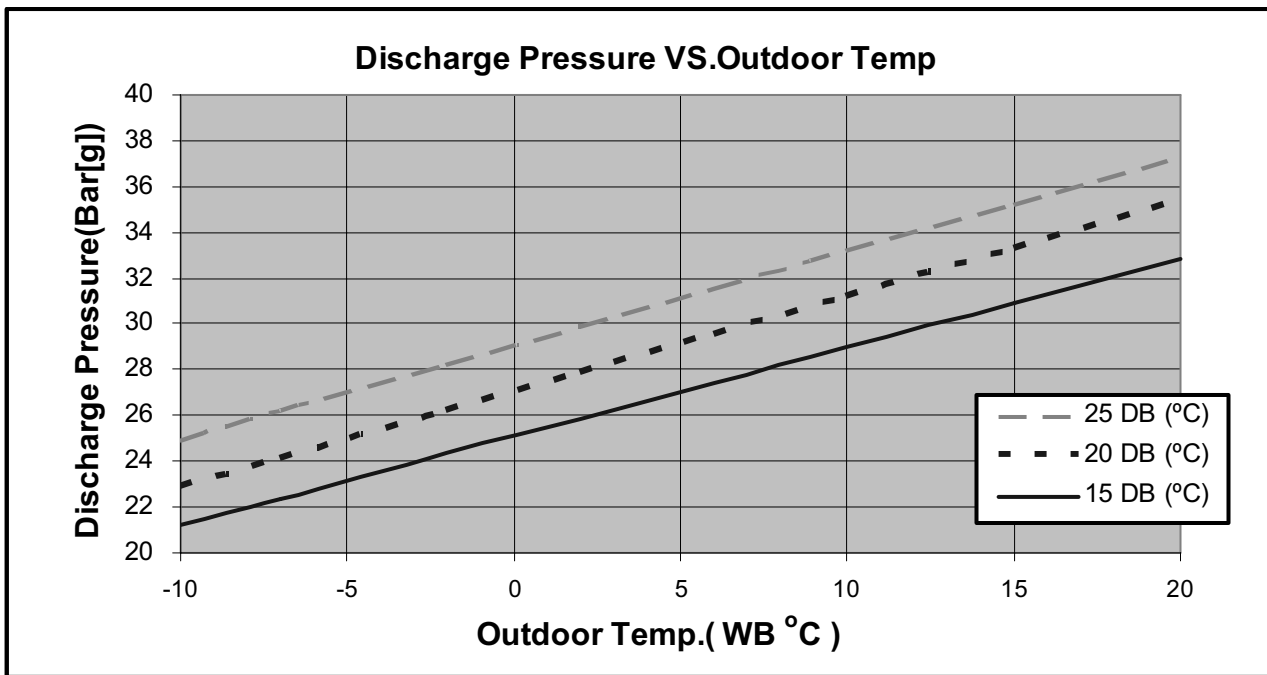
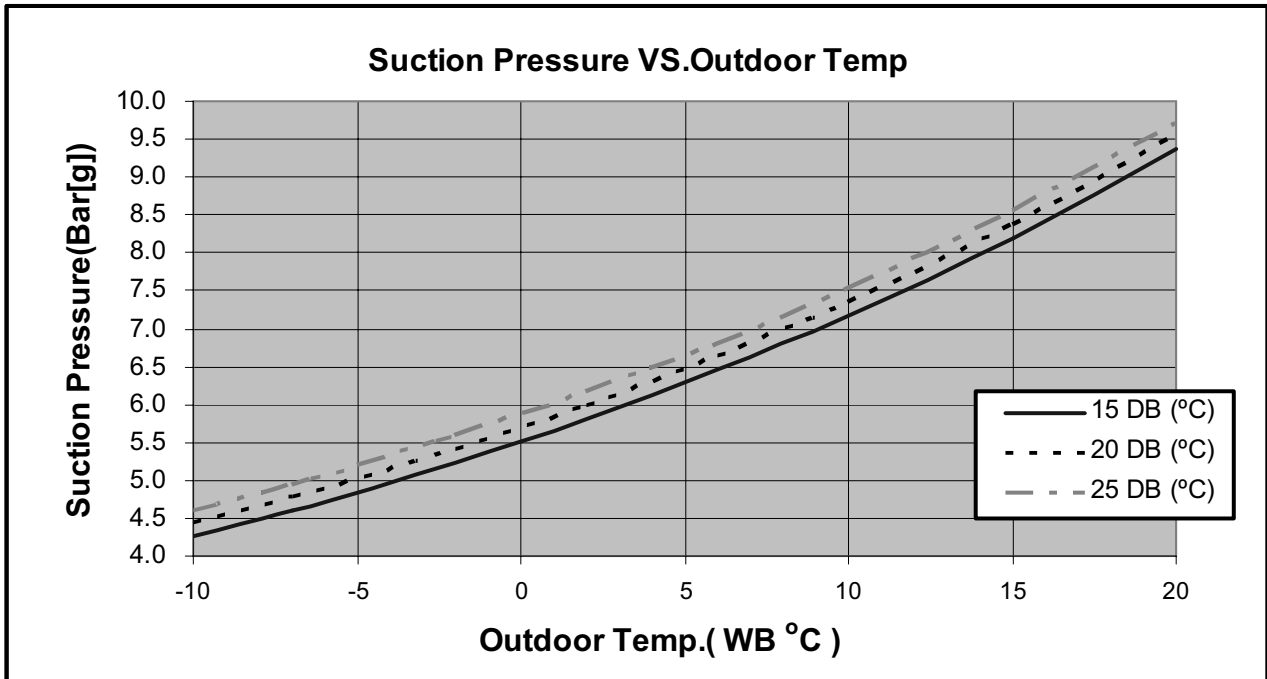
5.17 Pressure Curves

5.17.1 Cooling



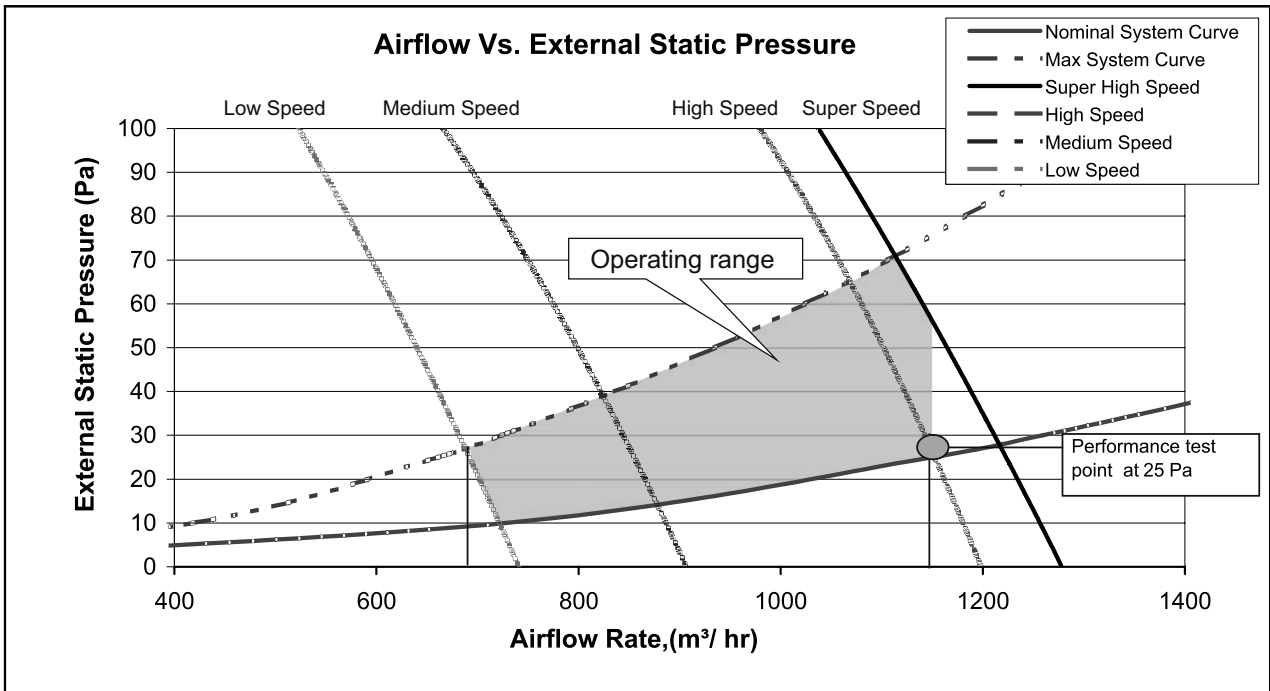


5.17.2 Heating

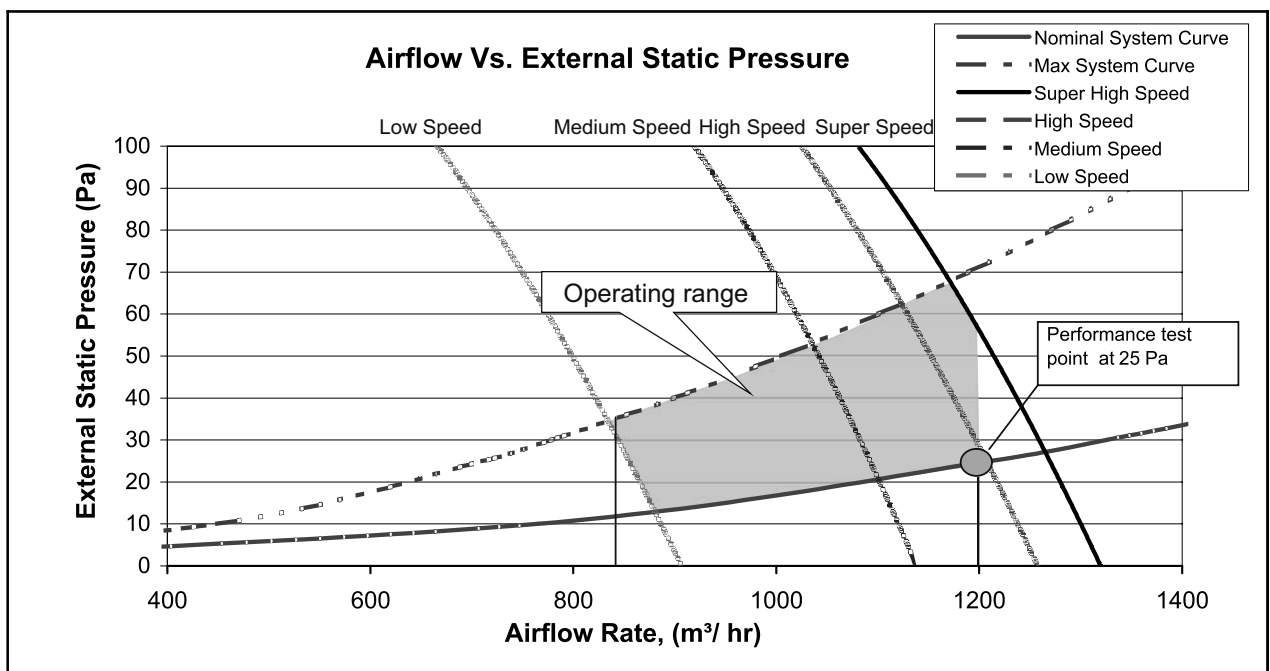


## 6. AIRFLOW CURVES

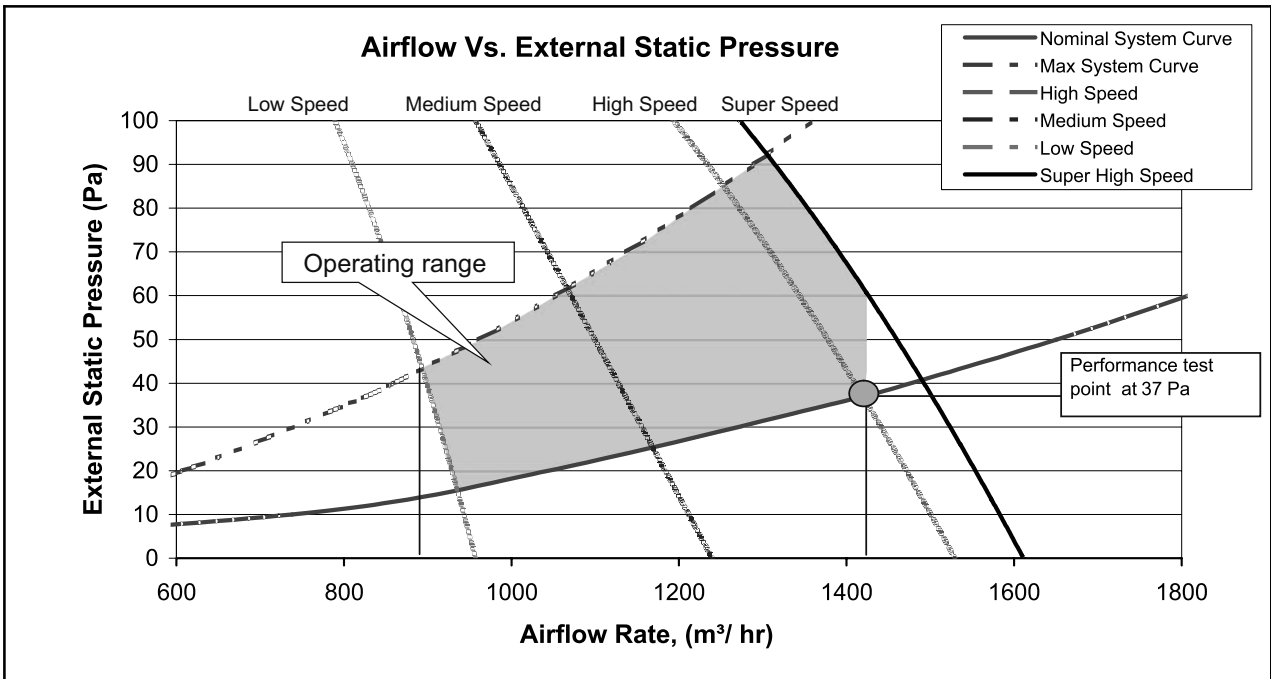
### 6.1 Model: DLS 18



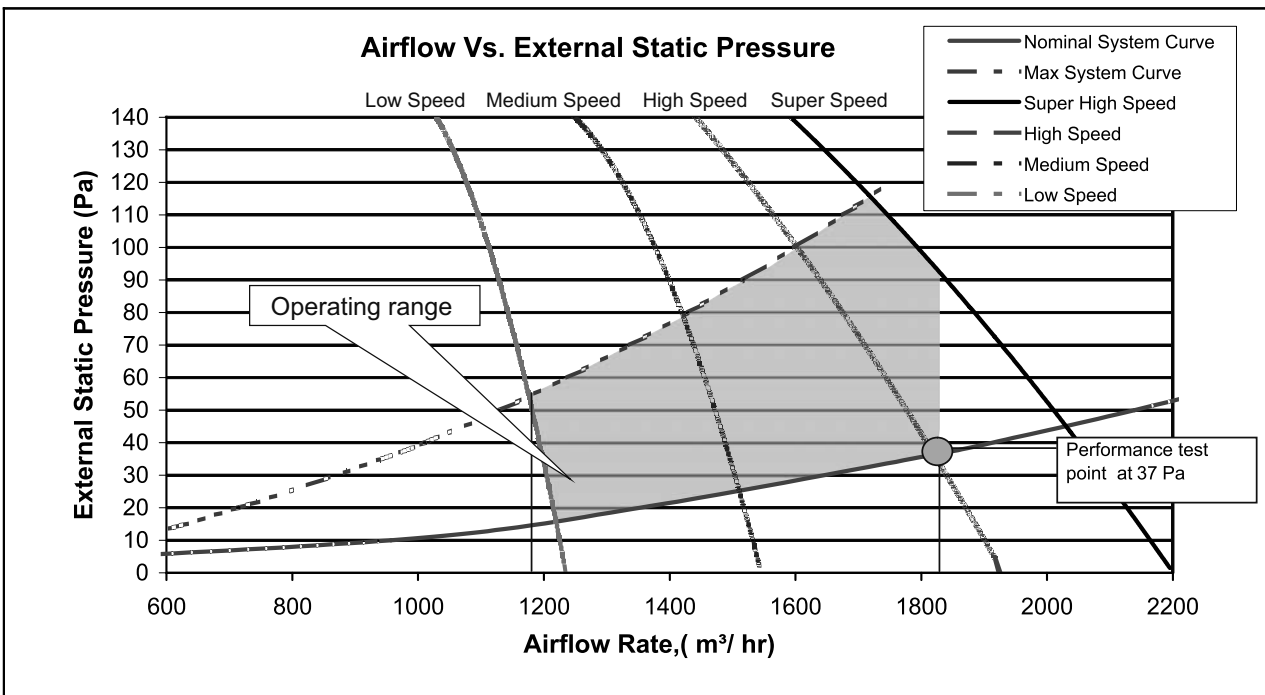
### 6.2 Model: DLS 24



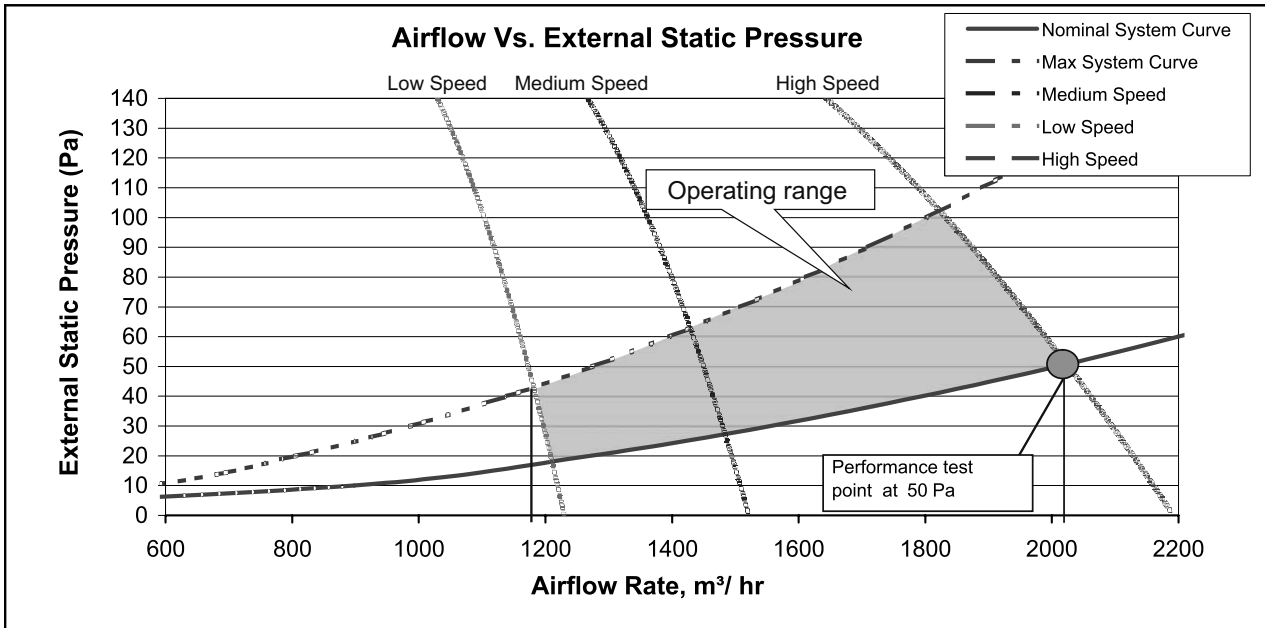
6.3 Model: DLS 30



6.4 Model: DLS 37



6.5 Model: DLS 44



6.6 DLS UNITS RANGE AIR FLOW CORRECTION FACTORS (at nominal rating conditions).

		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	0.90	0.92	0.95	0.97	1
	TC	1.07	1.05	1.03	1.02	1

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

## 7. SOUND LEVEL CHARACTERISTICS

### 7.1 Sound Pressure Level

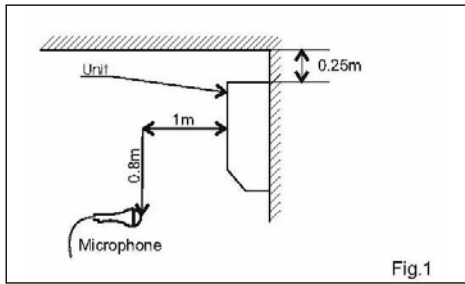


Figure 1. Wall Mounted

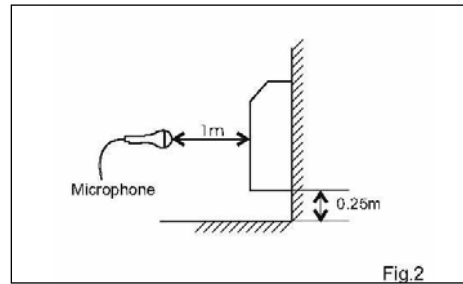


Figure 2. Floor Mounted

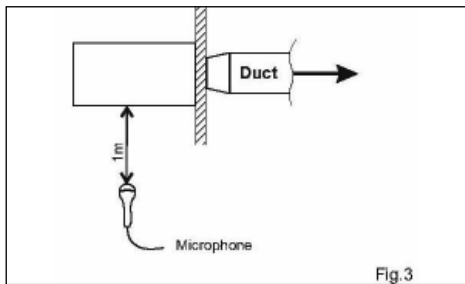


Figure 3. Ducted

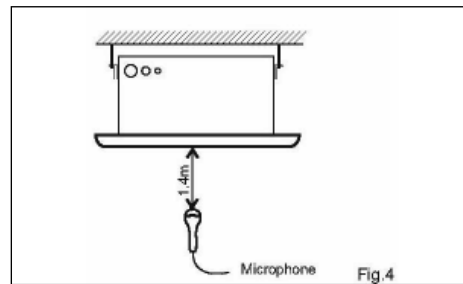
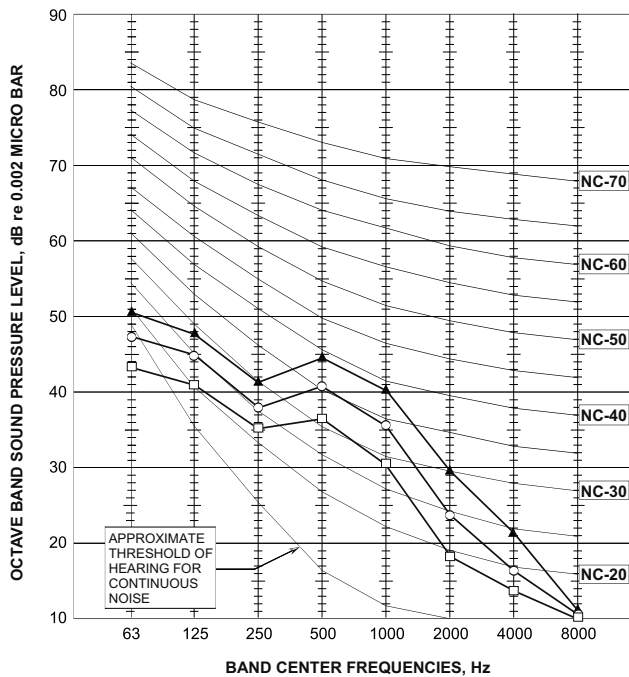


