



Technical Manual

ECF XLN Cassette R410A

Indoor Units	Outdoor Units R410A
ECF XLN24 ST	OU724 ST
ECF XLN24 ST 3PH	OU724T ST
ECF XLN24 RC	OU724 RC
ECF XLN24 RC 3PH	OU724T RC
ECF XLN30 ST	OU830 ST
ECF XLN30 ST 3PH	OU830T ST
ECF XLN30 RC	OU830 RC
ECF XLN30 RC 3PH	OU830T RC



REFRIGERANT	
R410A	HEATPUMP

LIST OF EFFECTIVE PAGES

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1. INTRODUCTION

1.1 General

The cassette (900X900) split ceiling mounted range comprise the ST (cooling only) and RC (heat pump) models, as follows:

- **Cooling Only** ECF XLN24ST, ECF XLN30ST , 1PH & 3PH units
- **Heat Pump** ECF XLN24RC, ECF XLN30RC, 1PH & 3PH units

1.2 Main Features

The (900X900) Cassette series benefits from the most advanced technological innovations, namely:

- R410A units
- Microprocessor control.
- Indoor spacial centrifugal fan for low noise operation
- High COP.
- Easy access to interconnecting tubing and wiring connections,
- Integral condensate water pump.
- Automatic treated air sweep.
- Easy installation and service.

1.3 Indoor Unit

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

It includes:

- Square bended coil with hydrophilic aluminum fins.
- A large diameter centrifugal fan
- Motorized flaps
- Advanced electronic control box assembly.

1.4 Filtration

The Cassette series presents with easily accessible, and re-usable pre-filters (mesh)

1.5 Control

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

1.6 Outdoor Unit

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

It includes :

- A **Rotary** Compressor mounted in a soundproofed compartment
- Axial fan.
- Outdoor coil with hydrophilic louver fins for RC units.
- Outlet air fan grill.
- Service valves" flare" type connection.
- Interconnecting wiring terminal block.
- Integra Electrical phase protector (on 3PH models).
- Advanced TYPHOON PCB

1.7 Tubing Connections

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

1.8 Accessories

ASK (All Season Kit):

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

RCW Wall Mounted Remote Control

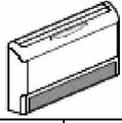
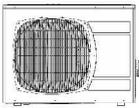
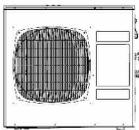
The RCW1/ RCW2 remote control is a wall mounted remote controler, for multi indoor unit applications and functioning

1.9 Inbox Documentation

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

1.10 Matching Table

1.10.1 R410A,

OUTDOOR UNITS			OUTDOOR UNITS							
										
MODEL	REF'	ECFXLN24	ECFXLN30	WNG24	WNG30	PXD24	PXD30	DNG24	DNG30	
	OU724ST	R410A	√		√		√		√	
	OU724T ST	R410A	√		√		√		√	
	OU724 RC	R410A	√		√*		√		√	
	OU724T RC	R410A	√		√*		√		√	
	OU830 ST	R410A		√		√		√		
	OU830T ST	R410A		√		√		√		
	OU830 RC	R410A		√		√		√		
	OU830T RC	R410A		√		√		√		

√* - this combination is out of the lego concept and cannot be matched with other types of indoor units.

The above table lists outdoor units and ECF XLN indoor units which can be matched together. In addition the listed outdoor units can be matched with other types of indoor units such as ducted, wall mounted and floor/ceiling.

2. PRODUCT DATA SHEET

2.1 R410A

Model Indoor Unit			ECF XLN-24		
Model Outdoor Unit			OU7-24		
Installation Method of Pipe			Flared		
Characteristics		Units	Cooling Only	Cooling	Heating
Capacity ⁽¹⁾		Btu/hr	23100	23100	24150
		kW	6.77	6.77	7.08
Power input ⁽¹⁾		kW	2.25	2.25	2.33
EER (Cooling) or COP(Heating) ⁽¹⁾		W/W	3.01	3.01	3.04
Energy efficiency class			B	B	D
Power supply		V/Ph/Hz	220-240V/Single/50Hz		
Rated current		A	9.6	9.6	9
Starting current		A	63		
Circuit breaker rating		A	20		
INDOOR	Fan type & quantity		Centrifugal x 1		
	Fan speeds	H/M/L	RPM	570/510/460	
	Air flow ⁽²⁾	H/M/L	m3/hr	910/800/690	
	External static pressure	Min-Max	Pa	N/A	
	Sound power level ⁽³⁾	H/M/L	dB(A)	54/50/48	
	Sound pressure level ⁽⁴⁾	H/M/L	dB(A)	44/41/38	
	Moisture removal		l/hr	2.5	
	Condensate drain tube I.D		mm	32	
	Dimensions	WxHxD	mm	840x230x840 (Unit) / 950x46x950 (Frame)	
	Weight		kg	36 (unit) / 6 (Frame)	
	Package dimensions	WxHxD	mm	1011x333x931 (Unit) / 1013x145x1013(Frame)	
	Packaged weight		kg	40 (unit) / 7 (Frame)	
	Units per pallet		units	5(Unit) / 15(Frame)	
	Stacking height		units	5 Levels (unit) / 15 Levels (Frame)	
	OUTDOOR	Refrigerant control		Capillary tube restrictor for heating)	
Compressor type, model		Rotary, Mitsubishi NN27VBAMT			
Fan type & quantity		Propeller(direct) x 1			
Fan speeds		H/L	RPM	850	
Air flow		H/L	m3/hr	3100	
Sound power level		H/L	dB(A)	67	
Sound pressure level ⁽⁴⁾		H/L	dB(A)	58	
Dimensions		WxHxD	mm	900x680x340	
Weight			kg	78	
Package dimensions		WxHxD	mm	985x730x406	
Packaged weight			kg	82	
Units per pallet			Units	6	
Stacking height			units	2 Levels	
Refrigerant type				R410A	
Refrigerant chargless distance			kg/m	2.16kg/12.5m	
Additional charge per 1 meter		g/m	25		
Connections between units	Liquid line	ln.(mm)	3/8"(9.53)		
	Suction line	ln.(mm)	5/8"(15.88)		
	Max .tubing length	m.	Max.30		
	Max .height difference	m.	Max.15		
Operation control type			Remote control		
Heating elements		kW			
Others			ASK – Factory Option		

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

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

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

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

Model Indoor Unit			ECF XLN-24		
Model Outdoor Unit			OU7-24T		
Installation Method of Pipe			Flared		
Characteristics		Units	Cooling Only	Cooling	Heating
Capacity ⁽¹⁾		Btu/hr	23100	23100	24150
		kW	6.77	6.77	7.08
Power input ⁽¹⁾		kW	2.25	2.25	2.33
EER (Cooling) or COP(Heating) ⁽¹⁾		W/W	3.01	3.01	3.04
Energy efficiency class			B	B	D
Power supply		V/Ph/Hz	400V/3PH/50Hz		
Rated current		A	3 X 7.4	3 X 7.4	3 X 7.6
Starting current		A	55		
Circuit breaker rating		A	3 X 16		
INDOOR	Fan type & quantity			Centrifugal x 1	
	Fan speeds	H/M/L	RPM	570/510/460	
	Air flow ⁽²⁾	H/M/L	m3/hr	910/800/690	
	External static pressure	Min-Max	Pa	N/A	
	Sound power level ⁽³⁾	H/M/L	dB(A)	54/50/48	
	Sound pressure level ⁽⁴⁾	H/M/L	dB(A)	44/41/38	
	Moisture removal		l/hr	2.5	
	Condensate drain tube I.D		mm	32	
	Dimensions	WxHxD	mm	840x230x840 (Unit) / 950x46x950 (Frame)	
	Weight		kg	36 (unit) / 6 (Frame)	
	Package dimensions	WxHxD	mm	1011x333x931 (Unit) / 1013x145x1013(Frame)	
	Packaged weight		kg	40 (unit) / 7 (Frame)	
	Units per pallet		units	5(Unit) / 15(Frame)	
	Stacking height		units	5 Levels (unit) / 15 Levels (Frame)	
OUTDOOR	Refrigerant control			Capillary tube (restrictor for heating)	
	Compressor type, model			Rotary, Mitsubishi NN27VDAMT	
	Fan type & quantity			Propeller(direct) x 1	
	Fan speeds	H/L	RPM	850	
	Air flow	H/L	m3/hr	3100	
	Sound power level	H/L	dB(A)	67	
	Sound pressure level ⁽⁴⁾	H/L	dB(A)	58	
	Dimensions	WxHxD	mm	900x680x340	
	Weight		kg	78	
	Package dimensions	WxHxD	mm	985x730x406	
	Packaged weight		kg	82	
	Units per pallet		Units	6	
	Stacking height		units	2 Levels	
	Refrigerant type			R410A	
	Refrigerant chargless distance		kg/m	2.16kg/12.5m	
	Additional charge per 1 meter		g/m	25	
	Connections between units	Liquid line	In.(mm)	3/8"(9.53)	
Suction line		In.(mm)	5/8"(15.88)		
Max .tubing length		m.	Max.30		
Max .height difference		m.	Max.15		
Operation control type			Remote control		
Heating elements		kW			
Others			ASK – Factory Option		

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

Model Indoor Unit			ECF XLN-30			
Model Outdoor Unit			OU830			
Installation Method of Pipe			Flared			
Characteristics		Units	Cooling Only	Cooling	Heating	
Capacity ⁽¹⁾		Btu/hr	28,300	28,300	30,500	
		kW	8.30	8.30	8.94	
Power input ⁽¹⁾		kW	2.94	2.94	2.88	
EER (Cooling) or COP(Heating) ⁽¹⁾		W/W	2.82	2.82	3.10	
Energy efficiency class			C	C	D	
Power supply		V/Ph/Hz	220-240V/Single/50Hz			
Rated current		A	12.3	12.3	12.3	
Starting current		A	80			
Circuit breaker rating		A	25			
INDOOR	Fan type & quantity		Centrifugal x 1			
	Fan speeds	H/M/L	RPM	740/700/620		
	Air flow ⁽²⁾	H/M/L	m3/hr	1200/1120/985		
	External static pressure	Min-Max	Pa	N/A		
	Sound power level ⁽³⁾	H/M/L	dB(A)	61/59/56		
	Sound pressure level ⁽⁴⁾	H/M/L	dB(A)	52/50/47		
	Moisture removal		l/hr	3.2		
	Condensate drain tube I.D		mm	32		
	Dimensions	WxHxD	mm	840x230x840 (Unit) / 950x46x950 (Frame)		
	Weight		kg	36 (unit) / 6 (Frame)		
	Package dimensions	WxHxD	mm	1011x333x931 (Unit) / 1013x145x1013(Frame)		
	Packaged weight		kg	40 (unit) / 7 (Frame)		
	Units per pallet		units	5(Unit) / 15(Frame)		
	Stacking height		units	5 Levels (unit) / 15 Levels (Frame)		
OUTDOOR	Refrigerant control		Capillary			
	Compressor type, model		Rotary, Mitsubishi NN33VAAMT			
	Fan type & quantity		Propeller(direct) x 1			
	Fan speeds	H/L	RPM	850		
	Air flow	H/L	m3/hr	3150		
	Sound power level	H/L	dB(A)	69		
	Sound pressure level ⁽⁴⁾	H/L	dB(A)	59		
	Dimensions	WxHxD	mm	900x860x340		
	Weight		kg	78		
	Package dimensions	WxHxD	mm	985x907x435		
	Packaged weight		kg	82		
	Units per pallet		Units	6		
	Stacking height		units	2 Levels		
	Refrigerant type		R410A			
	Refrigerant chargless distance		kg/m	2.42kg/15m		
	Additional charge per 1 meter		g/m	30		
	Connections between units		Liquid line	ln.(mm)	3/8"(9.53)	
Suction line			ln.(mm)	5/8"(15.88)		
Max .tubing length			m.	Max.30		
Max .height difference			m.	Max.15		
Operation control type		Remote control				
Heating elements		kW				
Others		Crankcase heater (50W)				

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

Model Indoor Unit			ECF XLN-30				
Model Outdoor Unit			OU830T				
Installation Method of Pipe			Flared				
Characteristics		Units	Cooling Only	Cooling	Heating		
Capacity ⁽¹⁾		Btu/hr	28,300	28,300	30,500		
		kW	8.30	8.30	8.94		
Power input ⁽¹⁾		kW	2.86	2.86	2.79		
EER (Cooling) or COP(Heating) ⁽¹⁾		W/W	2.9	2.9	3.20		
Energy efficiency class			C	C	D		
Power supply		V/Ph/Hz	400V/3PH/50Hz				
Rated current		A	3 x 5.2	3 x 5.2	3 x 5.2		
Starting current		A	35				
Circuit breaker rating		A	3 x 16				
INDOOR	Fan type & quantity		Centrifugal x 1				
	Fan speeds		H/M/L	RPM		740/700/620	
	Air flow ⁽²⁾		H/M/L	m3/hr		1200/1120/985	
	External static pressure		Min-Max	Pa		N/A	
	Sound power level ⁽³⁾		H/M/L	dB(A)		61/59/56	
	Sound pressure level ⁽⁴⁾		H/M/L	dB(A)		52/50/47	
	Moisture removal		l/hr	3.2			
	Condensate drain tube I.D		mm	32			
	Dimensions		WxHxD	mm			840x230x840 (Unit) / 950x46x950 (Frame)
	Weight		kg	36 (unit) / 6 (Frame)			
	Package dimensions		WxHxD	mm			1011x333x931 (Unit) / 1013x145x1013(Frame)
	Packaged weight		kg	40 (unit) / 7 (Frame)			
	Units per pallet		units	5(Unit) / 15(Frame)			
	Stacking height		units	5 Levels (unit) / 15 Levels (Frame)			
	OUTDOOR	Refrigerant control		Capillary			
Compressor type, model		Rotary, Mitsubishi NN33YCAMT					
Fan type & quantity		Propeller(direct) x 1					
Fan speeds		H/L	RPM		850		
Air flow		H/L	m3/hr		3150		
Sound power level		H/L	dB(A)		69		
Sound pressure level ⁽⁴⁾		H/L	dB(A)		59		
Dimensions		WxHxD	mm			900x860x340	
Weight		kg	78				
Package dimensions		WxHxD	mm			985x907x435	
Packaged weight		kg	82				
Units per pallet		Units	6				
Stacking height		units	2 Levels				
Refrigerant type		R410A					
Refrigerant chargless distance		kg/m	2.42kg/15m				
Additional charge per 1 meter		g/m	30				
Connections between units		Liquid line	In.(mm)	3/8"(9.53)			
		Suction line	In.(mm)	5/8"(15.88)			
		Max .tubing length	m.	Max.30			
		Max .height difference	m.	Max.15			
Operation control type		Remote control					
Heating elements		kW					
Others		Crankcase heater (50W),3PH Protector					

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

3. RATING CONDITIONS

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

Cooling:

Indoor: 27°C DB 19°C WB

Outdoor: 35 °C DB

Heating:

Indoor: 20°C DB

Outdoor: 7°C DB 6°C WB

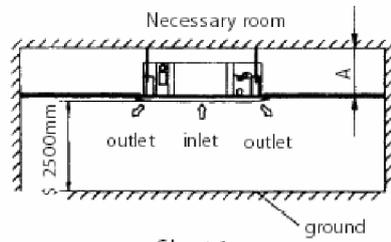
3.1 Operating Limits

3.1.1 R410A

		Indoor	Outdoor
Cooling	Upper limit	32°C DB 23°C WB	46°C DB
	Lower limit	21°C DB 15°C WB	10°C DB
Heating	Upper limit	27°C DB	24°C DB 18°C WB
	Lower limit	10°C DB	-9°C DB -10°C WB
Voltage	1PH	198 – 264 V	
	3PH	360 – 440 V	

4. OUTLINE DIMENSIONS

4.1 ECF XLN 24, 30,



Note: 27 Series A/ 260mm
45 Series A/ 330mm

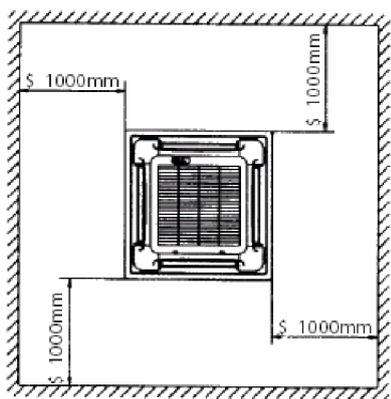


Chart 2

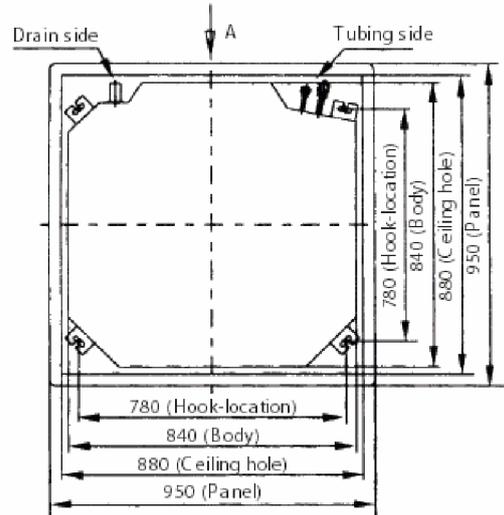


Chart 3

(Unit: mm)

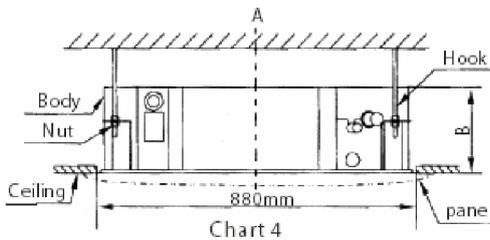


Chart 4

Note: 27 Series B=240mm
45 Series B=310mm

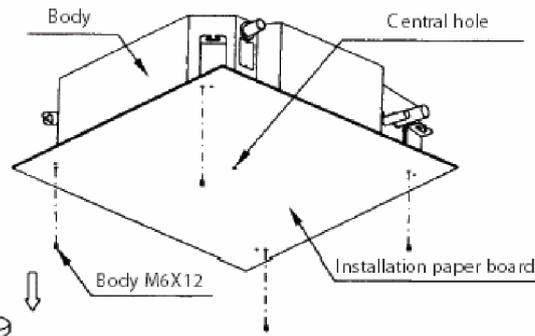


Chart 7

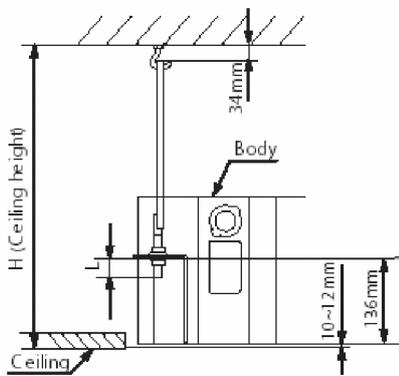


Chart 5

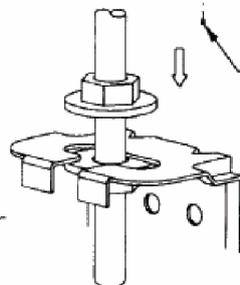
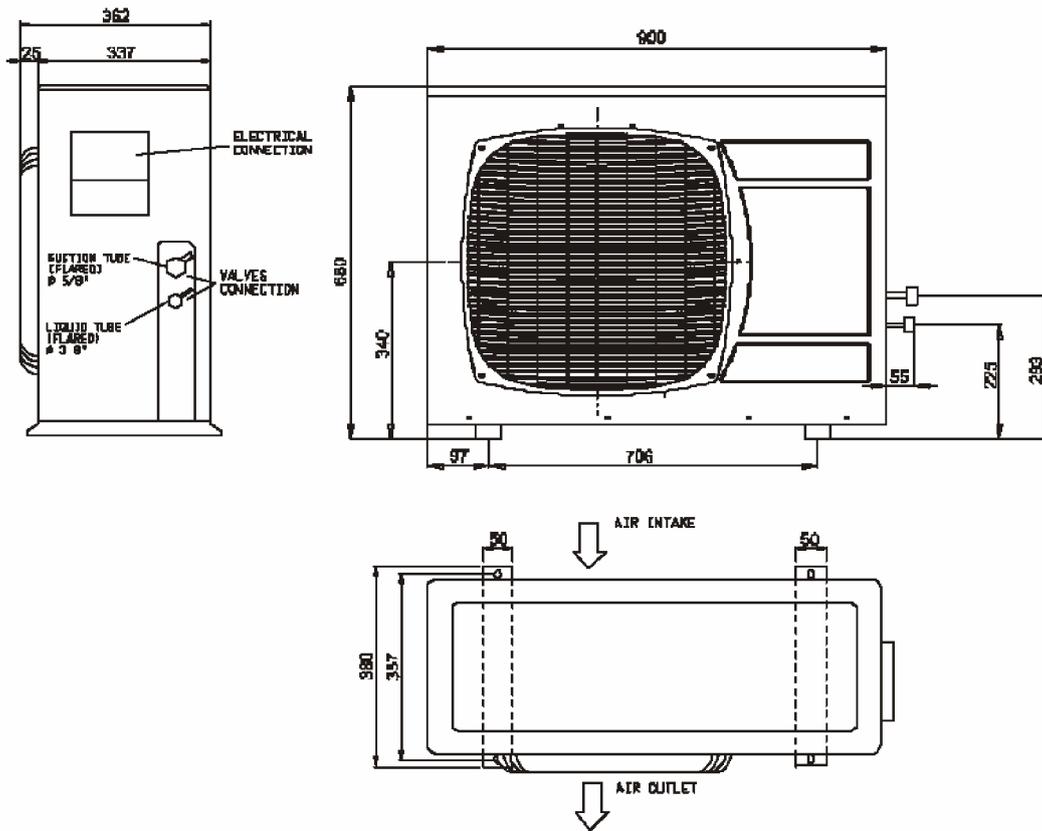
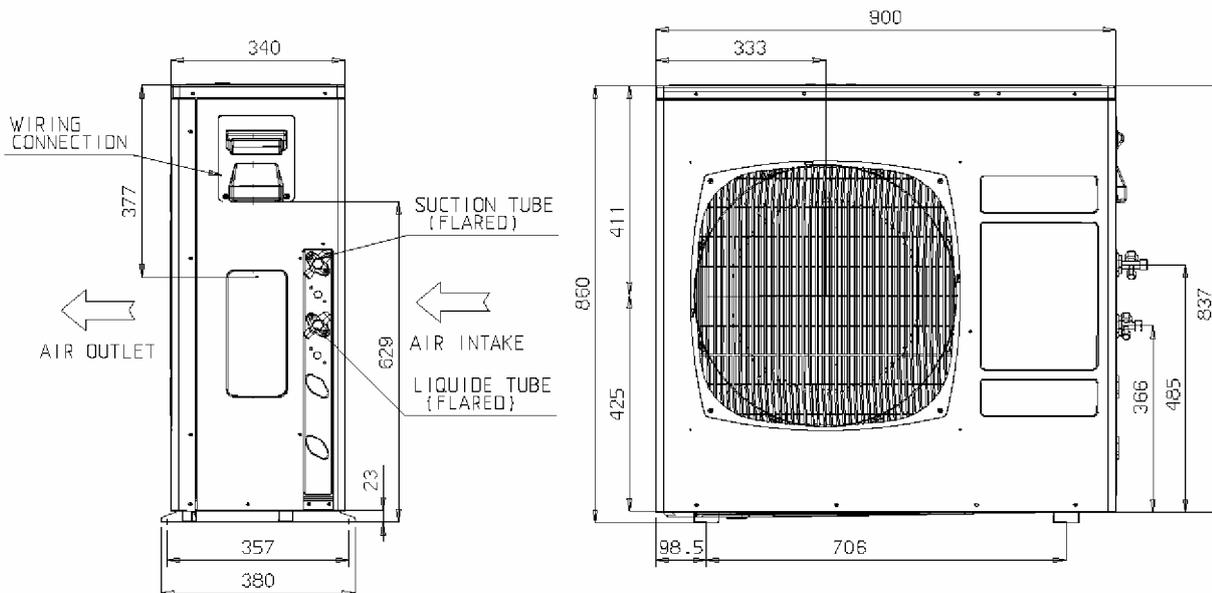


Chart 6

4.2 Outdoor Unit : OU724



4.3 Outdoor Unit : OU830



5. PERFORMANCE DATA

5.1 ECF XLN24 OU724 R410A 1PH/3PH

5.1.1 Cooling Mode at 7.5m Tubing Connection.

230V : Indoor Fan at High Speed.

ENTERING AIR DB OD COIL (°C)	DATA	ENTERING AIR WB/DB ID COIL (°C)				
		15/21	17/24	19/27	21/29	23/32
15 ⁽¹⁾	TC	6.91	7.31	7.65	7.99	8.26
	SC	4.74	5.02	5.29	5.17	5.26
	PI	1.60	1.60	1.60	1.61	1.62
20 ⁽¹⁾	TC	6.84	7.24	7.58	7.92	8.19
	SC	4.88	5.18	5.47	5.31	5.43
	PI	1.73	1.73	1.74	1.76	1.76
25	TC	6.57	7.04	7.45	7.79	8.06
	SC	4.61	4.93	5.22	5.12	5.25
	PI	1.86	1.88	1.90	1.91	1.91
30	TC	6.16	6.63	7.18	7.45	7.72
	SC	4.38	4.73	5.10	5.00	5.21
	PI	2.02	2.04	2.07	2.08	2.09
35	TC	5.69	6.16	6.77	7.11	7.38
	SC	4.12	4.48	4.90	4.84	5.04
	PI	2.18	2.21	2.25	2.27	2.28
40	TC	5.15	5.62	6.23	6.57	6.84
	SC	3.83	4.21	4.63	4.56	4.78
	PI	2.35	2.39	2.43	2.45	2.47
46	TC	4.47	4.94	5.55	5.89	6.16
	SC	3.48	3.86	4.35	4.26	4.46
	PI	2.58	2.62	2.66	2.70	2.73

LEGEND

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

(1) Marked area is below standard operating limits. For operating in low ambient conditions, refer to Optional Accessories.

5.1.2 Heating Mode at 7.5m Tubing Connection.

230V : Indoor Fan at High Speed.

ENTERING AIR WB OU COIL (°C)	ENTERING AIR DB ID COIL (°C)					
	15		20		25	
	TH	PI	TH	PI	TH	PI
-10	4.09	1.86	3.93	1.99	3.78	6.34
-7	4.40	1.91	4.24	2.02	4.09	6.46
-2	4.67	1.93	4.52	2.05	4.36	6.58
2	5.69	2.03	5.45	2.16	5.22	6.94
6	7.29	2.18	7.08	2.33	6.83	7.52
10	7.93	2.30	7.72	2.46	7.50	7.99
15	8.57	2.40	8.35	2.59	8.14	8.35
20	9.03	2.47	8.81	2.68	8.57	8.78

* the above chart includes the weighted deicing influence.

LEGEND

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

5.2 Capacity Correction Factor Due to Tubing Length (One Way)

TOTAL TUBING LENGTH								
4m	7.5m	10m	15m	20m	25m	30m	40m	50m
1.01	1	0.98	0.97	0.96	0.95	0.94	---	---

* Minimum recommended tubing length between indoor and outdoor units is 4m.

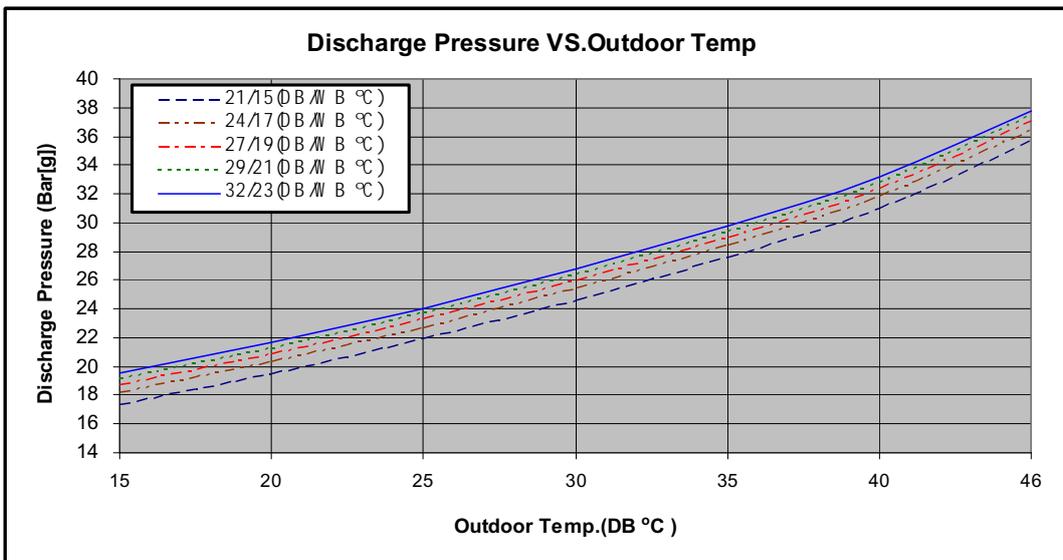
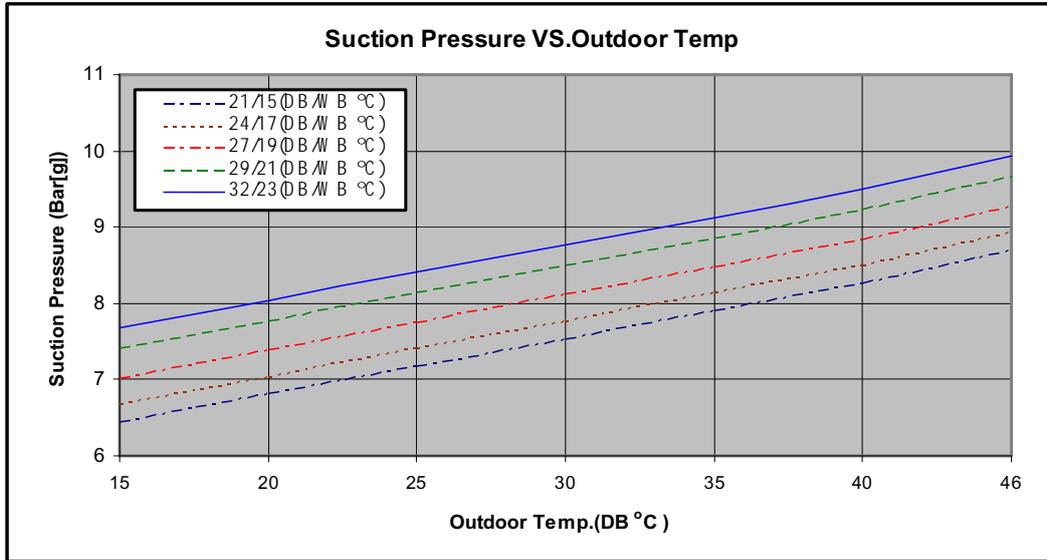
5.2.1 Heating

TOTAL TUBING LENGTH								
4m	7.5m	10m	15m	20m	25m	30m	40m	50m
1.02	1	0.99	0.99	0.98	0.97	0.97	---	---

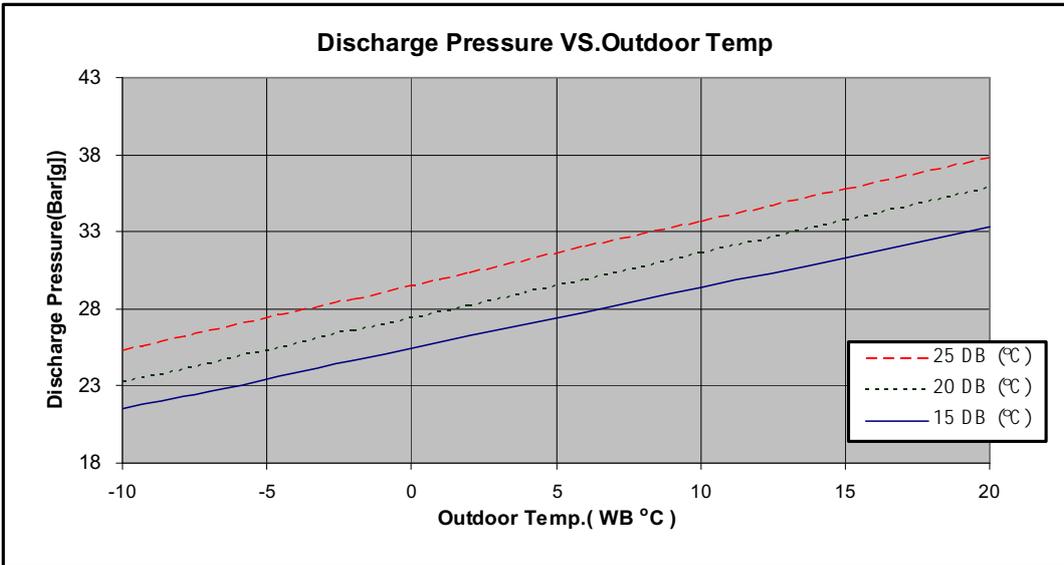
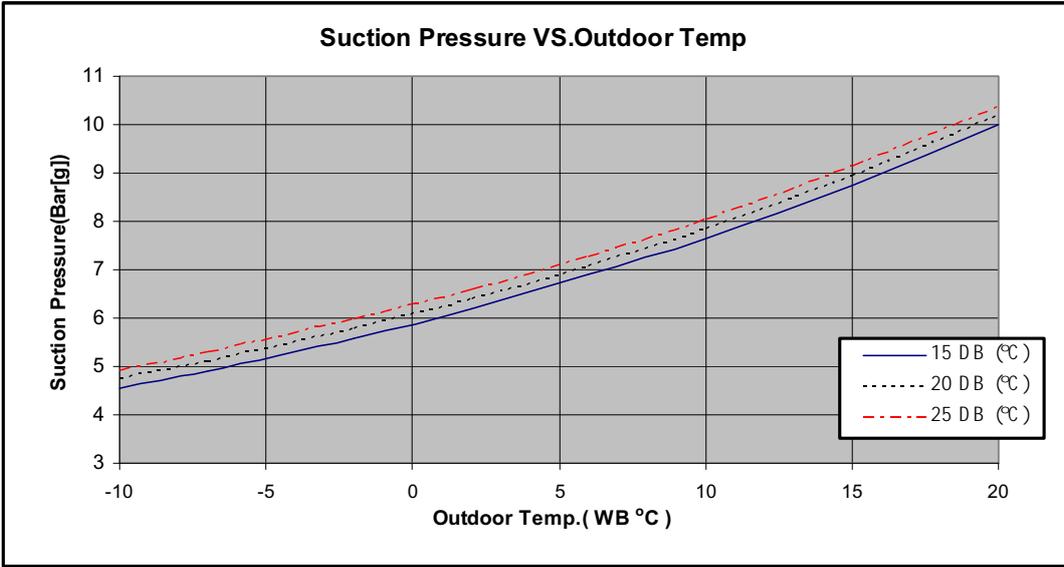
* Minimum recommended tubing length between indoor and outdoor units is 4m.

5.3 Pressure Curves.

5.3.1 Cooling.



5.3.2 Heating.



5.4 ECF XLN30 OU830 R410A

5.4.1 Cooling Mode at 7.5m Tubing Connection.

230V : Indoor Fan at High Speed.

ENTERING AIR DB OD COIL (°C)	DATA	ENTERING AIR WB/DB ID COIL (°C)				
		15/21	17/24	19/27	21/29	23/32
15 ⁽¹⁾	TC	8.47	8.96	9.38	9.79	10.13
	SC	5.80	6.15	6.48	6.33	6.44
	PI	2.09	2.09	2.09	2.11	2.11
20 ⁽¹⁾	TC	8.38	8.88	9.30	9.71	10.04
	SC	5.98	6.35	6.71	6.52	6.66
	PI	2.25	2.27	2.28	2.29	2.30
25	TC	8.05	8.63	9.13	9.55	9.88
	SC	5.64	6.04	6.39	6.27	6.43
	PI	2.43	2.45	2.48	2.50	2.50
30	TC	7.55	8.13	8.80	9.13	9.46
	SC	5.36	5.79	6.25	6.12	6.37
	PI	2.63	2.67	2.70	2.72	2.73
35	TC	6.97	7.55	8.30	8.72	9.05
	SC	5.05	5.49	6.00	5.93	6.17
	PI	2.85	2.89	2.94	2.96	2.98
40	TC	6.31	6.89	7.64	8.05	8.38
	SC	4.69	5.16	5.67	5.59	5.86
	PI	3.07	3.12	3.17	3.20	3.23
46	TC	5.48	6.06	6.81	7.22	7.55
	SC	4.26	4.73	5.32	5.22	5.47
	PI	3.37	3.42	3.48	3.53	3.56

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

(1) Marked area is below standard operating limits. For operating in low ambient conditions, refer to Optional Accessories.

5.4.2 Heating Mode at 7.5m Tubing Connection.

230V : Indoor Fan at High Speed.

ENTERING AIR WB OU COIL (°C)	ENTERING AIR DB ID COIL (°C)					
	15		20		25	
	TH	PI	TH	PI	TH	PI
-10	5.16	2.30	4.97	2.45	4.77	2.58
-7	5.56	2.36	5.36	2.49	5.16	2.63
-2	5.90	2.39	5.70	2.53	5.51	2.68
2	7.18	2.51	6.88	2.66	6.59	2.82
6	9.21	2.69	8.94	2.88	8.63	3.06
10	10.01	2.84	9.74	3.04	9.48	3.25
15	10.82	2.97	10.55	3.20	10.28	3.40
20	11.40	3.05	11.13	3.31	10.82	3.57

* the above chart includes the weighted deicing influence.

LEGEND

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

5.5 ECF XLN30 OU830T R410A

5.5.1 Cooling Mode at 7.5m Tubing Connection.

230V : Indoor Fan at High Speed.

ENTERING AIR DB OD COIL (°C)	DATA	ENTERING AIR WB/DB ID COIL (°C)				
		15/21	17/24	19/27	21/29	23/32
15 ⁽¹⁾	TC	8.47	8.96	9.38	9.79	10.13
	SC	5.80	6.15	6.48	6.33	6.44
	PI	2.03	2.03	2.04	2.05	2.05
20 ⁽¹⁾	TC	8.38	8.88	9.30	9.71	10.04
	SC	5.98	6.35	6.71	6.52	6.66
	PI	2.19	2.21	2.22	2.23	2.24
25	TC	8.05	8.63	9.13	9.55	9.88
	SC	5.64	6.04	6.39	6.27	6.43
	PI	2.37	2.39	2.41	2.43	2.43
30	TC	7.55	8.13	8.80	9.13	9.46
	SC	5.36	5.79	6.25	6.12	6.37
	PI	2.56	2.59	2.63	2.65	2.66
35	TC	6.97	7.55	8.30	8.72	9.05
	SC	5.05	5.49	6.00	5.93	6.17
	PI	2.77	2.81	2.86	2.88	2.89
40	TC	6.31	6.89	7.64	8.05	8.38
	SC	4.69	5.16	5.67	5.59	5.86
	PI	2.99	3.03	3.09	3.12	3.14
46	TC	5.48	6.06	6.81	7.22	7.55
	SC	4.26	4.73	5.32	5.22	5.47
	PI	3.27	3.33	3.39	3.43	3.47

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

(1) Marked area is below standard operating limits. For operating in low ambient conditions, refer to Optional Accessories.

5.5.2 Heating Mode at 7.5m Tubing Connection.

230V : Indoor Fan at High Speed.

ENTERING AIR WB OU COIL (°C)	ENTERING AIR DB ID COIL (°C)					
	15		20		25	
	TH	PI	TH	PI	TH	PI
-10	5.16	2.23	4.97	2.38	4.77	2.50
-7	5.56	2.29	5.36	2.41	5.16	2.54
-2	5.90	2.32	5.70	2.46	5.51	2.59
2	7.18	2.43	6.88	2.58	6.59	2.73
6	9.21	2.61	8.94	2.79	8.63	2.96
10	10.01	2.75	9.74	2.94	9.48	3.15
15	10.82	2.87	10.55	3.10	10.28	3.29
20	11.40	2.96	11.13	3.21	10.82	3.46

* the above chart includes the weighted deicing influence.

LEGEND

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

5.6 Capacity Correction Factor Due to Tubing Length (One Way)

TOTAL TUBING LENGTH								
4m	7.5m	10m	15m	20m	25m	30m	40m	50m
1.01	1	0.98	0.97	0.96	0.95	0.94	0.93	0.90

* Minimum recommended tubing length between indoor and outdoor units is 4m.

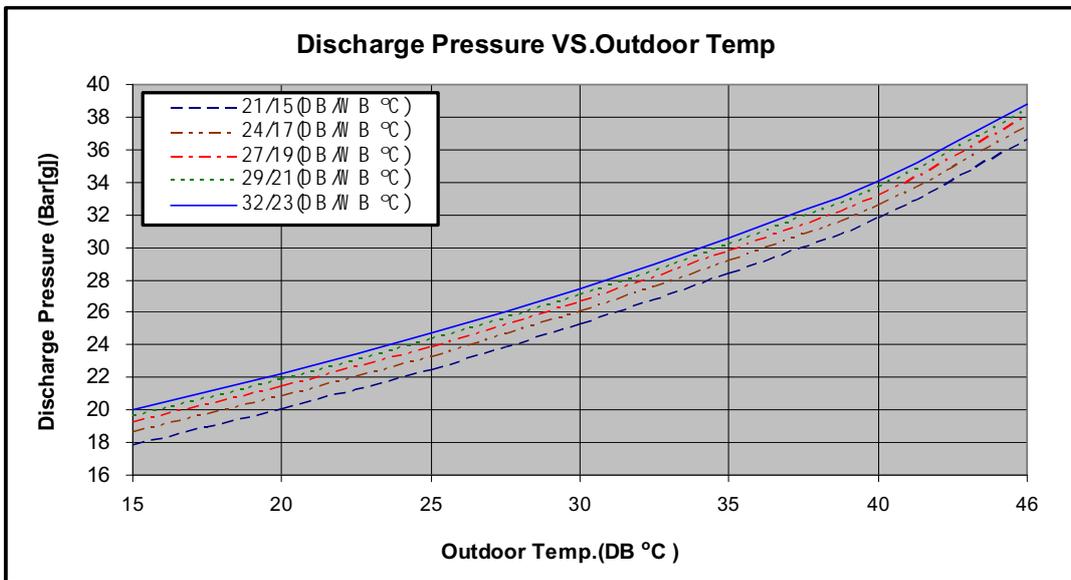
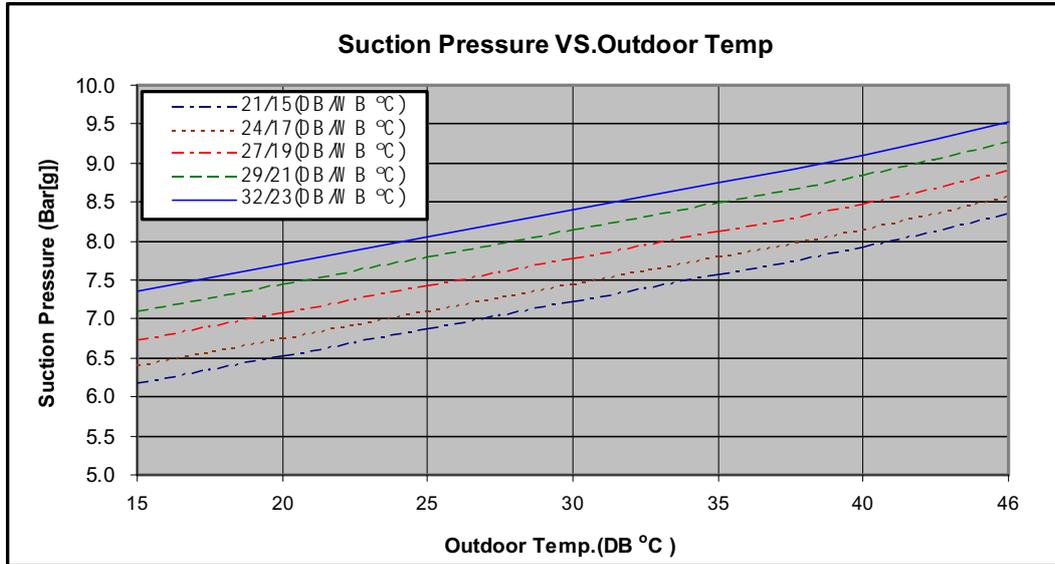
5.6.1 Heating

TOTAL TUBING LENGTH								
4m	7.5m	10m	15m	20m	25m	30m	40m	50m
1.02	1	0.99	0.99	0.98	0.97	0.97	0.96	0.95

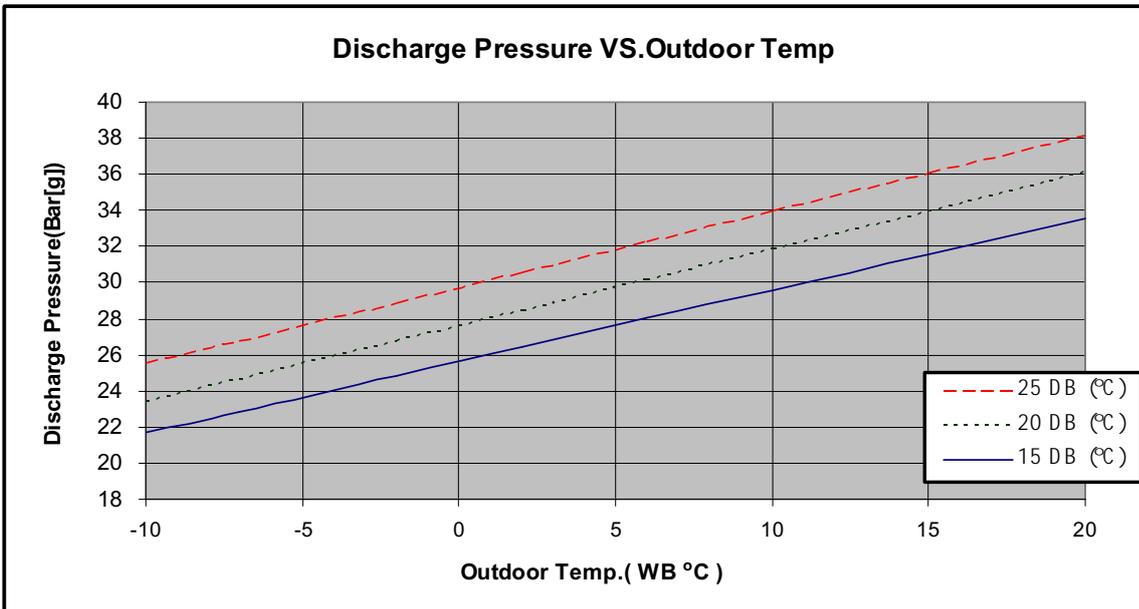
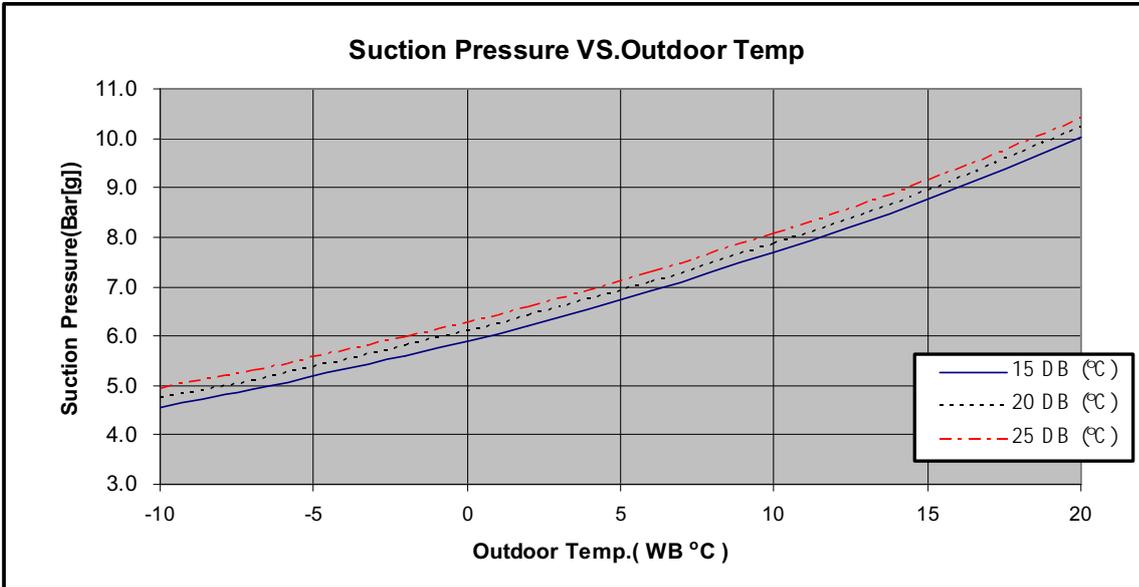
* Minimum recommended tubing length between indoor and outdoor units is 4m.