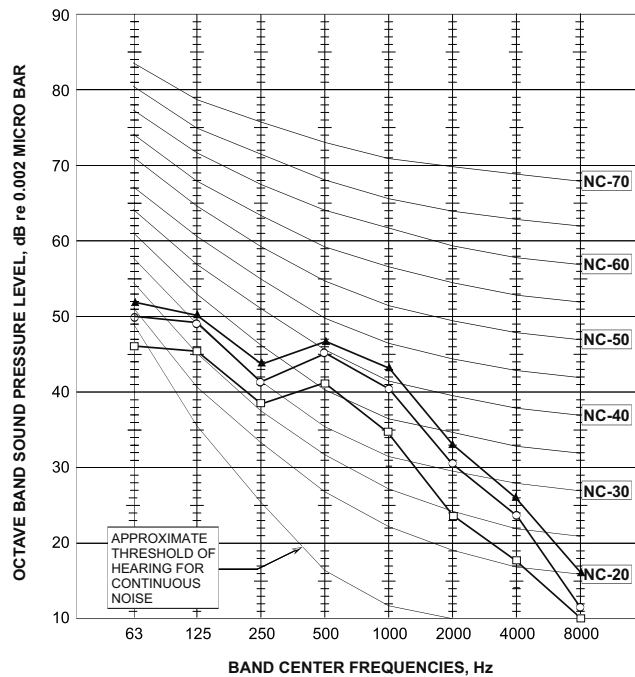
Figure 4. Cassette

### 7.2 Sound Pressure Level Spectrum (Measured as Figure 3)

DLS 18



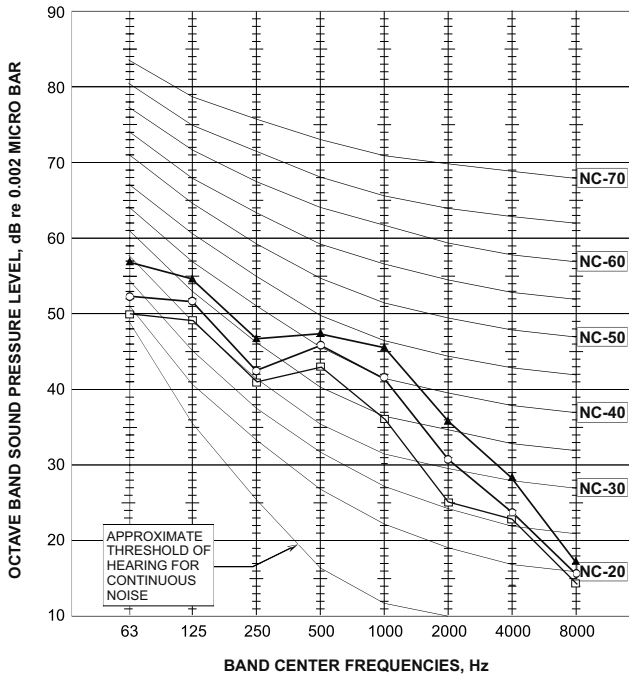
DLS 24



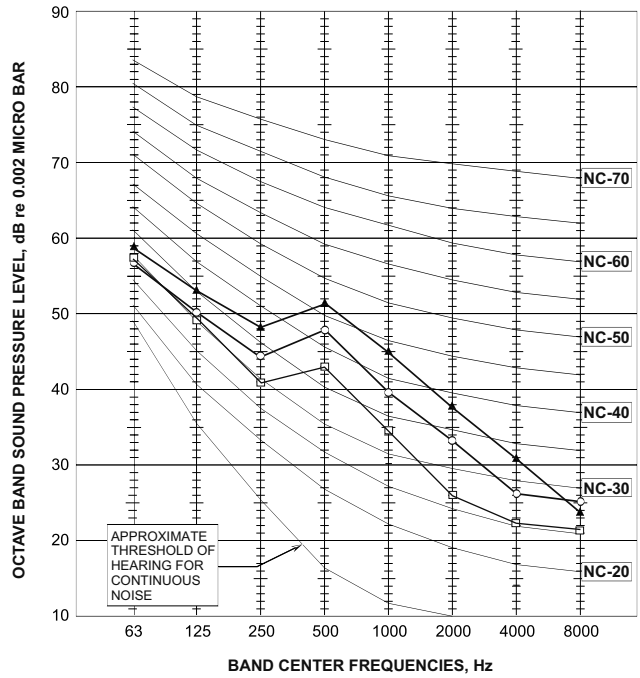
FAN SPEED	LINE
HI	—▲—
ME	—○—
LO	—□—

# SOUND LEVEL CHARACTERISTICS

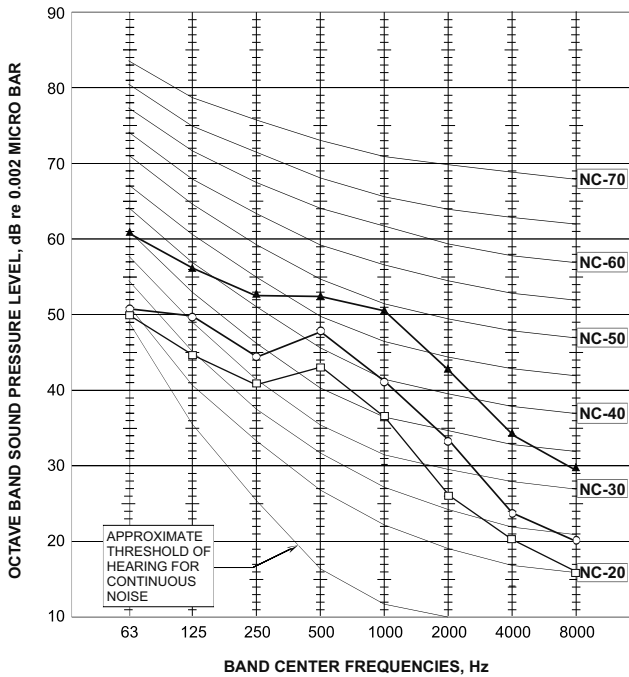
## DLS 30



## DLS 37



## DLS 44



FAN SPEED	LINE
HI	—▲—
ME	—○—
LO	—□—

### 7.3 Outdoor units

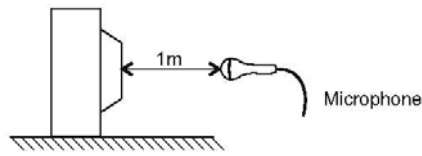
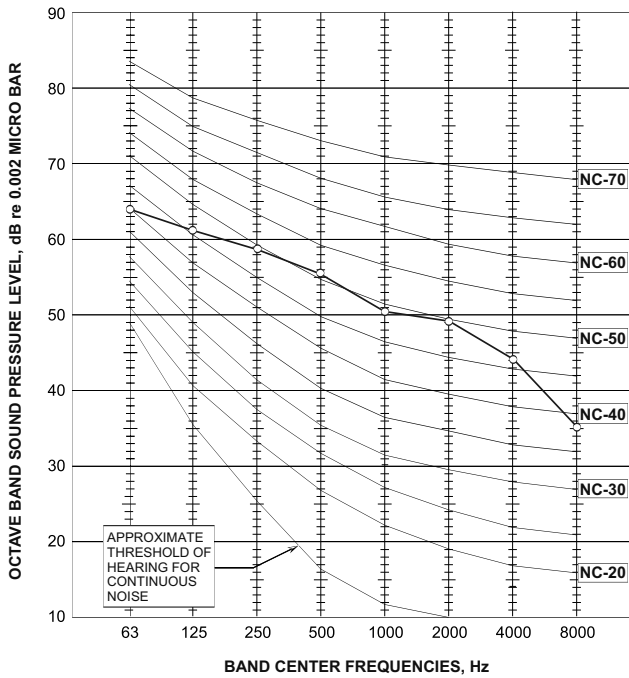


Fig.5

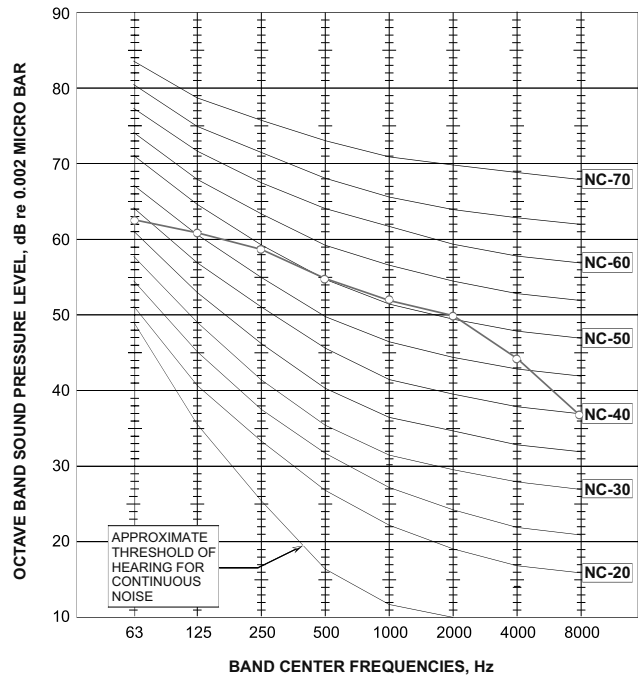
Microphone Distance from Unit

### 7.4 Sound Pressure Level Spectrum (Measured as Figure 5)

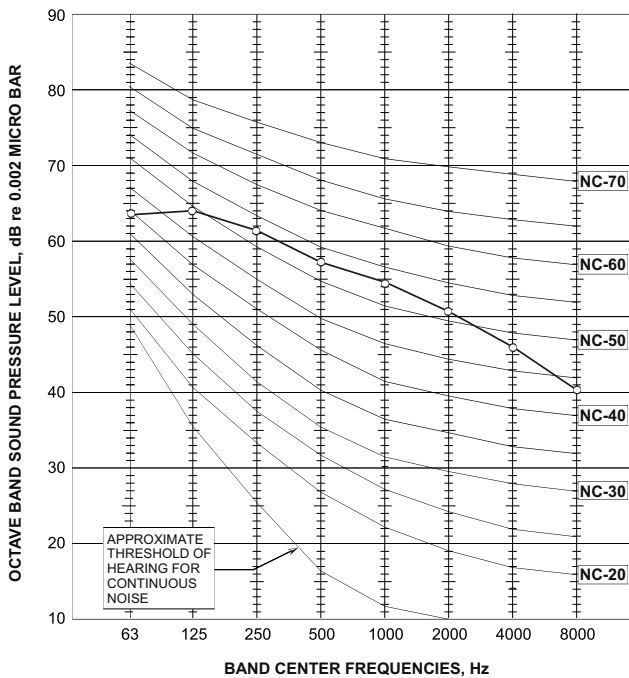
**GC 18 NRC Cooling**



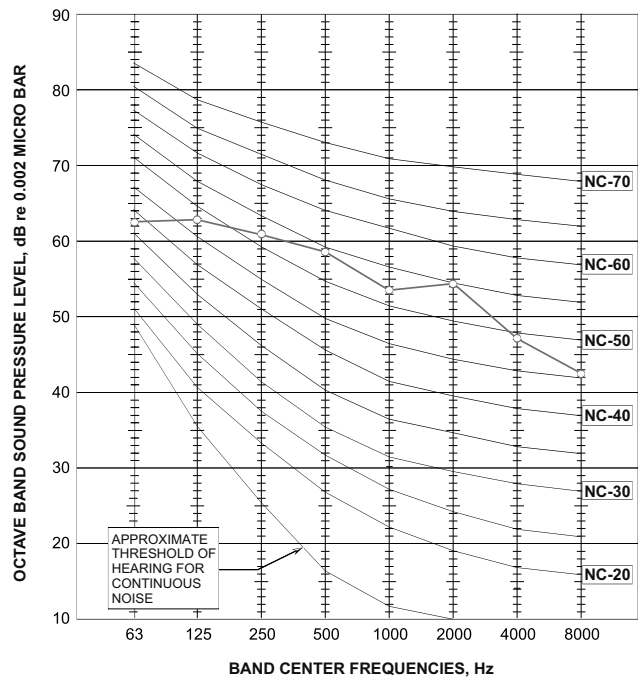
**GC 18 NRC Heating**



**GC 24 NRC Cooling**

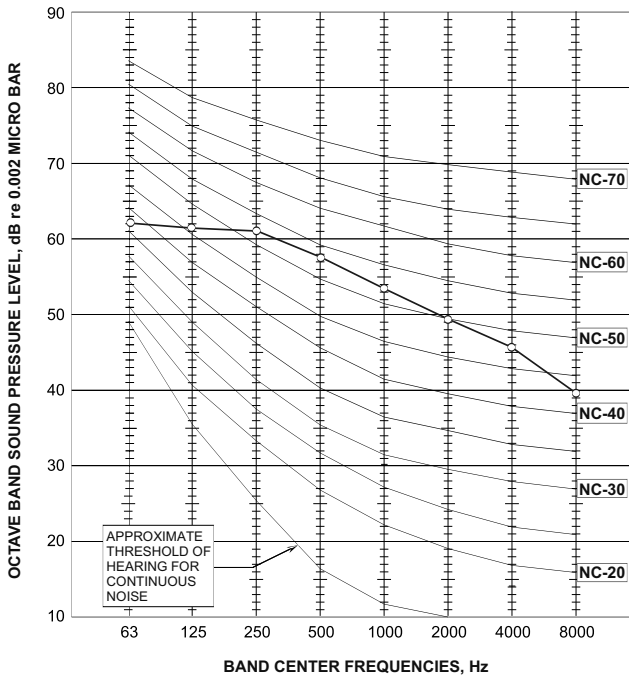


**GC 24 NRC Heating**

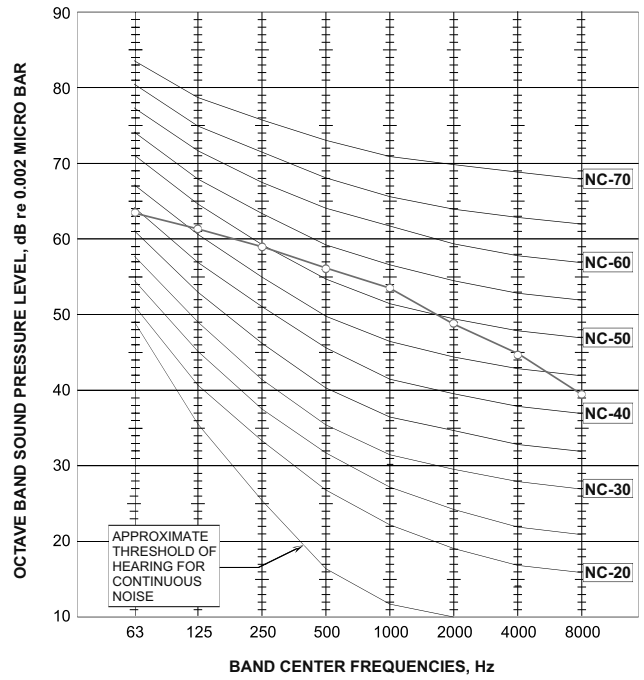


# SOUND LEVEL CHARACTERISTICS

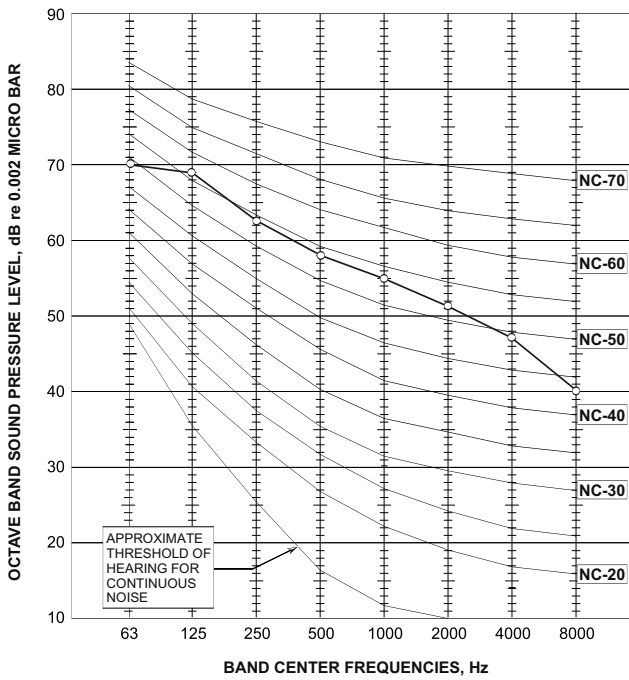
## GCN 30 NRC Cooling



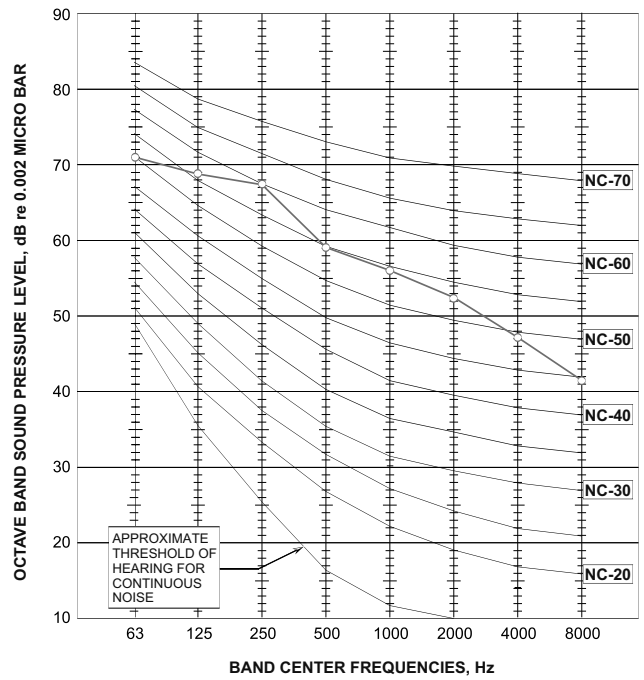
## GCN 30 NRC Heating



## GCN 37 NRC Cooling

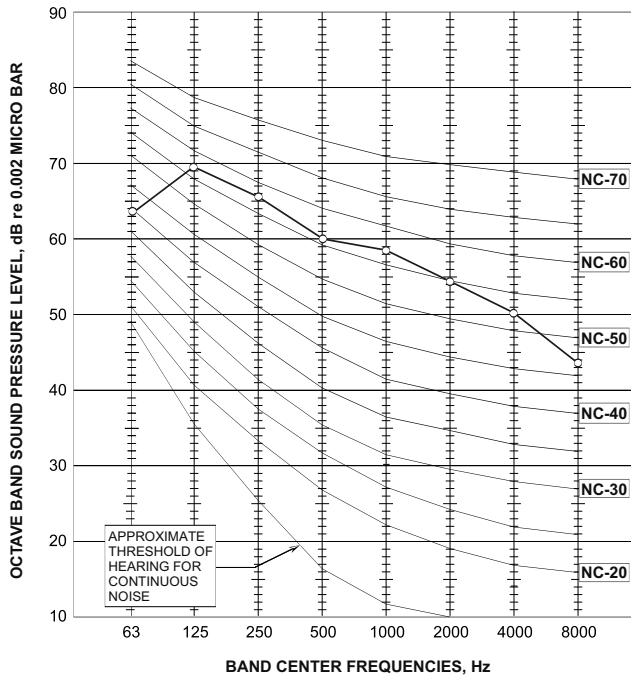


## GCN 37 NRC Heating

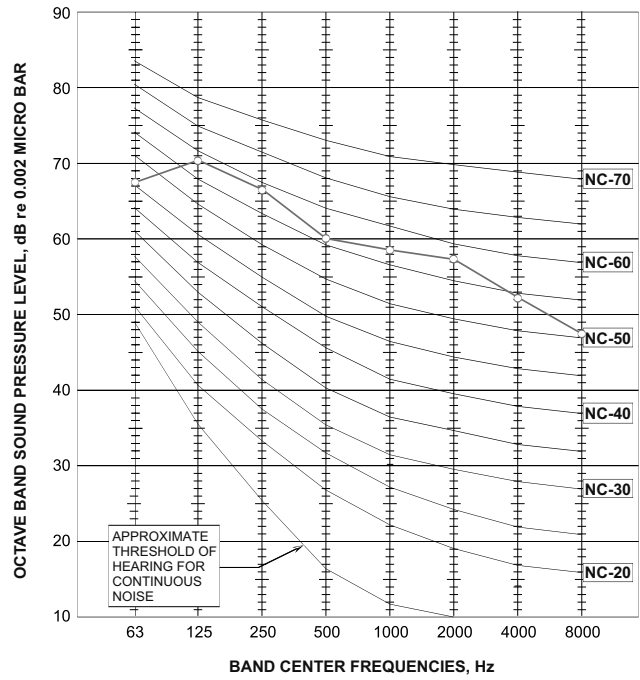




**GCN 40 NRC Cooling**



**GCN 40 NRC Heating**



## 8. ELECTRICAL DATA

### 8.1 Single Phase Units

MODEL	DLS 18	DLS 24
Power Supply	To Indoor 1PH – 230V – 50 Hz	To Outdoor 1PH – 230V – 50 Hz
Max Current, A		14
Circuit Breaker	20	20
Power Supply Wiring No. X Cross Section mm <sup>2</sup>	3 X 2.5 mm <sup>2</sup>	3 X 2.5 mm <sup>2</sup>
Interconnecting Cable RC Model No. X Cross Section mm <sup>2</sup>	5 X 2.5 mm <sup>2</sup> + 2 X 0.5 mm <sup>2</sup> (OCT Sensor)	6 X 1.5 mm <sup>2</sup> + 2 X 0.5 mm <sup>2</sup> (OCT Sensor)
Interconnecting Cable ST Model No. X Cross Section mm <sup>2</sup>	4 X 2.5 mm <sup>2</sup> + 2 X 0.5 mm <sup>2</sup>	5 X 1.5 mm <sup>2</sup> + 2 X 0.5 mm <sup>2</sup>

MODEL	DLS 30	DLS 37
Power Supply	To Outdoor 1PH – 230V – 50 Hz	To Outdoor 1PH – 230V – 50 Hz
Max Current, A	17	23
Circuit Breaker	25	25
Power Supply Wiring No. X Cross Section mm <sup>2</sup>	3 X 4 mm <sup>2</sup>	3 X 4 mm <sup>2</sup>
Interconnecting Cable RC Model No. X Cross Section mm <sup>2</sup>	6 X 1.5 mm <sup>2</sup> + 2 X 0.5 mm <sup>2</sup> (OCT Sensor)	6 X 1.5 mm <sup>2</sup> + 2 X 0.5 mm <sup>2</sup> (OCT Sensor)
Interconnecting Cable ST Model No. X Cross Section mm <sup>2</sup>	5 X 1.5 mm <sup>2</sup> + 2 X 0.5 mm <sup>2</sup> (OCT Sensor)	5 X 1.5 mm <sup>2</sup> + 2 X 0.5 mm <sup>2</sup> (OCT Sensor)

### 8.2 Three Phase Units

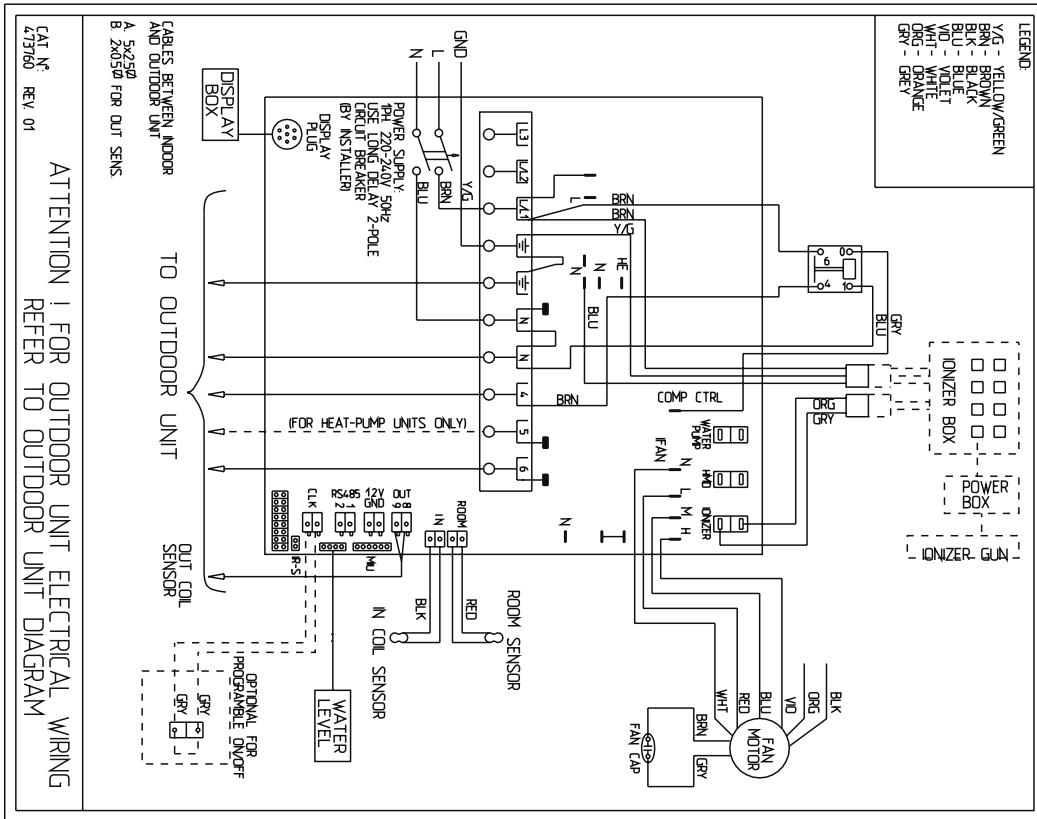
MODEL	DLS 18	DLS 24	DLS 30
Power Supply	To Outdoor 3PH – 400V – 50 Hz	To Outdoor 3PH – 400V – 50 Hz	To Outdoor 3PH – 400V – 50 Hz
Max Current, A			10
Circuit Breaker	3 X 10	3 X 10	3 X 16
Power Supply Wiring No. X Cross Section mm <sup>2</sup>	5 X 1.5 mm <sup>2</sup>	5 X 1.5 mm <sup>2</sup>	5 X 2.5 mm <sup>2</sup>
Interconnecting Cable RC Model No. X Cross Section mm <sup>2</sup>	6 X 1.5 mm <sup>2</sup> + 2 X 0.5 mm <sup>2</sup> (OCT Sensor)	6 X 1.5 mm <sup>2</sup> + 2 X 0.5 mm <sup>2</sup> (OCT Sensor)	6 X 1.5 mm <sup>2</sup> + 2 X 0.5 mm <sup>2</sup> (OCT Sensor)
Interconnecting Cable ST Model No. X Cross Section mm <sup>2</sup>	5 X 1.5 mm <sup>2</sup> + 2 X 0.5 mm <sup>2</sup>	5 X 1.5 mm <sup>2</sup> + 2 X 0.5 mm <sup>2</sup>	5 X 1.5 mm <sup>2</sup> + 2 X 0.5 mm <sup>2</sup> (OCT Sensor)

MODEL	DLS 37	DLS 44
Power Supply	To Outdoor 3PH – 400V – 50 Hz	To Outdoor 3PH – 400V – 50 Hz
Max Current, A	12.5	17
Circuit Breaker	3 X 16	3 X 16
Power Supply Wiring No. X Cross Section mm <sup>2</sup>	5 X 2.5 mm <sup>2</sup>	5 X 2.5 mm <sup>2</sup>
Interconnecting Cable RC Model No. X Cross Section mm <sup>2</sup>	6 X 1.5 mm <sup>2</sup> + 2 X 0.5 mm <sup>2</sup> (OCT Sensor)	6 X 1.5 mm <sup>2</sup> + 2 X 0.5 mm <sup>2</sup> (OCT Sensor)
Interconnecting Cable ST Model No. X Cross Section mm <sup>2</sup>	5 X 1.5 mm <sup>2</sup> + 2 X 0.5 mm <sup>2</sup> (OCT Sensor)	5 X 1.5 mm <sup>2</sup> + 2 X 0.5 mm <sup>2</sup> (OCT Sensor)

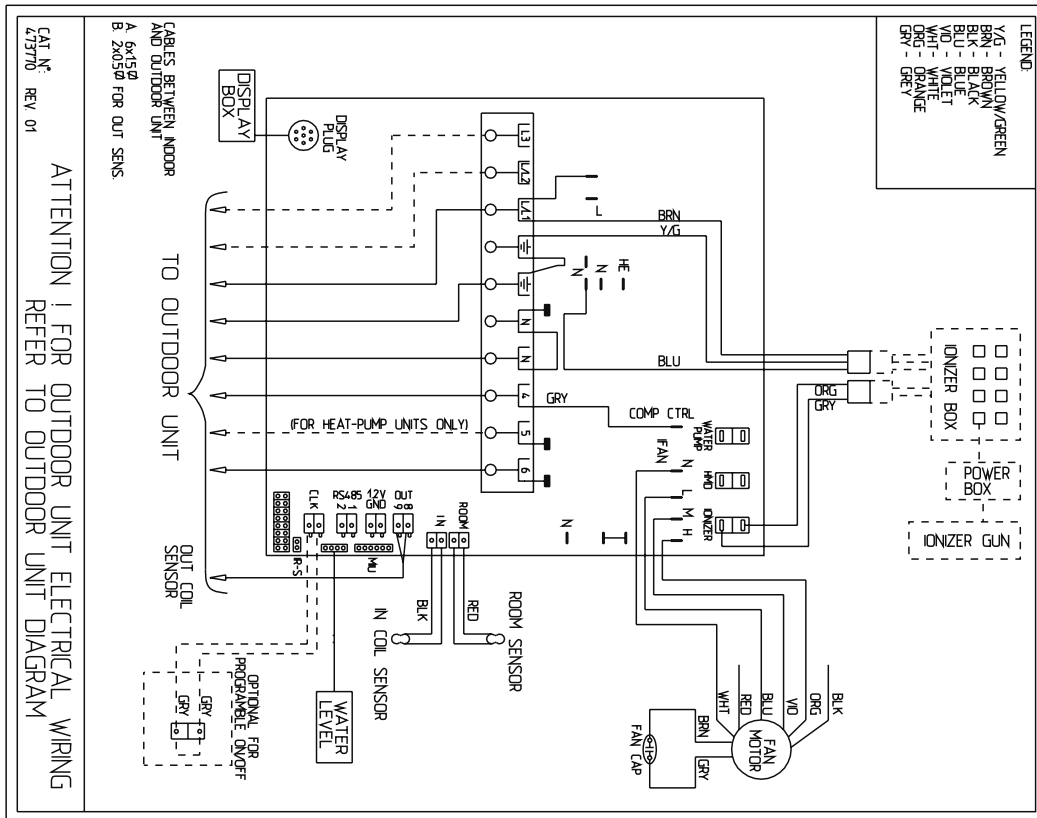
NOTE: Power wiring cord should comply with local laws and electrical regulations requirements.

## 9. WIRING DIAGRAMS

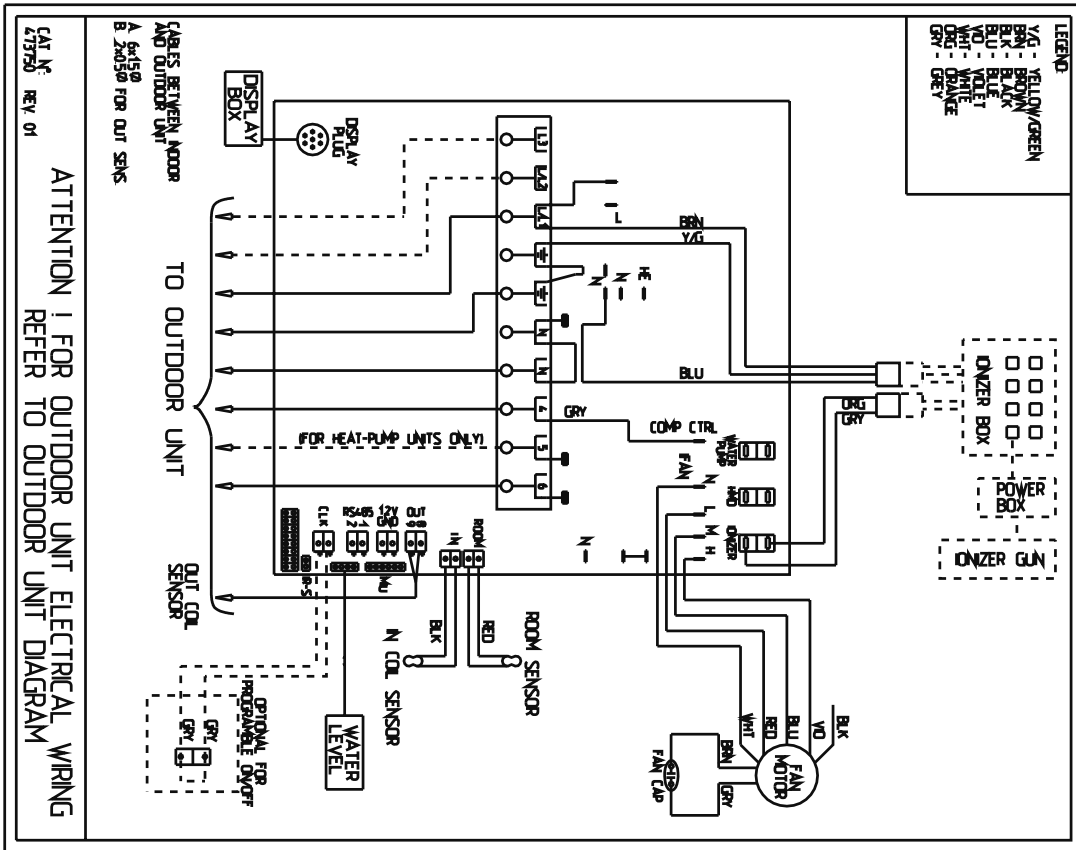
### 9.1 Indoor Unit: DLS 18



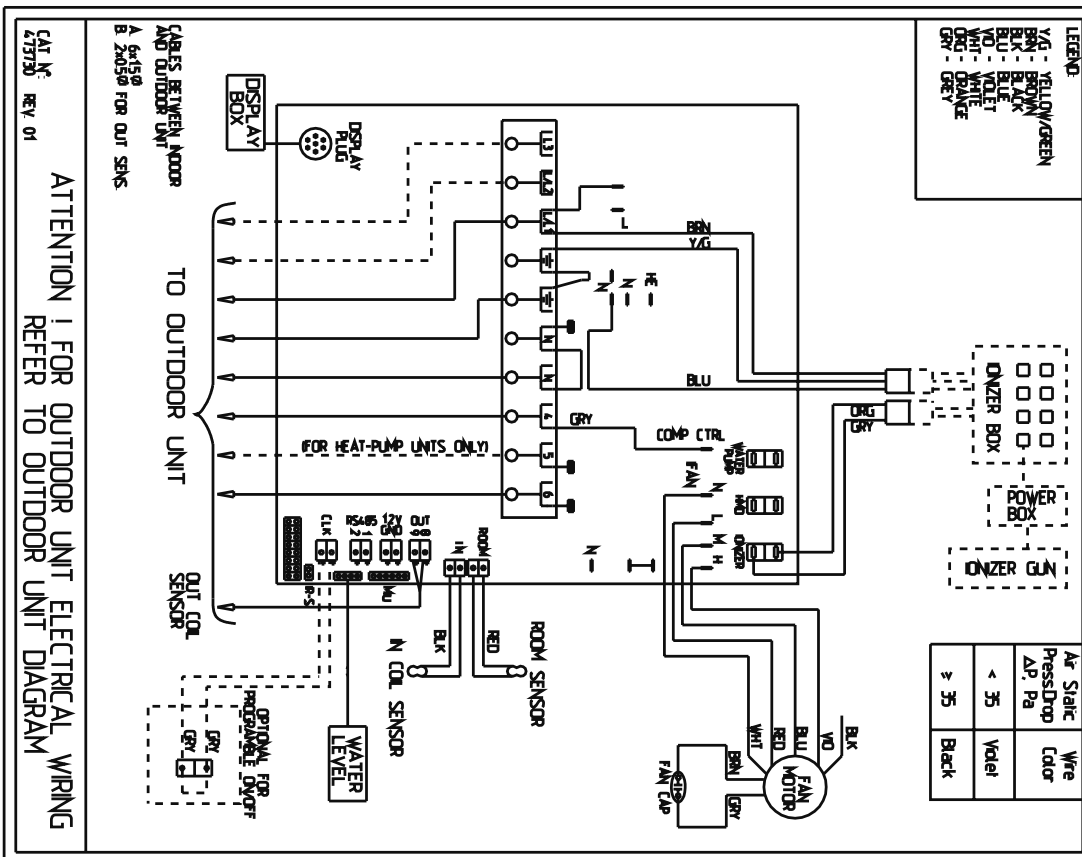
### 9.2 Indoor Unit: DLS 24



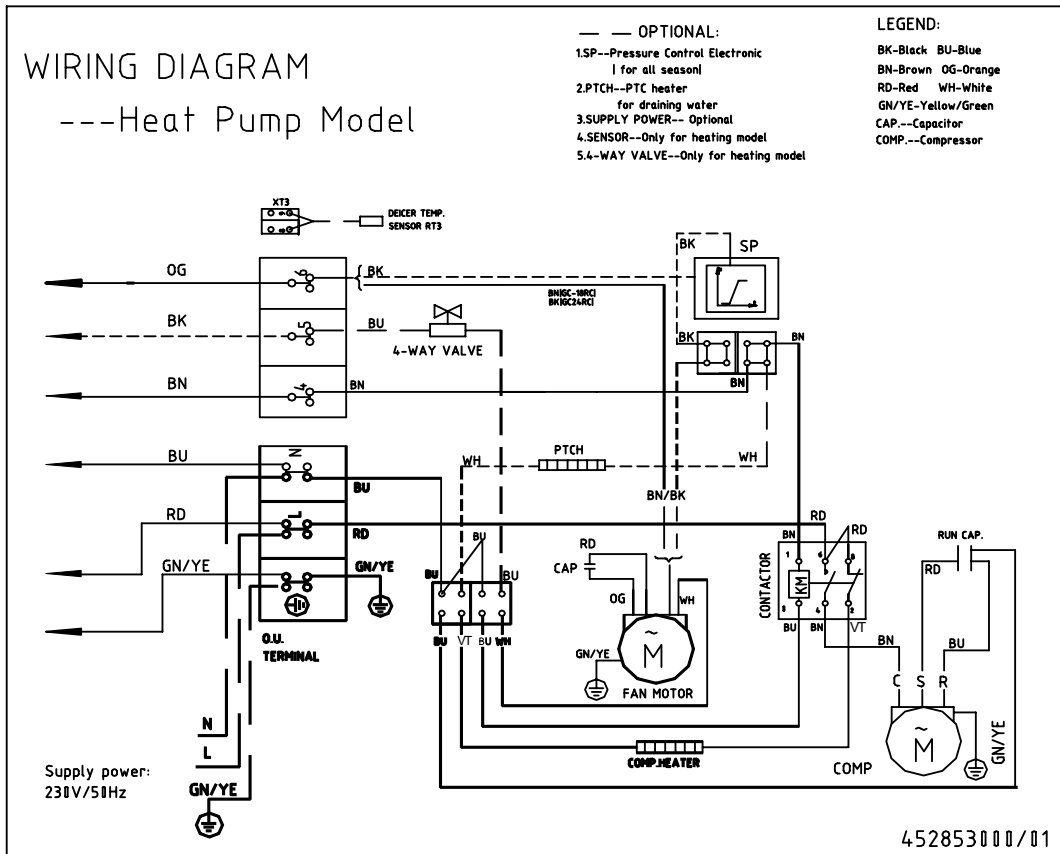
9.3 Indoor Unit: DLS 30, 37



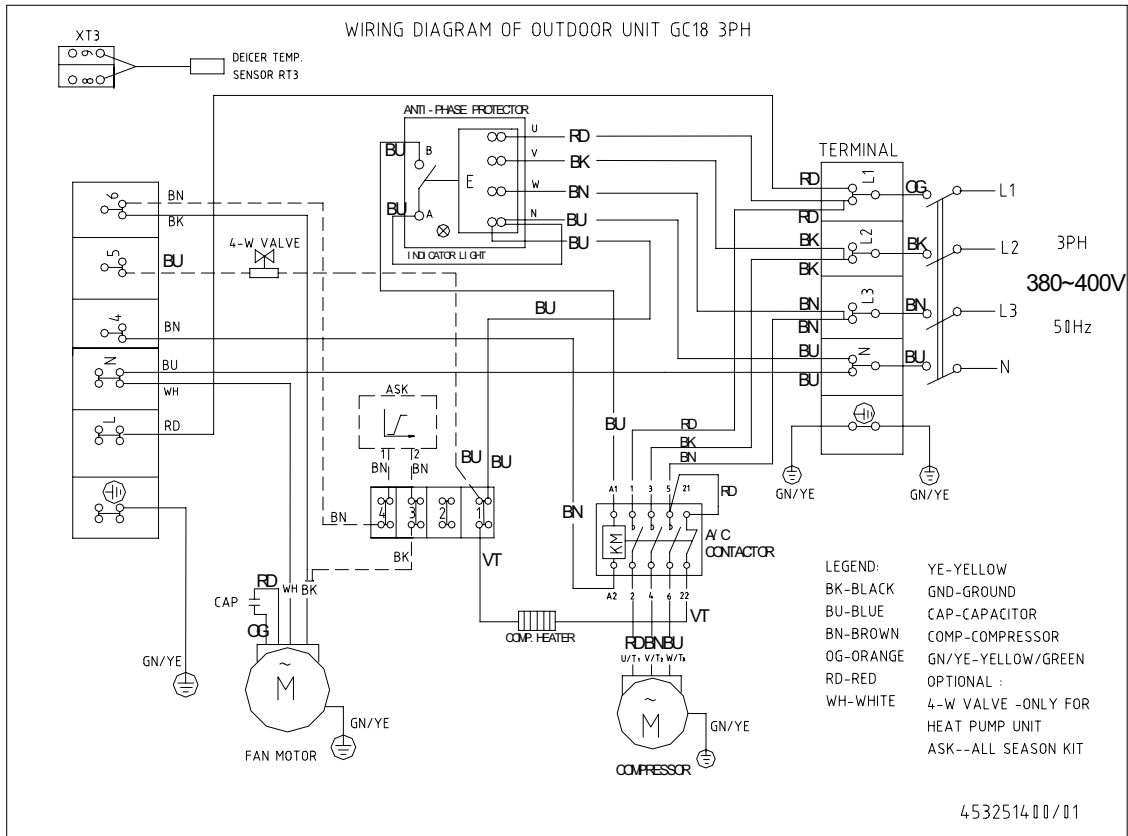
9.4 Indoor Unit: DLS 44



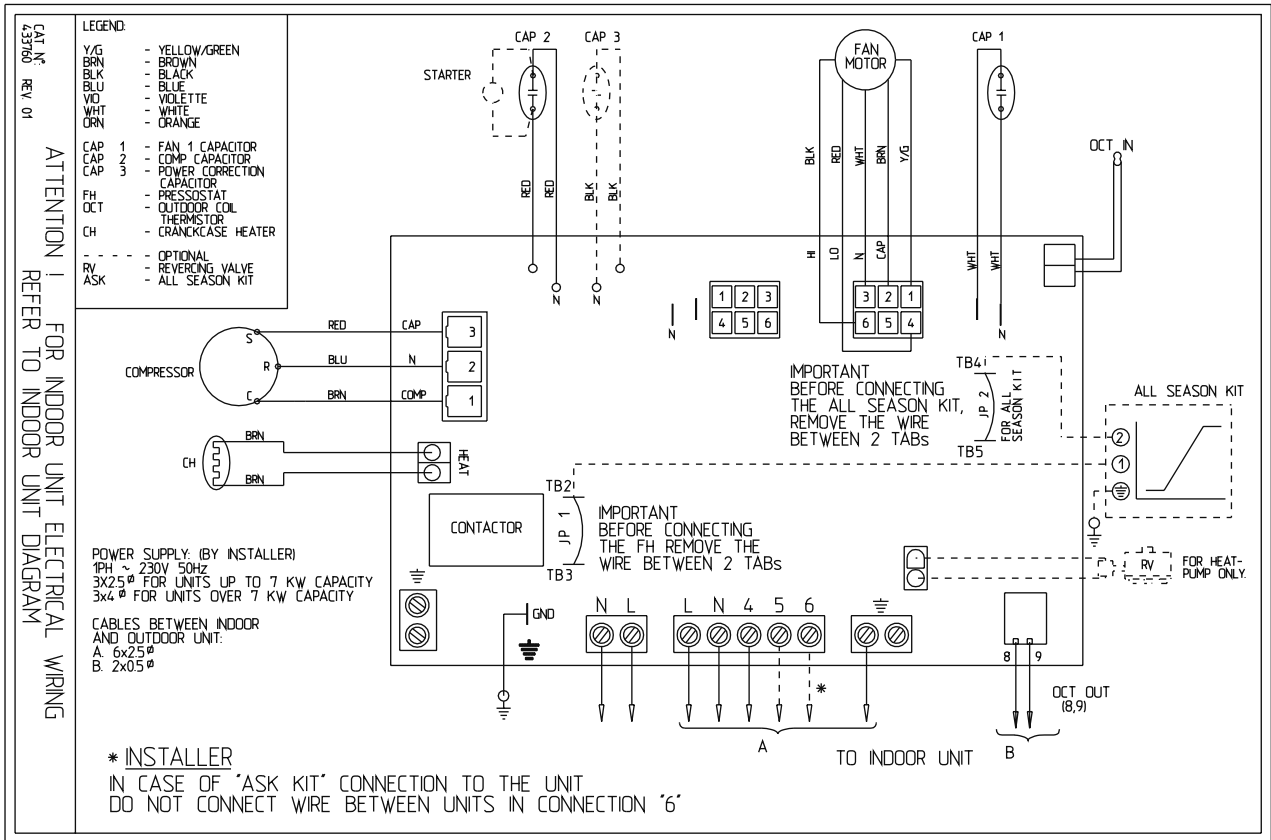
9.4 Outdoor Unit: GC 18 NRC (1PH)



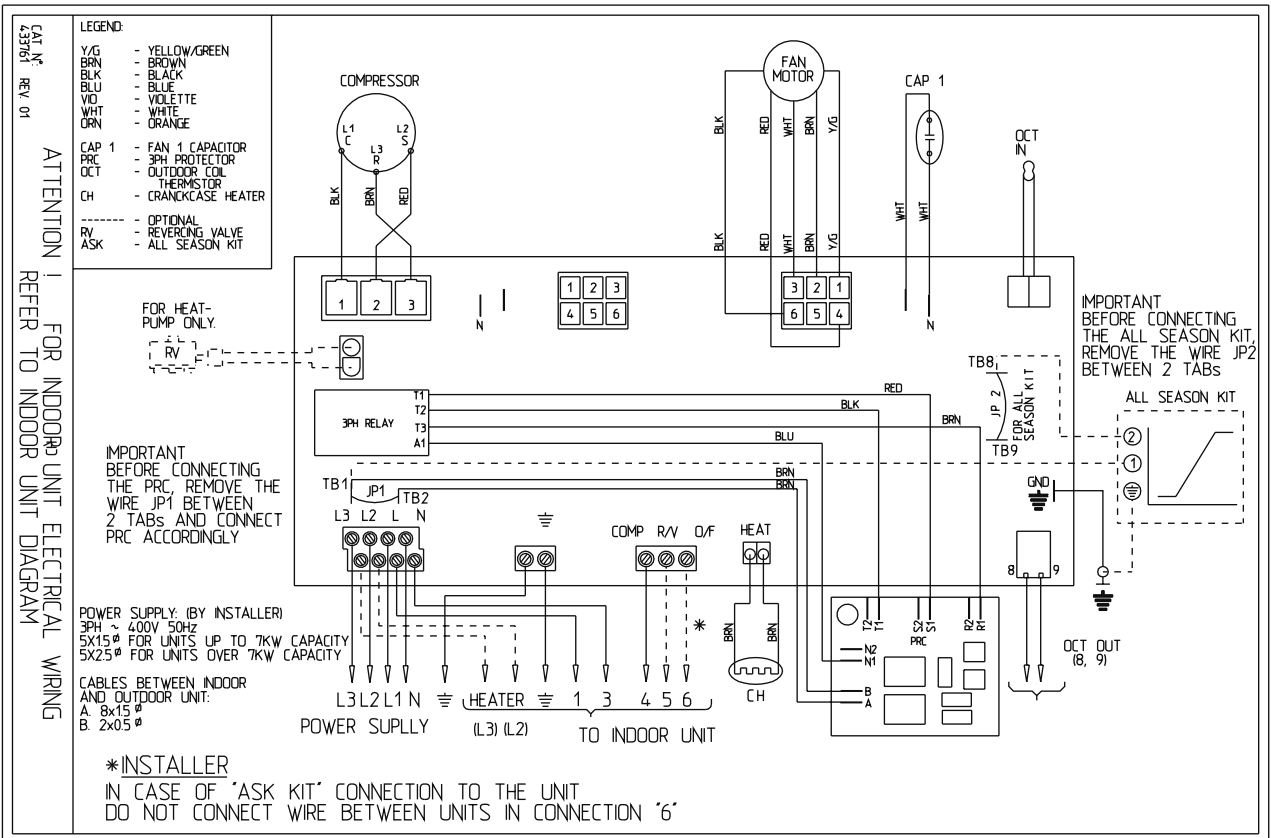
9.5 Outdoor Unit: GC 18 NRC (3PH)



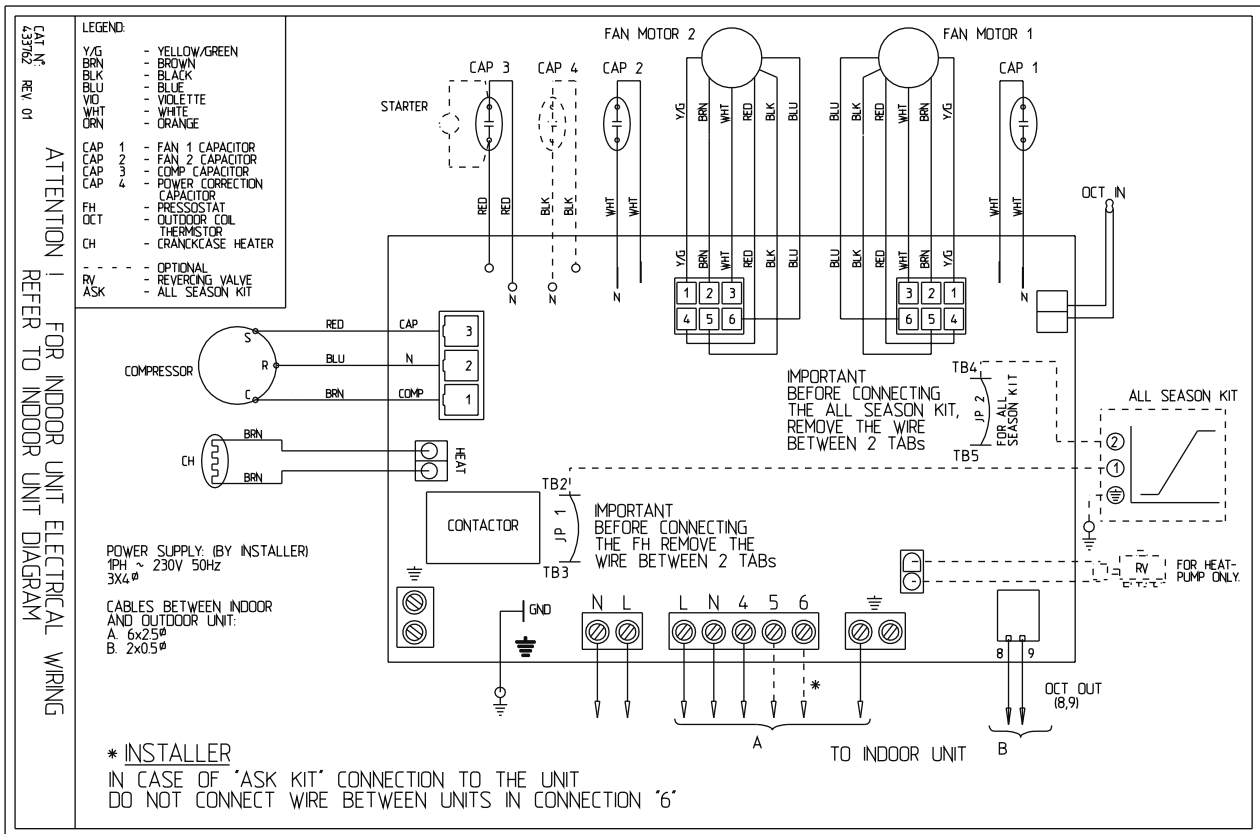
### 9.6 Outdoor Unit: GCN 30 NRC (1PH)



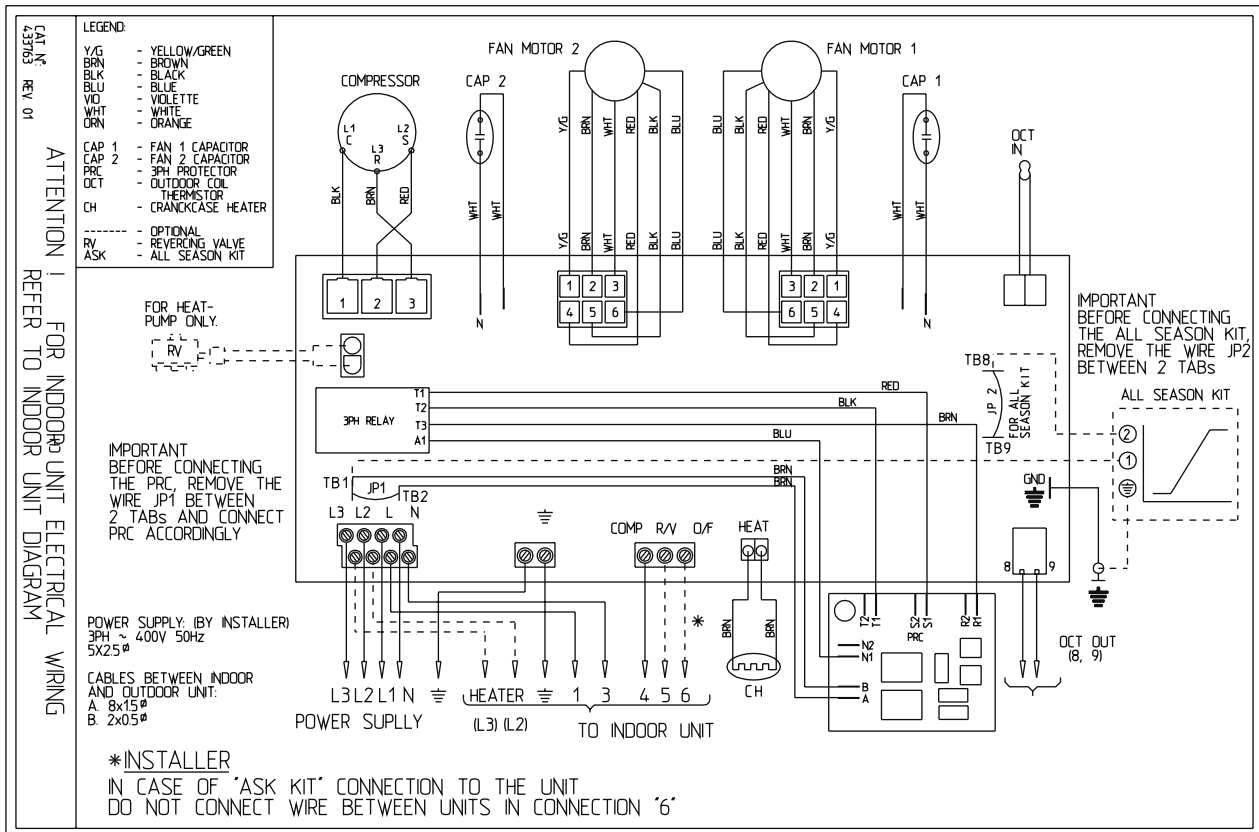
### 9.7 Outdoor Unit:GCN 30 NRC (3PH)