5.7 Pressure Curves.

5.7.1 ECF XLN30 OU830 R410A - Cooling:

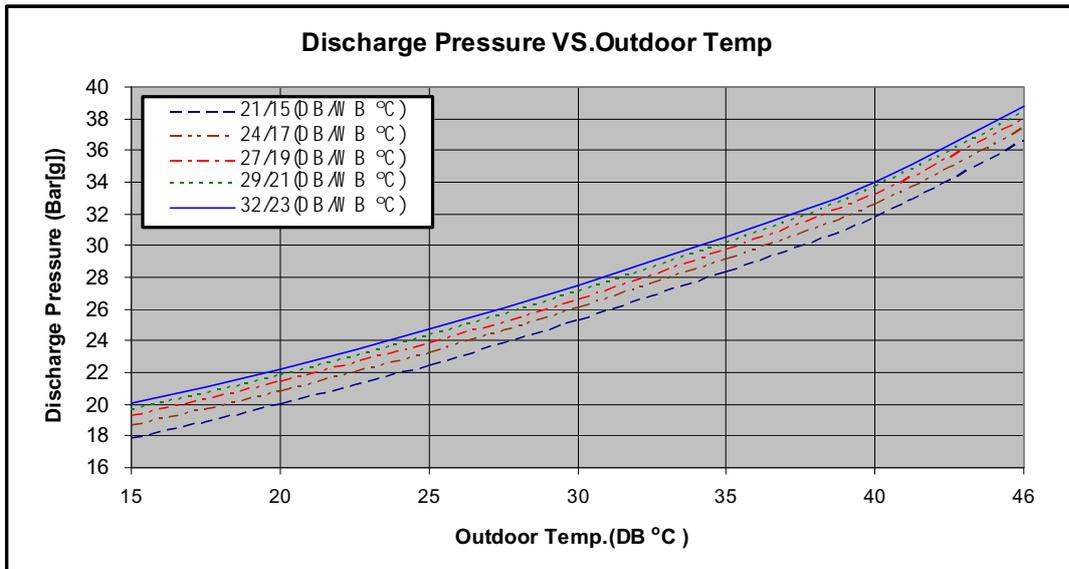
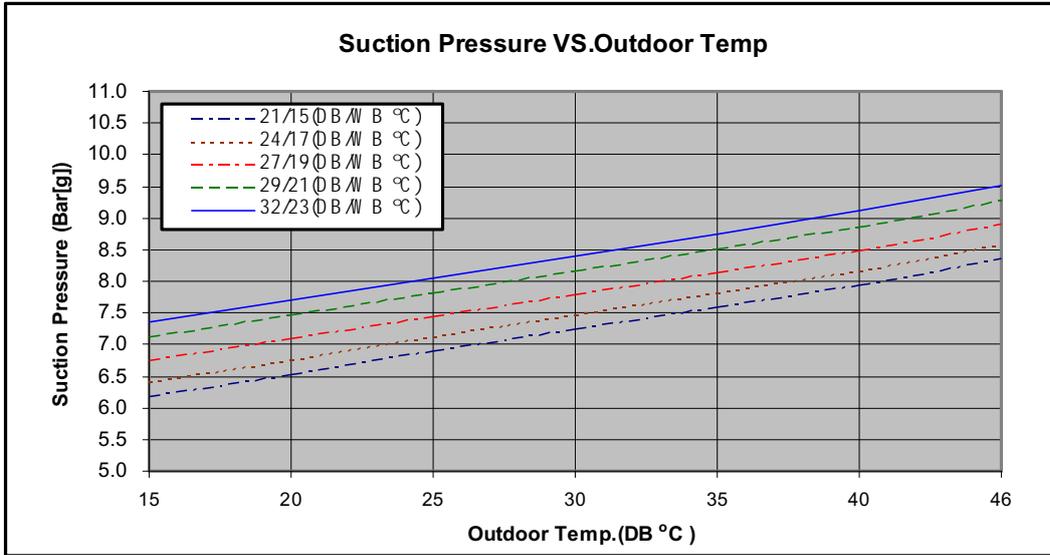


5.7.2 Heating.

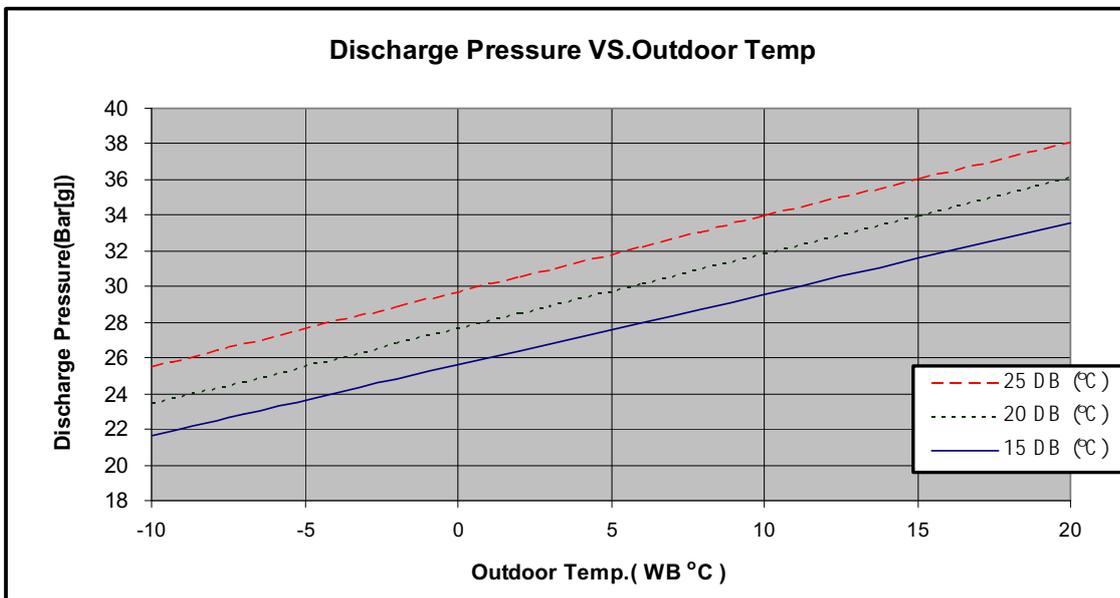
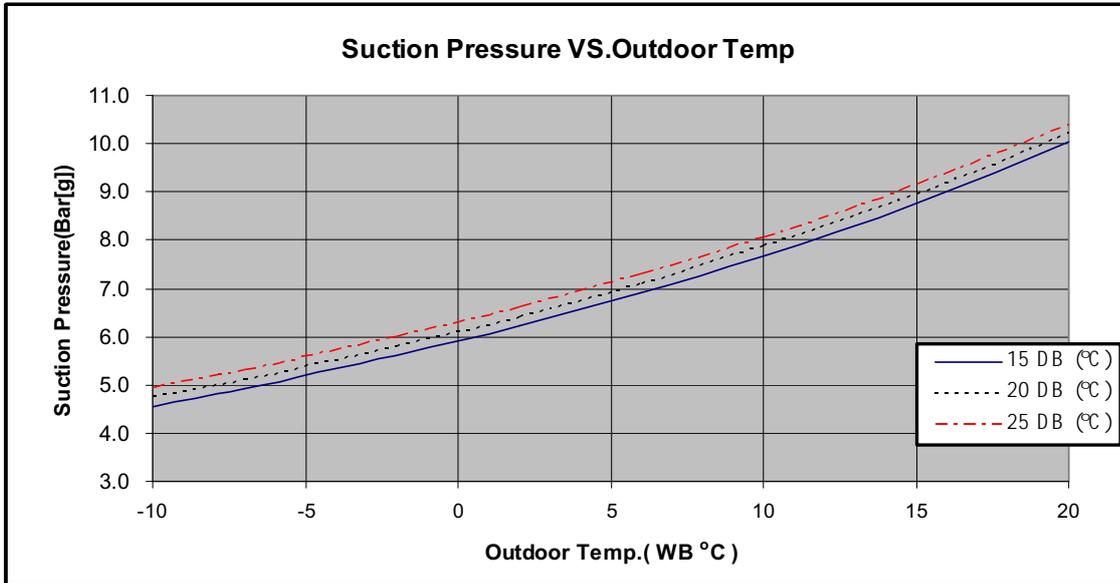


5.8 Pressure Curves.

5.8.1 ECF XLN30 OU830T R410A - Cooling:



5.8.2 Heating.



6. ELECTRICAL DATA

6.1 Single Phase Units

MODEL	ECF XLN 24	ECF XLN24	ECF XLN 30
Power Supply	To Outdoor	To Indoor(option)	To Outdoor
	1PH – 230V – 50 Hz	1PH – 230V – 50 Hz	1PH – 230V – 50 Hz
Max Current, A	15	15	17
Circuit Breaker	20	20	25
Power Supply Wiring No. X Cross Section mm ²	3 X 2.5 mm ²	3 X 2.5 mm ²	3 X 4 mm ²
Interconnecting Cable RC Model No. X Cross Section mm ²	6 X 2.5 mm ² + 2 X 0.5 mm ² (OCT Sensor)	5 X 2.5 mm ² + 2 X 0.5 mm ² (OCT Sensor)	6 X 1.5 mm ² + 2 X 0.5 mm ² (OCT Sensor)
Interconnecting Cable ST Model No. X Cross Section mm ²	5 X 2.5 mm ² + 2 X 0.5 mm ² (OCT Sensor)	4 X 2.5 mm ² + 2 X 0.5 mm ² (OCT Sensor)	5 X 1.5 mm ² + 2 X 0.5 mm ² (OCT Sensor)

6.2 Single Phase Units + Optional Heating Element

MODEL	ECF XLN 24		ECF XLN30
Power Supply	To indoor / To Outdoor		To Outdoor
	1PH-230V-50Hz		1PH – 230V – 50 Hz
Heating Element, kW	2.1		2.7
Max Current, A	25.5		28
Circuit Breaker	32		32
Power Supply Wiring No. X Cross Section mm ²	3x4 mm ²		3 X 4 mm ²
Interconnecting Cable No. X Cross Section mm ²	5x2.5 mm ² +2x0.75 mm ² (OCT sensor)	6x2.5 mm ² +2x0.75 mm ² (OCT sensor)	6 X 2.5 mm ² + 2 X 0.5 mm ² (OCT Sensor)

6.3 Three Phase Units

MODEL	ECF XLN 24T	ECF XLN30T
Power Supply	To Outdoor	To Outdoor
	3PH – 400V – 50 Hz	3PH – 400V – 50 Hz
Max Current, A	3x7.5	3x9.2
Circuit Breaker	3x10	3x16
Power Supply Wiring No. X Cross Section mm ²	5 X 1.5 mm ²	5 X 2.5 mm ²
Interconnecting Cable RC Model No. X Cross Section mm ²	6 X 2.5 mm ² + 2 X 0.5 mm ² (OCT Sensor)	6 X 1.5 mm ² + 2 X 0.5 mm ² (OCT Sensor)
Interconnecting Cable ST Model No. X Cross Section mm ²	5 X 2.5 mm ² + 2 X 0.5 mm ² (OCT Sensor)	5 X 1.5 mm ² + 2 X 0.5 mm ² (OCT Sensor)

6.4 Three Phase Units + Optional Heating Element

MODEL	ECF XLN 24T	ECF XLN30T
Power Supply	To outdoor	To Outdoor
	3PH-400V-50Hz	3PH – 400V – 50 Hz
Heating Element, kW	2.1	2.7 ⁽¹⁾
Max Current, A	3x10.1	3x14.6
Circuit Breaker	3x15	3x16
Power Supply Wiring No. X Cross Section mm ²	5x1.5mm ²	5 X 2.5 mm ²
Interconnecting Cable No. X Cross Section mm ²	8x1.5 mm ² +2x0.5 mm ² (OCT sensor)	8 X 1.5 mm ² + 2 X 0.5 mm ² (OCT Sensor)

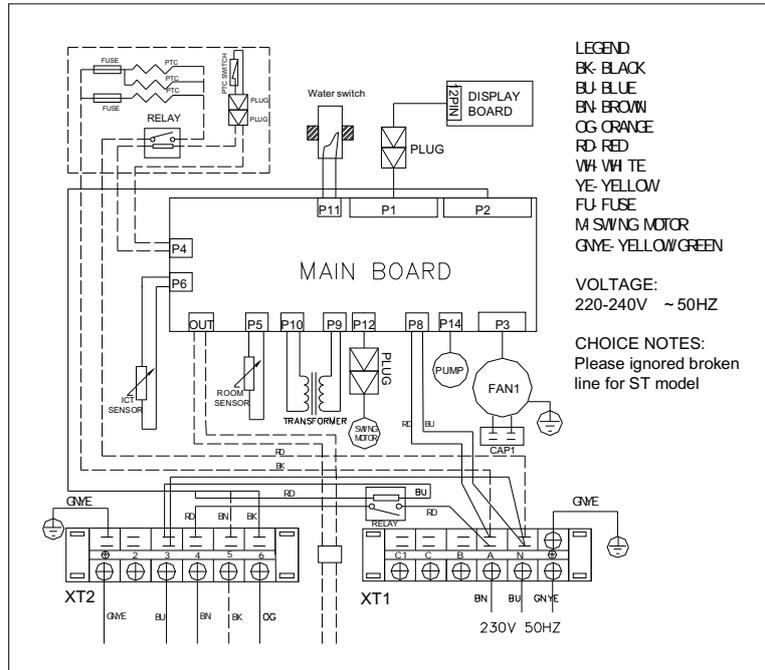
(1) The power supply to the heating element kit is provided separately from the main power supply unit.

NOTE

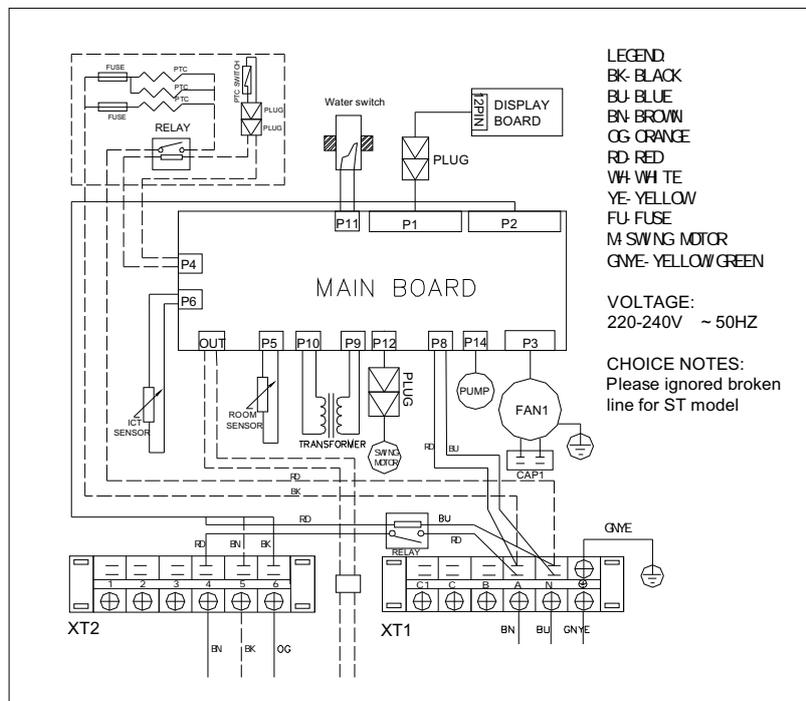
Power wiring cord should comply with local laws and electrical regulations requirements.

7. WIRING DIAGRAMS

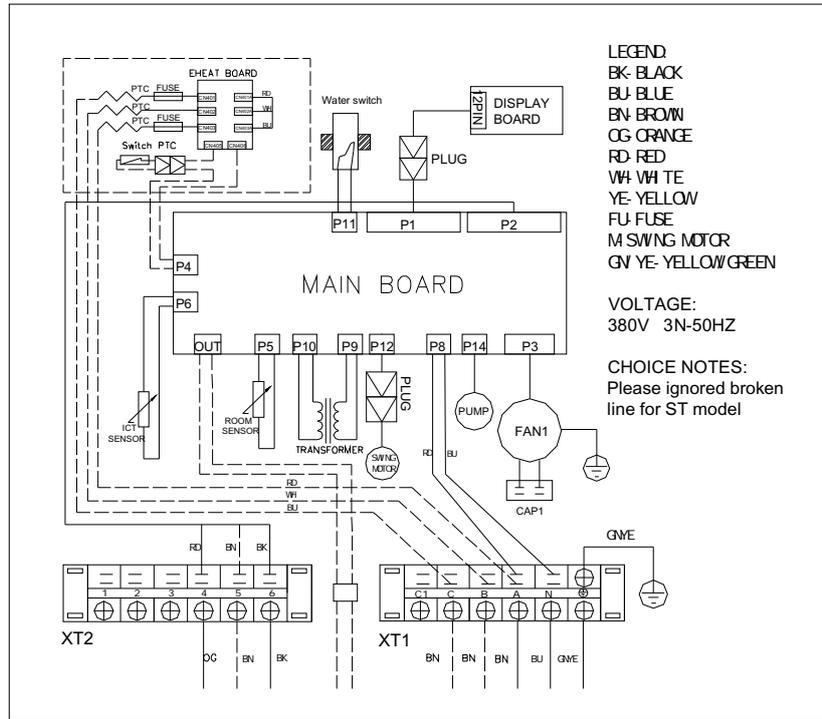
7.1 Indoor Unit : ECF XLN 24 (Power Supply to Indoor)



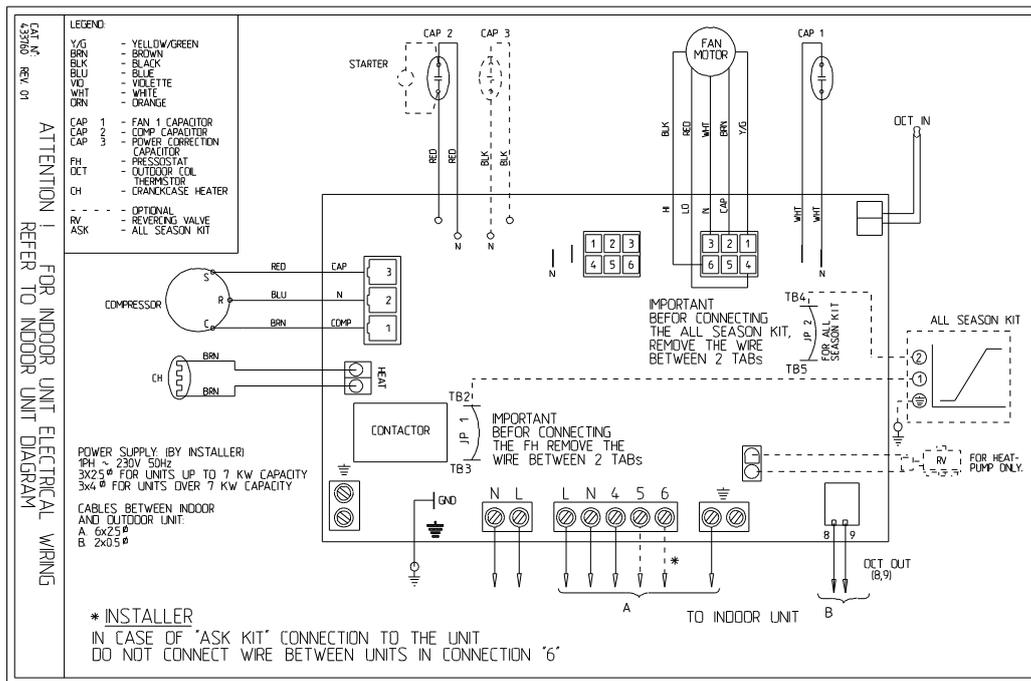
7.2 Indoor Unit : ECF XLN 24/30 (Power Supply to Outdoor)



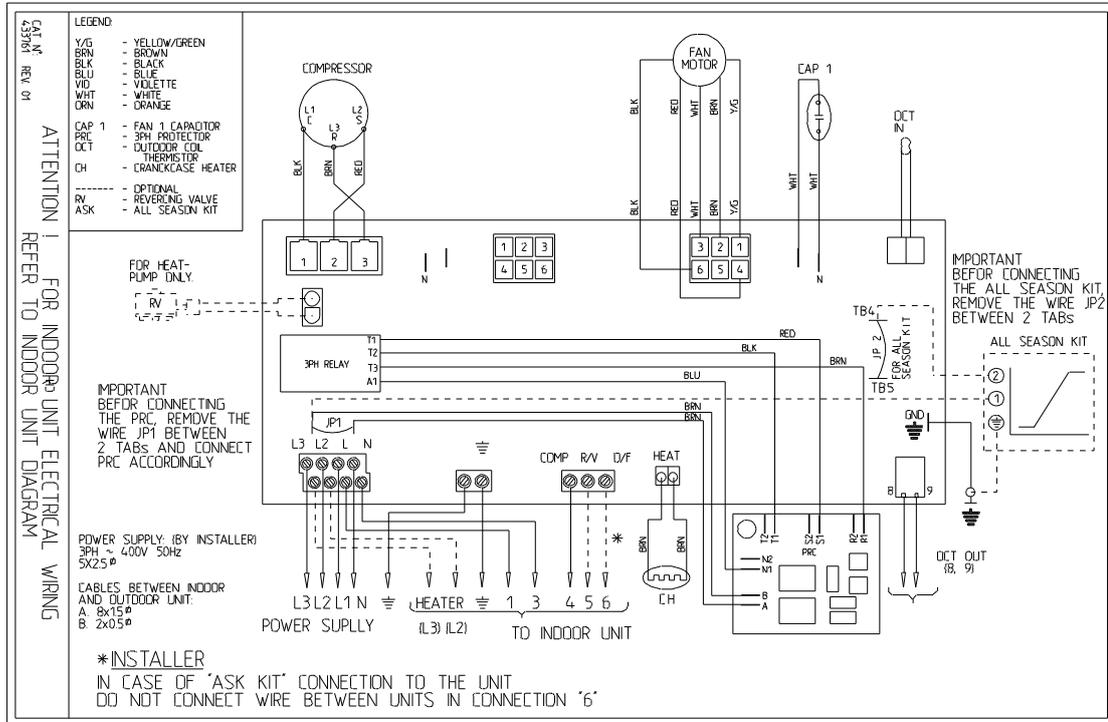
7.3 Indoor Unit : ECF XLN24/30 three phase