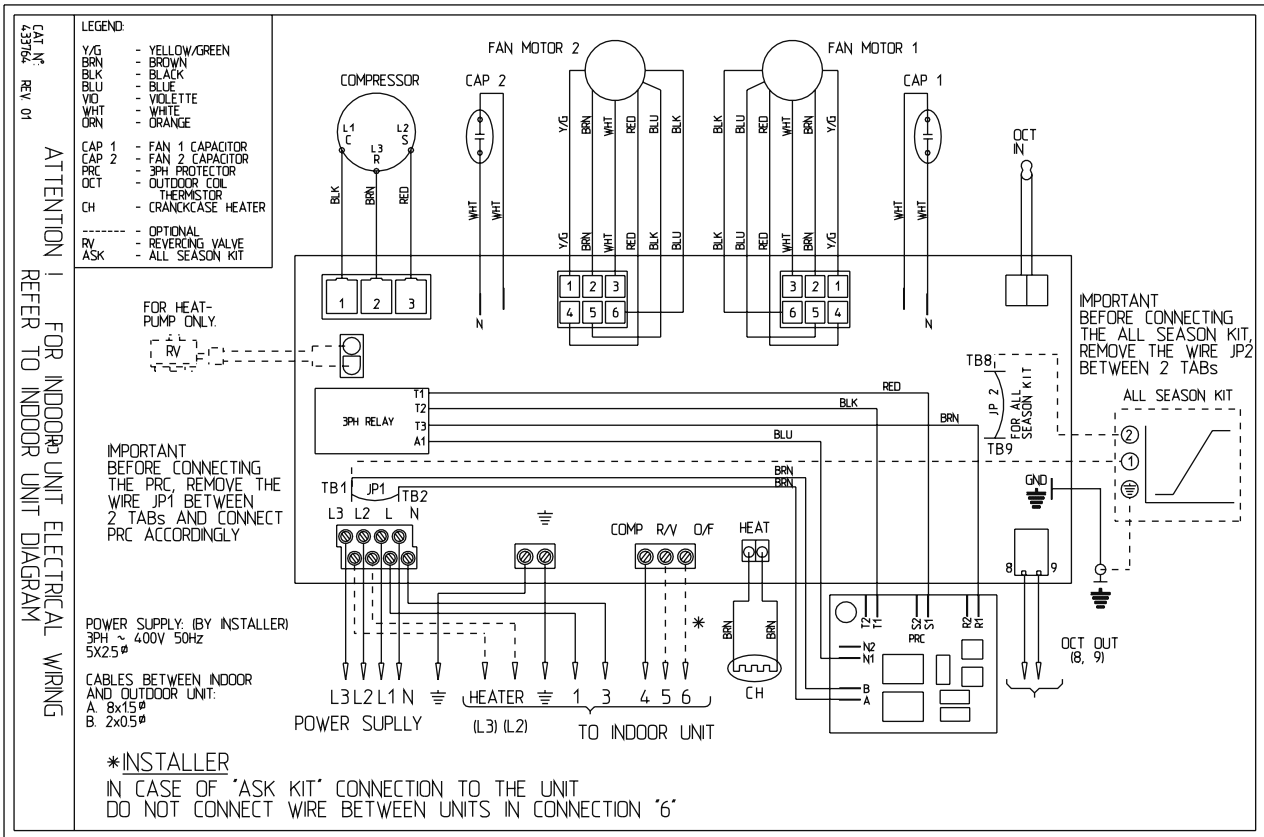
### 9.8 Outdoor Unit: GCN 37 NRC ( 1PH)



### 9.9 Outdoor Unit: GCN 37 NRC ( 3PH)



9.10 Outdoor Unit: GCN 40 NRC ( 3PH)

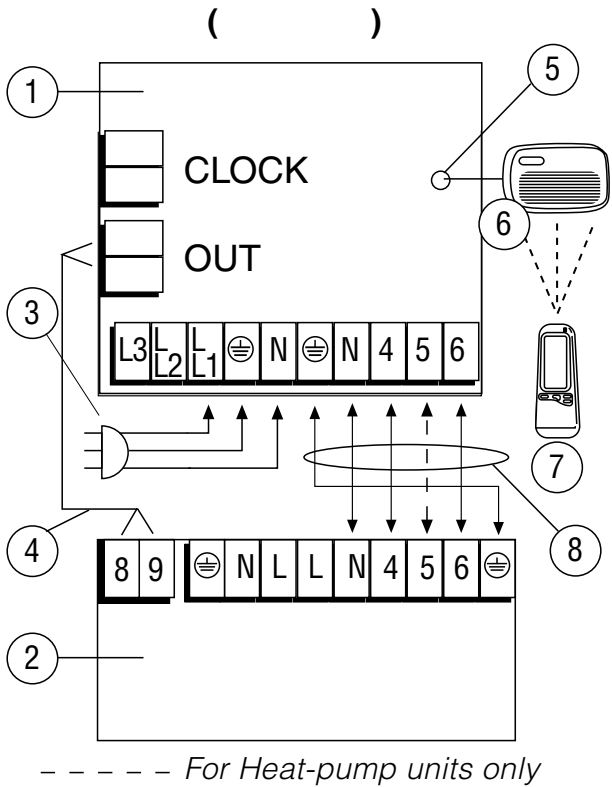




**10. ELECTRICAL CONNECTIONS**

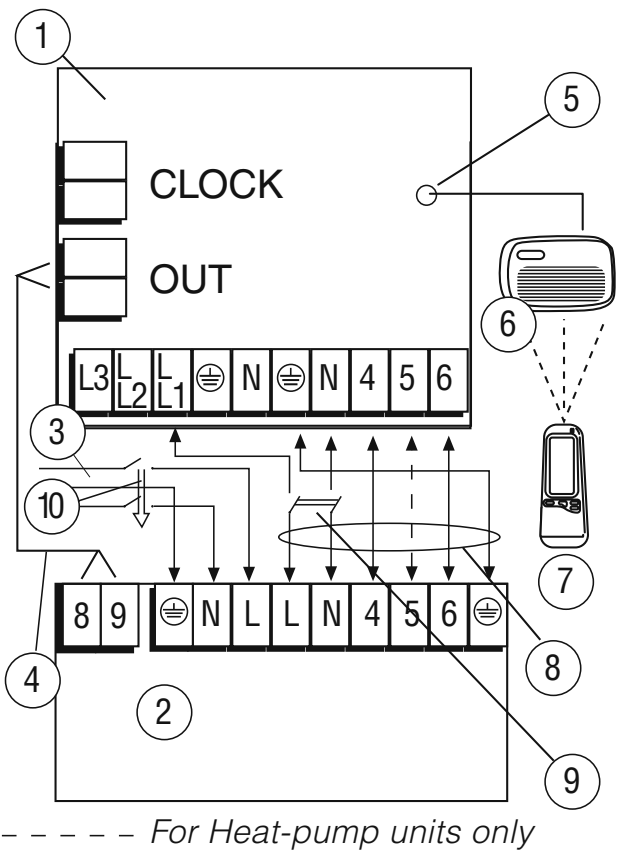
**10.1 DLS 18 1PH**

- 1. Indoor Unit
- 2. Outdoor Unit
- 3. Power supply
- 4. Control cable (2 x 0.5mm<sup>2</sup>)
- 5. Display connector
- 6. Display unit
- 7. Wireless remote control
- 8. Inter connecting cable (5 x 2.5mm<sup>2</sup>)



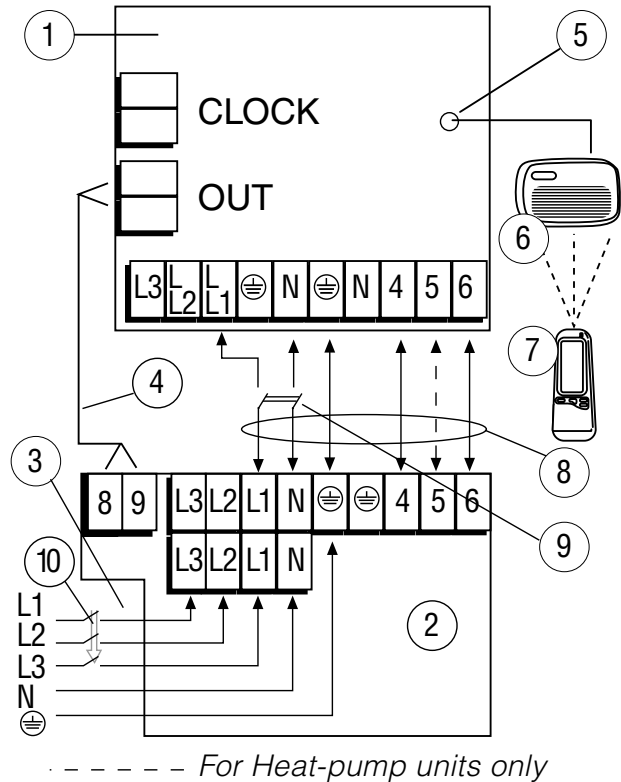
**10.2 DLS 24, 30, 37, 1PH**

- 1. Indoor unit
- 2. Outdoor unit
- 3. Power supply cable
- 4. Control cable (2 x 0.5mm<sup>2</sup>)
- 5. Display connector
- 6. Display unit
- 7. Wireless remote control
- 8. Inter connecting cable (5 x 2.5mm<sup>2</sup>)
- 9. Switch ON-OFF
- 10. Circuit breaker



10.3 DLS 18, 24, 30, 37, 44 (3PH)

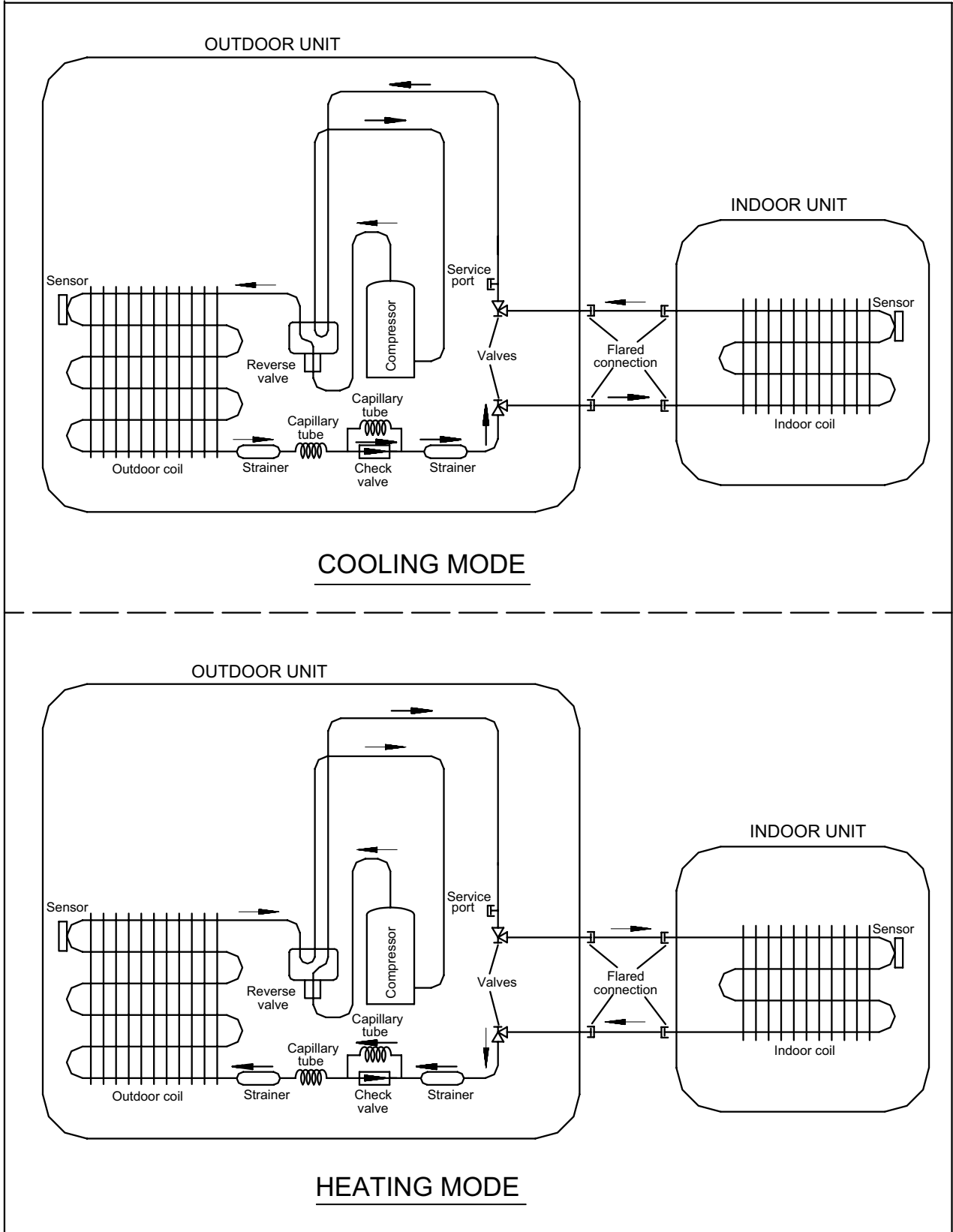
1. Indoor unit
2. Outdoor unit
3. Power supply cable
4. Control cable (2 x 0.5mm<sup>2</sup>)
5. Display connector
6. Display unit
7. Wireless remote control
8. Inter connecting cable (6 x 1.5mm<sup>2</sup>)
9. Switch ON-OFF
10. Circuit breaker



# 11. REFRIGERATION DIAGRAMS

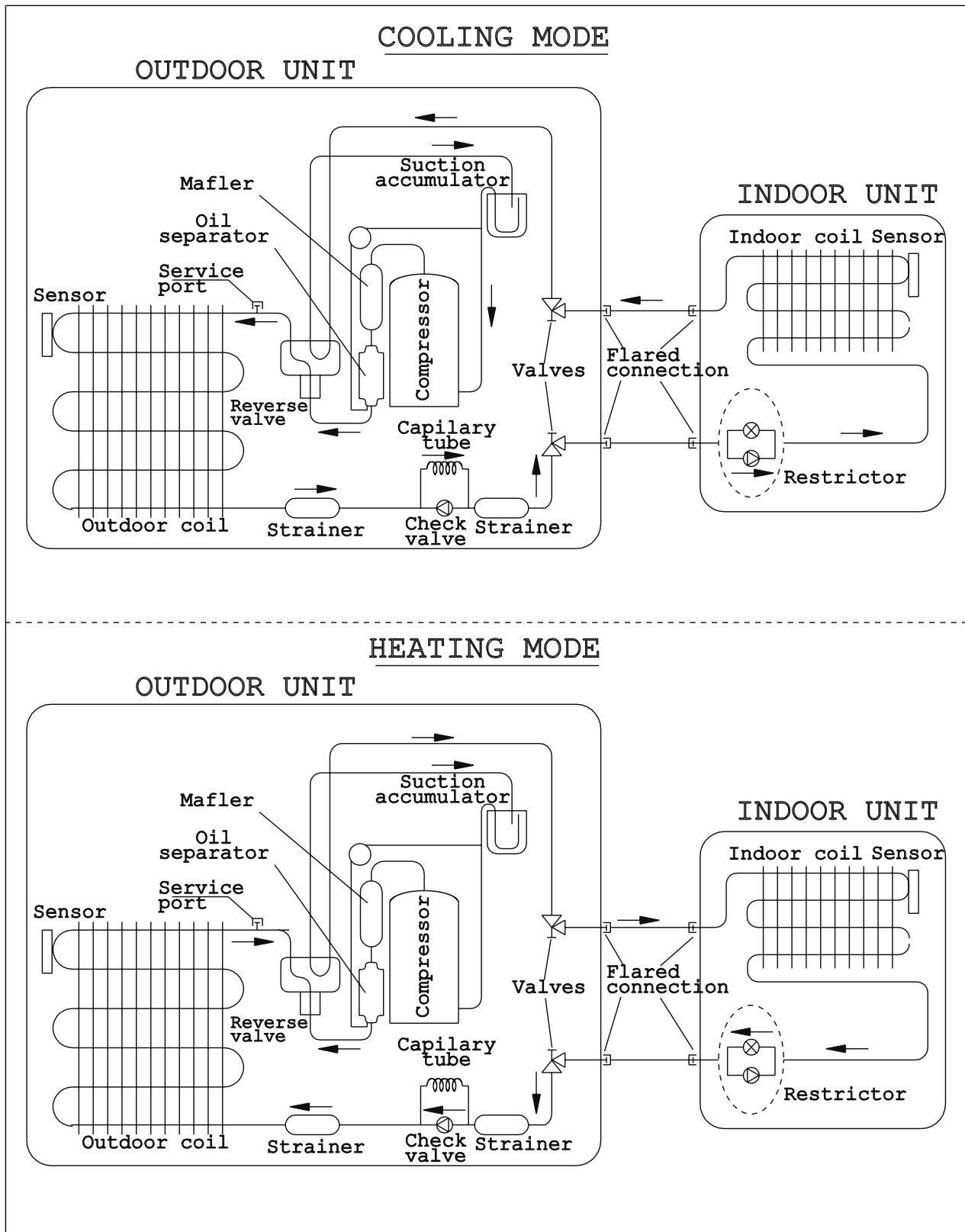
## 11.1 Heat Pump Models

### 11.1.1 DLS 18/ GC 18 NRC



11.2 Heat Pump Models

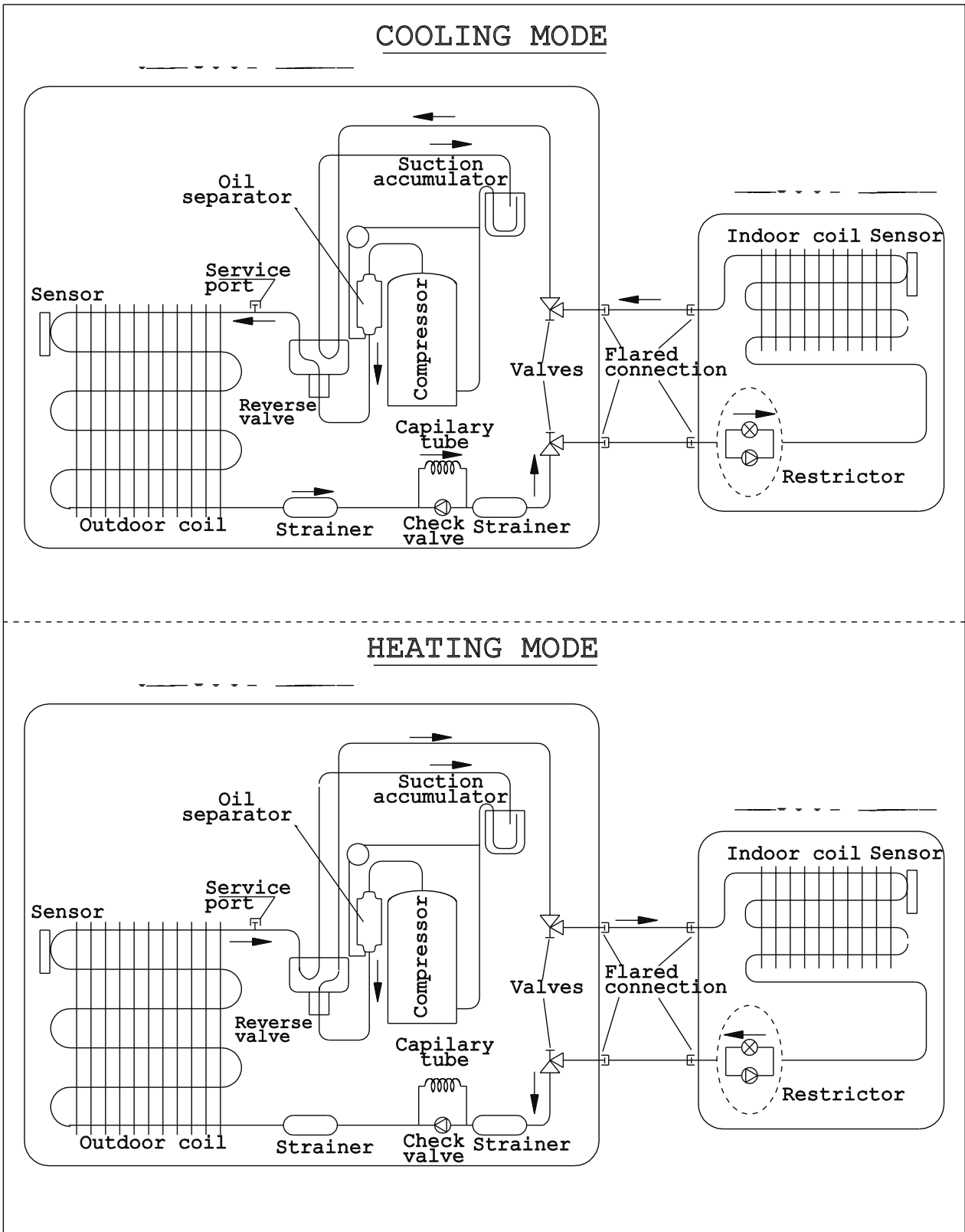
11.2.1 DLS 24/ GC 24 NRC,  
DLS 30/ GCN 30 NRC



11.3 Heat Pump Models

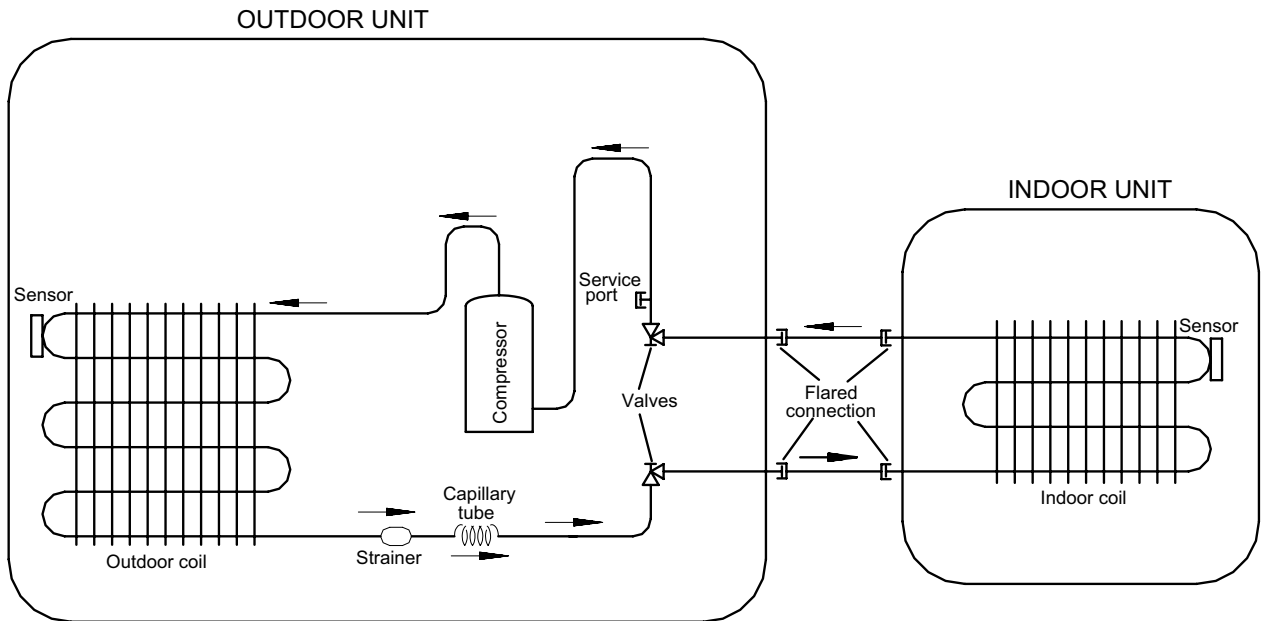
11.3.1 DLS 37/ GCN 37 NRC

DLS 44/ GCN 40 NRC



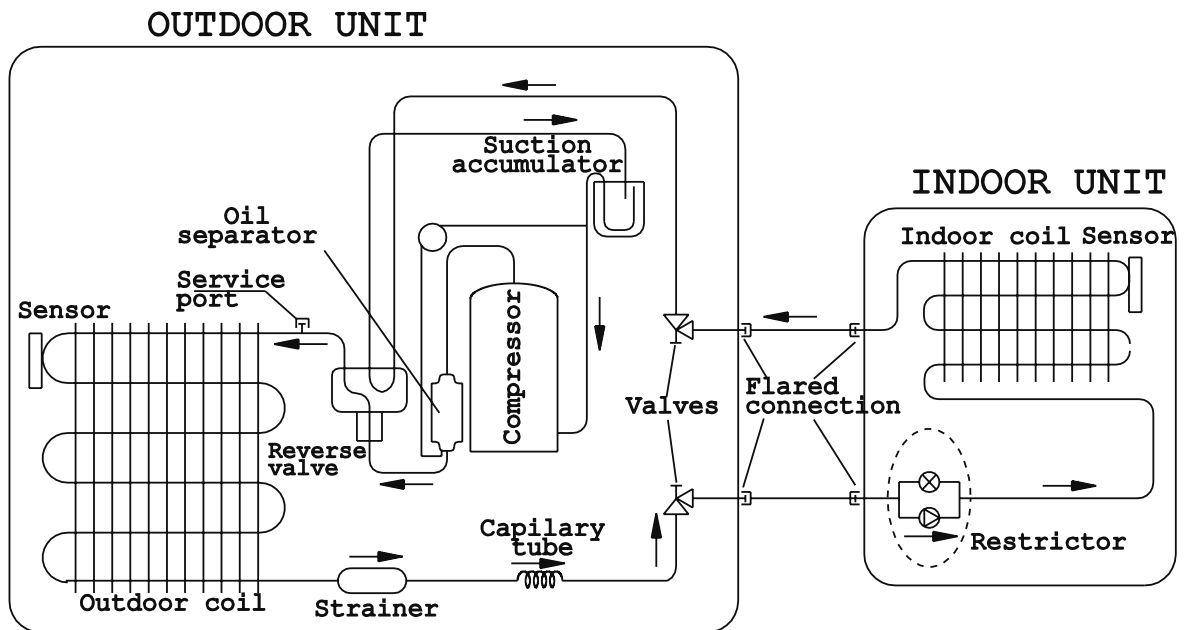
**11.4 Cooling Model Only**

**11.4.1 DLS 18 ST**

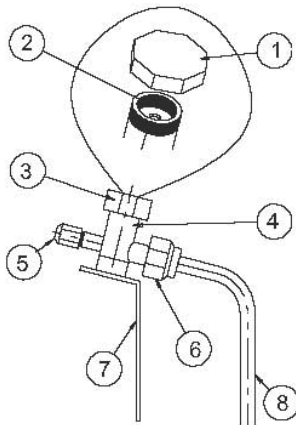
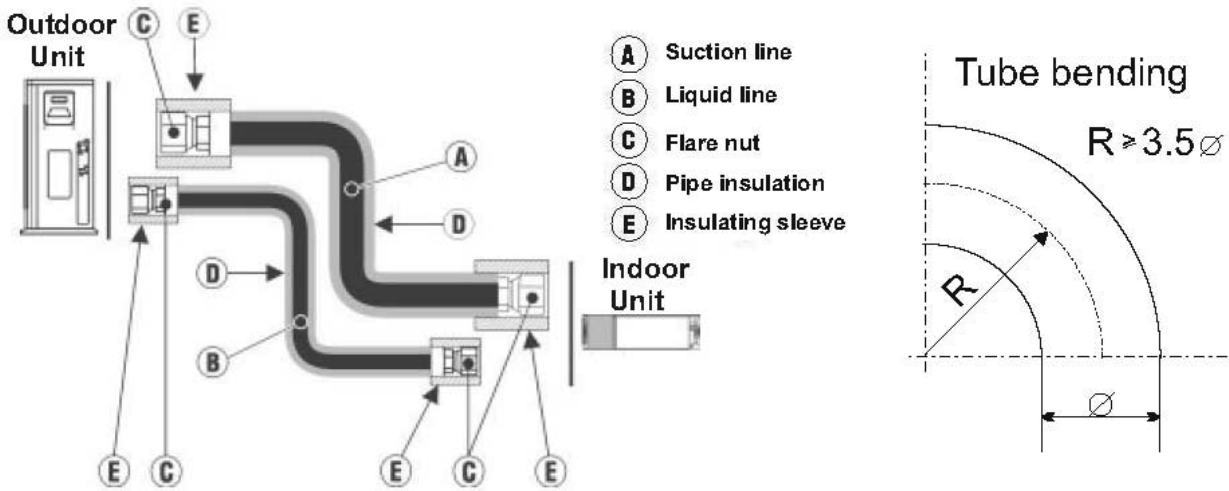


**11.5 Cooling Models Only**

**11.5.1 DLS 24, 30, 37, 44 ST**



## 12. TUBING CONNECTIONS

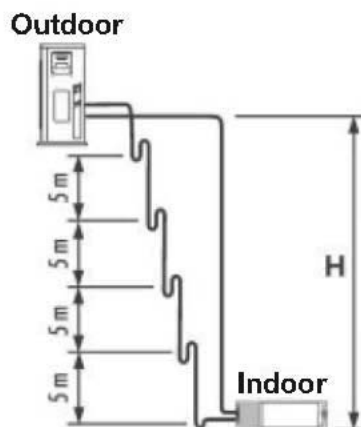


TUBE (Inch)	1/4"	3/8"	1/2"	5/8"	3/4"
<b>TORQUE (Nm)</b>					
<b>Flare Nuts</b>	15-18	40-45	60-65	70-75	80-85
<b>Valve Cap</b>	13-20	13-20	18-25	18-25	40-50
<b>Service Port Cap</b>	11-13	11-13	11-13	11-13	11-13

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

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

\*Applicable for DLS 18 only, for DLS 24 – 44 oil traps are not required.



# 13. CONTROL SYSTEM

## 13.1 Electronic Control

### 13.1.1 Introduction

The electronic control information is designed for service applications, and is common to the following groups of air-conditioners:

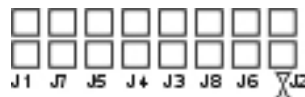
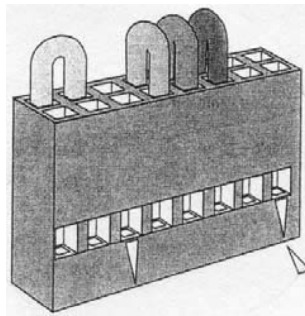
- **ST/RC group** -Cooling only / cooling and heating by heat pump.
- **SH group** -Cooling and heating by heat pump and supplementary heater.
- **RH group** -Cooling, heating by heaters only.

### 13.1.2 Model Plug Settings

Before installation, make sure to set the model plug conforming to the suitable group.

GROUP	J6 Setting	J2 Setting
ST / RC	Open	Open
SH	Closed	Open
RH	Closed	Closed

Model Plug



Group	Location of the jumpers
ST	
RC	
RH	
SH	



**13.1.3 Remote Control DIP Switch Settings**

SETTING SWITCH STATUS				DEFINITION	
SW. NO. 1	SW. NO. 2	SW. NO. 3	SW. NO. 4	RC3	RC4
OFF	OFF	--	--	RC-ALL MODES OF OPERATION	
ON	OFF	--	--	STD-COOL, FAN, DRY, ACTIVE	
OFF	ON	--	--	HEAT-COOL, FAN, DRY, ACTIVE	
ON	ON	--	--	AUTO FAN (AF)	
--	--	OFF	--	TEMP. DISPLAY IN °C DEGREES	VERTICAL SWING ONLY
--	--	ON	--	TEMP. DISPLAY IN °F DEGREES	HORIZONTAL & VERTICAL SWING FUNCTIONS TOGETHER
--	--	--	OFF	TIMER & CLOCK 12H AM, PM	DISABLE LCD & KEY ILLUMINATION
--	--	--	ON	TIMER & CLOCK 24H	ENABLE LCD & KEY ILLUMINATION

Reset operation - Press the 4 buttons simultaneously: "CLEAR ", "SET", "HR +", "HR -" for 5 seconds

**LEGEND**

**SW1, SW2** - Selection of RC/ST

**SW3** – Selection of Display °C or °F in RC3 or swing function in RC4

**SW4** – Selection of Time Display 12H AM/PM or 24H in RC3 or illumination in RC4

**OFF** = 0

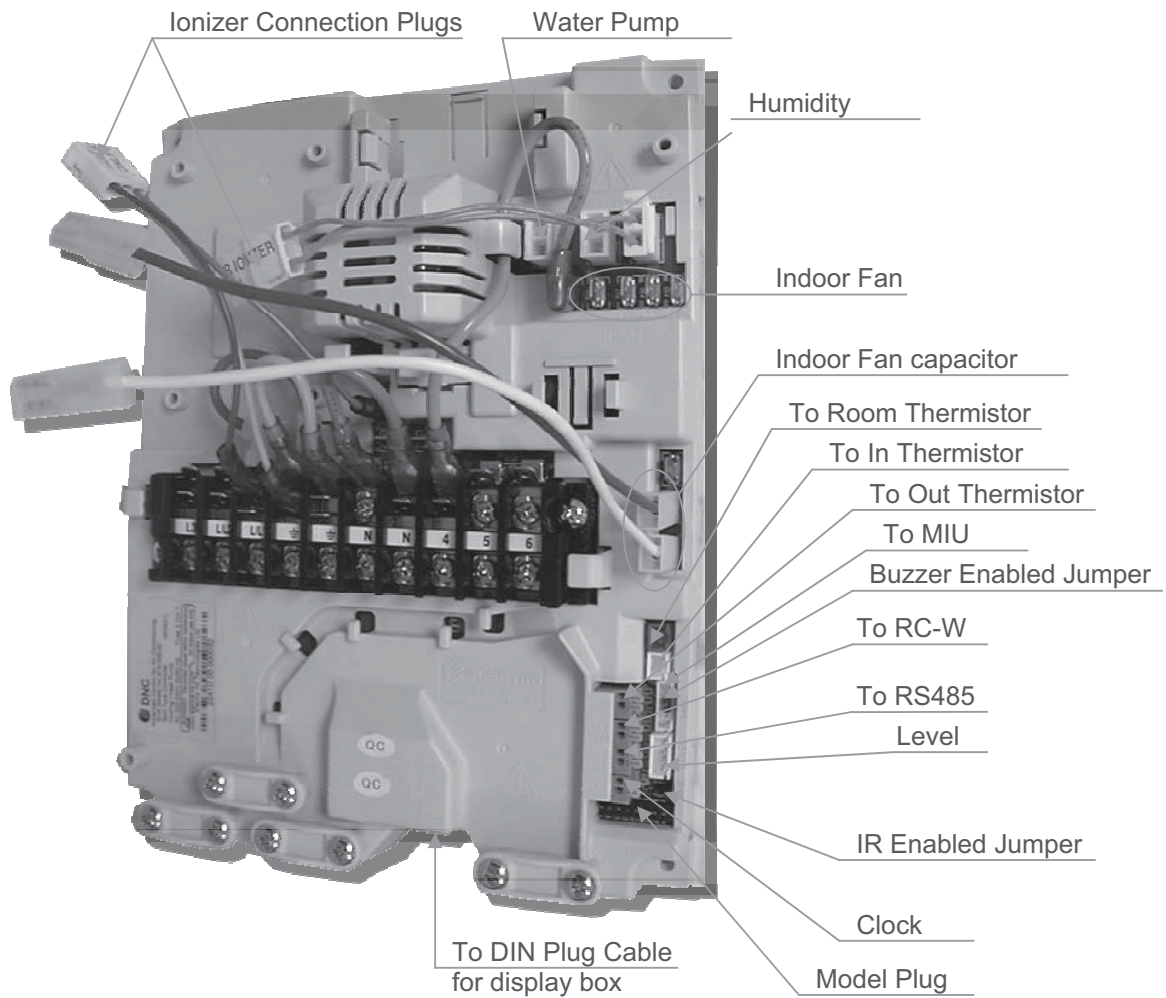
**ON** = 1

***NOTE***

**After setting the DIP switches perform reset operation.**



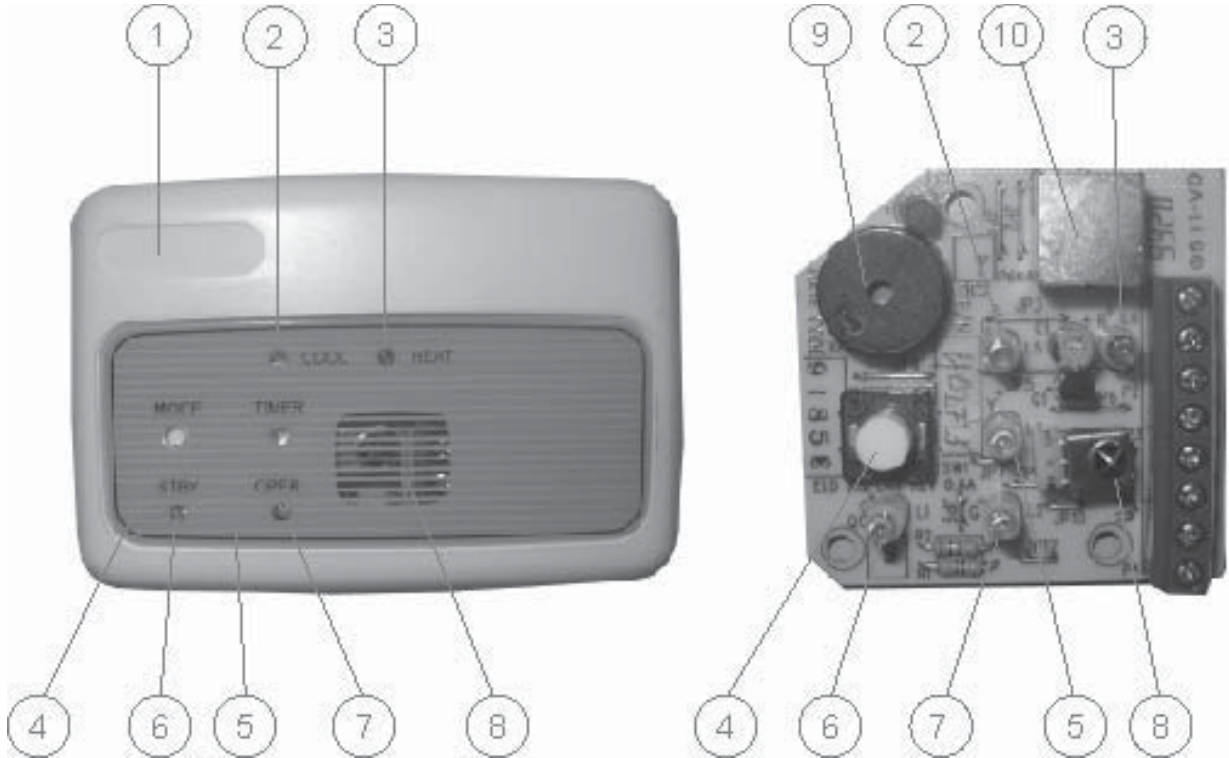
13.1.4 Main PCB Controller



13.1.5 Display Board

Display

Display Board PCB



**Legend**

- 1. Name Plate
- 2. Cooling LED
- 3. Heating LED
- 4. Push Button (Mode)
- 5. Timer LED
- 6. STBY LED
- 7. Operation LED
- 8. IR Receiver
- 9. Buzzer
- 10. Display Port Connection

## 13.2 Abbreviations

AC	- Alternate Current
A/C	- Air-Conditioner
ANY	- ON or OFF status
CLOCK	- ON/OFF Operation Input, (dry contact)
COMP	- Compressor
CPU	- Central Processing Unit
HE	- Heating Element
HPC	- High Pressure Control
H/W	- Hardware
ICP	- Indoor Condensation Pump
ICT	- Indoor Coil Temperature (RT2) sensor
IF, I FAN	-Indoor Fan
IR	- Infra Red
LEVEL1	- Normal Water Level
LEVEL2/3	- Medium/High Water Level
LEVEL4	- Overflow Level
Max	- Maximum
Min	- Minimum
min	- Minute (time)
NA	- Not Applicable
OCP	- Outdoor Condensation Pump
OCT	- Outdoor Coil Temperature (RT3) sensor
OF, OFAN	- Outdoor Fan
OPER	- Operate
Para.	- Paragraph
RAT	- Return Air Temperature (RT1) sensor
RC	- Reverse Cycle (Heat Pump)
R/C	- Remote Control
RCT	- Remote Control Temperature
RH	- Resistance Heater
RT	- Room Temperature (i.e. RCT in I FEEL mode, RAT)
RV	- Reversing Valve
SB, STBY	- Stand-By
sec	- Second (time)
Sect	- Section
SH	- Supplementary Heater
SPT	- Set Point Temperature
ST	- Standard (a Model with Cooling Only)
S/W	- Software
TEMP	- Temperature
W/O	- Without
AT	- The difference between SPT and RT. in Heat Mode: AT = SPT-RT Cool/Dry/Fan Mode: AT = RT-SPT

**13.3 General functions for all models**

**13.3.1 COMP operation**

- For each Mode including POWER OFF & SB, a Min time delay of 3 min before COMP restarting, excluding DEICING Mode.
- The Min operation time of COMP under different operating conditions is

Operation Mode	Min operation time of COMP
Heat, Cool or Auto Modes	3 min.
Fan, Dry, Overflow, Protection modes, or mode change	ignored

**13.3.2 IFAN operation**

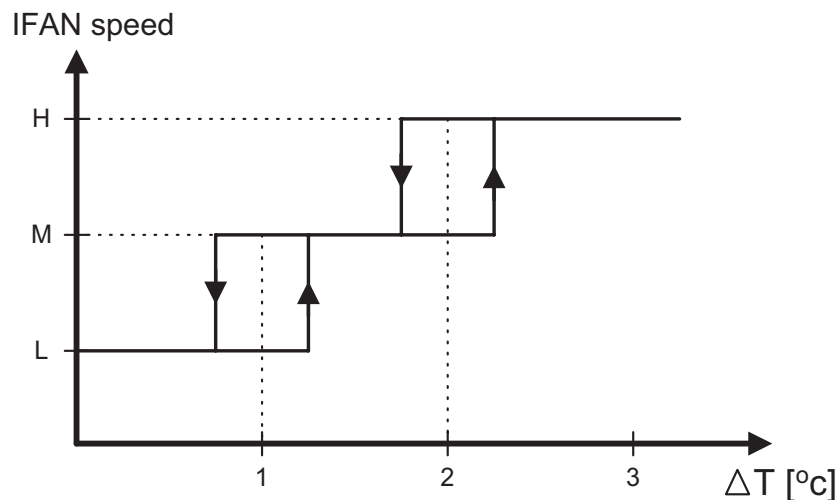
- Whenever the IFAN starts from OFF to ON it will start in Low speed for 25 sec and then will go to ANY speed.
- Min time interval between IFAN speed change in AUTOFAN Mode, is 30 sec.
- Min time interval between IFAN speed change in H/M/L Mode is 1 sec.
- IFAN speed in Heat/Cool Autofan Mode is determined according to the following table:

$\Delta T$	IFAN Speed
$\Delta T \geq 2$	HIGH
$2 \geq \Delta T \geq 1$	MED
$1 \geq \Delta T$	LOW

where in Heat Mode:  $\Delta T = SPT - RT$   
in Cool Mode:  $\Delta T = RT - SPT$

Note:

1. In Heat Mode, the rules in section 4.0.3 have the higher priority.
2. The table above can be represent by a hysteresis curve which will minimize the switching of the IFAN relay and will minimize the change in IFAN speed:



**13.3.3 OFAN operation**

- Min time interval between OFAN ON/OFF state change is 30 sec.

**13.3.4 HE operation**

- Minimum Heaters ON or OFF time is 30 sec.
- Heaters can be activated only if IFAN is on.
- In RH group, HE-1 and HE-2 will be activated only when COMP (or WVWL) is not operating, except in Dry Mode.

**13.3.5 Protections**

- High pressure protection is applicable to all operating modes.
- Deicing control is valid in Heat and Auto Heat Mode only.
- Defrosting control is valid in Dry, Cool, Heat and Auto Modes.
- No reset after protection modes.

**13.3.6 Thermistors operation**

- Return air Temp. is detected by RAT (RT1) in normal Mode, or by RCT (R/C sensor) in I-FEEL Mode.
- Indoor Coil Temp. is detected by ICT (RT2).
- Outdoor Coil Temp. is detected by OCT (RT3).
- Similarly, in the Indoor Units of a WMQ/T system, 4.7k Ohm (5%) resistors must be connected to the OCT ports to disable the “Thermistor Temp reading doesn’t change” error checking.

**13.3.7 Definition of thermistor faults:**

- a. Thermistor is disconnected - The thermistor reading is below -30°C.
- b. Thermistor is shorted - The thermistor reading is over 75°C.
- c. Thermistor Temp reading doesn’t change (irrelevant for RT1) -
  - I. This test is performed only once after a unit is switched from OFF/STBY to operation. At the first occurrence of 10 min continuous COMP operation, the current ICT & OCT are compared with those when the COMP was switched from OFF to ON 10 min before. If the  $\Delta T$  is less than 3°C, the thermistor is regarded as defective.
  - II. The ICT and OCT no-change error can be disabled together by connecting a 4.7 k or 3.9 k ohm resistor (5%) to the OCT connector. These resistors are equivalent to a thermistor at 43+/-1°C and 48+/-1°C respectively.

### III.Cases for disabling thermistor short/disconnected detection

- i. The detection of thermistor faults (a) and (b) above, are disabled when Deicer Protection is started. The detection will be enabled again only after the deicing is completed, and COMP has been restarted and operated for 30 sec.
- ii. When all the following conditions are fulfilled:
  - a. 4.7K Ohm resistor is connected on the OCT
  - b. IFAN is OFF
  - c. Compressor is ON
  - d. ICT < -30 (disconnected)

### IV.General features

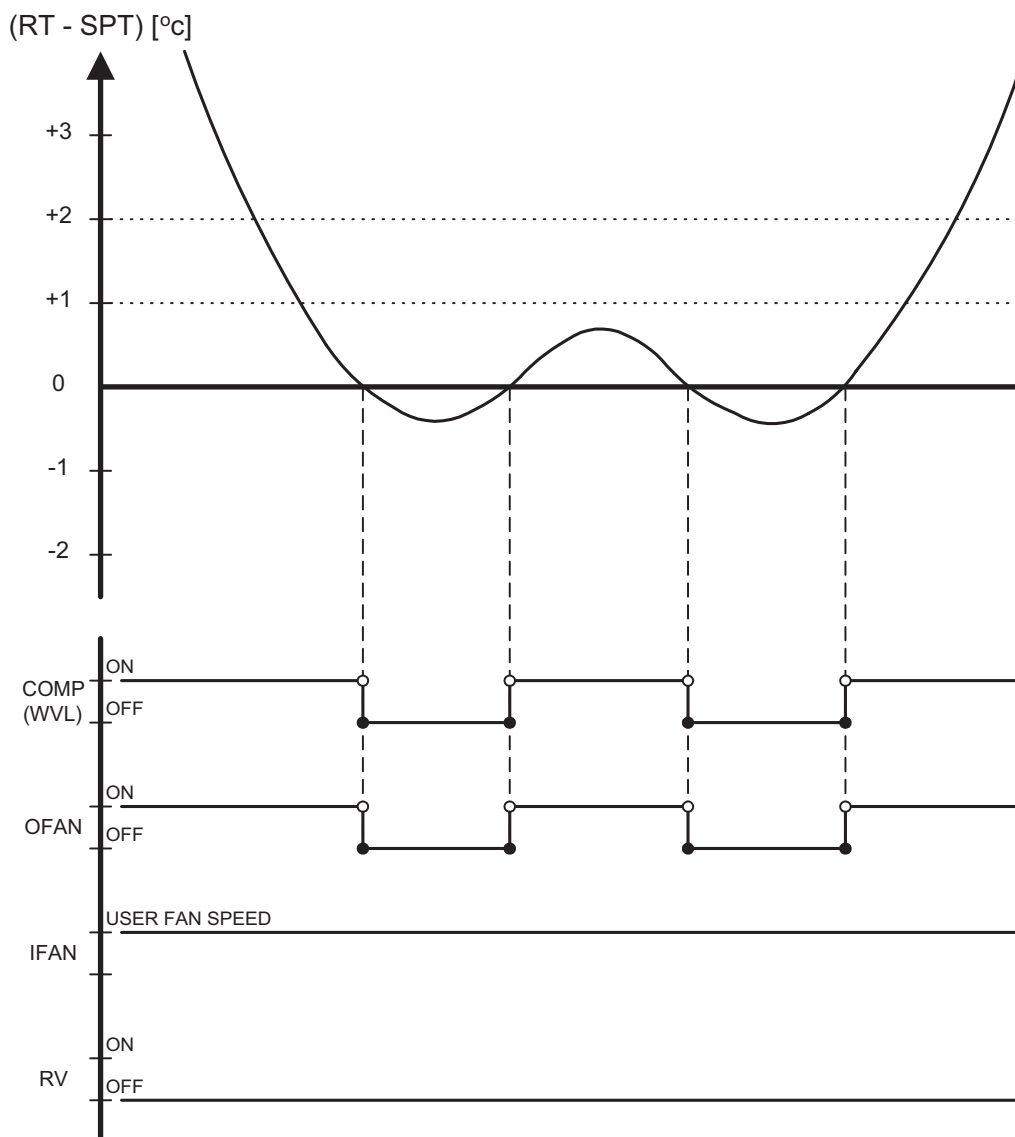
- 1) Allowed (control target) range for RAT is SPT +/- 1°C.
- 2) Whenever the unit is changed from Cool/Dry/STBY mode to Heat mode or vice versa, the procedures below are followed:  
Stop COMP for 3 min → Change RV state → Start COMP if necessary.

## 13.4 Cooling

Mode: Cool, Auto (at Cooling)  
 Temp: Selected desired temperature.  
 Fan: HIGH, MED, and LOW  
 Timer: Any  
 I Feel: On or Off

### Control function

Maintains room temp at desired level by comparing RT and SPT.



### Note:

- 1) IFAN is always running at High, Medium or Low speed selected by user.
- 2) In IFEEL mode, the Room Temperature (RT) is the RCT from an R/C. Otherwise, the RT is the RAT from the Room Thermistor.

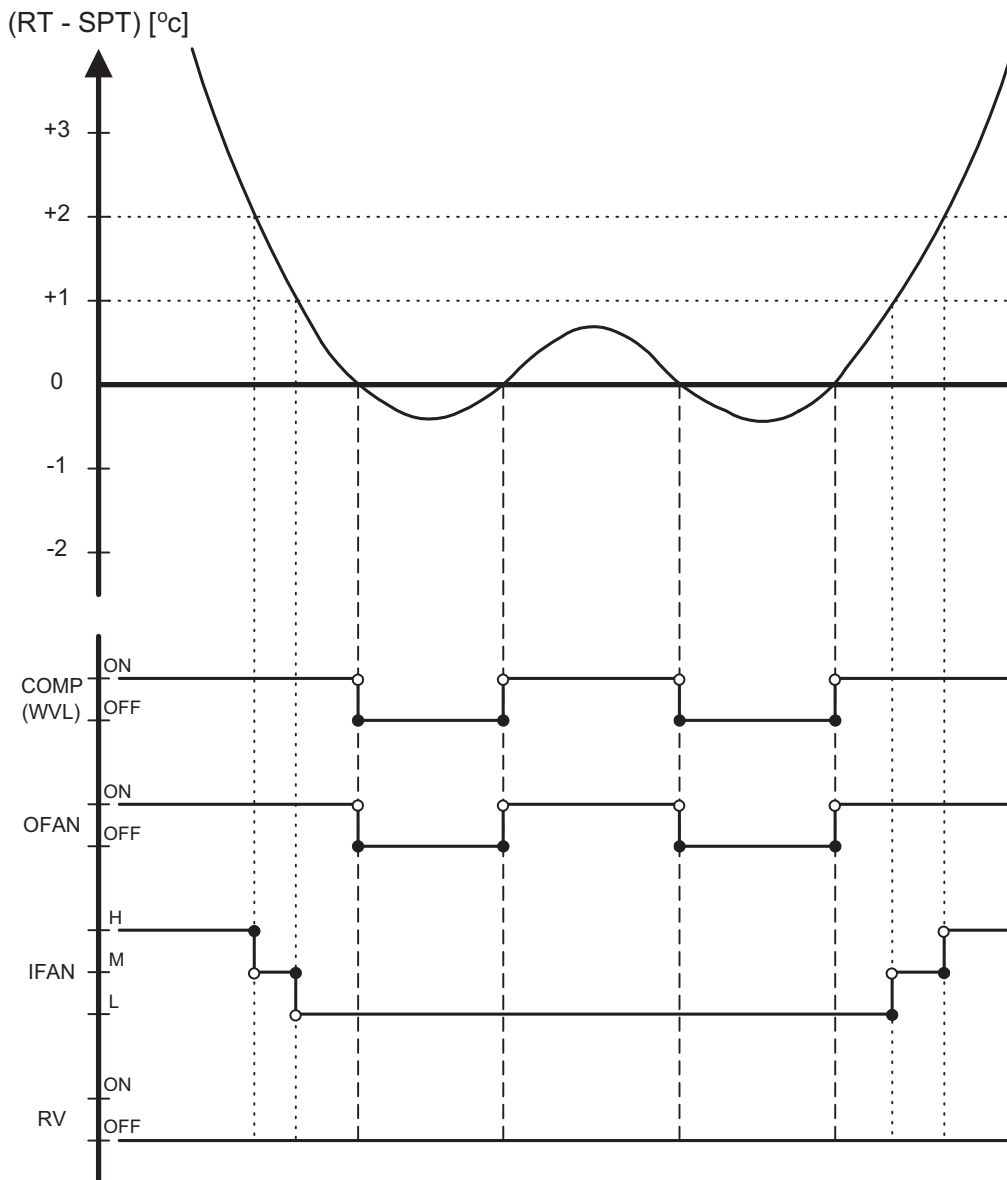


13.4.1 Cooling with Autofan

- Mode: Cool, Auto (at cooling)
- Temp: Selected desired temperature
- Fan: Auto
- Timer: Any
- I Feel: On or Off

Control function

Maintains room temp at desired level and controls the IFAN speed for optimal comfort.