7.4 Outdoor Unit : OU724 / OU830 1PH

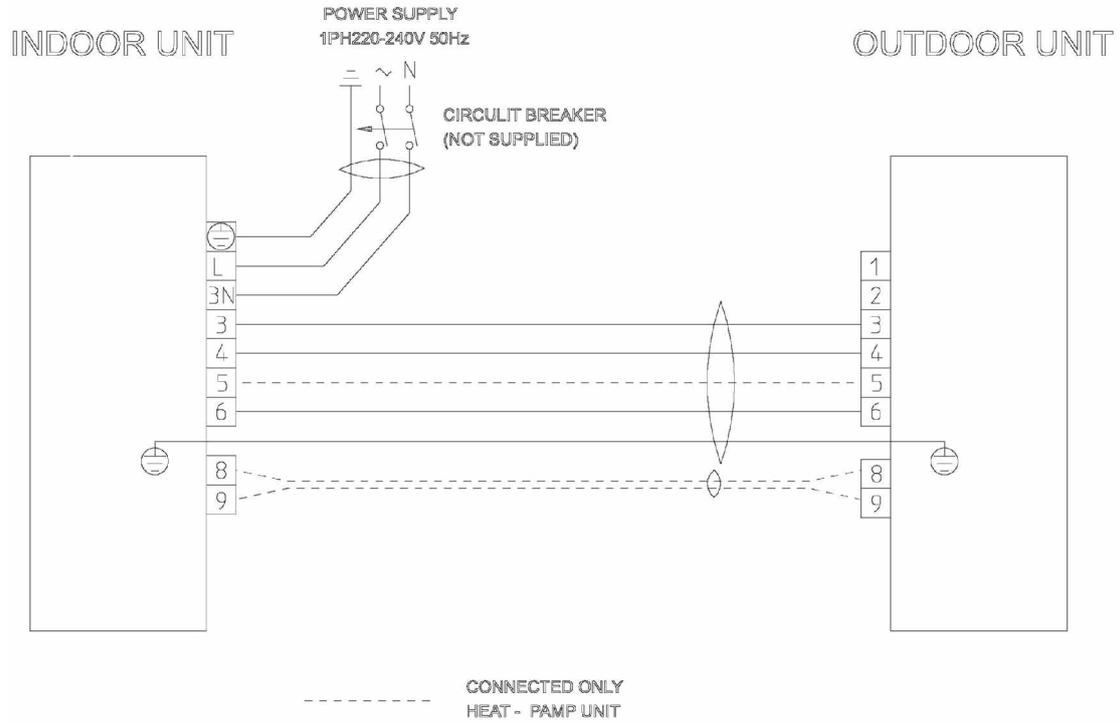


7.5 Outdoor Unit ; OU724 / OU830 3PH

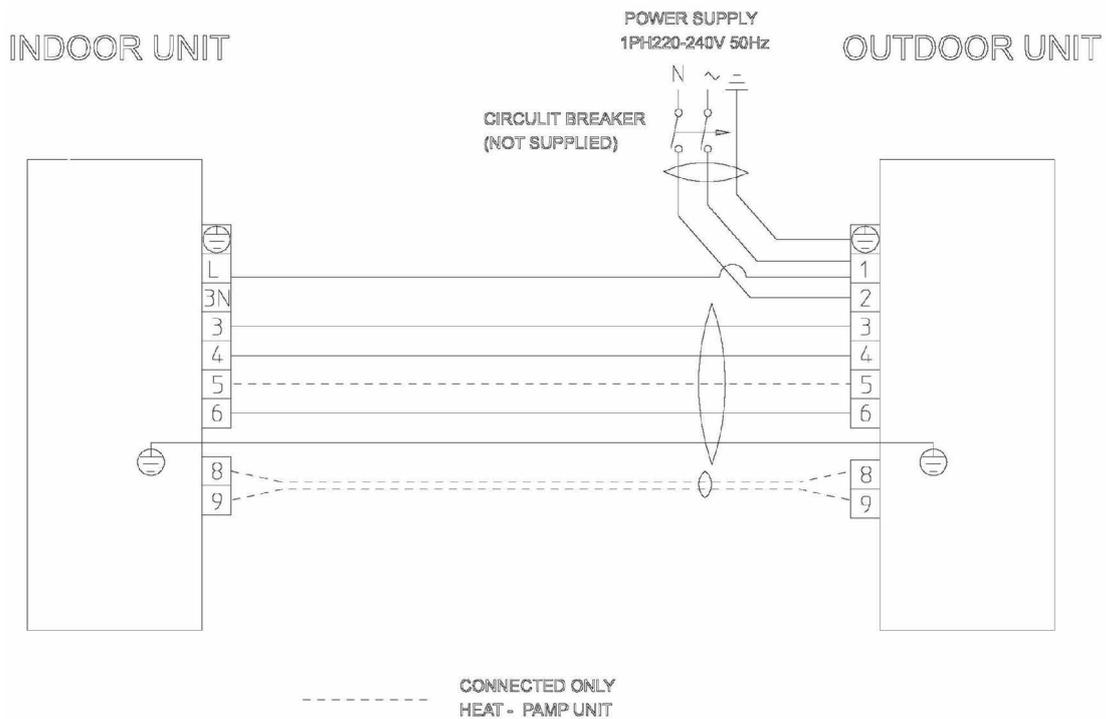


8. ELECTRICAL CONNECTIONS

8.1 ECF XLN 24 (Power Supply to Indoor)



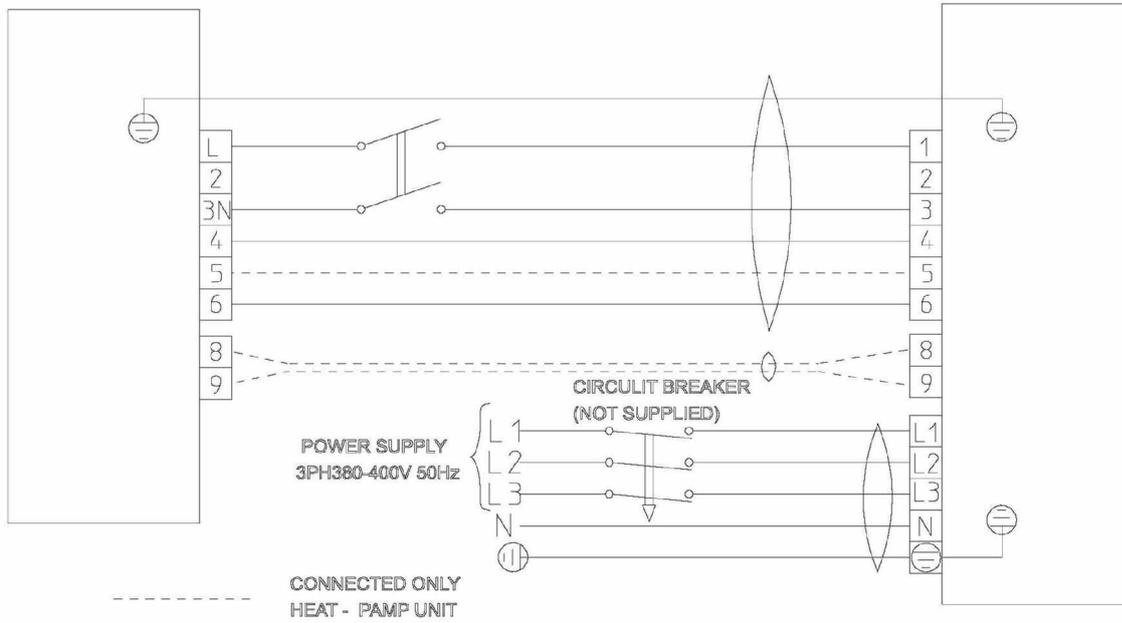
8.2 ECF XLN 24/30 (Power Supply to Outdoor)



8.3 ECF XLN 24/30 3PH

INDOOR UNIT

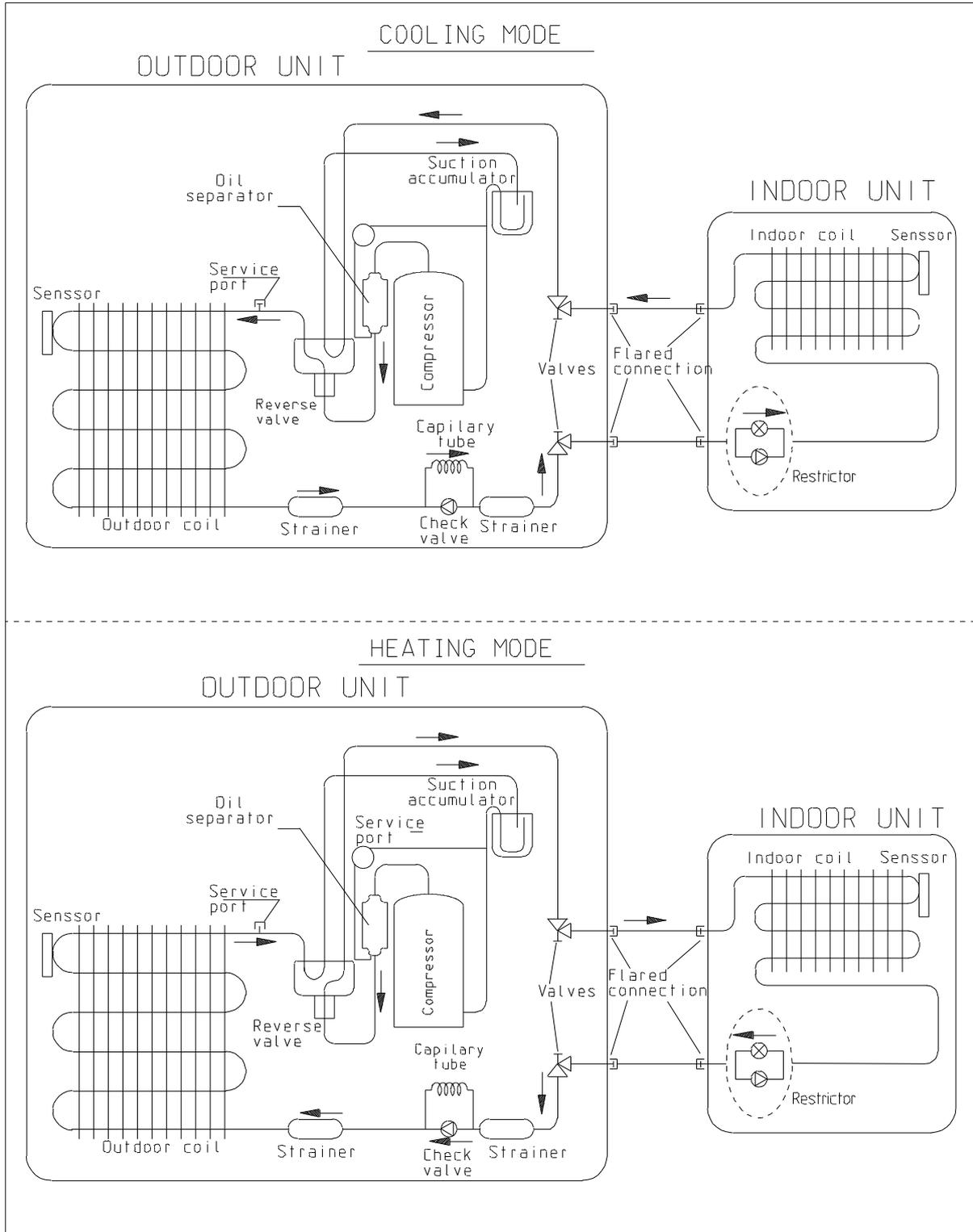
OUTDOOR UNIT



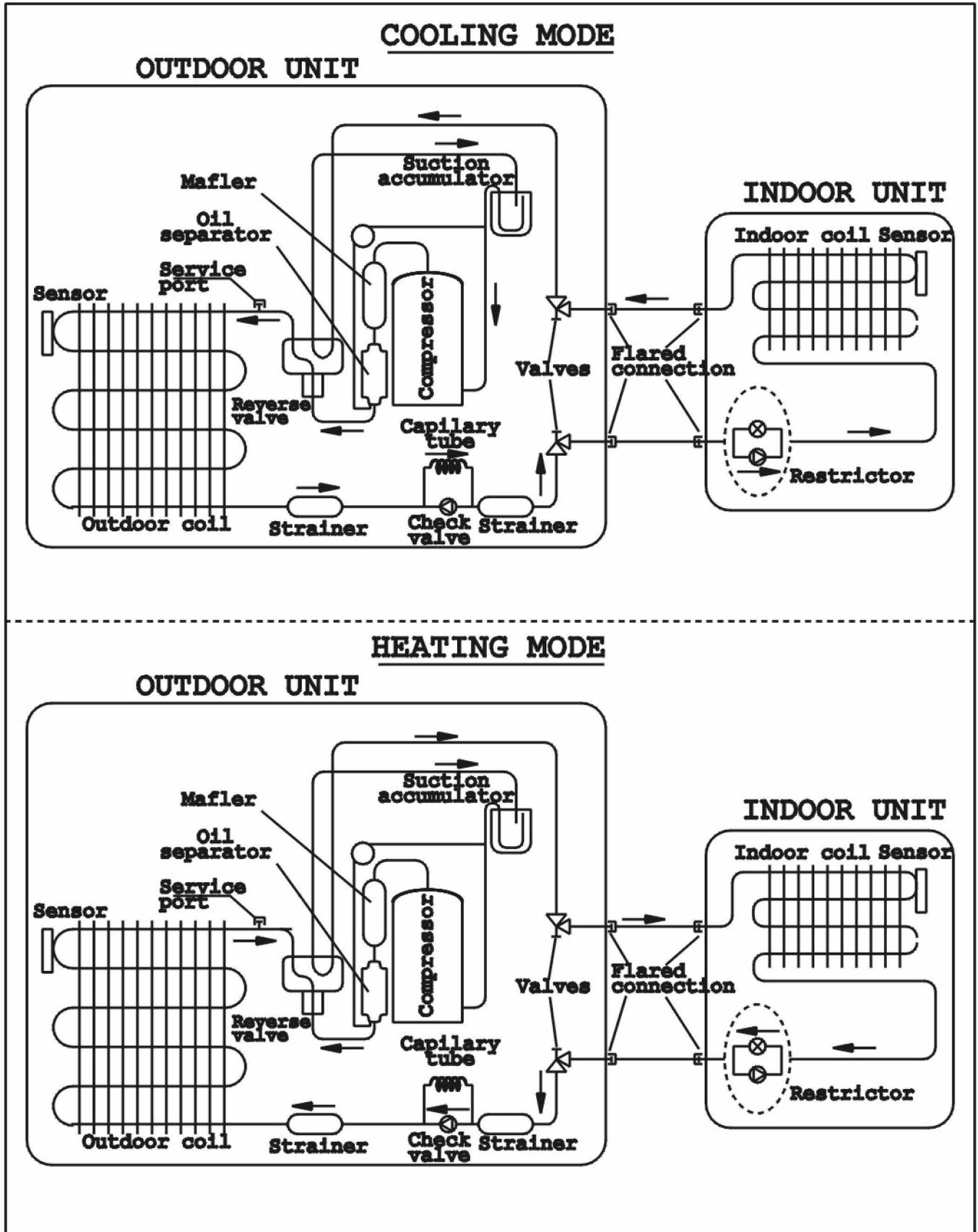
9. REFRIGERATION DIAGRAMS

9.1 Heat Pump Models

9.1.1 ECF XLN 24 R410A

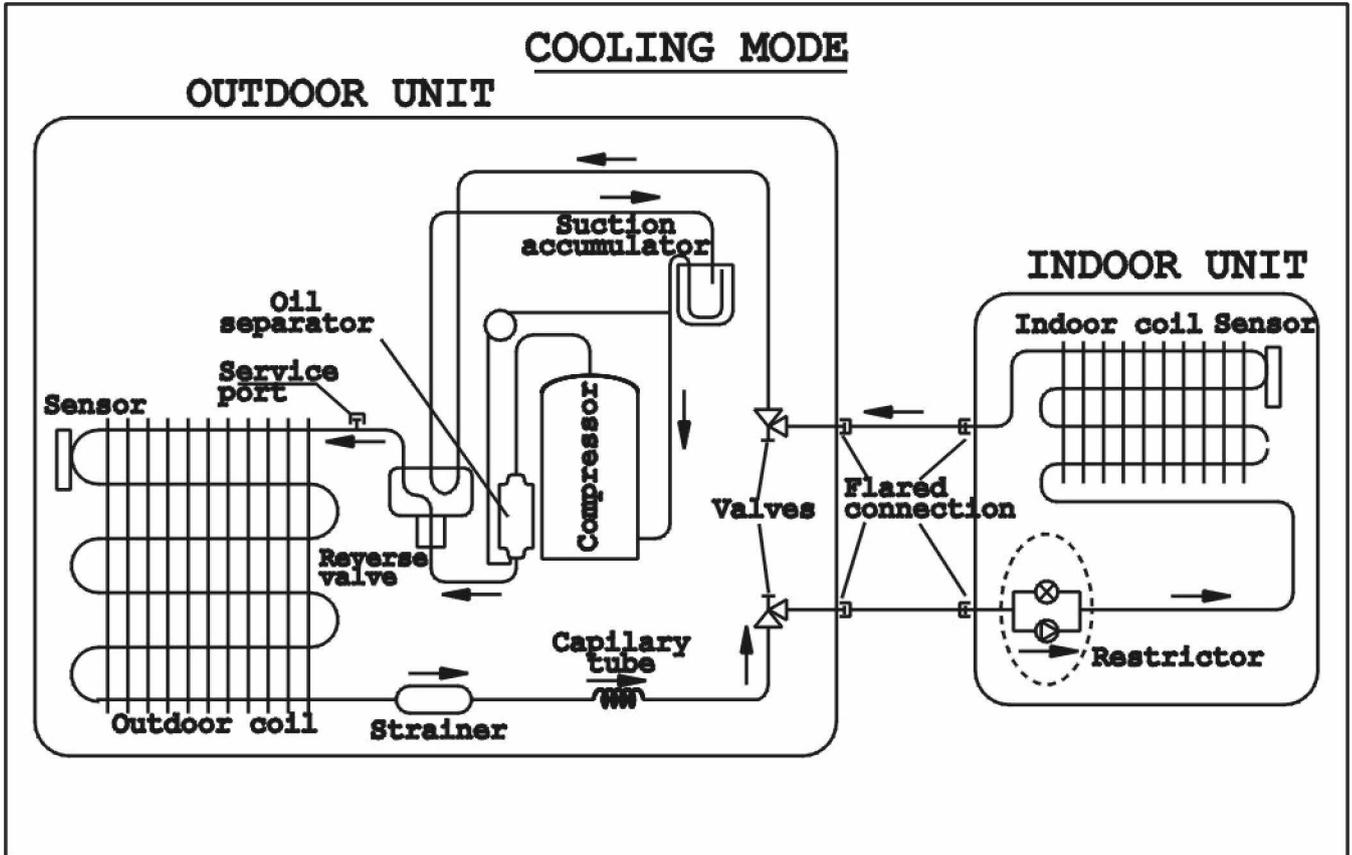


9.1.2 ECF XLN 30 R410A

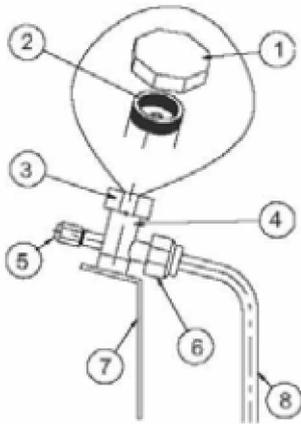
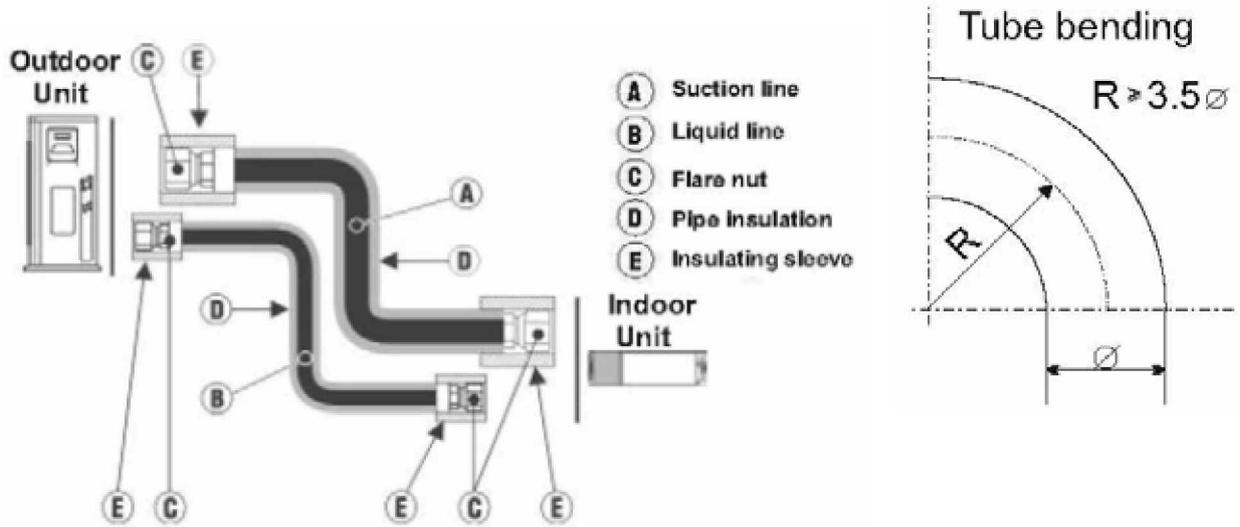


9.2 Cooling Only Models

9.2.1 ECF XLN 24, 30,



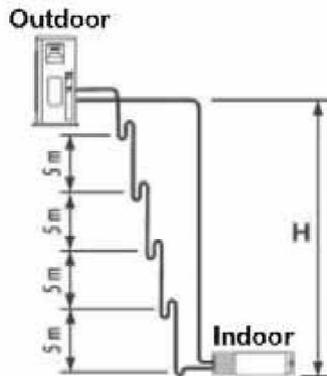
10. TUBING CONNECTIONS



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

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

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



11. CONTROL SYSTEM

11.1 Electronic Control

11.1.1 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.

11.1.2 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

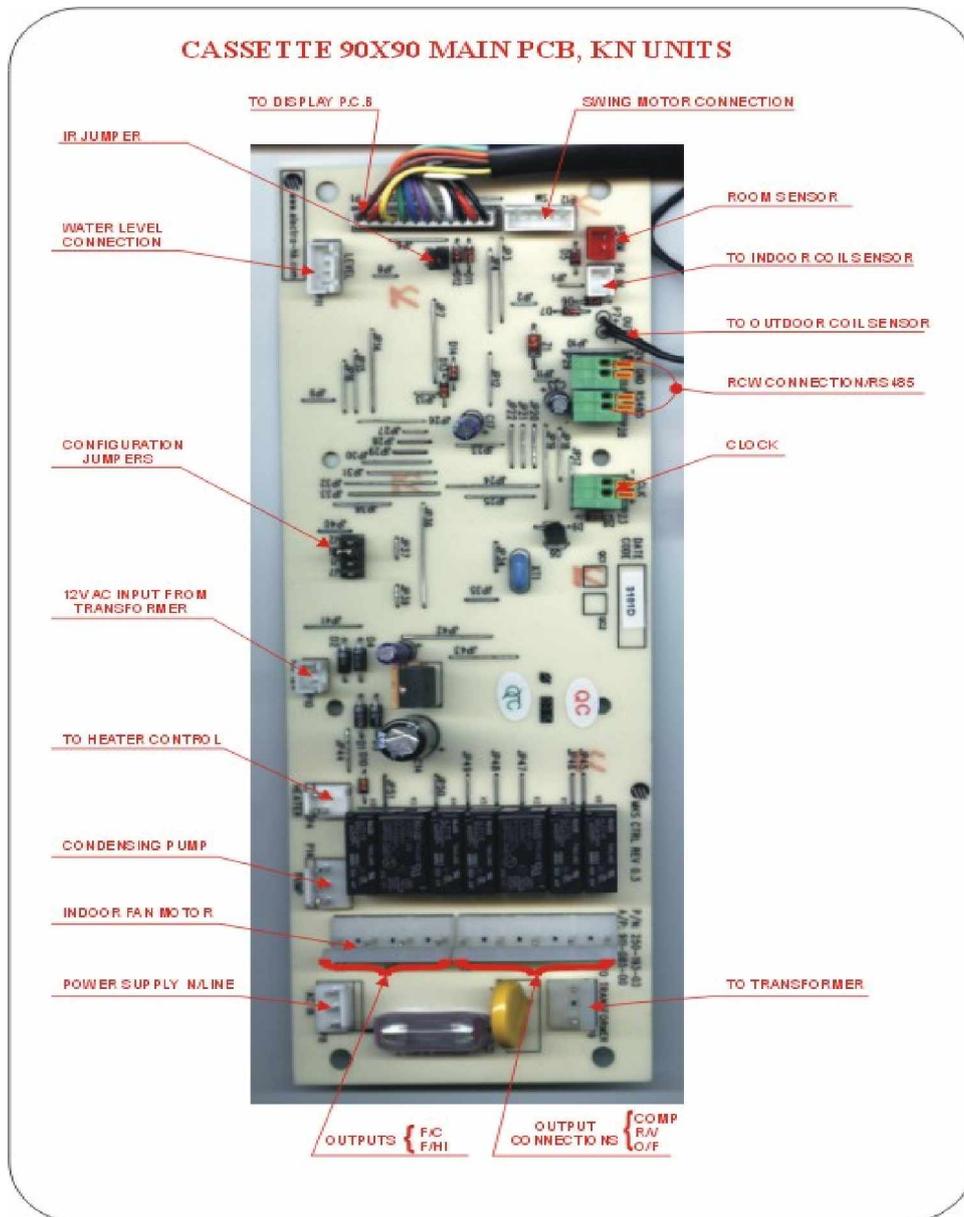
ON = 1

NOTE

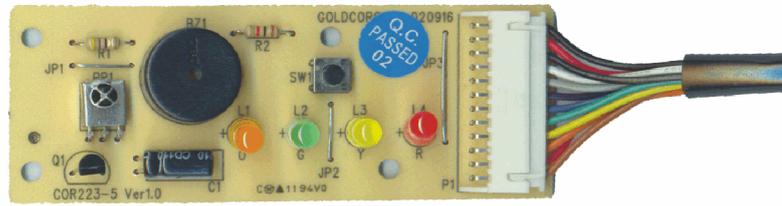
After setting the DIP switches perform reset operation.



11.1.3 Main PCB Controller



11.1.4

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

11.2 Control Function

11.2.1 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
CTV	- Compensation Temperature Value
HE	- Heating Element
HPC	- High Pressure Control
H/W	- Hardware
ICP	- Indoor Condensation Pump
ICT	- Indoor Coil Temperature (RT2) sensor
IF, IFAN	- Indoor Fan
IR	- Infrared
LEVEL1	- Normal Water Level
LEVEL2/3	- Medium/High Waterlevel
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 IFEEL mode, RAT otherwise)
RV	- Reversing Valve
SB, STBY	- Stand-By
sec	- Second (time)
Sect	- Section
SH	- Supplementary Heater
SPT	- Set Point Temperature
ST	- Standard (Model with Cooling Only)
S/W	- Software
TEMP	- Temperature
W/O	- Without
ΔT	- The difference between SPT and RT. in Heat Mode: $\Delta T = SPT - RT$ in Cool/Dry/Fan Mode: $\Delta T = RT - SPT$

11.3 General Functions

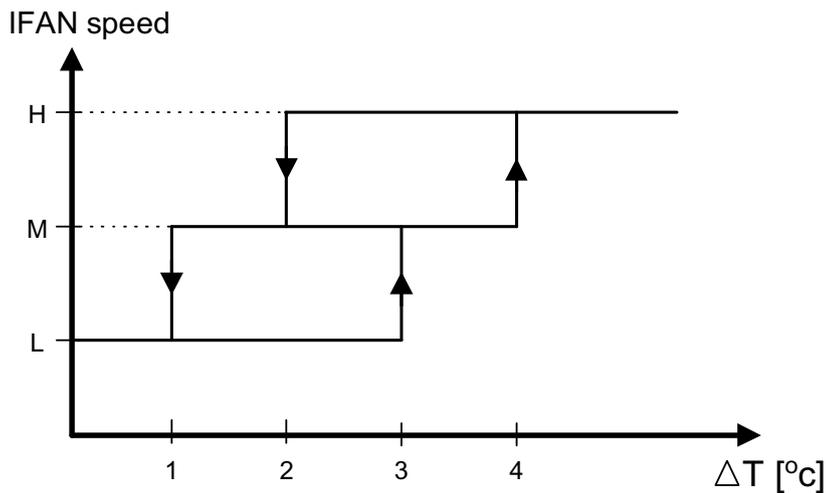
11.3.1 COMP Operation

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

Operation Mode	Min Operation Time of COMP
Heat, Cool, HP protection or Auto Modes	3 min.
Fan, Dry, Overflow, Protection Modes, or Mode Change	Ignored

11.3.2 IFAN operation

- a. Min time interval between IFAN speed change in AUTOFAN Mode is 30 sec.
- b. Min time interval between IFAN speed change in H/M/L Mode is 1 sec.
- c. IFAN speed in Heat/Cool AUTOFAN Mode is determined according to the following chart:



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

11.3.3 OFAN Operation

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

11.3.4 HE Operation

- a. Min Heaters ON or OFF time is 30 sec.
- b. Heaters can never be in operation while IFAN is OFF.
- c. In RH group, HE-1 and HE-2 will be activated only when COMP is not operating, except in Dry Mode.

11.3.5 Protections

- a. High pressure protection is applicable to all operating modes.
- b. Deicing control is valid in Heat and Auto Heat Modes only.
- c. Defrosting control is valid in Dry, Cool, and Auto Cool Modes.

11.3.6 Thermistors Operation

- a. Return air Temp. is detected by RAT in normal Mode, or by RCT (R/C sensor) in I-FEEL Mode.
- b. Indoor Coil Temp. is detected by ICT.
- c. Outdoor Coil Temp. is detected by OCT.
- d. Definition of thermistor faults:
 - 1) Thermistor is disconnected - the thermistor reading is below -30°C .
 - 2) Thermistor is shorted - the thermistor reading is above 75°C .
 - 3) Thermistor Temp reading doesn't change -
 - a) 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 are compared with those when the COMP was switched from OFF to ON 10 min before. If the ΔT is less than 3°C , the thermistor is regarded as defective.
 - b) The ICT no-change error can be disabled together by connecting a $4.7\text{k}\Omega$ resistor (5%) to the ICT connector. These resistors are equivalent to a thermistor $48\pm 1^{\circ}\text{C}$.
- e. Cases for disabling ICT thermistor disconnected detection:
 - 1) The detection of thermistor faults a. and b. above is disabled when Deicer Protection is started. The detection will be enabled again only after (1) the deicing is completed, and (2) COMP has been restarted and operated for 30 sec.
 - 2) When all the following conditions are fulfilled:
 - a) $4.7\text{k}\Omega$ resistor is connected to the OCT.
 - b) IFAN is OFF.
 - c) Compressor is ON.
 - d) $\text{ICT} < -30$ (disconnected).

11.3.7 RV Fault

This test is applied only in compressor units where 4.7k Ω resistor is not connected to the OCT.

The test is performed every time the unit is switched from OFF/STBY to OPER in Heat mode or changes operation mode from COOL/DRY to HEAT or (this applies also in AUTO COOL/HEAT mode).

If ICT is lower than 35°C at the time of mode change, then at the first occurrence of 15 min continuous COMP operation, ICT is compared with ICT reading when the COMP was switched from OFF to ON 15 min before. RV fault is defined when ICT decreases more than 5°C.

In this case, the COMP will stop and the SB LED will blink. The fault is reset after switching to SB or after mode change.

11.3.8 General Features

- a. Allowed (control target) range for RAT is SPT +/-1°C.
- b. 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.

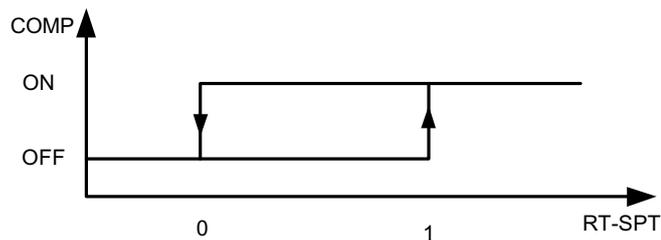
11.4 Cooling Mode

11.4.1 Cooling Mode – General

- a. Mode Definition
 - Mode: COOL, AUTO (at Cooling)
 - Temp: Selected desired temperature.
 - Fan: HIGH, MED, LOW, AUTO.
 - Timer: Any
 - I-FEEL: ON or OFF
- b. Room Temperature, RT, is detected by:
 - RAT in normal operation, or
 - RCT (R/C sensor) in I-FEEL mode.
- c. Indoor Coil Temp is detected by ICT.
- d. Outdoor Coil Temp is detected by OCT.

11.4.2 Control Functions

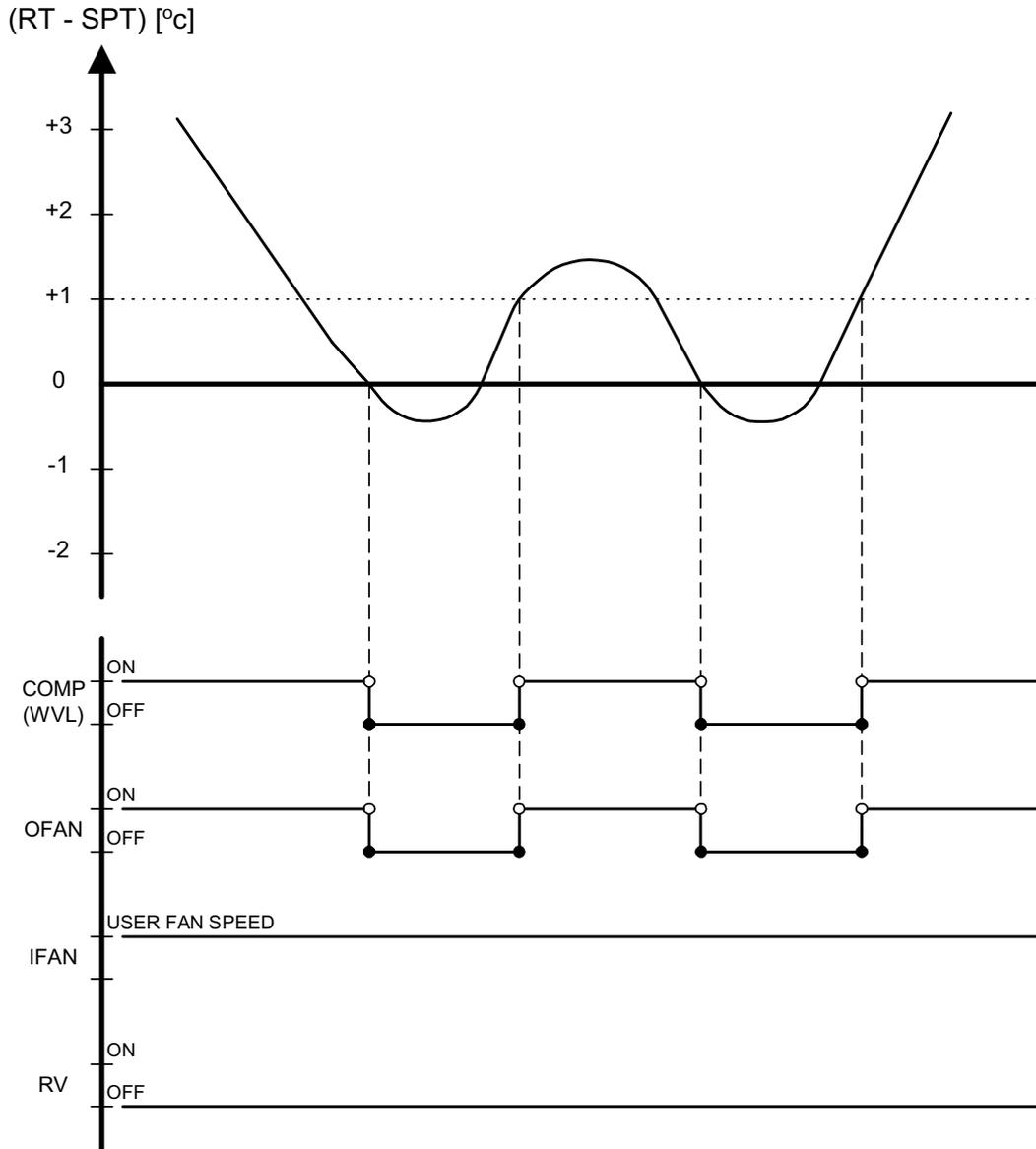
- a. COMP Operation



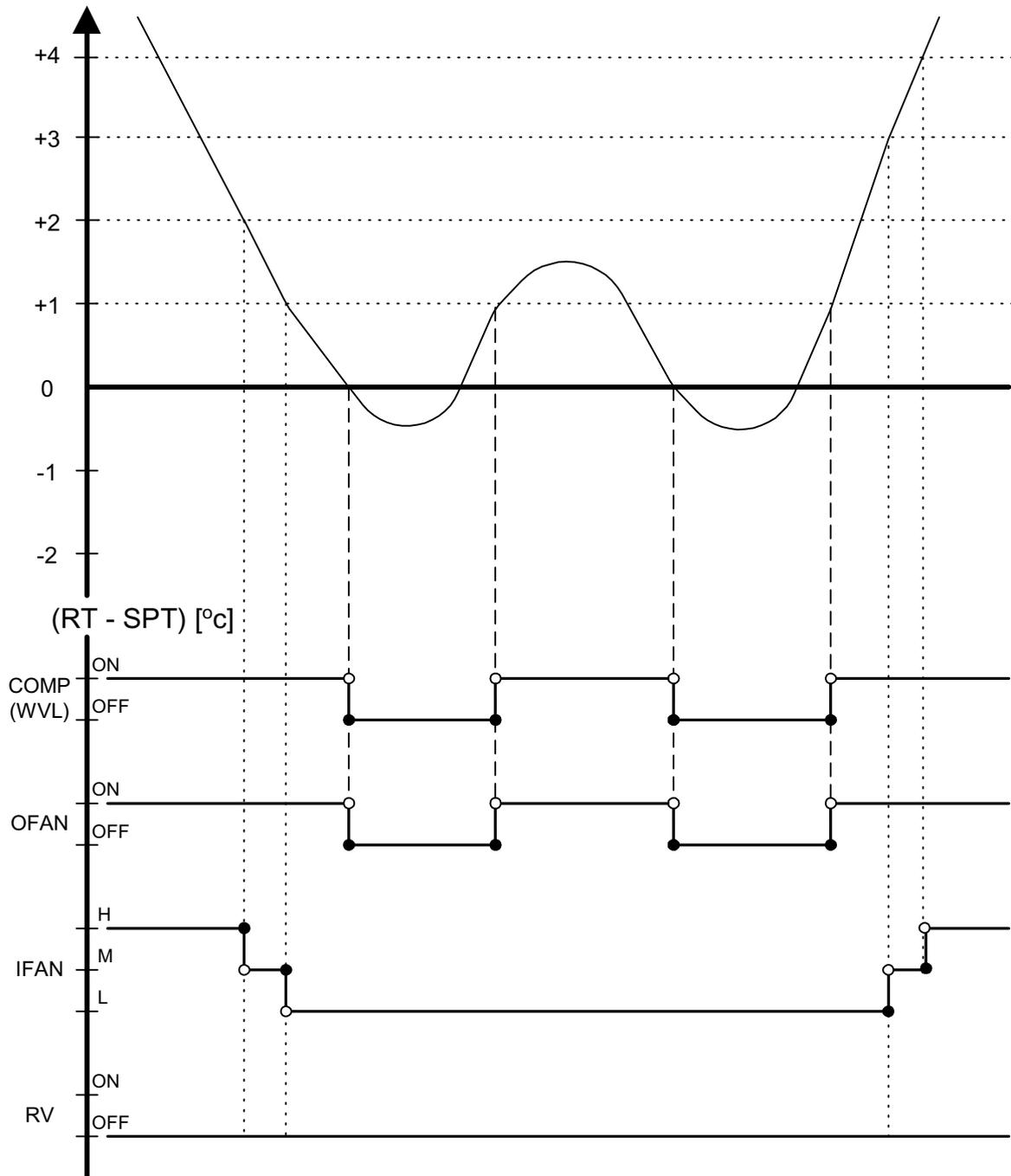
- b. OFAN Operation
 - In normal operation OFAN operates together with the COMP.
- c. IFAN Operation
 - IFAN will operate in ANY speed regardless the ICT or COMP state.
 - IFAN speed will be determined according to user selection or AUTO-FAN logic
- d. RV and HEATERS outputs
 - RV and HEATERS are in OFF state in COOL mode.

11.4.3 Sequence Diagrams

- a. Maintaining room temp at desired level by comparing RT and SPT with user defined IFAN speed.



b. Maintaining room temp at desired level by comparing RT and SPT with AUTO-IFAN.



11.5 Heating Mode

11.5.1 Heating Mode - General

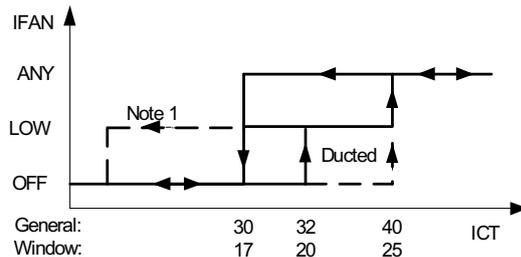
- a. Compensation Procedure
 When I-FEEL is OFF during HEAT mode: $RT = RAT - CTV$.
 When I-FEEL is ON during HEAT mode: $RT = RCT$.

Type of Indoor	CTV
Wall Mounted	+3 °C
Mobiles / Floor Ceiling	+0 °C
Square /Window	+2 °C
Ducted	+4 °C
Cassettes	+4 °C

No compensation will be activated in Forced operation modes

- b. IFAN operation rules for RC and SH groups:

- 1) As a general rule for **RC and SH groups**, IFAN will be switched ON according to the following graph:



NOTE 1

When COMP is ON (except WAX Model), IFAN will change from LOW to OFF either when:

- a) $ICT < 28$ and IFAN is on for 5 min or longer.
Or,
- b) $ICT < 20$

NOTE 2

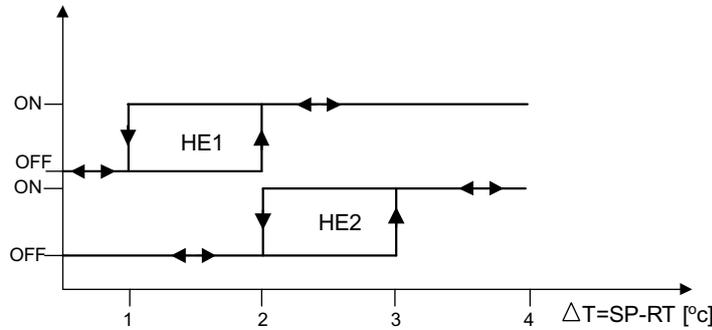
When ICT is faulty:

When the compressor switches from OFF to ON (excluding deicing), IFAN will be on in ANY speed.

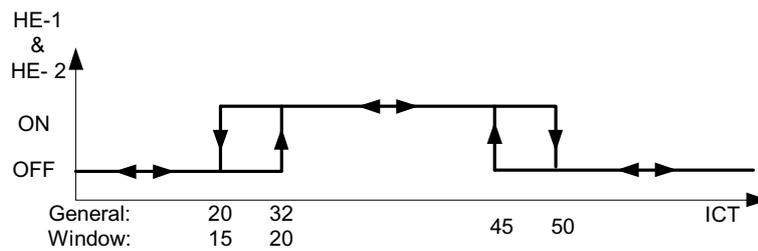
When the compressor switches from ON to OFF, the IFAN will change to LOW speed for 30 seconds and then it will be off.

- 2) In SH or RC group, IFAN will operate for Min 30 sec according to 1) above after HEs are turned off, where in a case it has to be OFF, it will be forced to LOW speed.

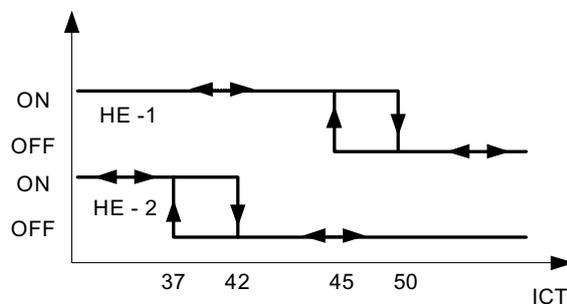
- c. IFAN operation rules for RH group
 - 1) In RH group, IFAN starts when HE starts. When HE switches to OFF, IFAN switches to LOW for 30 sec and then stops.
- d. Heaters operation rules for RC and SH groups:
 - 1) For both RC and SH groups, Heaters versus ΔT is as follows:



- 2) Operation rules for Heaters in RC group:
 - a) Heaters can be enabled only if IFAN is ON.
 - b) Heaters will operate according to ΔT and the following graph:



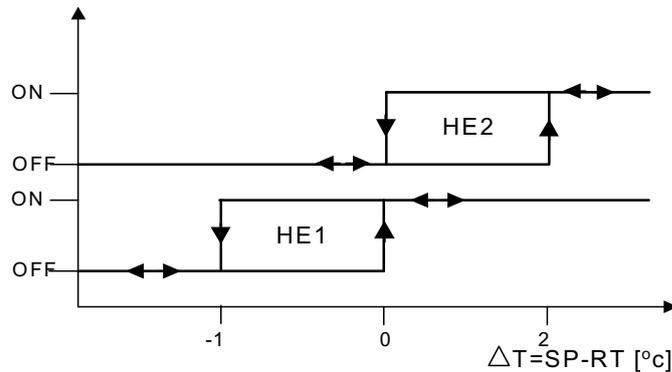
- 3) Rules for Heaters operation in SH group:
 - a) When heaters are to be ON and IFAN is to be OFF according to d. 1) above, IFAN will be forced to LOW speed.
 - b) Heaters will operate according to ΔT and the following graph:



- 4) For both RC and SH groups, excluding deicing, HE1 and HE2 can be ON only when the compressor is ON.