## 13.5 Heating Mode

### 13.5.1 Heating Mode - General

In heating Mode, temp. compensation schedule will be activated for wall mounted and ducted models (i.e. FCD/RWK, ELD, ECC, WAX, WMF and WMN/WHX) according to the following table:

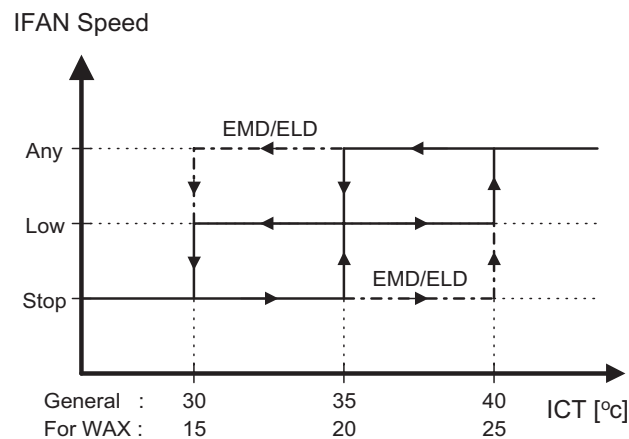
SPT [°C]	Add to SPT	
	I-FEEL ON	I-FEEL OFF
$18 \leq \text{SPT} \leq 27$	0 °C	+2 °C
$27 < \text{SPT} \leq 30$	0 °C	+3 °C

### 13.5.2 IF operating rules

(a) As a general rule for **RC and SH groups**, when **COMP is ON**, excluding protection modes, IFAN will be switched ON if

- $\text{ICT} > 35^\circ\text{C}$  (or  $40^\circ\text{C}$  for EMD/ELD,  $20^\circ\text{C}$  for WAX), or
- at the IFTC second <sup>(4)</sup> after the COMP is switched ON. In this case, the IFAN will be started at low speed <sup>(5)</sup>. The default IFTC values are:

0 sec	for EMD/ELD models
15 sec	for WMN4/RWK(FCX) models
600 sec	for WV (including IFC) models
30 sec	for all other models

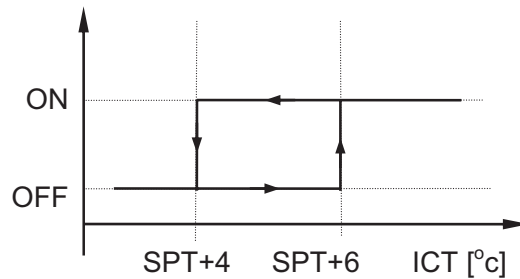


Notes :

- 1) In EMD/ELD models, the IFAN will start if  $\text{ICT} \geq 40^\circ\text{C}$  at any IFAN speed, and will stop if  $\text{ICT} < 30^\circ\text{C}$ .
- 2) In **SH or RC group**, if HE is set to OFF due to low ICT, IFAN will be switched to LOW and will be turned OFF after 30 sec.
- 3) An exception to this rule) is the Back-up mode for SH group. 4) If the IFAN is turned ON by the IFTC operation, its minimum operation time before stopping due to low ICT temperature is 60 sec.

- (b) In **RC and SH groups**, whenever **COMP & HE are both OFF**, excluding protection modes, IFAN operation will be according to the following:  
 In **WAX, flour mounted or mobile models**, IFAN switches to LOW for 30 sec and then stops.  
 In **other models** IFAN will operate in low speed for 30 sec and then stop. If COMP is OFF for more than 3 minutes and IFEEL Mode is inactive, IFAN will operate in low speed according to the following graph:

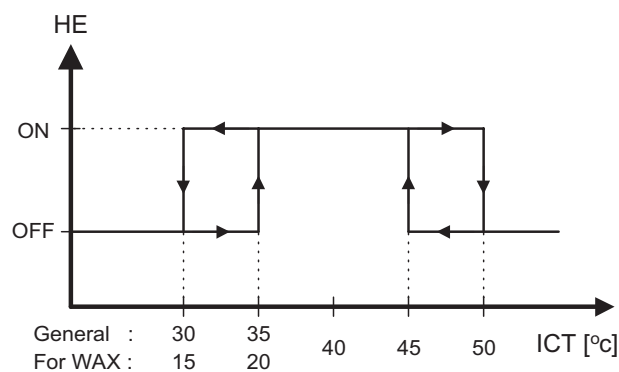
IFAN (Low Speed)



- (c) In **RH group**, IFAN starts when HE starts. When HE switches to OFF, IFAN switches to LOW for 30 sec and then stops.

### 13.5.3 HE operation

- (a) For **all Groups**, HE can be ON only when IFAN is ON.  
 (b) For **all Groups**, HE switches to OFF when  $ICT > 50\text{ }^{\circ}\text{C}$ , and is activated again when  $ICT \leq 45\text{ }^{\circ}\text{C}$ .  
 (c) In **RH group**, HE operation is according to the difference between RAT and SPT (see Sect 4.3, 4.4).  
 (d) In **SH or RC group**, HE operation is limited by the following graph:



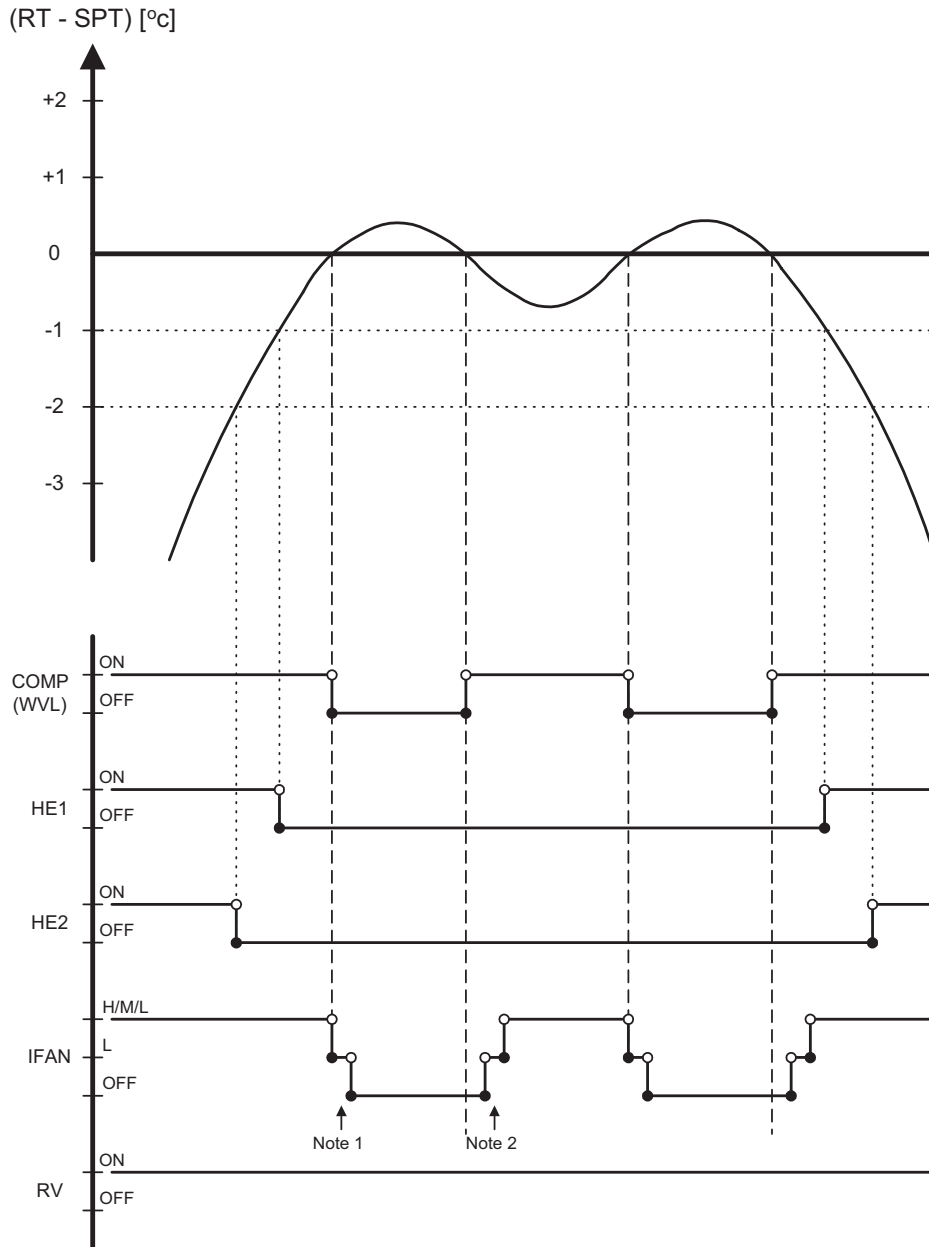
- (f) Back-up mode for **SH group**  
 After COMP (or WVL) has been working for 5 minutes, HE & IFAN are activated even if the ICT is still below 35°C. This situation is called Back-up Mode. Both HE & IFAN will work in Back-up Mode until the ICT reaches 35°C. Then, the operation goes on in the usual mode (IFAN as in 4.0.3.a, and HE as in 4.0.4.d).

**13.5.4 Heating, RC or SH Group**

Mode: Heat, Auto (at heating)  
 Temp: Selected desired temperature  
 Fan: HIGH, MED, LOW  
 Timer: Any  
 I Feel: On or Off

Control function

Maintains room temp. at desired level by comparing RAT or RCT to SPT.

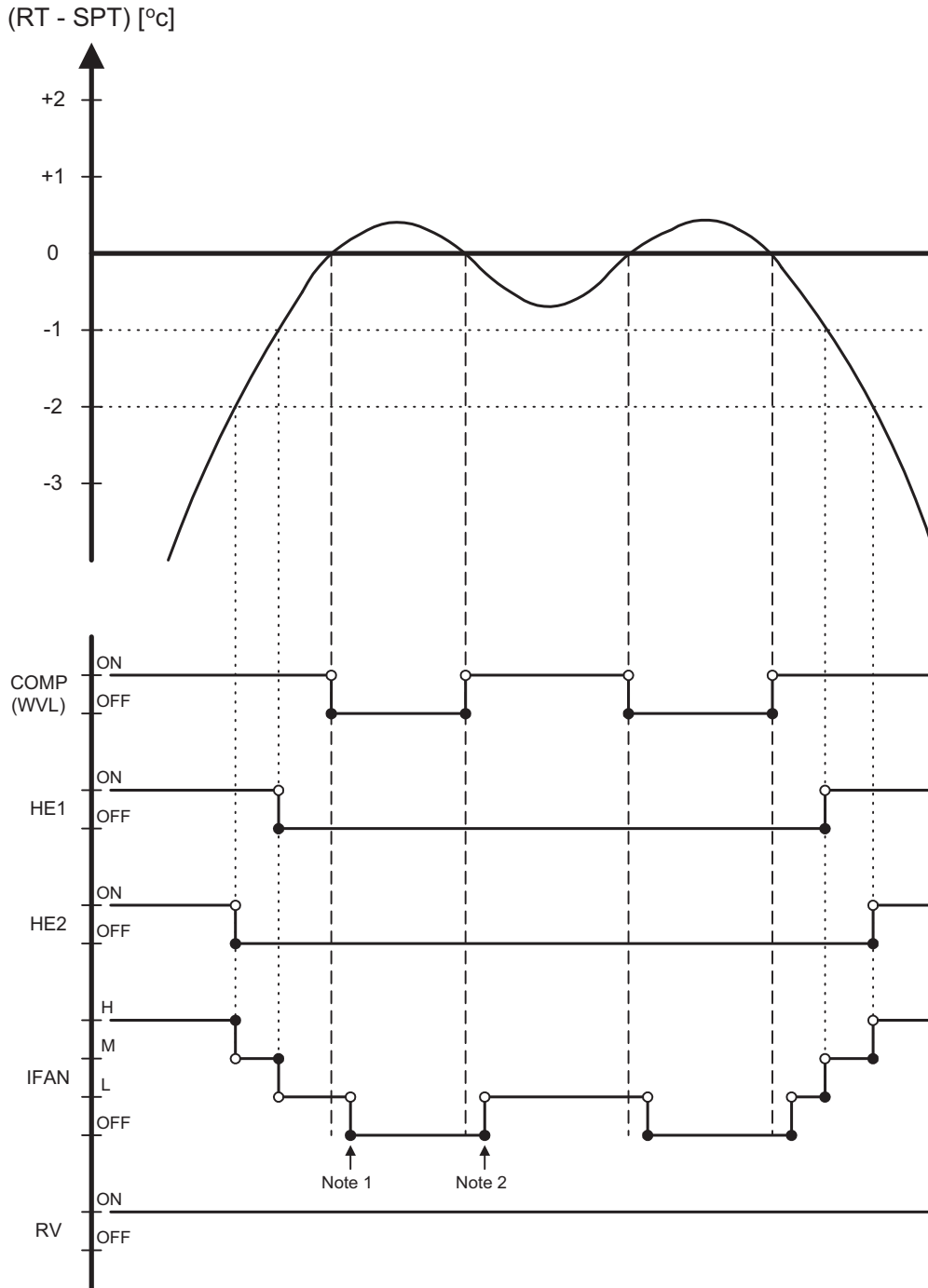


**13.5.5 Heating, RC or SH Group with Autofan**

Mode: Heat, Auto (at heating)  
 Temp: Selected desired temperature  
 Fan: Auto  
 Timer: Any  
 I Feel: On or Off

Control function

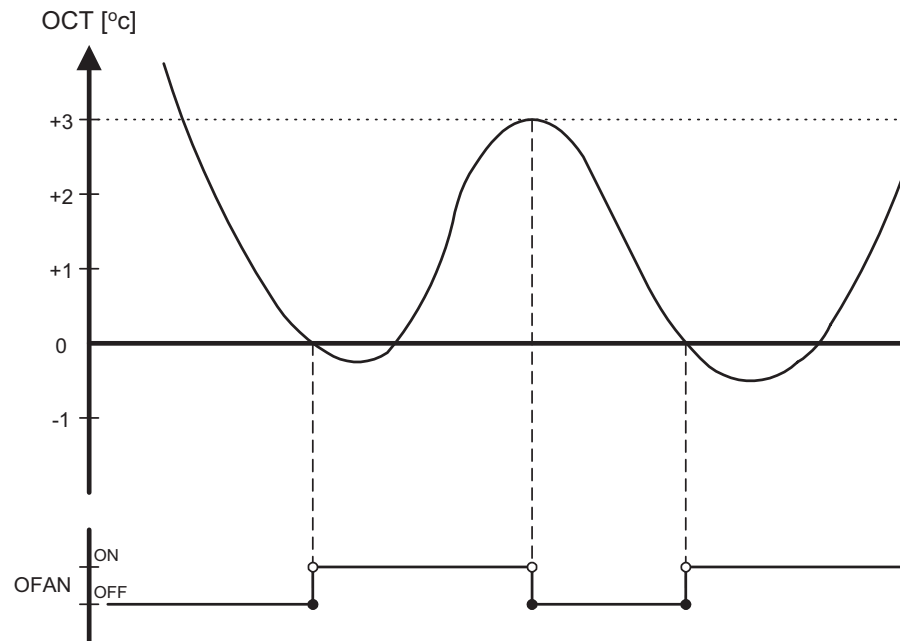
Maintains room temp at desired level by controlling COMP, IFAN and OFAN.



**13.5.6 OFAN operation is controlled by the graph below when**

- ⌘ (RAT  $\geq$  SPT - 2°C), AND
- ⌘ (ICT  $\geq$  45°C), AND
- ⌘ (COMP is ON)

Otherwise, OFAN runs together with COMP.

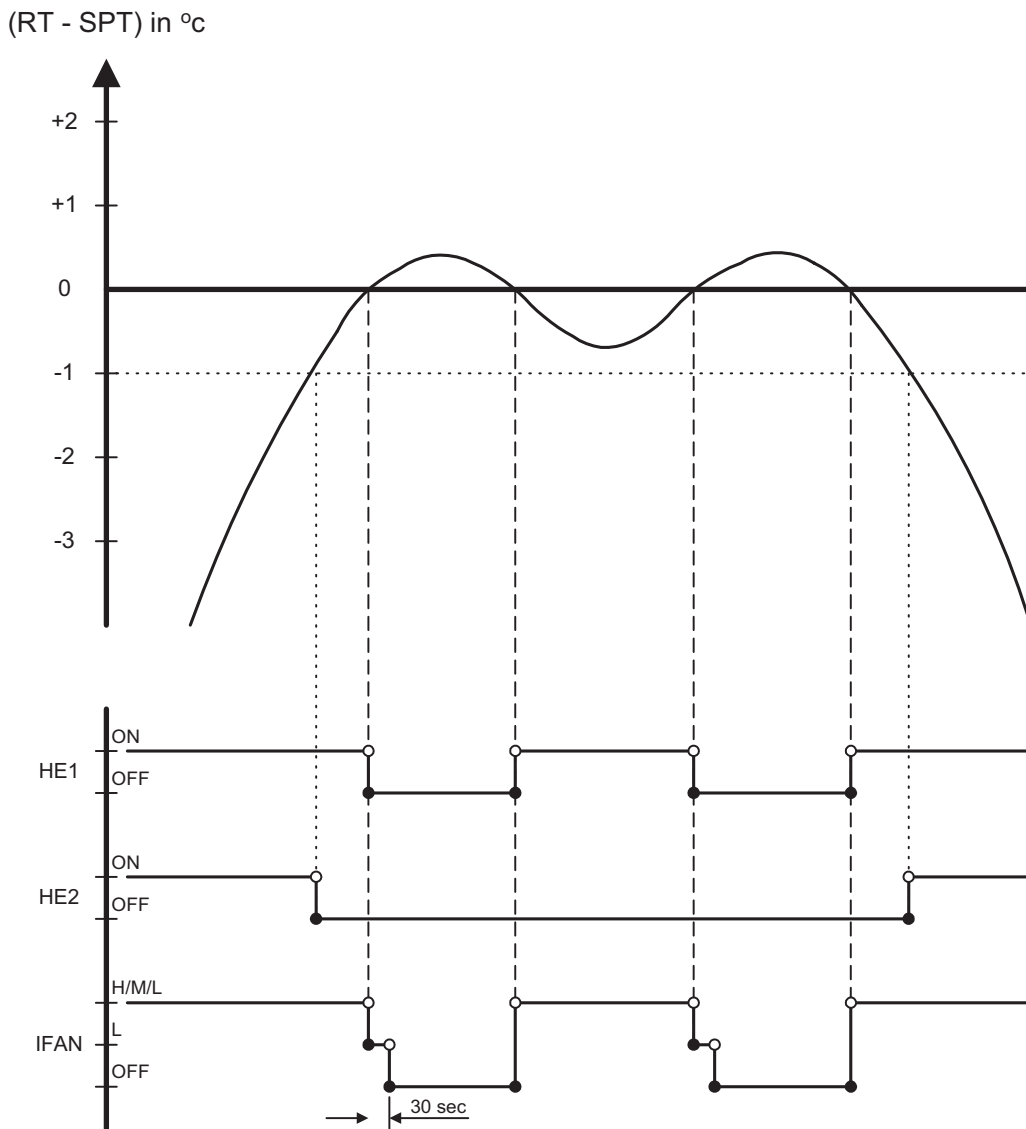


**13.5.7 Heating, RH Group**

Mode: Heat, Auto (at Heating)  
Temp: Selected desired temperature  
Fan: HIGH, MED, LOW  
Timer: Any  
I Feel: On or Off

Control Function

Maintains room temp. at desired level by controlling Heating Elements : HE1 or HE2.



Notes:

- 1) COMP (or WV), OFAN and RV are always OFF.

### 13.5.8 Heating, RH Group, with Autofan

Mode: Heat, Auto (at Heating)

Temp: Selected desired temperature

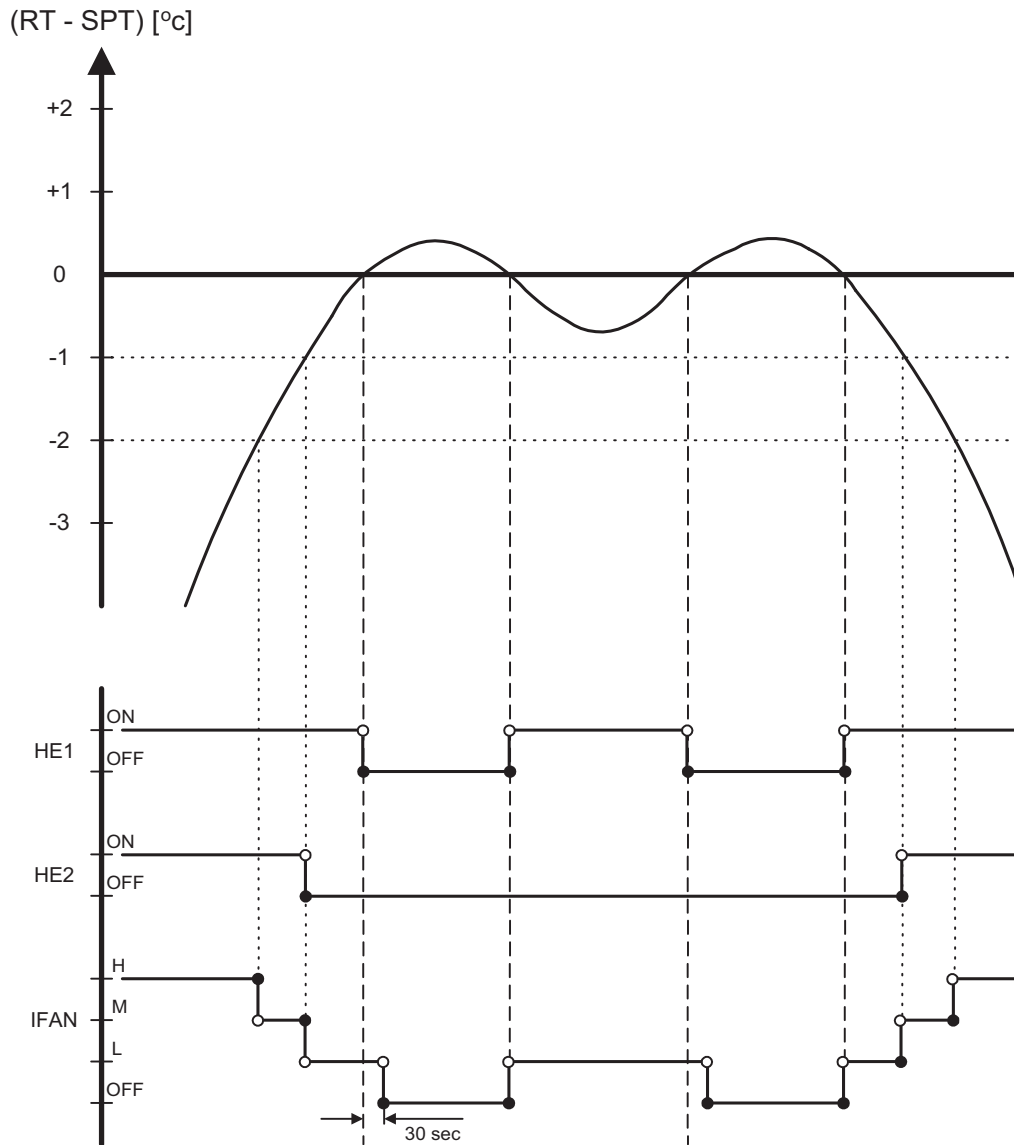
Fan: Auto

Timer: Any

I Feel: On or Off

#### Control function

Maintains room temp at desired level by controlling the 2-Stage Electric Heaters.



#### Notes:

- 1) COMP (or WV), OFAN and RV are always OFF.



### 13.6 Automatic Cooling or Heating - General

**13.6.1** The Auto Mode is for model with compressor and the WVH-RH only. The WVH-ST, RC and SH units do not work in Auto Mode.

- Switching-temperature between Cooling and Heating is  $SPT \pm 3^{\circ}C$ .
- Autofan in Automatic Cooling and Heating Mode will activate “Cooling with Autofan Mode” and “Heating with Autofan Mode” respectively.
- When the Auto Mode is started with  $SPT \pm 0^{\circ}C$ , the unit will not select Auto Heat or Auto Cool mode immediately. Instead, the unit will be in a temporary Fan Mode with IFAN operating at low speed. The proper Auto Heat mode or Auto Cool will be started whenever the RT reaches  $SPT-1^{\circ}C$  or  $SPT+1^{\circ}C$  respectively.
- For RC & SH units, Mode change between Auto Heat & Auto Cool Modes is possible only after the COMP has been OFF during the last T minutes.

Mode Change	time, T
Auto Cool to Auto Heat	3 min
Auto Heat to Auto Cool	4 min

- For RH units, Mode change between Auto Heat & Auto Cool Modes is possible after the COMP/HEs have been OFF during the last T minutes.

Mode Change	time, T
Auto Cool to Auto Heat	COMP off for 3 min
Auto Heat to Auto Cool	HEs off for 3 min

- When unit is changed from Cool/Dry mode to Auto Mode, the unit will continue to operate at (Auto) Cool Mode until the conditions for switching from Auto Cool to Auto Heat are satisfied.