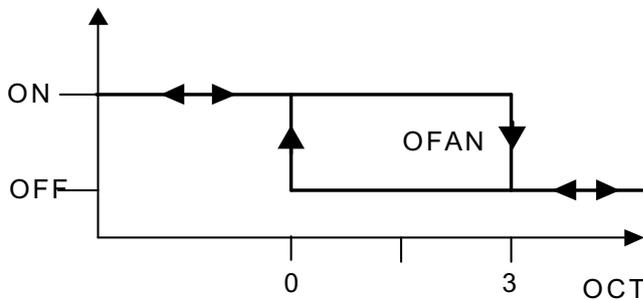
e. Heaters operation rules for RH groups:

- 1) In RH group, HE operation is according to the difference between RAT and SPT.



f. OFAN Operation for RC and SH groups

- 1) As a general rule for RC and SH groups, excluding protection modes, OFAN starts with the compressor.
- 2) When OFAN is ON it will operate according to the following conditions:
 - a) OFAN operates together with the compressor.
 - b) When $(RT \geq SPT - 2)$ and $ICT \geq 50$ and the $4.7k\Omega$ resistor is not connected to the OCT, OFAN will operate according to the following curve:

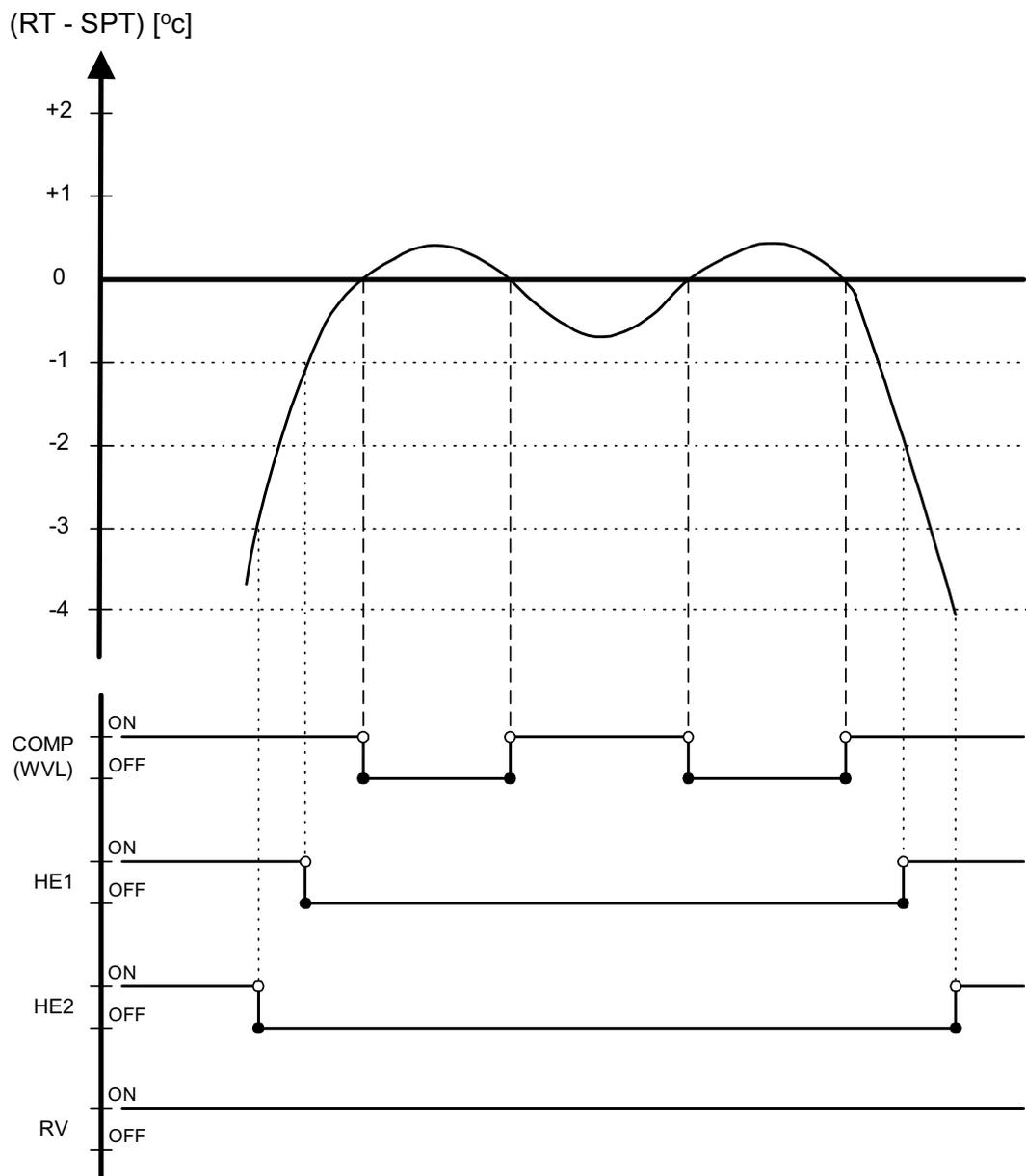


11.6 Heating, RC or SH Group

- Mode: HEAT, AUTO (at heating)
- Temp: Selected desired temperature
- Fan: HIGH, MED, LOW
- Timer: Any
- I-FEEL: ON or OFF

11.6.1 Sequence Diagram

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

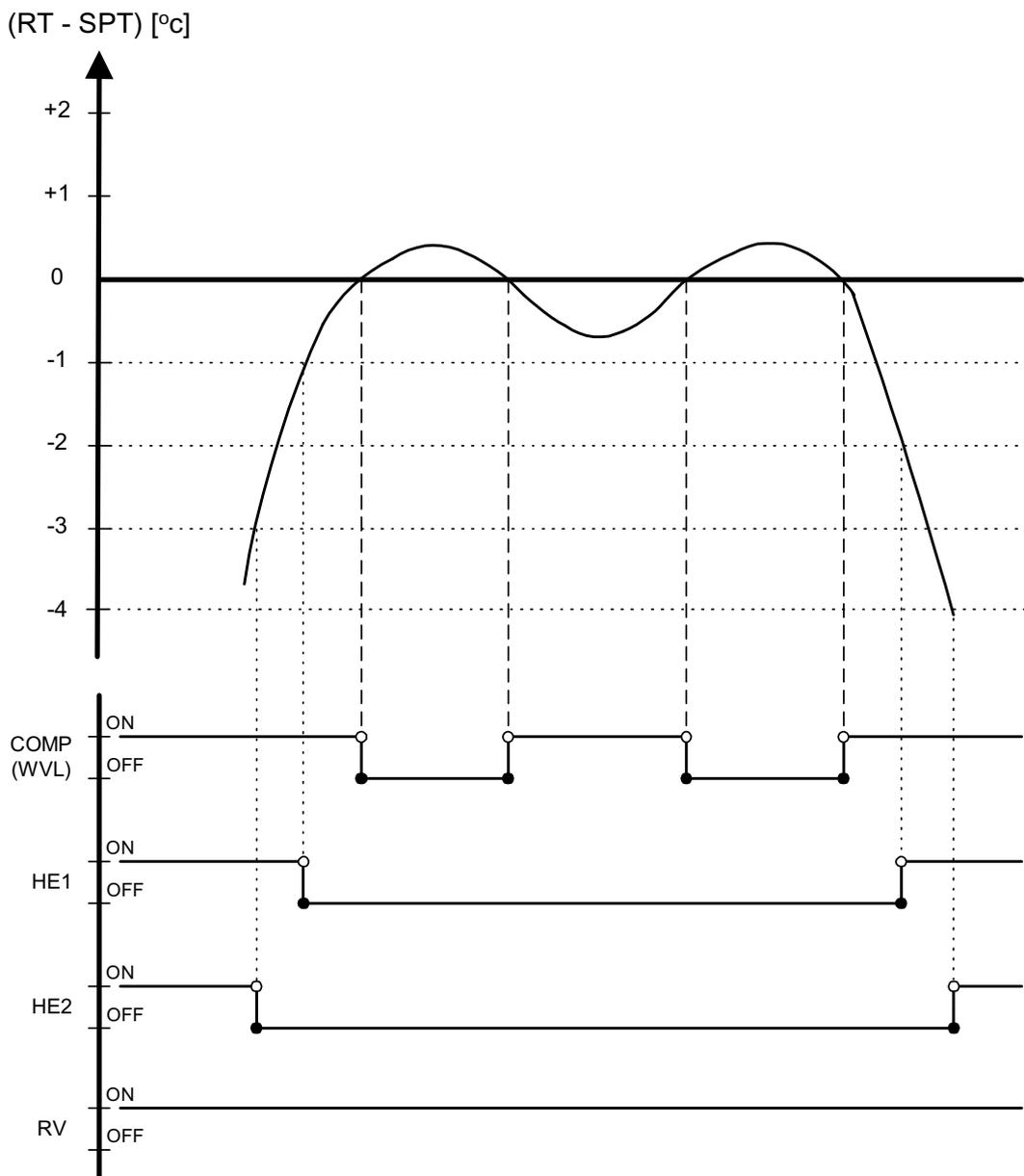


11.7 Heating, RC or SH Group with Autofan

- Mode: HEAT, AUTO (at heating)
- Temp: Selected desired temperature
- Fan: AUTO
- Timer: Any
- I-FEEL: ON or OFF

11.7.1 Sequence Diagram

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



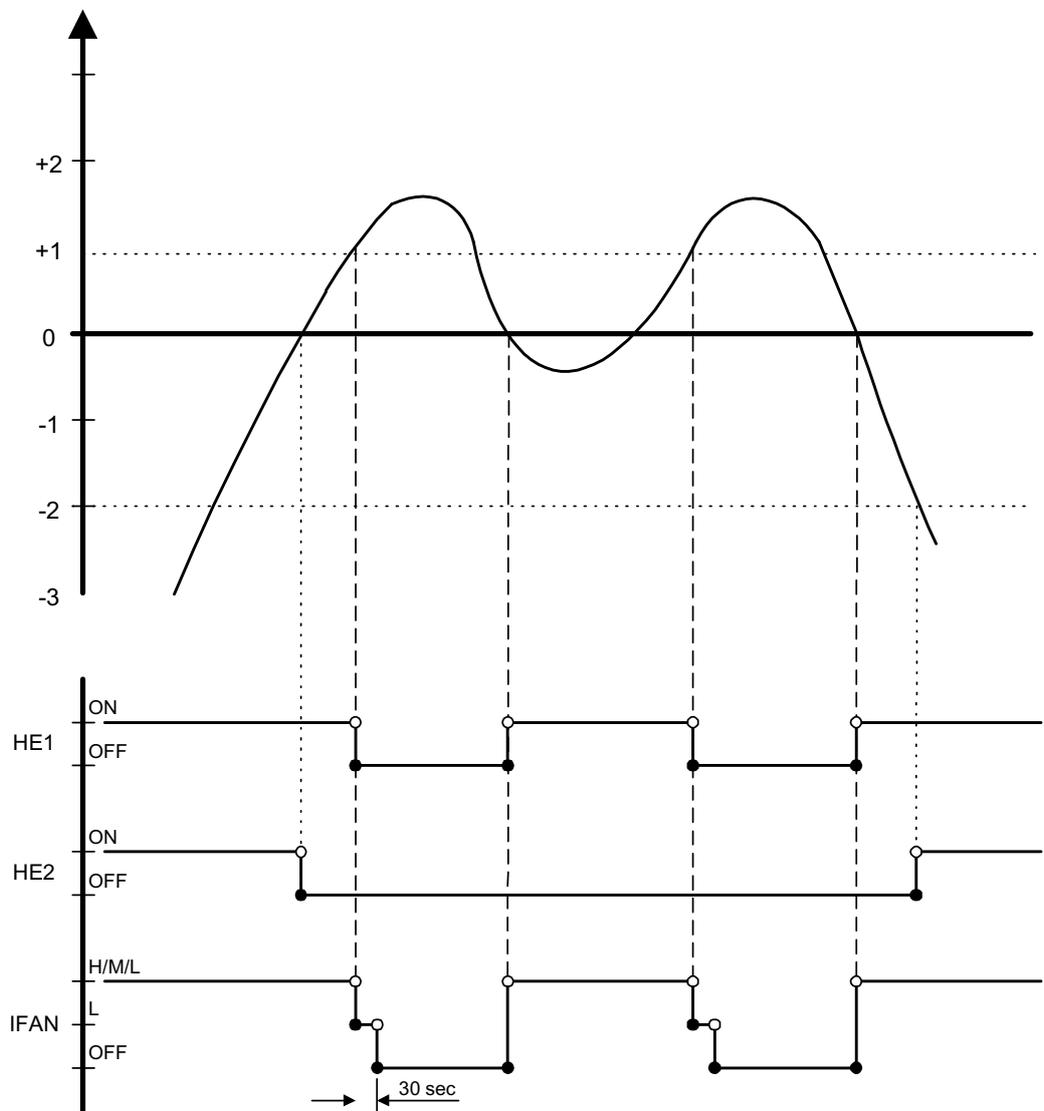
11.8 Heating, RH Group

- Mode: HEAT, AUTO (at Heating)
- Temp: Selected desired temperature
- Fan: HIGH, MED, LOW
- Timer: Any
- I-FEEL: ON or OFF

11.8.1 Sequence Diagram

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

(RT - SPT) in °c



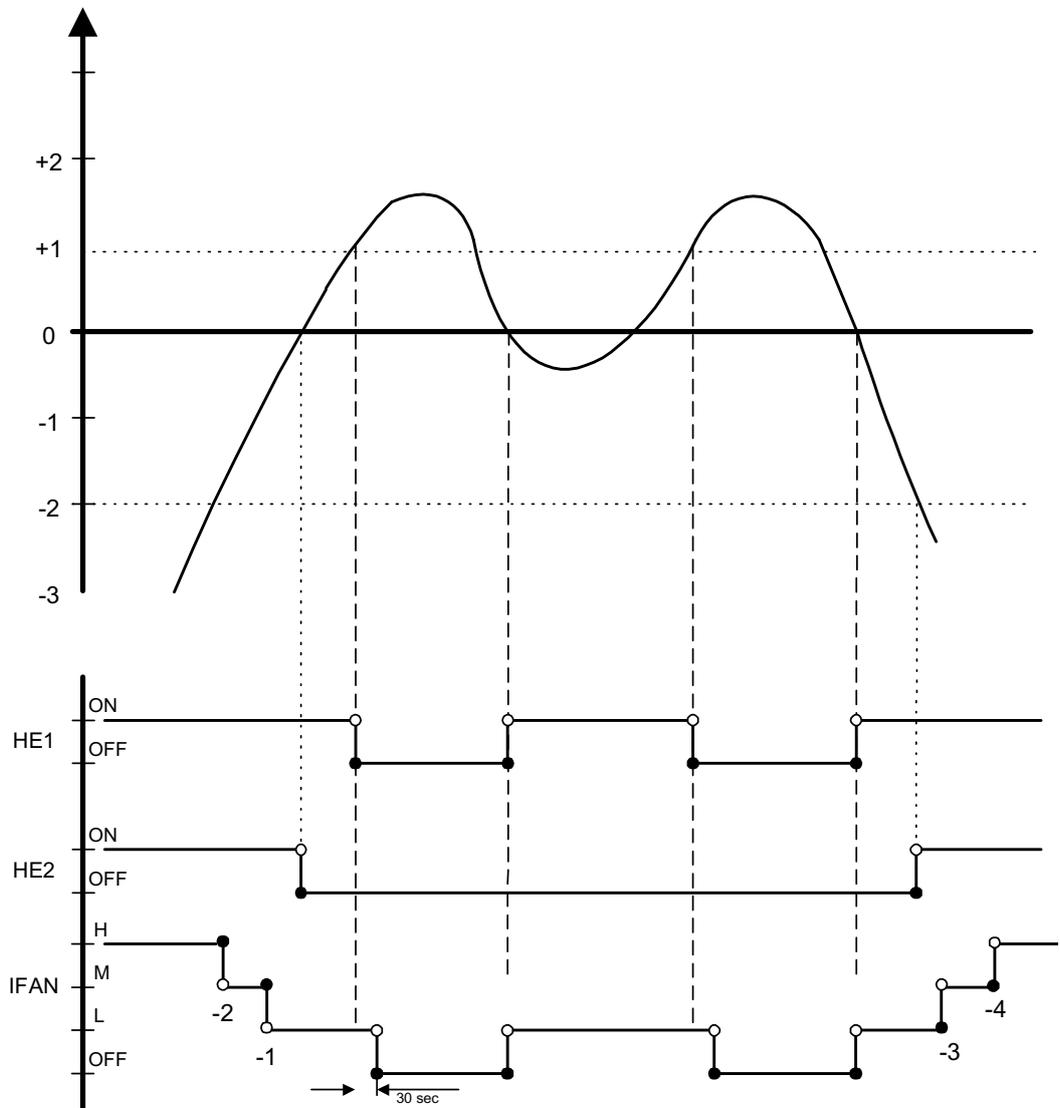
11.9 Heating, RH Group, with AUTOFAN

- Mode: HEAT, AUTO (at Heating)
- Temp: Selected desired temperature
- Fan: AUTO
- Timer: Any
- I-FEEL: ON or OFF

11.9.1 Sequence Diagram

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

(RT - SPT) in °C



11.10 Automatic Cooling or Heating

11.10.1 Automatic Cooling or Heating - General

The AUTO Mode is for models with compressor and the WVL-RH only. The WVL-ST, RC and SH units do not work in AUTO Mode.

a. Mode Definition

Mode: AUTO

Temp: Selected desired temperature

Fan: Any

Timer: Any

I-FEEL: ON or OFF

b. Switching-temperature between Cooling and Heating is $SPT \pm 3^{\circ}C$.

c. 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.

d. 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

e. For RH and WVL-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

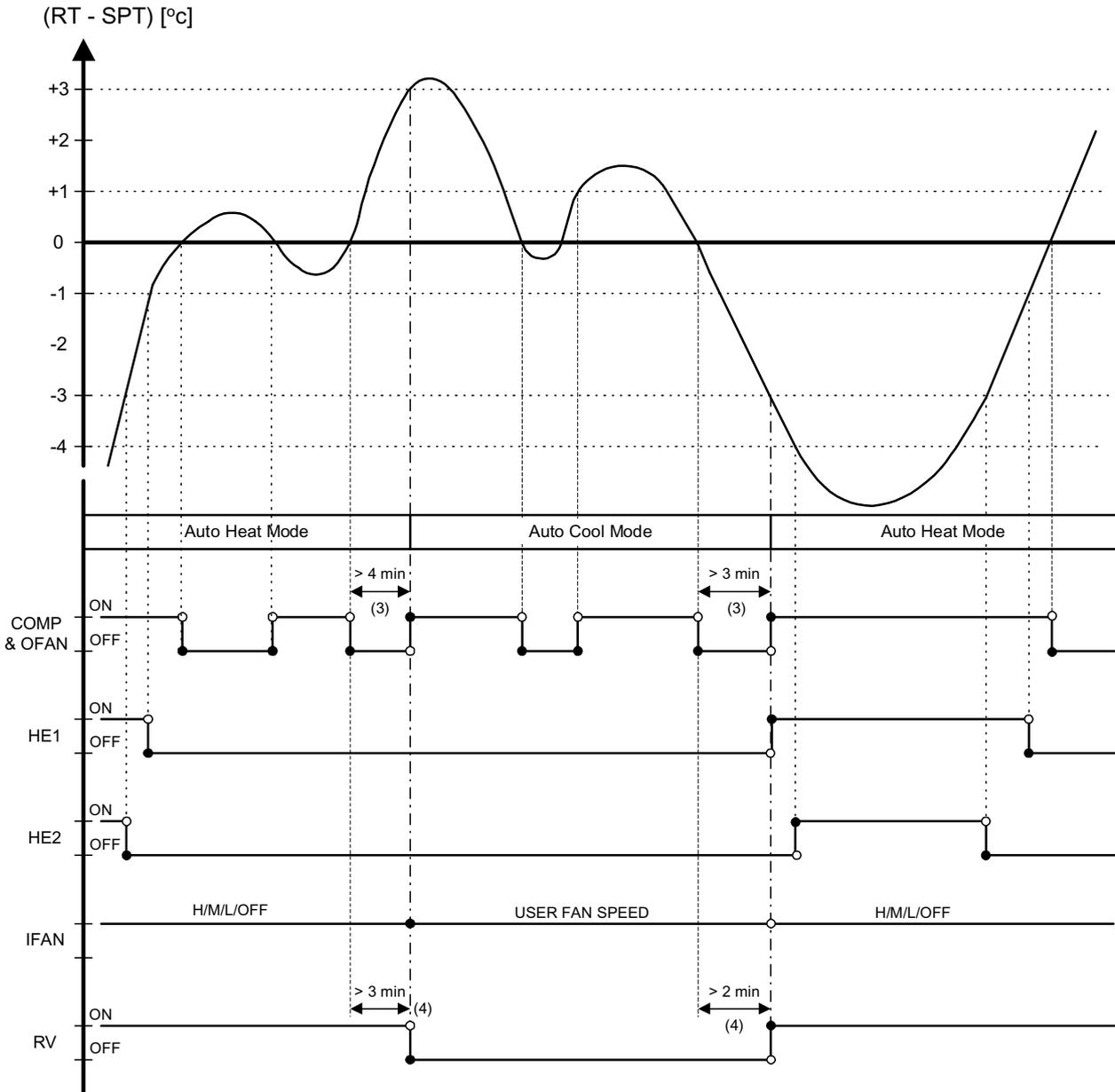
f. When unit is changed form Cool/Dry Mode to Auto Mode, the unit will continue to operate in (Auto) Cool Mode until the conditions for switching from Auto Cool to Auto Heat are satisfied.

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

11.10.2 Sequence Diagrams

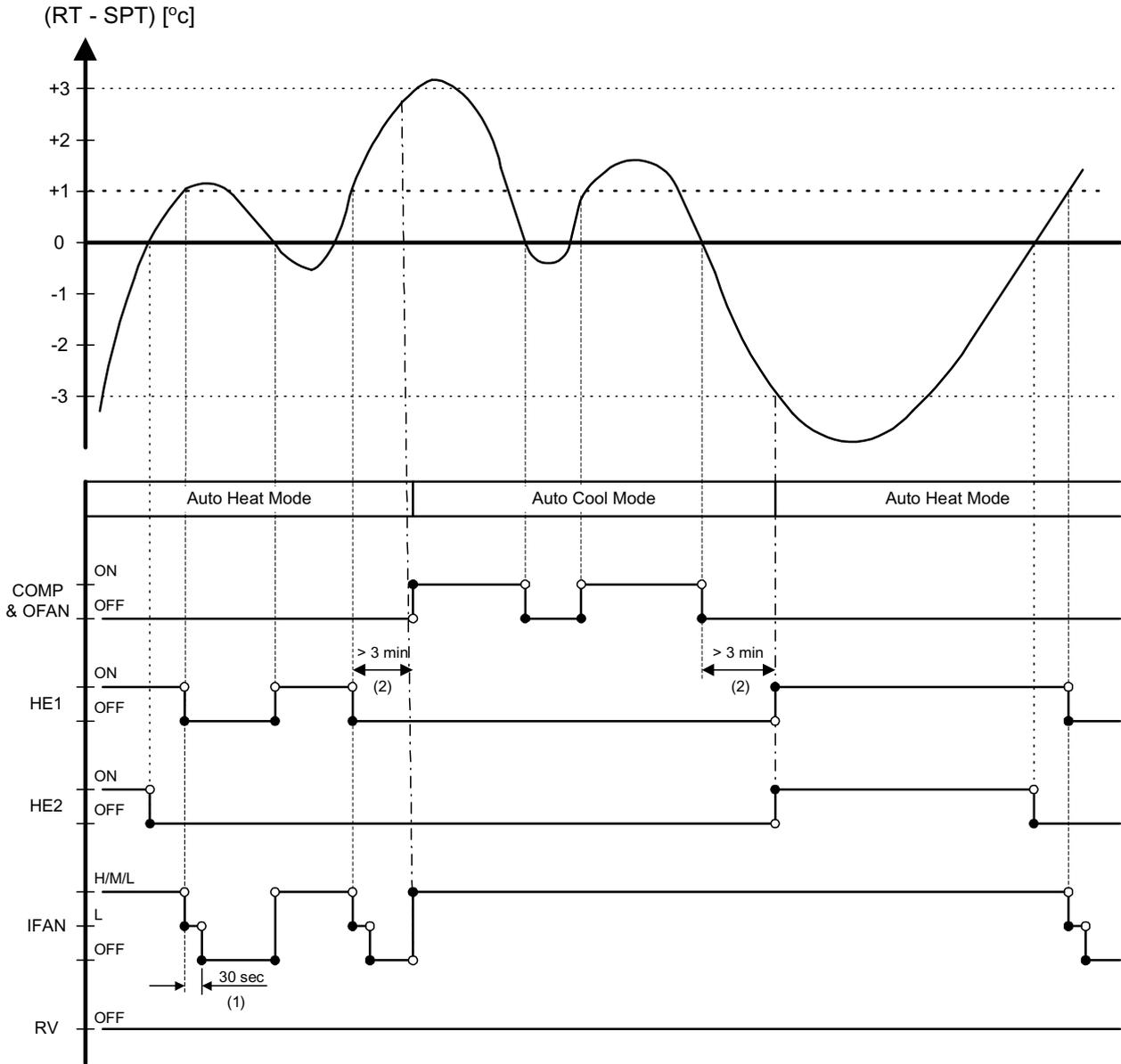
a. Auto Cooling or Heating, RC or SH Groups

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



b. Auto Cooling or Heating RH Group

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



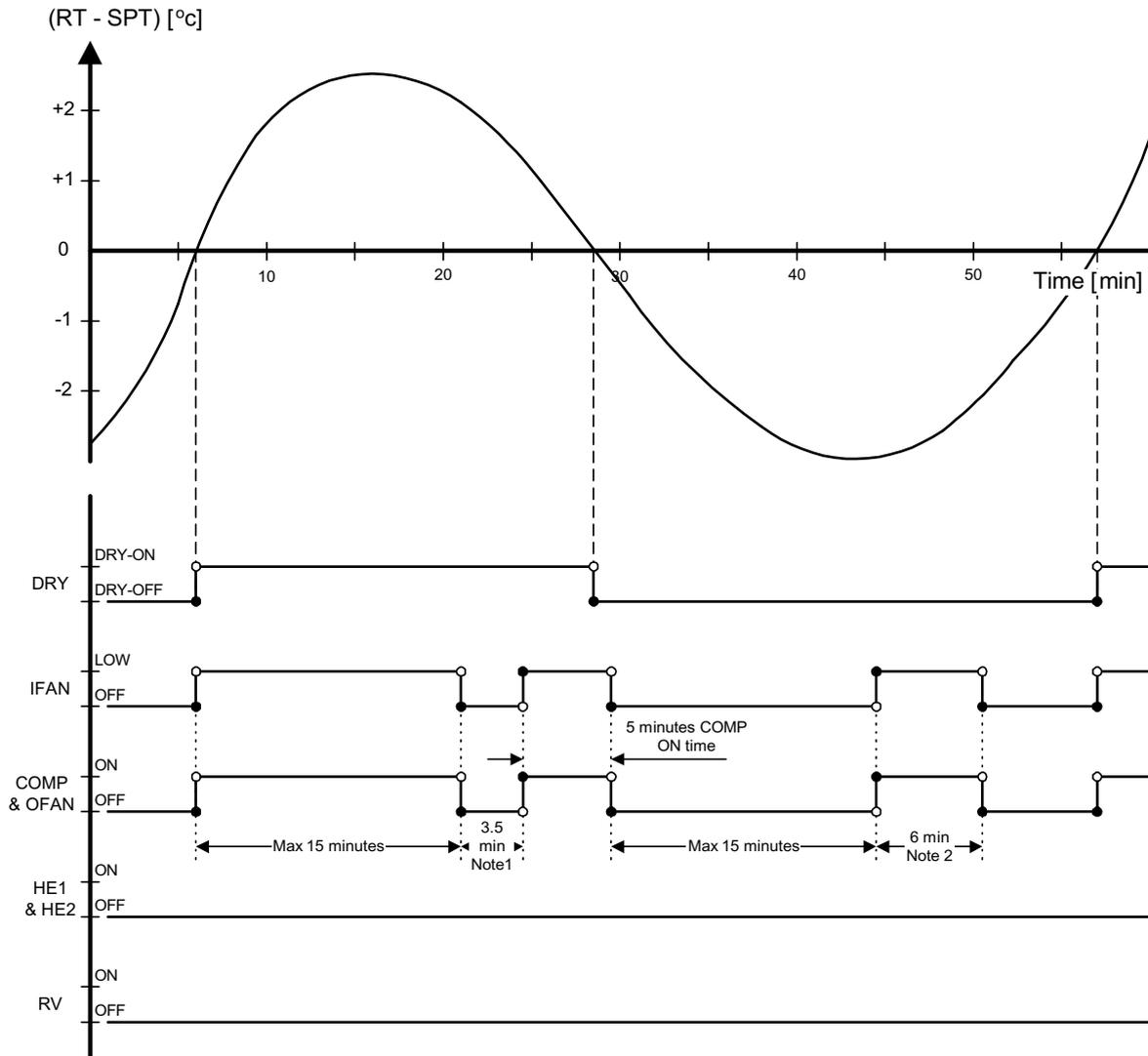
11.11 Dry Mode

11.11.1 Dry, ST or RC Group or P2000 Model with Any Group Settings

- Mode: DRY
- Temp: Selected desired temperature
- 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.

11.11.2 DRY, SH or RH group

Mode: DRY

Temp: Selected desired temperature

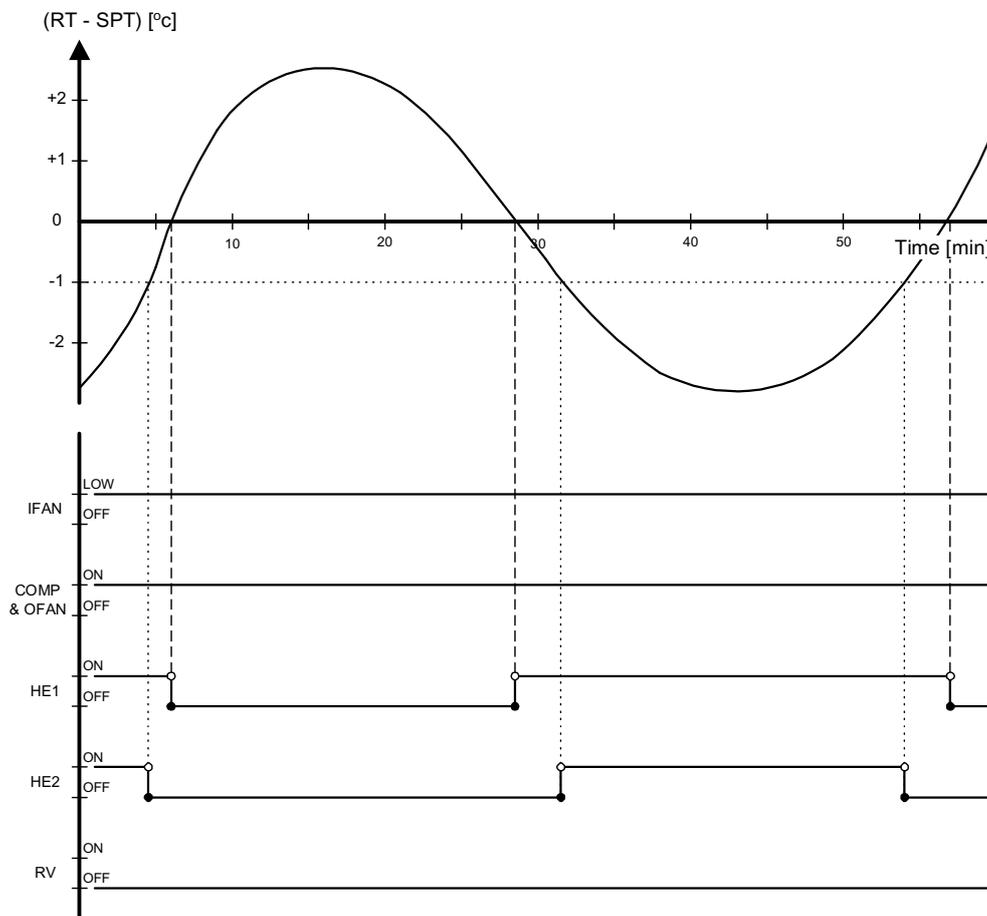
Fan: LOW (automatically selected by software)

Timer: Any

I-FEEL: Any

Control function

Reduces room humidity with minimum temp. fluctuations by operating in Cool Mode with LOW speed IFAN and HE.



11.12 Protection

11.12.1 Cooling Mode Protections

a. Indoor Coil Defrost

Mode: COOLING, DRY, AUTO

Temp: Selected desired temp.

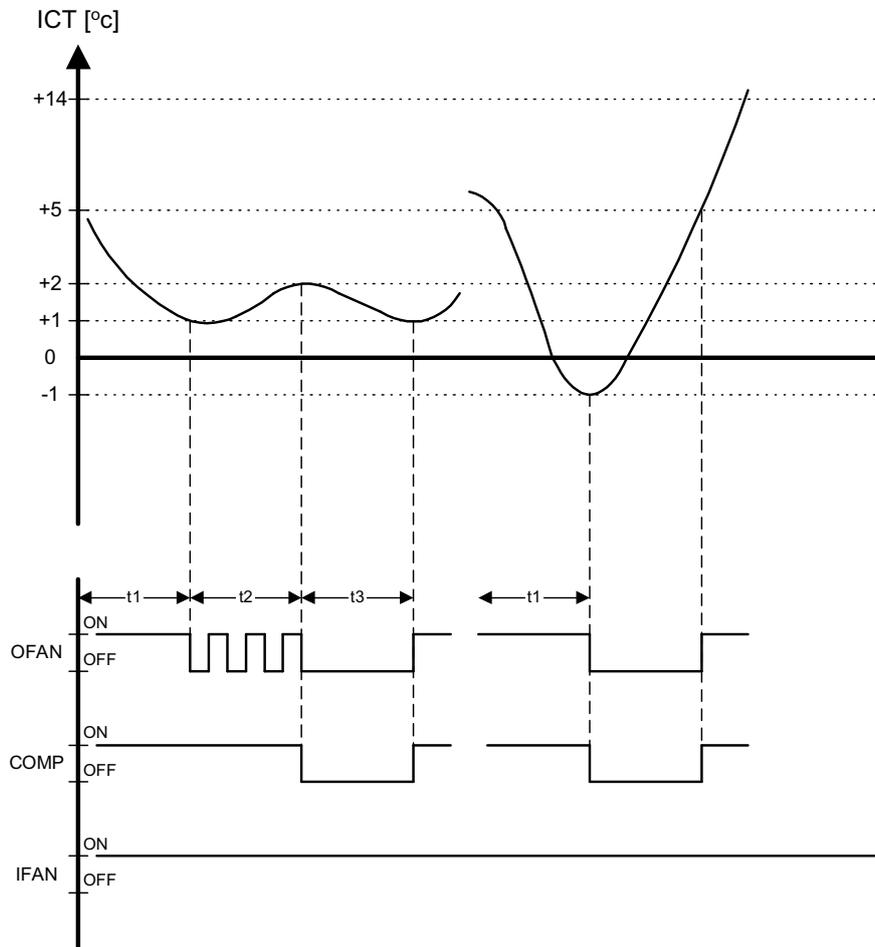
Fan: Any

Timer: Any

I-FEEL: ON or OFF

Control Function

Protects the indoor coil from ice formation at low ambient temperatures.



t1 = 5 min minimum for each COMP starting.

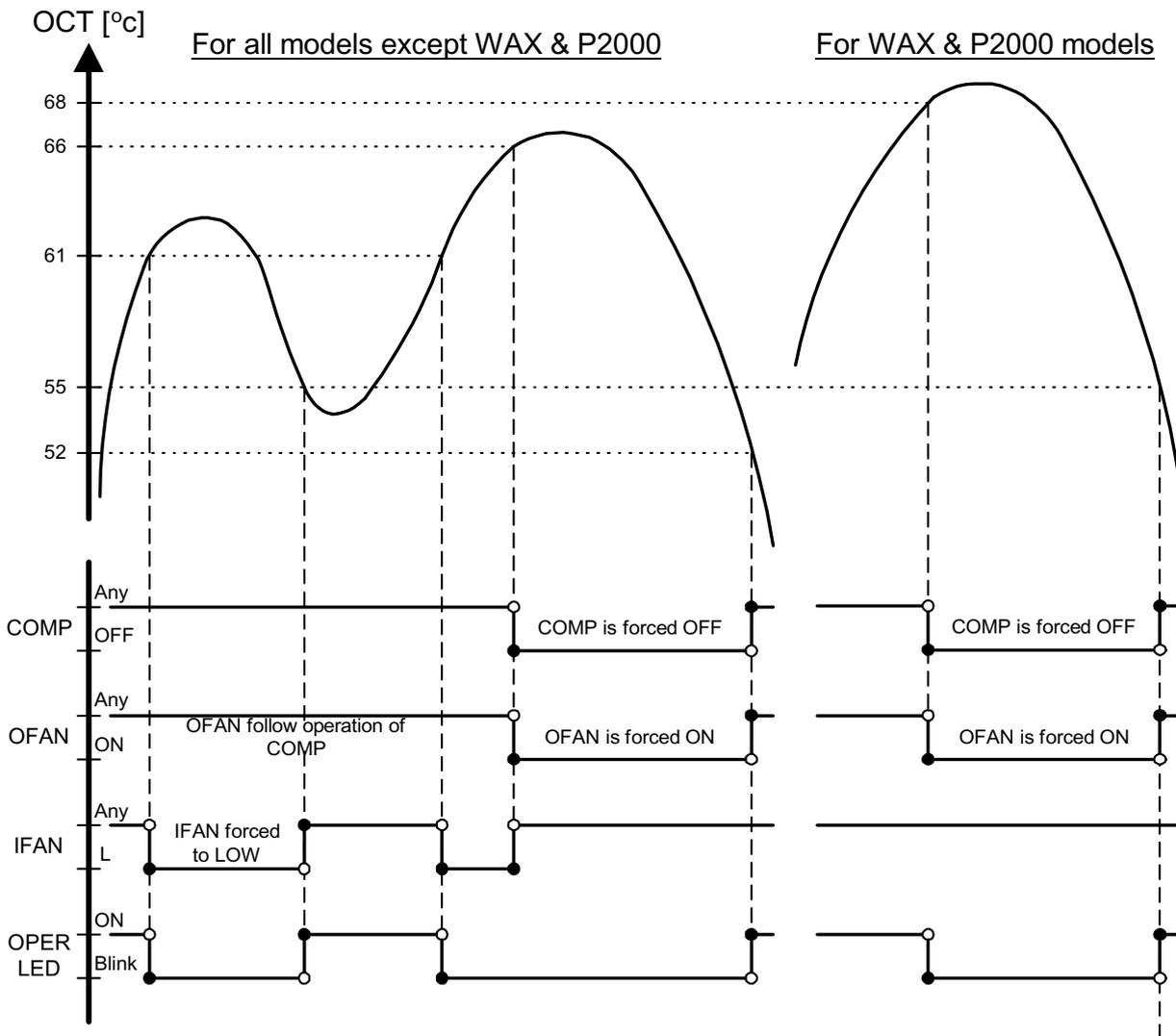
t2 = OFAN cycling (alternate between ON and OFF every 30 sec) for 20 min maximum.

t3 = COMP and OFAN stops for 10 min minimum.

- b. High Pressure Protection
 - Mode: (AUTO) COOLING or DRY
 - Temp: Selected desired temperature
 - Fan: Any
 - Timer: Any
 - I-FEEL: ON or OFF

Control Function

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



NOTE

The ICT is also monitored during COOL and DRY modes, 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.

11.12.2 Condensation Pump.

Mode: Cool, Dry, Auto

Temp: Selected desired temperature

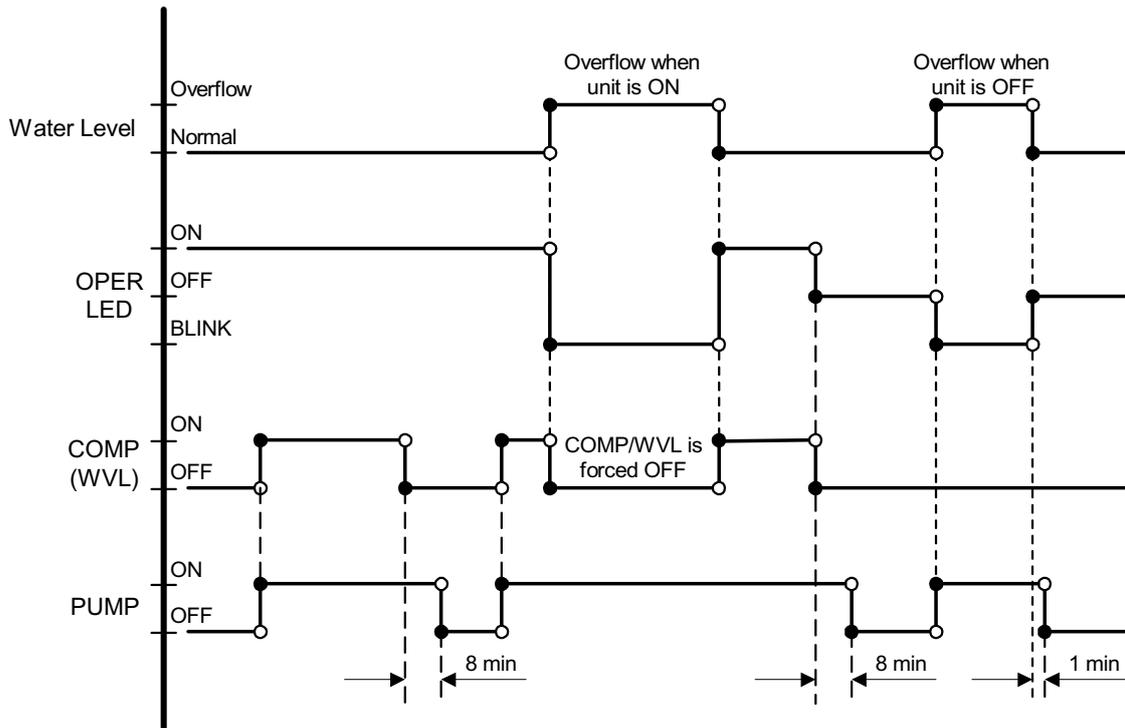
Fan: Any

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.
2. For the NEC version of MCU, the "Over Flow" & "Normal" condition are indicated by logic "0" & "1" at the LEVEL4 input pin respectively.
3. For the Fujitsu version of MCU, 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.

11.12.3 Heating Mode Protections

- a. Outdoor Coil Deicing (excluding RH Group)

Mode: HEATING, AUTO (at heating)

Temp: Selected desired temperature

Fan: Any

Timer: Any

I-FEEL: Any

Control function

To protect the outdoor coil from ice formation by controlling COMP & RV operation.

- 1) Deicer Activation Algorithm

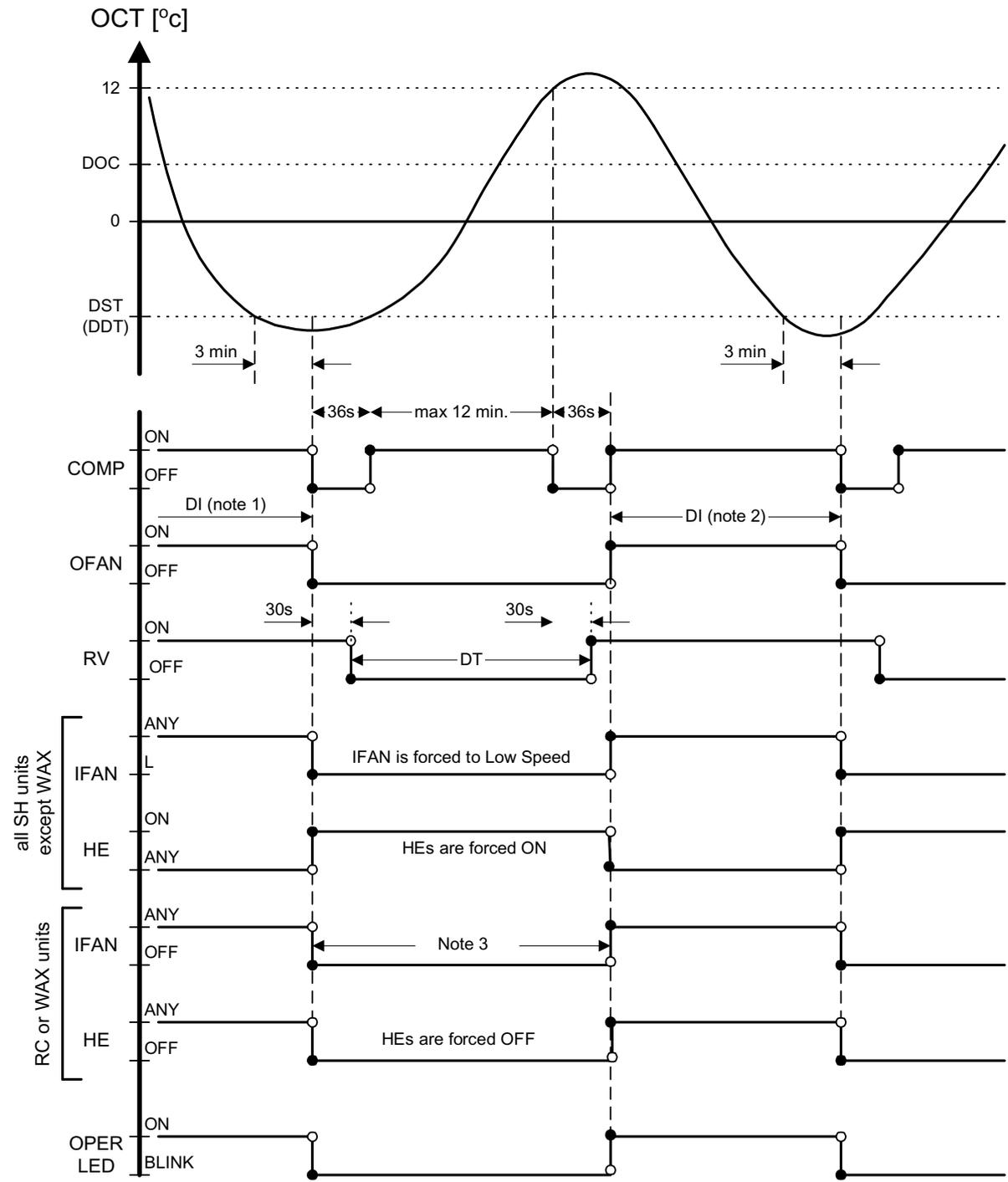
a) Static deicer threshold is -5°C

b) Dynamic deicer threshold changes of 3°C in 3 minutes in the OCT temperature

c) In first COMP activation (after SB or OFF), if $\text{OCT} < 0^{\circ}\text{C}$, min time to first deicer is 10 min else 40 min.

d) In a case of reading 3 successive OCT values below -10°C and previously 3 successive OCT values of 43°C (4.7 K), the unit will activate deicing procedure.

2) Deicing procedure



NOTES

1. In the following Deicing cycles, the time interval between two Deicing cycles activation is between 30 to 80 min.
2. For RC group, IFAN is forced OFF.
3. For SH group, HEs are forced ON and IFAN is forced to operate at LOW speed, regardless of the ICT and difference between RAT & SPT.
4. When jumper J7 is set, the DST value is -2°C.

b. High Pressure Protection (excluding RH Group)

Mode: (AUTO) HEATING

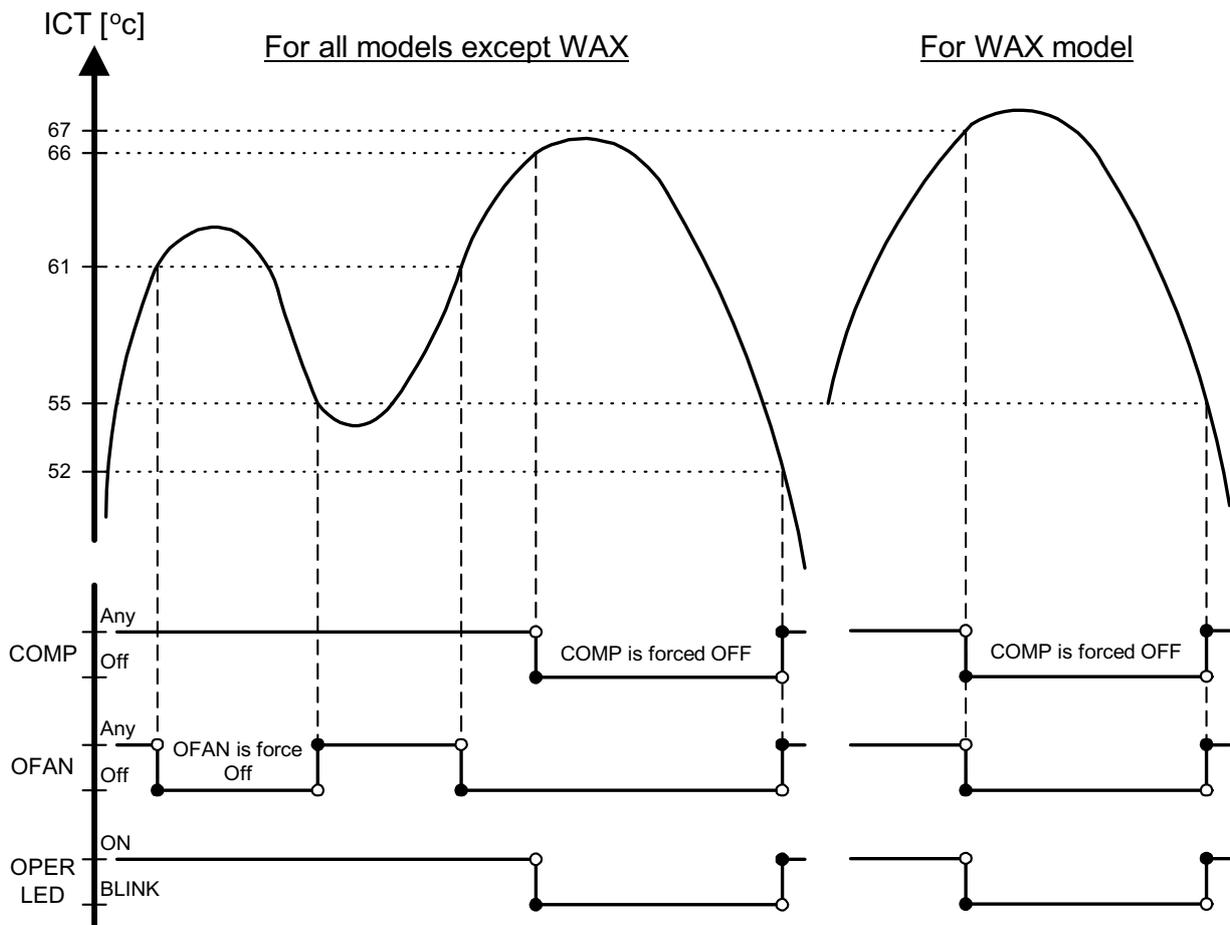
Fan: Any

Timer: Any

I-FEEL: ON or OFF

Control Function

Protects the compressor from high pressure by switching OFF the OFAN and COMP.