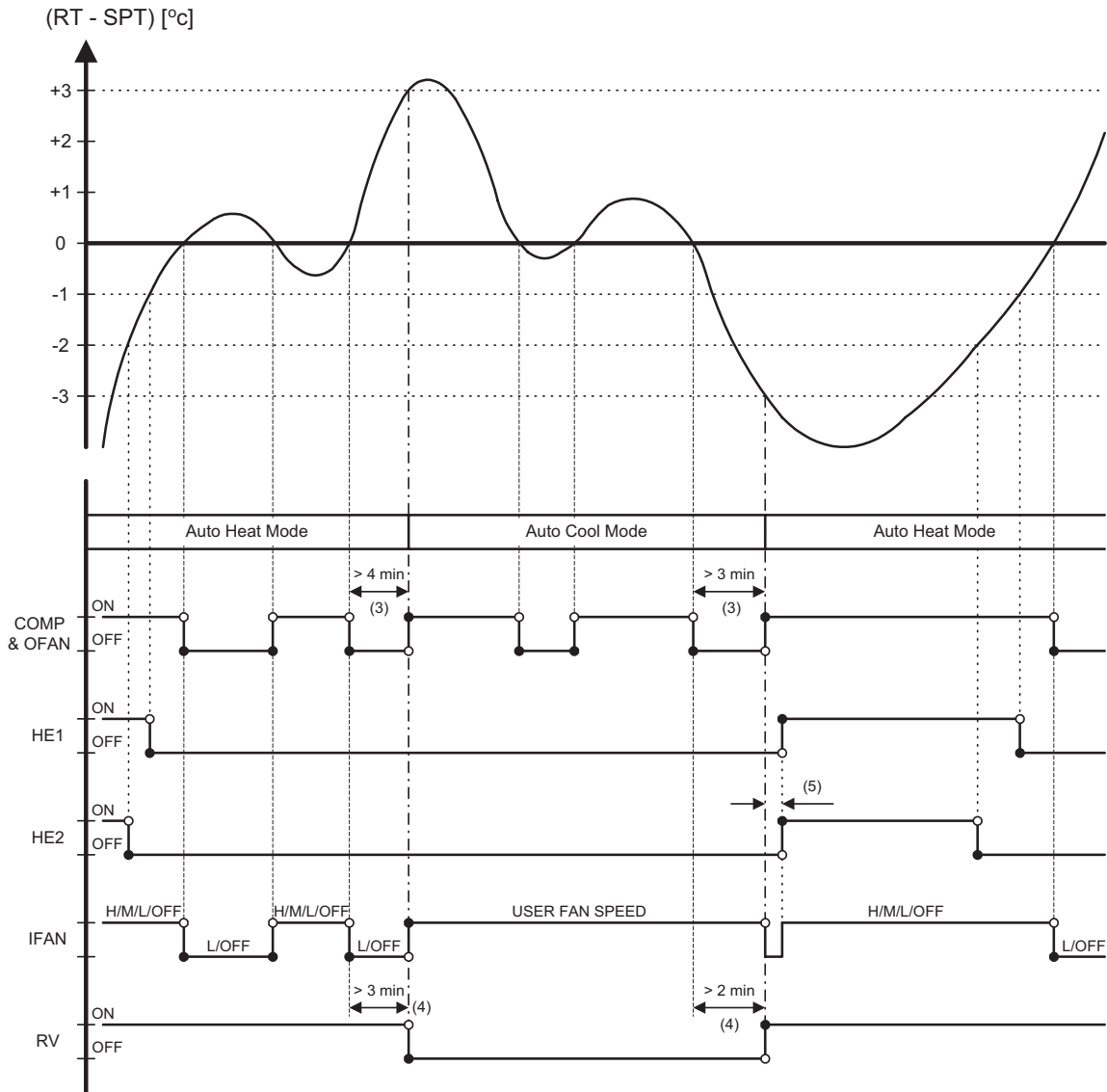
Similarly, when unit is changed from Heat Mode to Auto Mode, the unit will continue to operate at (Auto) Heat Mode until the conditions for switching from Auto Heat to Auto Cool are satisfied.

**13.6.2 Auto Cooling or Heating, RC or SH Groups**

Mode: Auto  
 Temp: Selected desired temperature  
 Fan: Any  
 Timer: Any  
 I Feel: On or Off

Control function

Maintains room temp at desired level by selecting between cooling and heating modes.

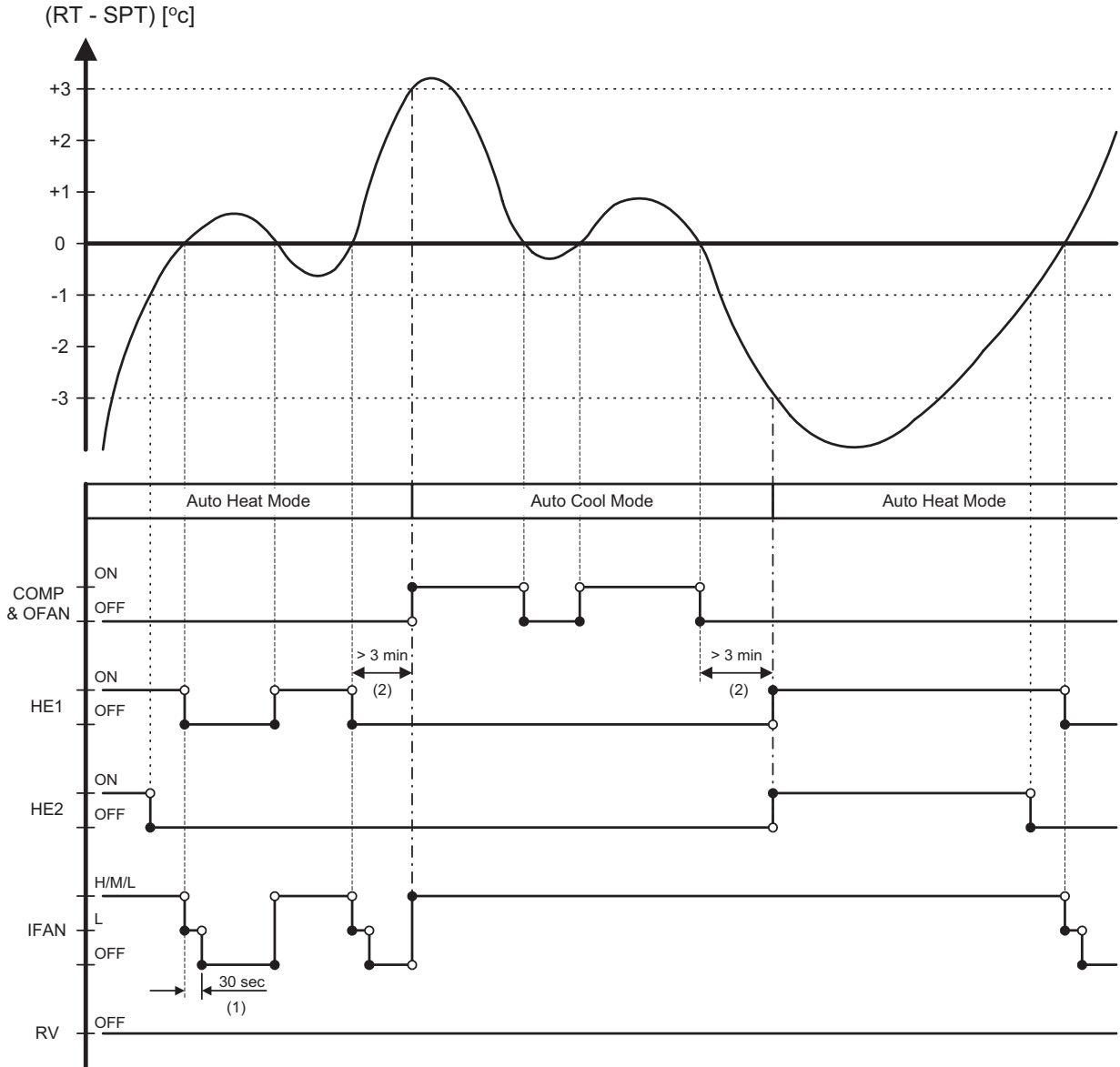


**13.6.3 Auto Cooling or Heating RH Group**

- Mode: Auto
- Temp: Selected desired temperature
- Fan: Any
- Timer: Any
- I Feel: On or Off

Control function

Maintains room temp at desired level by selecting between Cooling or Heating Modes.

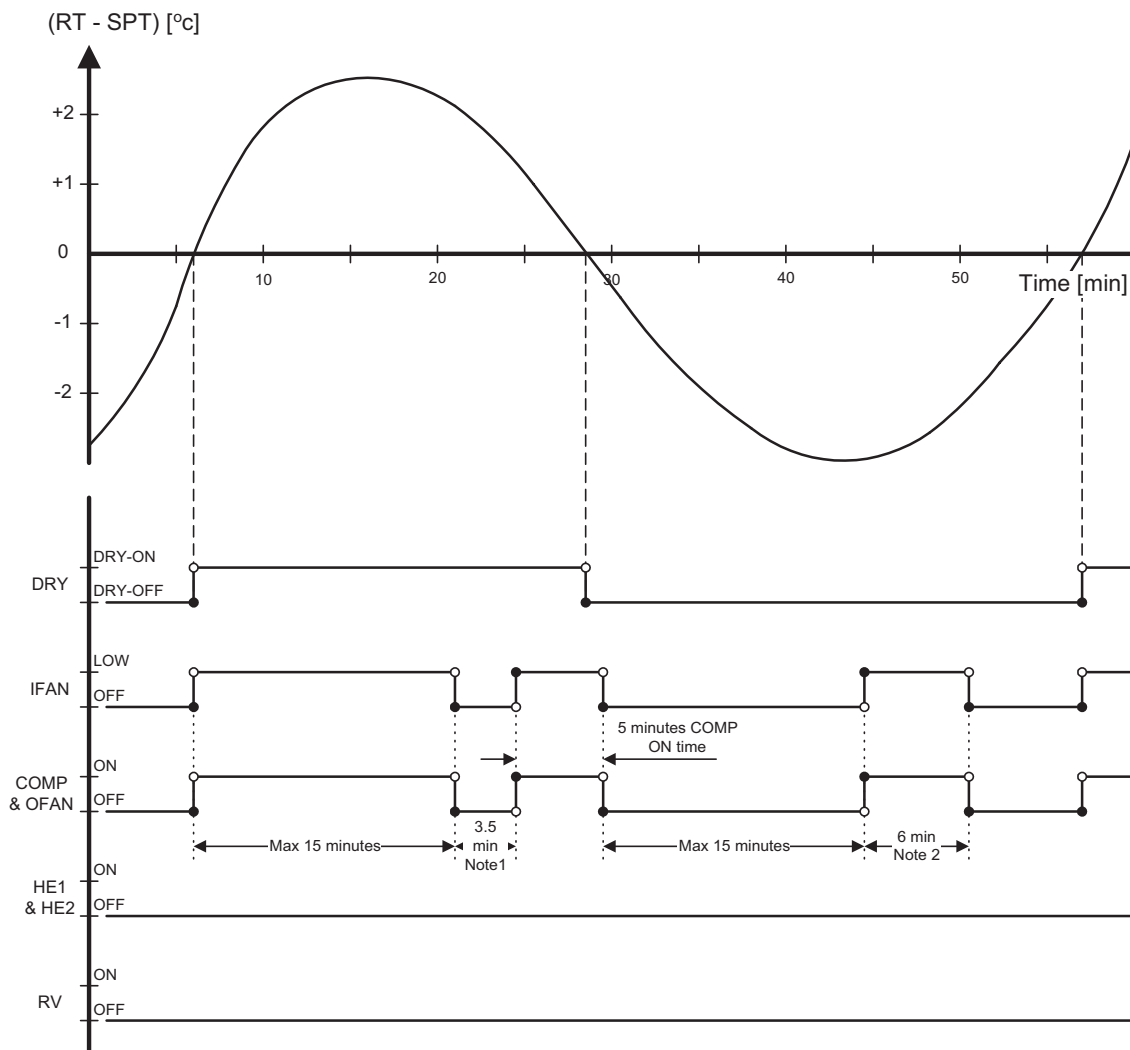


### 3.7 Dry, ST or RC group or P2000 model with any group settings

Mode: Dry  
 Temp: Selected desired temp  
 Fan: Low (automatically selected by software)  
 Timer: Any  
 I FEEL:Any

#### Control function

Reduce room humidity with minimum temp. fluctuations by operating in Cool Mode with low speed IFAN.



#### Notes :

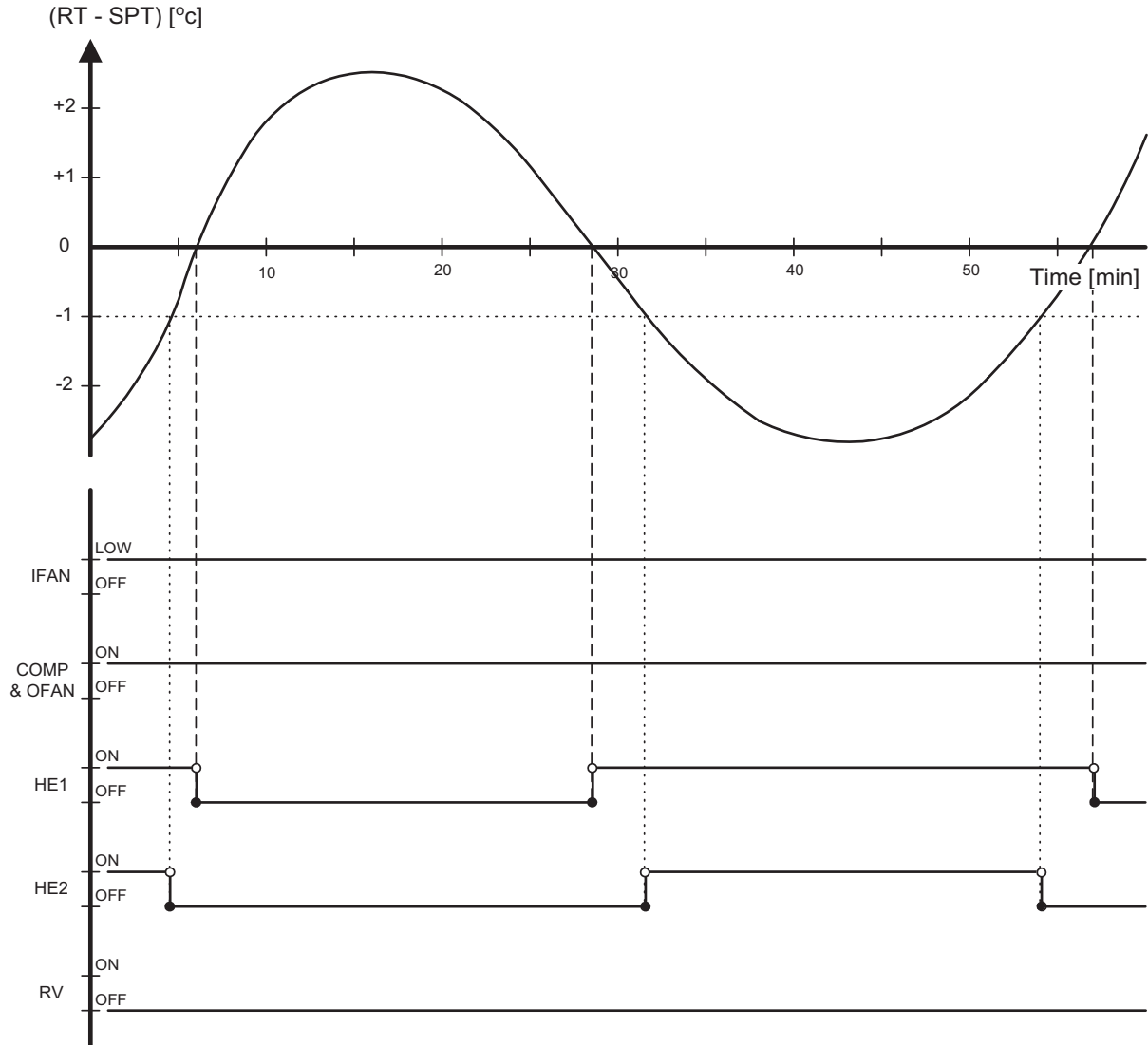
1. When Dry is ON, the COMP is forced OFF for 3.5 min (longer than the 3 min Min COMP-Off time) after every 15 min of continuous COMP operation.
2. When Dry is OFF, the COMP is forced ON for 6 min (longer than the 3 min Min COMP-On time) after every 15 min of continuous COMP OFF time.
3. When Dry is changed from ON to OFF or vice versa, the limits mentioned in (1) & (2) are ignored. The COMP operation is only controlled by the 3 min Min OFF time and 1 min Min ON time.
4. In Dry Mode, IFAN is LOW when COMP is ON, and is OFF when COMP is OFF.
5. HEs are always OFF in Dry Mode.

**13.7.1 Dry, SH or RH group excluding P2000 model**

Mode : Dry  
 Temp: Selected desired temp.  
 Fan: Low (automatically selected by software)  
 Timer: Any  
 I FEEL: Any

Control function

Reduce room humidity with minimum Temp. fluctuations by operating in Cool Mode with low speed IFAN and HE.



Notes :

- 1) HP and Defrost protections are the same as in Cool Mode.
- 2) HEs are operated according to the room temp., in the same way as in Heating for RH group .
- 3) IFAN is operating continuously at low speed.

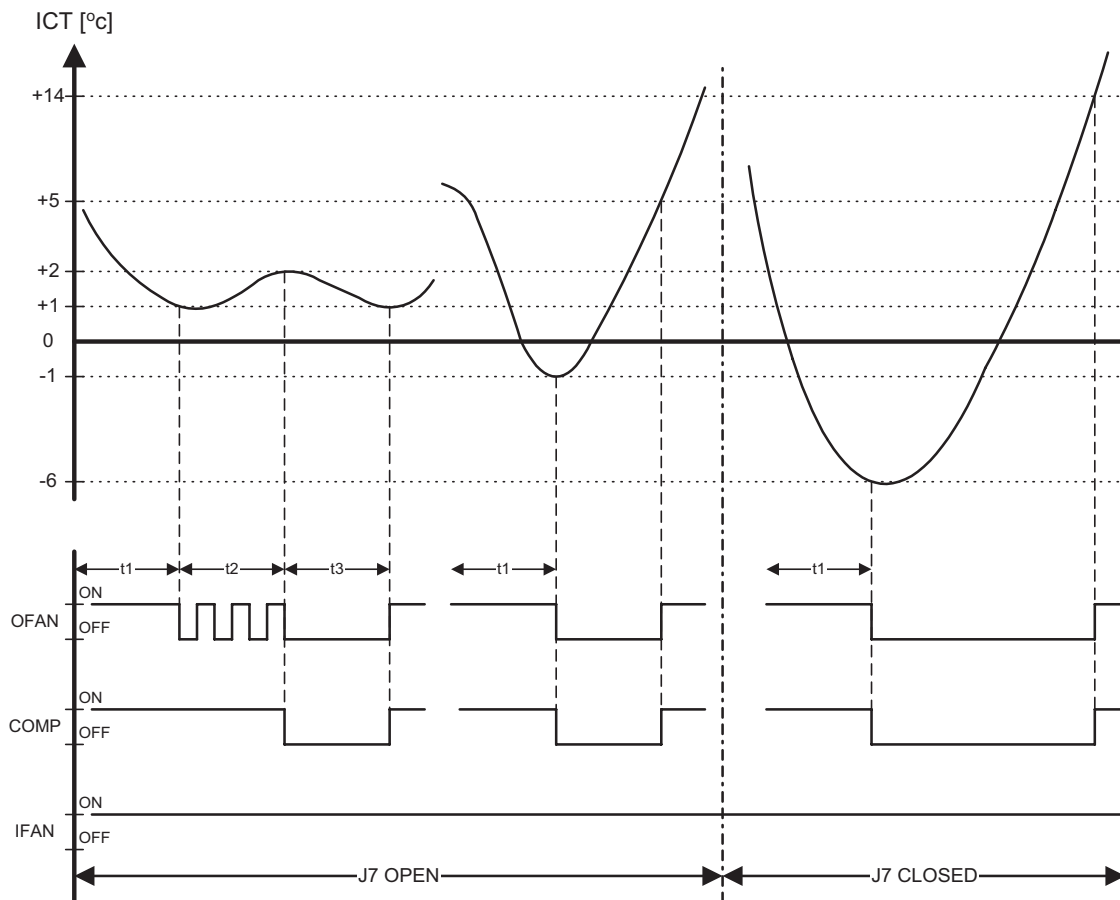
## 13.8 Cooling Mode Protections

### 13.8.1 Indoor Coil Defrost

Mode: Cooling, Dry, Auto  
 Temp: Selected desired temp.  
 Fan: Any  
 Timer: Any  
 I Feel: On or Off

#### Control Function

Protect the indoor coil from ice formation at low ambient temperature.



t1 = 5 min minimum for each COMP starting  
 t2 = OFAN cycling (alternate between ON and OFF every 30 sec) for 20 min maximum  
 t3 = COMP and OFAN stop for 10 min minimum

#### Notes:

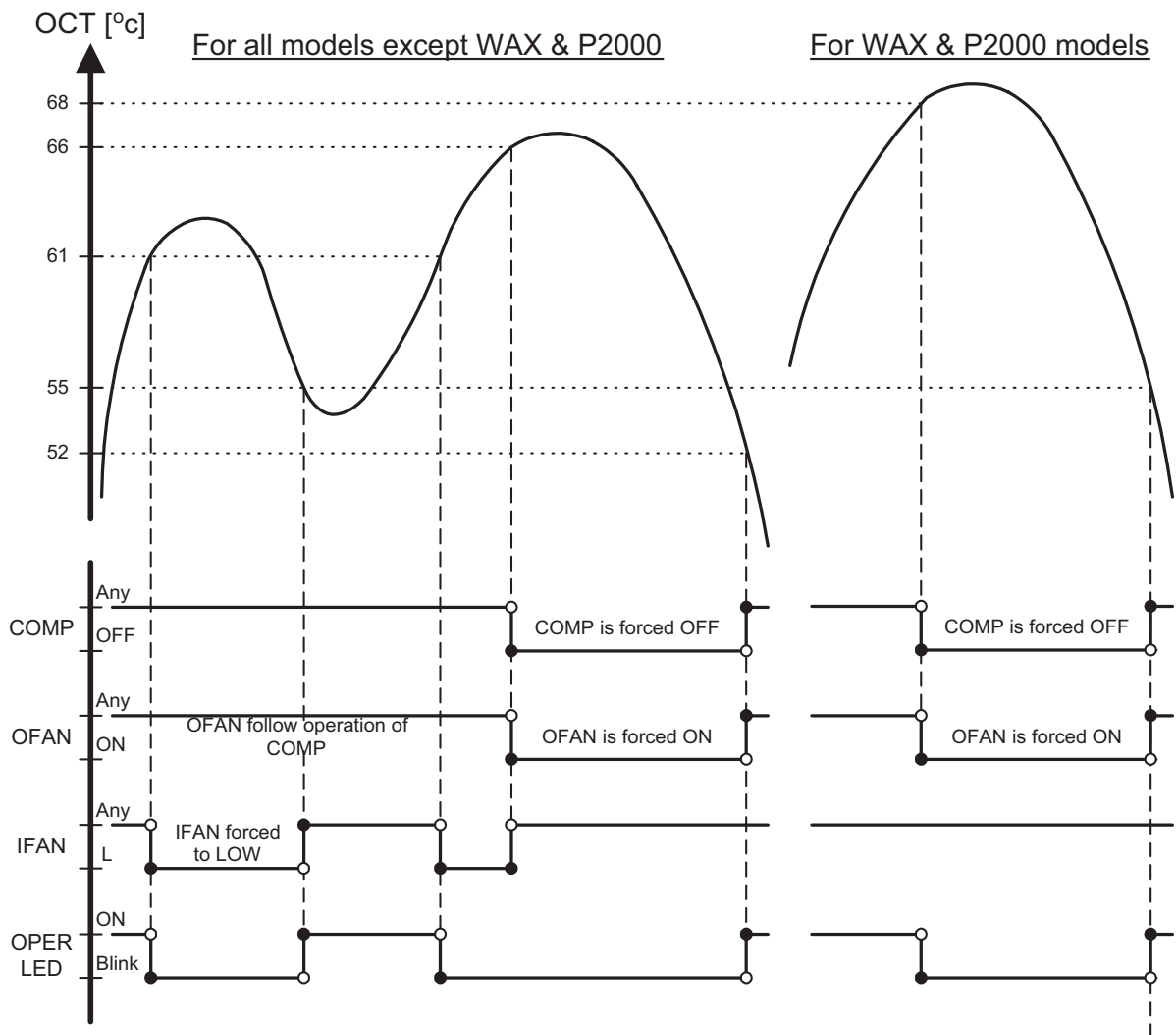
1. When J7 is closed (connected), OFAN cycling is cancelled and the set temperature for COMP & OFAN cut-out and cut-in are changed. COMP & OFAN are forced OFF when  $ICT \leq -6^{\circ}\text{C}$ , and are kept OFF until  $ICT > 14^{\circ}\text{C}$ .
2. For WAX model, the defrost processes is simpler. When J7 is open, COMP & OFAN are forced OFF when  $ICT \leq -1^{\circ}\text{C}$ , and are kept OFF until  $ICT > 5^{\circ}\text{C}$ . When J7 is closed, the WAX defrosting process is the same as that of the other models (R.H.S. of the graph above). In both cases, the ICT checking in t2 and t3 are not applied.

### 13.8.2 High Pressure Protection

Mode: (Auto) Cooling or Dry  
 Temp: Selected desired temp.  
 Fan: Any  
 Timer: Any  
 I Feel: On or Off

#### Control Function

To protect the COMP from the high pressure built-up in the outdoor coil during normal cooling operation, by switching OFF the IFAN and COMP.



Note:

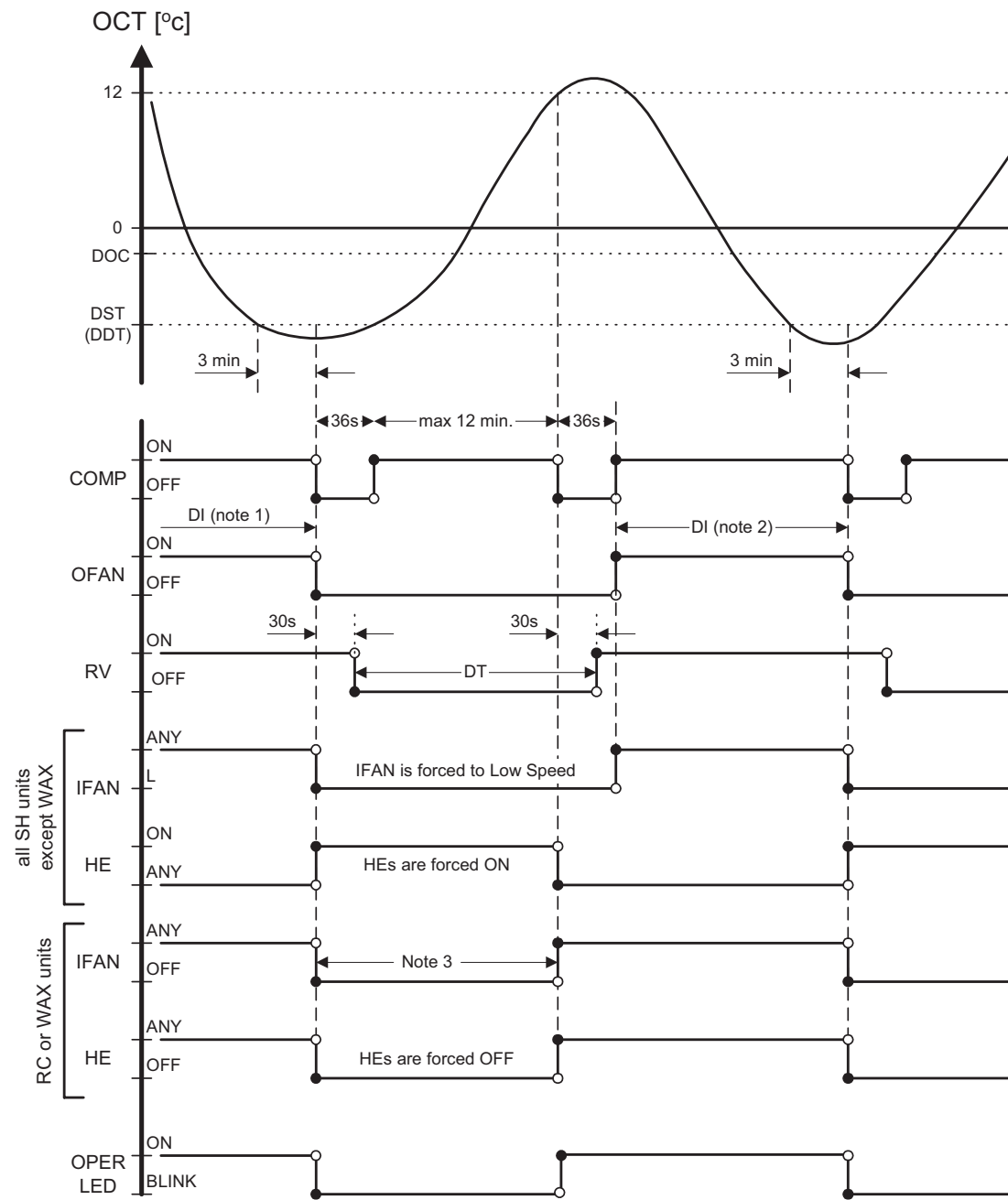
1. The ICT is also monitored during Cool and Dry mode, in case the RV control circuit is faulty. Whenever ICT reaches 70°C, which indicates a high pressure in the indoor coil, the COMP will be forced off automatically. The COMP can be turned on again only after the ICT is under 70°C again and after the 3 min COMP ON delay time. The OPER LED will not blink in this case.

**13.8.3 Outdoor coil Deicing (excluding RH Group)**

Mode: Heating, Auto (at heating)  
 Temp: Selected desired Temp  
 Fan: Any  
 Timer: Any  
 I FEEL:Any

Control function

Protects the Outdoor coil from ice formation by controlling COMP & RV operation.  
 Deicing procedure:





Notes :

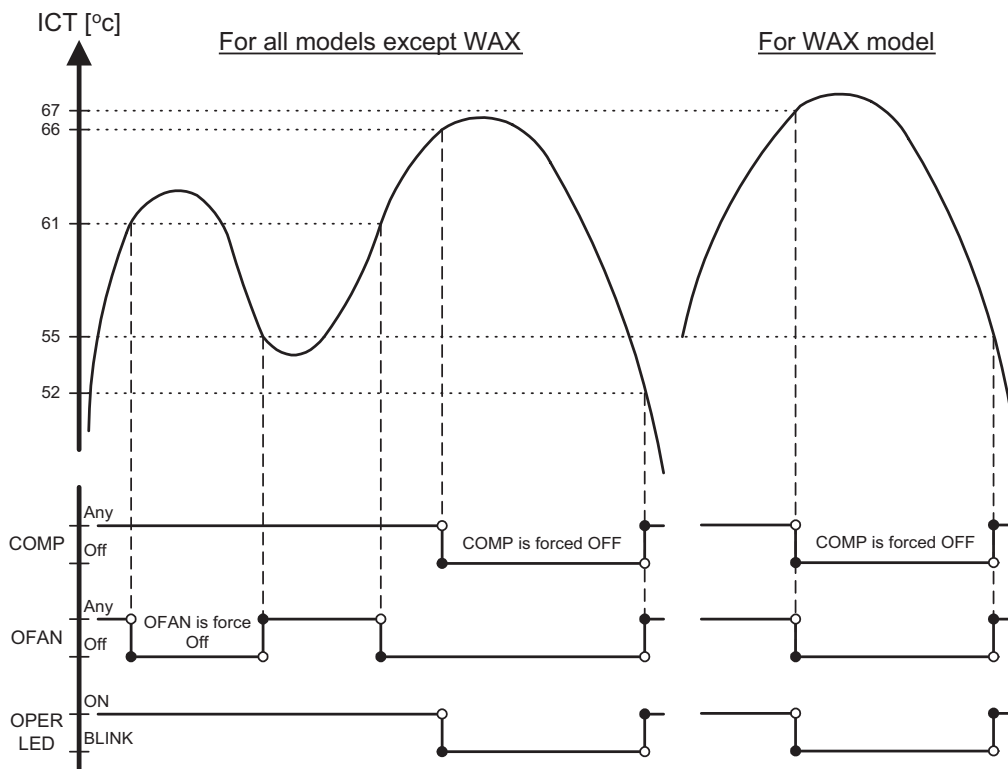
1. At the first COMP activation after SB or OFF, if (OCT < 0°C), then DI = 10 min, else DI = 40 min.
2. In the following Deicing cycles, the time interval between two Deicing cycles activation is between 30 to 80 min (refer to the flow chart).
1. For RC group, HEs are forced OFF. IFAN operation is as in Heat Mode,. IFAN will be set to OFF when ICT<30°C.  
For WAX, the IFAN is simply forced OFF.
3. For SH group, HEs are forced ON and IFAN is forced to operate in Low speed, regardless of the ICT and difference between RAT & SPT.

**13.8.4 .High pressure protection (excluding RH Group)**

Mode: (Auto) Heating  
 Fan: Any  
 Timer: Any  
 I Feel: On or Off

Control Function

Protect the Compressor from high pressure by switching OFF the OFAN and COMP.



Notes:

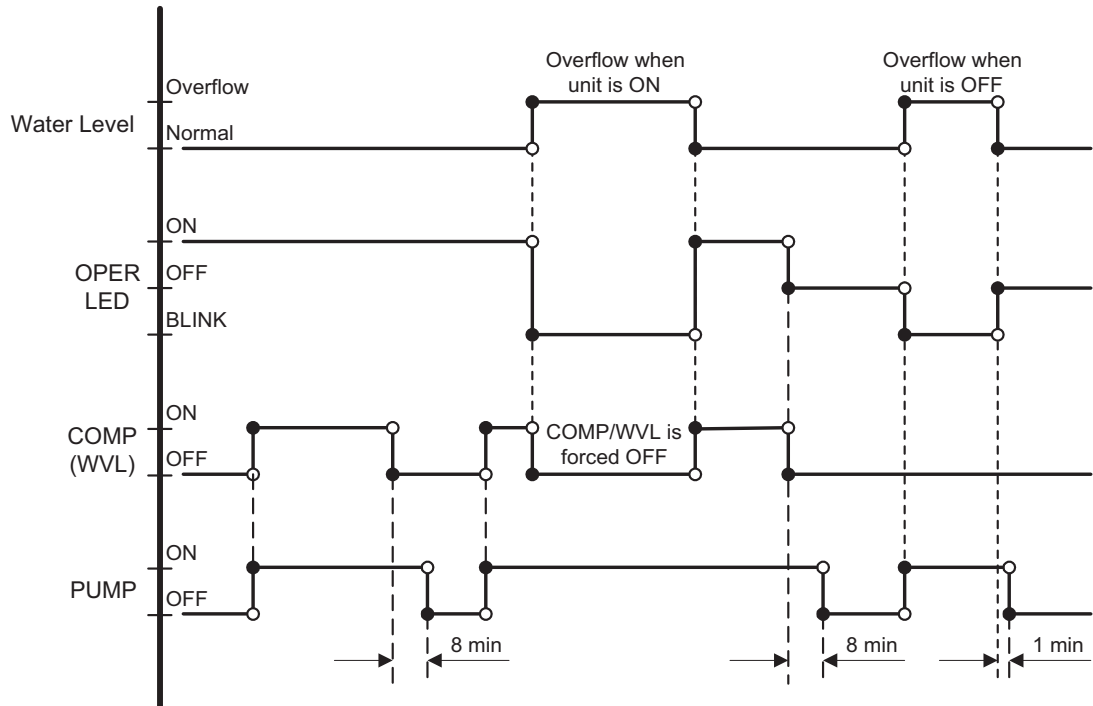
1. IFAN, HE1 and HE2 will be activated according to the relevant Heating Mode Sect.
2. In case of any malfunction in the relay control circuit, the OCT is also monitored during heating mode. Whenever OCT reaches 70°C, which indicates a high pressure in the outdoor coil, the COMP will be forced off automatically. The COMP can be turned on again only after the 3 min COMP ON delay and the OCT is under 70°C. The OPER LED will not blink in this case.

### 13.8.5 Condensation Pump (DNC model only)

Mode: Cool, Dry, Auto  
 Temp: Selected desired temperature  
 Fan: Any  
 Timer: Any  
 I FEEL: Any

#### Control function:

Prevent Condensed water from Overflowing.



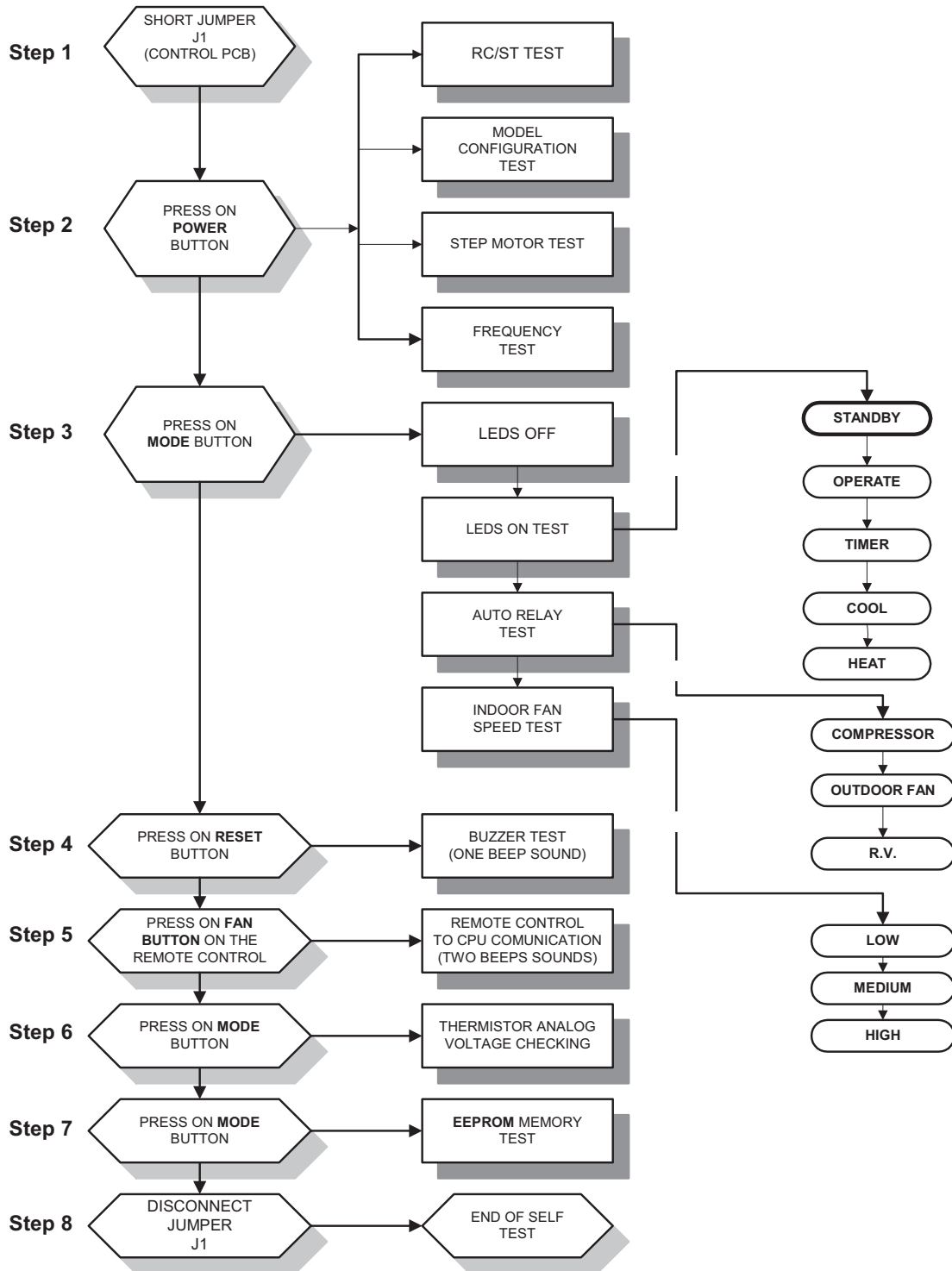
#### Notes:

1. The switch used for water level detection is closed under normal condition, and is open when water overflow.
3. The "Over Flow" & "Normal" condition are indicated by logic "1" & "0" at the LEVEL4 input pin respectively.
4. The "Overflow" condition can activate the water pump in SB and operating modes.

### 13.9 Controller Self-Test Procedure

#### 13.9.1 By Shorting Test Jumper J1

**SELF-TEST FLOW CHART**  
FOR CONTROLLER (VERSION 4V5 OR HIGHER)



**13.9.2 By Remote Control Settings:**

- a. **STEP 1: TURNING ON THE POWER.**  
Turn ON the power, make sure that the unit is in operation.
- b. **STEP 2 : ENABLE SELF-TEST MODE**
  - 1) Use the remote control to send the first settings to display / indoor unit HEAT mode, HIGH IFAN, set temperature to 16 °C, no I-FEEL Sleep or any other timer settings are needed.
  - 2) Cover the IR transmitter components in the remote control so that it will not transmit the signals to the indoor unit display.
  - 3) Use the remote control to send the second settings to display / indoor unit COOL mode, LOW IFAN, no I-FEEL Sleep or any other timer settings.
  - 4) Uncover the remote control IR transmitter and change the temperature settings. If the display/indoor unit receive the settings properly the following steps will start:
- c. **STEP 3: MODEL SETTING CONFIRMATION**
  - 1) The STAND-BY and COOL LEDS will indicate the operation mode as follows:

OPERATION MODE	STAND-BY LED	COOL LED
ST	ON	OFF
RC	OFF	OFF
SH	OFF	ON
RH	ON	ON

- 2) Testing the Model configuration. Selected by the COMP, STAND-BY, TIMER LEDS and FILTER will indicate the model configuration as follows (the relevant line for this manual is highlighted):

MODEL	COMP	OPERATE LED	TIMER LED	FILTER LED
WNG	ON	OFF	OFF	OFF
MBX	ON	OFF	OFF	ON
WNX	ON	OFF	ON	OFF
PRX	ON	ON	OFF	OFF
WMN1	ON	ON	OFF	ON
EMD/LS	ON	ON	ON	OFF
K/DNC/DLS	ON	ON	ON	ON
WMN 4	OFF	OFF	ON	OFF
PXD	OFF	OFF	ON	ON
WMN 2/WHX	OFF	ON	OFF	ON
WMN 3	OFF	ON	ON	ON

In this term the step motor will turn to HOME POSITION.

d. STEP 3: AUTO LED WALK TEST.

- 1) All the LEDS will turn OFF.
- 2) All the LEDS will turn ON for 1 second one by one in the following sequence:  
STAND-BY ⇨ OPERATE ⇨ TIMER ⇨ FILTER ⇨ COOL ⇨ HEAT.
- 3) In PRX all the LEDS will turn ON for 1 second one by one in the following sequence : 18 °c ⇨ 20 °c ⇨ 22 °c ⇨ 24 °c ⇨ 26 °c ⇨ 28 °c ⇨ 30 °c ⇨ High IFAN ⇨ Auto IFAN ⇨ Med IFAN ⇨ Low IFAN ⇨ STAND-BY⇨ TIMER ⇨ FILTER ⇨COOL⇨ HEAT.

e. STEP 4: AUTO REALY WALK TEST:

All relays will energize one by one in the following sequence:

COMPRESSOR ⇨ OUTDOOR FAN⇨R. V. ⇨ HEATER 1 ⇨ HEATER 2 ⇨ INDOOR WATER PUMP ⇨ SWING or OUTDOOR WATER PUMP ⇨ INDOOR FAN: LOW ⇨ MID ⇨ HIGH.

When the relay walk test is completed, the next test will start automatically.

f. STEP 5: FREQUENCY TESTING:

If the frequency measuring process fails the COOL LED will turn ON. In order to move to the next step, press ON/OFF button on the remote control.

g. STEP 6: INPUT TEST.

The test purpose is to check the analog real time indicators (thermistors, LEVEL and clock) according to the table below.

LED Indicator	Condition for LED to be ON
STBY LED	Room thermistor ≠ 25°c
OPER LED	Indoor coil thermistor ≠ 25°c
TIMER LED	Outdoor coil thermistor ≠ 25°c
FILTER LED	Clock
COOL LED	LEVEL 2&3
HEAT LED	LEVEL 4

h. STEP 7: TIMING RESET TEST (WATCH DOG).

The test purpose is to verify that the CPU rise time after power failure is between 1 to 3 sec, test results are indicated on the LEDS : STAND-BY,OPER, TIMER and FILTER turning ON one by one.

The results of the test are coded as follows:

Pass condition:

- 1 sec - STAND-BY and OPER are turned ON
- 2 sec - STAND-BY, OPER and TIMER are turned ON

Fail condition:

0 sec - STAND-BY is turned ON

3 sec - STAND-BY, OPER, TIMER and FILTER are turned ON

When the timing reset test is completed, the next test will start automatically.

i. STEP 8: MEMORY TEST (EEPROM)

The test purpose is to check if the memory is functioning correctly. The test result is reported by using the STAND-BY and FILTER LEDS:

LED Indicator	Condition for LED to be ON
STAND-BY LED	Test passed
FILTER LED	Test failed

AT THIS POINT THE SELF-TEST IS COMPLETED.

In order to terminate Self-Test mode the User can change the unit setting from COOL Mode, LOW FAN to COOL Mode, MED FAN or to wait without using the remote control for 60 sec.

**Values of Sensors Temperature VS. Voltage (DC)**

Temp. (°C)	Voltage (V)	Temp. (°C)	Voltage (V)	Temp. (°C)	Voltage (V)	Temp. (°C)	Voltage (V)
-20	4,554	2	3.744	24	2.555	46	1.487
-19	4,529	3	3.695	25	2.5	47	1.447
-18	4,502	4	3.646	26	2.445	48	1.409
-17	4,475	5	3.595	27	2.391	49	1.371
-16	4.446	6	3.544	28	2.338	50	1.334
-15	4.417	7	3.492	29	2.284	51	1.298
-14	4.386	8	3.439	30	2.232	52	1.263
-13	4.354	9	3.386	31	2.18	53	1.228
-12	4.322	10	3.332	32	2.128	54	1.195
-11	4.287	11	3.278	33	2.077	55	1.162
-10	4.252	12	3.223	34	2.027	56	1.13
-9	4.216	13	3.168	35	1.978	57	1.099
-8	4.178	14	3.113	36	1.929	58	1.069
-7	4.14	15	3.058	37	1.881	59	1.04
-6	4.1	16	3.002	38	1.834	60	1.011
-5	4.059	17	2.946	39	1.798	61	0.983
-4	4.017	18	2.89	40	1.742	62	0.956
-3	3.974	19	2.833	41	1.698	63	0.929
-2	3.93	20	2.777	42	1.654	64	0.904
-1	3.885	21	2.722	43	1.611	65	0.879
0	3.839	22	2.666	44	1.569	66	0.854
1	3.792	23	2.61	45	1.527	67	0.831

### 13.10 System Diagnostics

Pressing Mode button for 5-10 seconds in SB or any other operation mode will activate the DIAGNOSTICS mode, acknowledged by 3 short beeps and lighting of COOL and HEAT LEDs.

In DIAGNOSTICS mode, system failures will be indicated by the blinking of HEAT & COOL LEDs.

The coding method is as follows:

- HEAT LED blinks 5 times in 5 seconds, and then turns off for the next 5 seconds.
- COOL LED blinks during the same 5 seconds according to the following table:

No.	Problem	1	2	3	4	5
1	RT1 is disconnected	○	●	●	●	●
2	RT1 is shorted	○	●	●	●	○
3	RV fault	○	●	●	○	●
4	RT2 is disconnected	●	○	●	●	●
5	RT2 is shorted	●	○	●	●	○
6	(Reserved)	●	○	●	○	●
7	RT2 temp reading doesn't change	●	○	●	○	○
8	RT3 is disconnected	●	●	○	●	●
9	RT3 is shorted	●	●	○	●	○
10	(Reserved)	●	●	○	○	●
11	RT3 temp reading doesn't change	●	●	○	○	○
12	RT2 & RT3 temp reading doesn't change	●	○	○	○	○

#### LEGEND

○ - ON, ● - OFF

#### **NOTES**

1. If faults occur in more than one thermistor (except case number 12 in table above), only one fault will be indicated according to the following order: RT3, RT2, RT1.
2. A/C will return to normal mode when sending a command by the R/C during system DIAGNOSTICS mode. If the command from the R/C contains a Group ID, the ID will become the new Group ID of the ELCON unit.

## 14. TROUBLESHOOTING

### ELECTRICAL & CONTROL TROUBLESHOOTING

ATTENTION: check for broken or loose cable lugs first.

NO	SYMPTON	PROBABLE CAUSE	CORRECTIVE ACTION
1.	The stand-by indicator (red led) on the central control display panel doesn't light up.	There is no correct voltage between the line and neutral terminals on main P.C.B.	-If the voltage is low repair power supply. -If there is no voltage repair general wiring. -If there is correct voltage replace main or display P.C.B'S
2.	The operation indicator (green led) on the central control display panel does not light up.	The remote control batteries are discharged	-Replace batteries of the remote control
3.	The operation indicator (green led) does not light up when starting from unit.	Check main P.C.B and display P.C.B.	-Replace P.C.B if necessary.
4.	The indoor fan does not function correctly.	Check the voltage between indoor fan terminals on the main P.C.B.	- If there is voltage replace capacitor or motor.
5.	The outdoor fan does not function correctly.	Check the voltage between outdoor fan terminals on the main P.C.B.  There is voltage between outdoor fan terminals on the outdoor unit.  There is no voltage between outdoor fan terminals on the outdoor unit.	- If there is no voltage replace main P.C.B  - Replace capacitor or motor.  - Check and repair electrical wiring between indoor and outdoor units.
6.	The compressor does not start up.	Check voltage on compressor terminals on the outdoor unit. (with ammeter)  Check if there is correct voltage between compressor terminals on the outdoor unit.	-If no voltage replace main P.C.B. - If low voltage repair power supply. -If the voltage correct replace capacitor or compressor. -If there is no voltage repair electrical wiring between indoor and outdoor units.
7.	The refrigeration system does not function correctly.	Check for leaks or restrictions, with ammeter, pressure gauge or surface thermometer.	- Repair refrigeration system and charge refrigerant if necessary.
8.	No cooling or heating only indoor fan works.	Outdoor fan motor faulty or other fault caused, compressor overload protection cut out.	-Replace P.C.B.  - Outdoor fan blocked remove obstructions.



## TROUBLESHOOTING

ATTENTION : check for broken or loose cable lugs first

NO	SYMPTON	PROBABLE CAUSE	CORRECTIVE ACTION
9.	Only indoor fan and compressor working.	Outdoor fan blocked.	- Remove obstructions.
10.	Only indoor fan working.	-Run capacitor of outdoor fan motor faulty.  -Windings of outdoor fan are shorted.	- Replace capacitor.  -Replace motor.
11.	No cooling or heating takes place, indoor and outdoor fans working.	- Overload safety device on compressor is cut out (low voltage or high temperature)  - Compressor run capacitor faulty.  - Compressor windings are shorted.	- Check for proper voltage, switch off power and try again after one hour.  - Replace compressor capacitor.  - Replace compressor.
12.	No air supply at indoor unit, compressor operates.	-Indoor fan motor is blocked or turns slowly. -indoor fan run capacitor faulty. - motor windings are shorted.	- Check voltage, repair wiring if necessary.  -Check fan wheel if it is tight enough on motor shaft, tighten if necessary.  -Replace indoor fan motor.
13.	Partial, limited air supply at indoor unit.	Lack of refrigerant (will accompanied by whistling noise) cause ice formation on indoor unit coil in cooling mode.	-Charge the unit after localizing leak.
14.	Water accumulates and overflow from indoor unit section.	Drain tube or spout of drain pan clogged.	-Disassemble plastic drain tube from spout of indoor unit drain pan.
15.	Water dripping from outdoor unit base. (in heating mode)	Water drain outlet is clogged.	-Open outdoor unit cover clean out water outlet clean the base inside throughly.
16.	Freeze-up of outdoor coil in heating mode, poor heating effect in room, indoor fan operates.	-Faulty outdoor thermistor.  -Faulty control cable.  - Outdoor temperature is too low (below -2°C)  -Outdoor unit air outlet is blocked.	-Replace thermistor.  - Repair control cable.  - Shut unit off, outdoor temp. is below design conditions and cannot function properly.  -Remove obstructions.

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