11.13 Forced Operation (Excluding PRX & PXD Models)

- a. Forced operation allows units to start, stop and operate in cooling or heating in preset temp. according to the following table:

Forced Operation Mode	Pre-set Temp for : MBX, P2000, PX Models	Pre-set Temp for : FCD, RWK ,ELD, ECC, WAX, WNX, WMN Models
Cooling	20 °C	22 °C
Heating	25 °C	28 °C

NOTES

1. While under the forced operation, the temperature compensation schedule is disabled.
2. The forced operation is activated when the mode button on the Display Board is used to switch the unit to COOL or HEAT mode.
3. The IFAN is always set to Autofan Speed in forced operation.

Temp: Set – desired temperature selected

Fan: Any

Timer: Interact with Sleep Timer

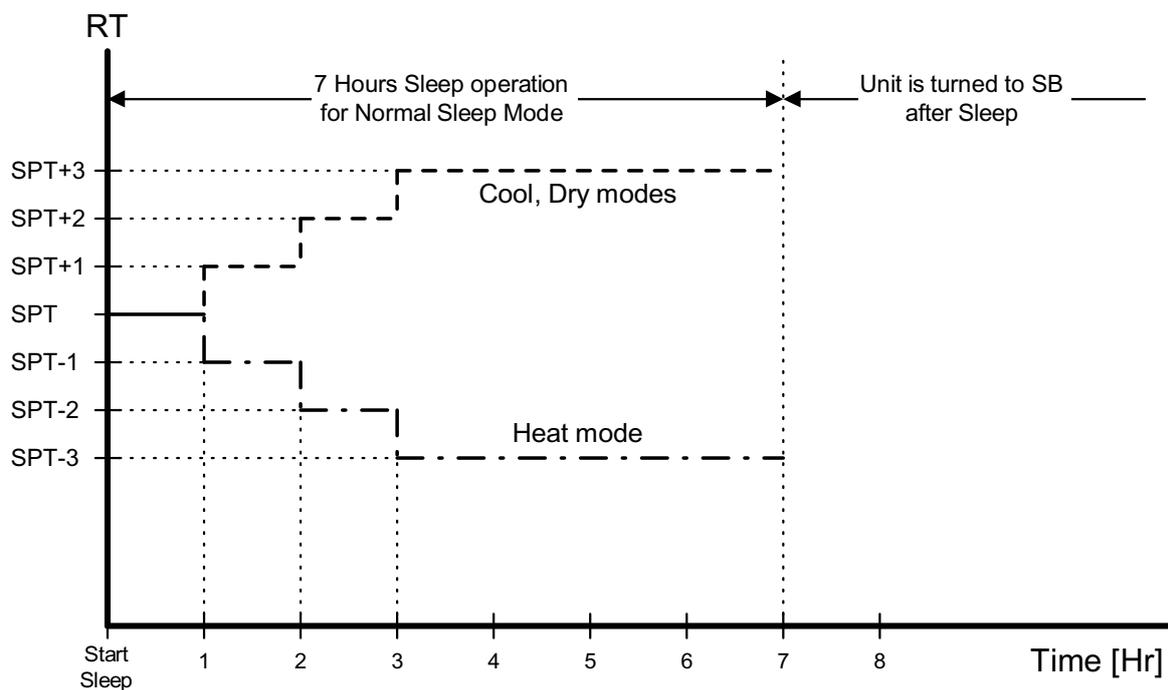
I-FEEL: ON or OFF

The Sleep mode is activated by using the SLEEP button on the R/C. In Sleep Mode, the unit will automatically adjust the SPT to turn up/down the room temperature (RT) gradually to provide maximum comfort for the sleeping user.

Sleep is treated as TIMER function. Therefore, the TIMER LED is activated similar to TIMER function.

11.14 SPT Adjustment in Sleep Mode

- In COOL, AUTO COOL or DRY modes, the SPT adjustment is positive (from 0 to +3°C).
- In HEAT or AUTO HEAT modes, the SPT adjustment is negative (from 0 to -3°C).
- In other modes, there is no SPT adjustment.
- The SPT adjustment is cancelled when the Sleep mode is cancelled.



NOTE

If OFF-timer is active, the unit may go to SB before or after 7 hours of sleep operation.

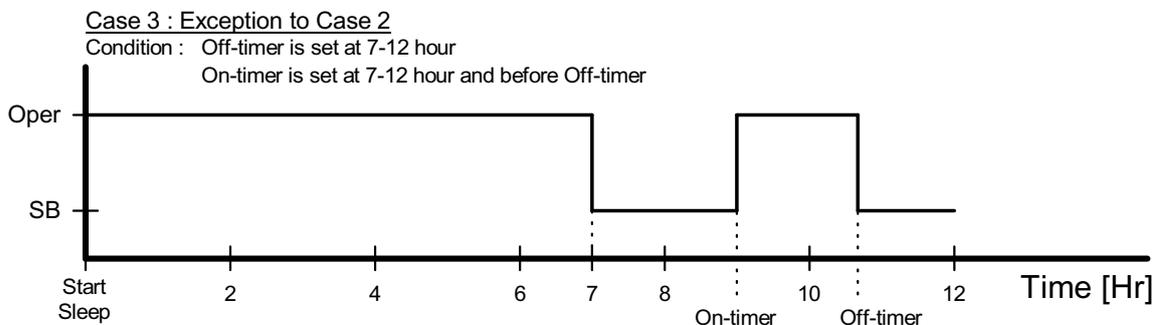
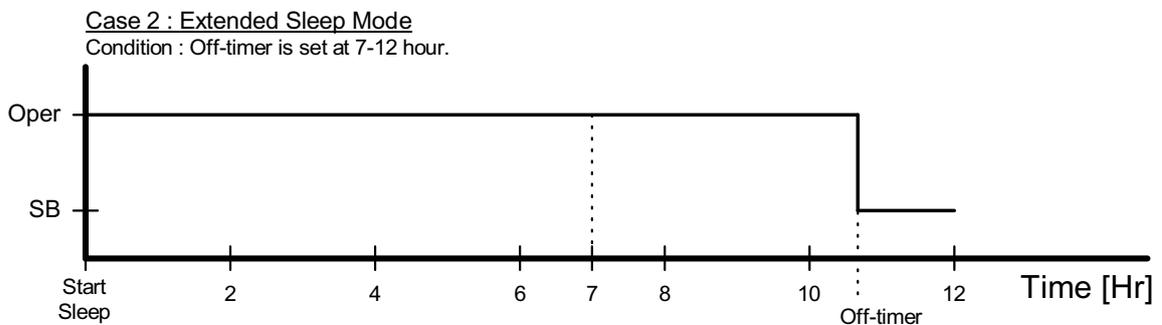
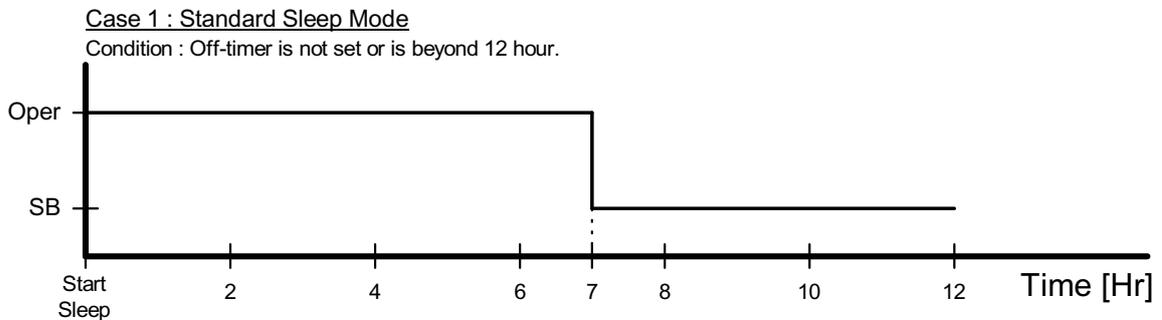
11.14.1 Time Adjustment in SLEEP Mode

In 10V4, the user can make use of the Off-Timer to extend the Sleep Time from 7 hours to 12 hour (max). The operation of the new “Extended Sleep Mode” is illustrated by the graphs below.

Case 1 is the Standard Sleep Mode, which is the only sleep mode in the previous version of MCU. The A/C unit simply works for 7 hours, then goes to SB.

Case 2 is the new Extended Sleep Mode. If an active Off-Timer is set to turn off the A/C between 7-12 hour, relative to the starting of Sleep, the Sleep time is extended. And, instead of going to SB at the 7th hour, the A/C will work until reaching the Off-time.

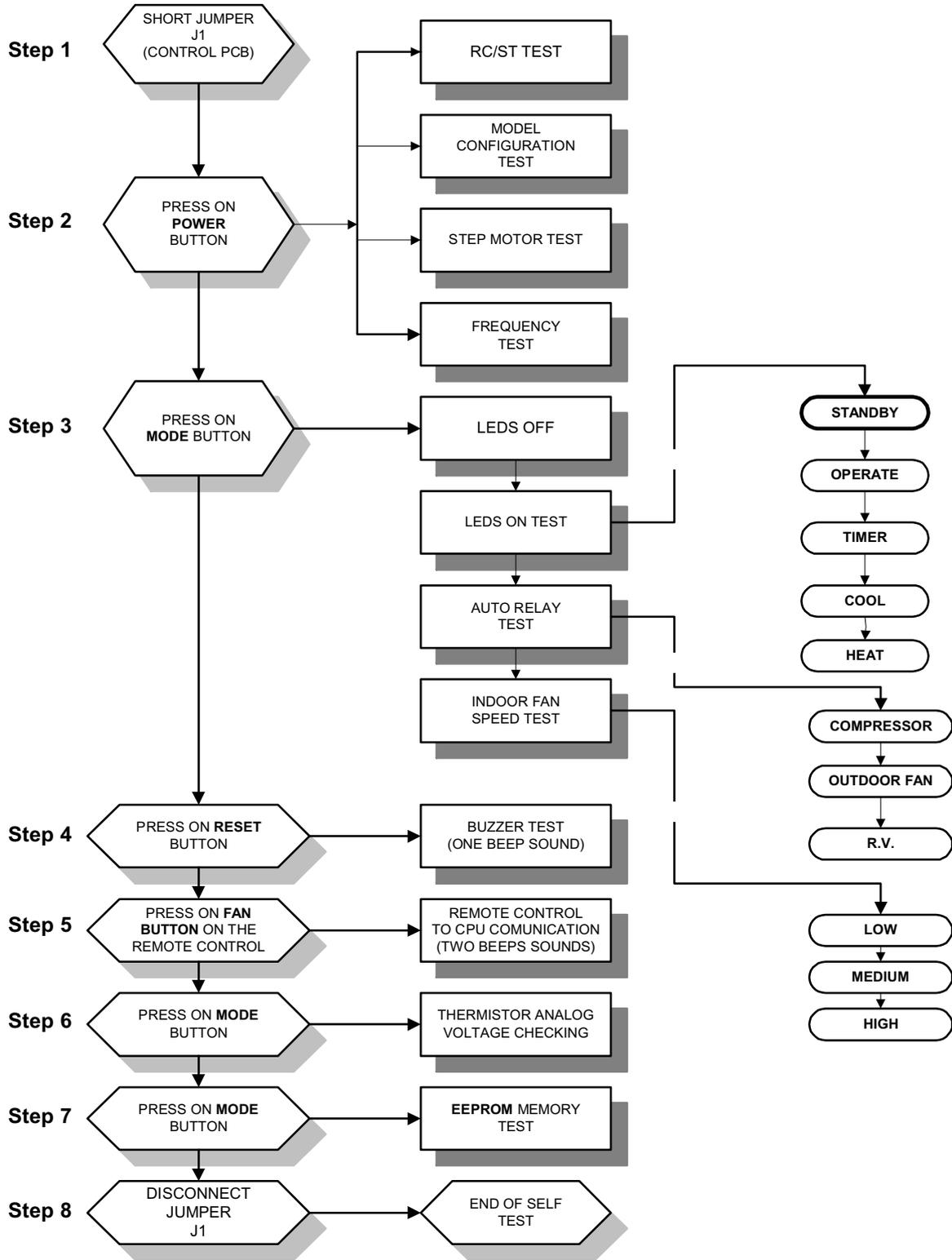
Case 3 is an exception to case 2. The Sleep Mode will not be extended to the Off-Time when the Off-Timer is preceded by an On-Timer, which is also between 7-12 hour.



11.15 Controller Self-Test Procedure

11.15.1 By Shorting Test Jumper J1

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



11.15.2 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
ECC-K	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 LEDES:

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)						
-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

11.16 System Diagnostics

Pressing Mode button for 5-10 seconds in SB or any other operation mode will activate the DIAGNOSTICS mode, acECF XLNowledged 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.

12. TROUBLESHOOTING

No.	SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
1	Power supply indicator (Red LED) does not light up.	No power supply.	Check power supply. If power supply is OK, check display and display wiring, if OK, replace PCB.
2	Unit does not respond to remote control command.	Remote control command did not reach the indoor unit.	Check remote control batteries. If batteries are OK, check display and display wiring, if OK, replace PCB.
3	Unit responds to remote control command but operate indicator (Green LED) does not light up.	Problem with display PCB.	Replace display PCB.
4	Indoor fan does not start (louvers are opened and Green LED lights up).	Unit in HEAT MODE and coil is still not warm.	Change to COOL MODE and check.
		Problem with PCB or capacitor.	Change to HIGH speed and check power supply to motor is higher than 130 VAC. If OK replace capacitor, if not OK replace controller.
5	Indoor fan works when unit is OFF, and indoor fan speed is not changed by remote control command.	PCB problem.	Replace controller.
6	Compressor does not start.	Electronics control problem or protection.	Perform diagnostics, and follow the actions described below.
7	Compressor stops during operation and Green LED remains on.	Electronic control or power supply problem.	Perform diagnostics, and follow the actions described below.
8	Compressor is ON but outdoor fan does not work.	Problem with outdoor electronics or outdoor fan capacitor.	Switch unit to COOL mode, HIGH speed with 16 degrees set point (summer) or HEAT mode high speed with 30 degrees set point (winter). Check power supply to motor is higher than 130 VAC. If OK replace capacitor, if not OK replace controller.
9	Unit works in wrong mode (cool instead of heat or heat instead of cool).	Electronics or power connection to RV.	Check RV power connections. If OK, check RV operation with direct 230 VAC power supply, if OK, replace outdoor controller.
10	All components are operating properly but no cooling or heating.	Refrigerant leak.	Check refrigeration system.

No.	SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
11	One of the protections is activated and compressor is stopped with no apparent reason.	Control problem or refrigeration system problem.	Perform diagnostics to detect active protection, and take action accordingly.
12	Compressor motor is noisy and no suction is present.	Wrong phase order to compressor.	Check compressor phase order.
13	Water leakage from indoor unit.	Indoor unit drainage tube is blocked.	Check and open drainage tube.
14	Freezing of outdoor unit in HEAT Mode and outdoor unit base is blocked with ice.		Connect base heater.
15	Unit operates with wrong fan speeds or wrong frequency.	Wrong jumper settings.	Perform diagnostics to obtain unit model or if operating by EEPROM parameters.
16	Filter LED comes ON after 512 hours of operation	Clogged air-filter	Replace air-filter. Press the RESET button.

13. OPTIONAL ACCESSORIES

13.1 RCW Wall Mounted Remote Control

13.1.1 The RCW wall mounted remote control can be fitted to a large range and models, It can be used as IR (wirless mode) or wired controller.the RCW can control up to15 indoor units using the same settings (on its wired application),

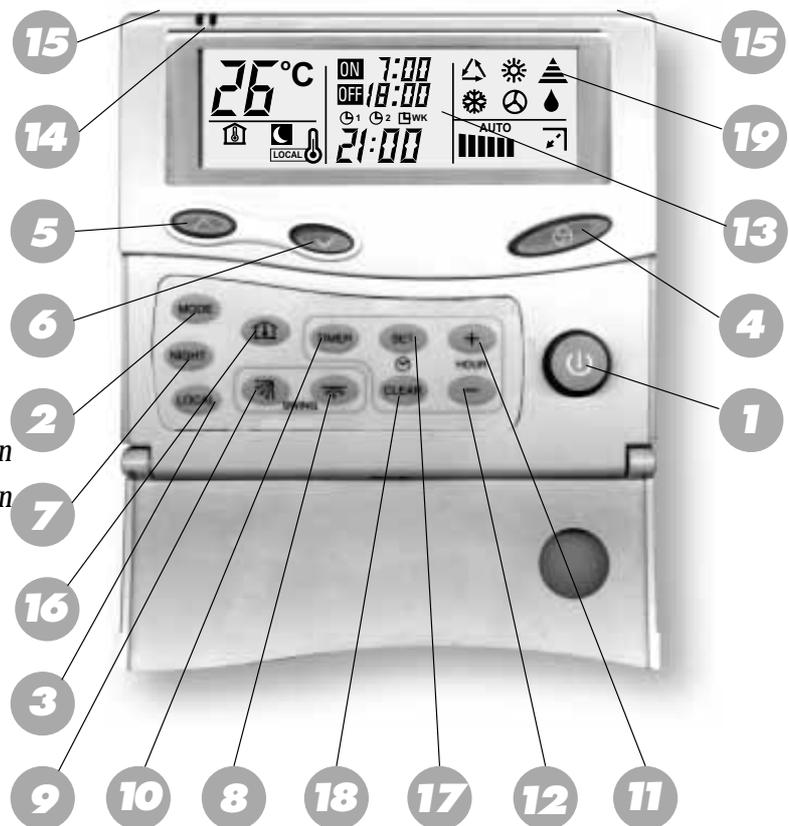
The max wiring length between the controller to the last indoor unit is 300m. for application on WNG LED indoor units an additional interface PCB is needed.

Ordering code no':

RCW – 436195
WNG add' PCB - SP000000290.

REMOTE CONTROL

1. START / STOP button
2. Operation mode selection button COOLING, HEATING, AUTO COOL / HEAT, DRY, FAN.
3. LOCAL temperature sensing button
4. FAN SPEED and AUTO FAN button
5. Room temperature UP button
6. Room temperature DOWN Button
7. NIGHT button
8. Airflow direction MANUAL positioning con
9. Airflow direction AUTO-CONTROL button
10. TIMER button
11. TIMER UP button
12. TIMER DOWN button
13. LCD operation display
14. LOCAL sensor
15. Infrared signal transmitter
16. ROOM temperature button
17. TIMER SET button
18. TIMER CLEAR button
19. Transmission sign



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13.2 RCW2 Wall Mounted Remote Control

13.2.1 The RCW2 wall mounted remote controller is a wired controller that can provide affective controlling management up to 15 different settings and temp' zones.

The RCW2 can be connected up to a max' of 32 units, allowing a max wiring length of 1000m. for application on WNG LED indoor units an additional interface PCB is needed.

Ordering code no':

RCW2 – SP000000081
 WNG add' PCB - SP000000290

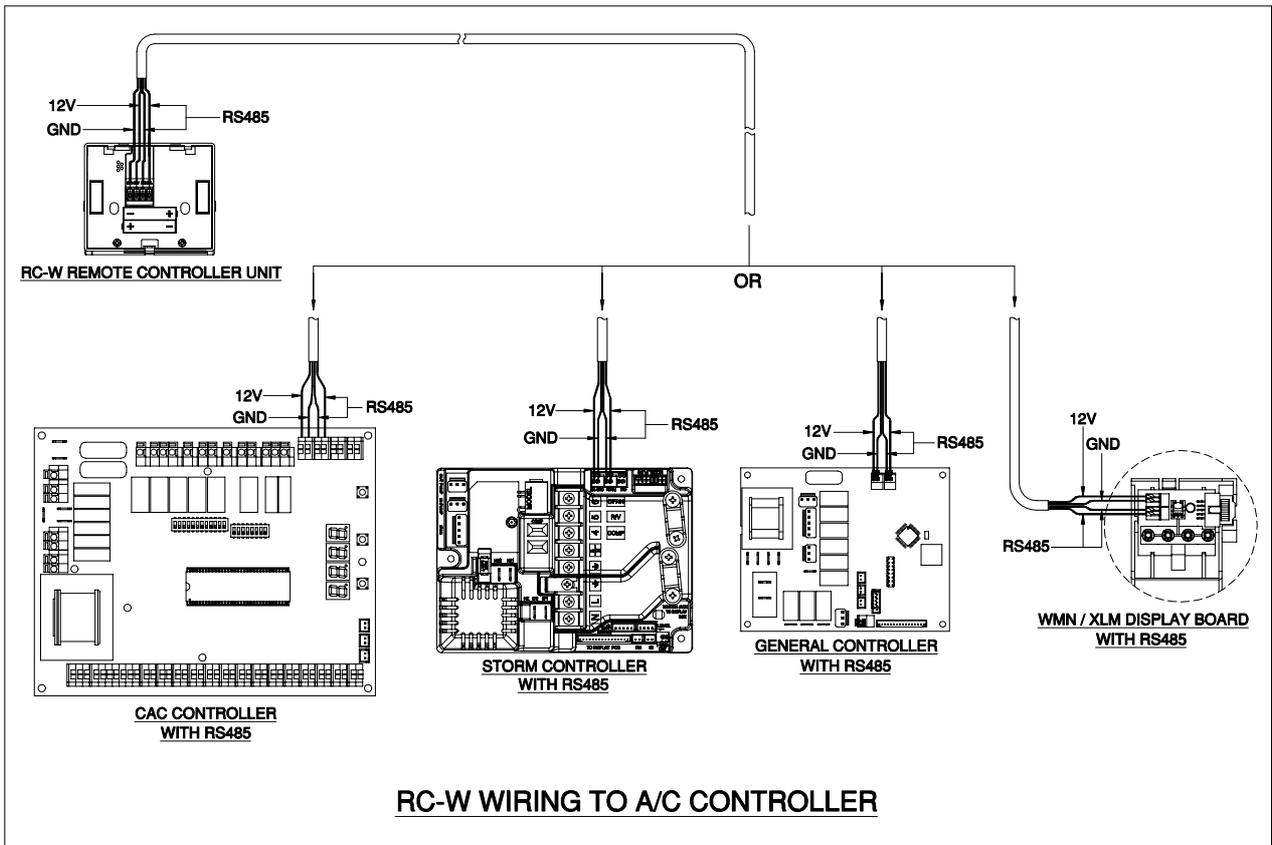
The diagram shows the RCW2 remote control with the following callouts:

- 1** Display screen.
- 2** Keys for raising and lowering the set temperature.
- 3** Ventilation mode selection :
 - ▮ Low speed.
 - ▮▮ Medium speed.
 - ▮▮▮ High speed.
 - AUTO : Automatic speed selection.
- 4** ON / Standby.

Additional key functions shown in the diagram:

- SET: Accessing the time setting mode.
- +: Advancing the time setting.
- : Retarding the time setting.
- CLEAR: Clearing memory of programmed time settings in programming mode.
- LOCAL DAY: Day of the week selection key or sending "I feel" local temperature setting.
- PROG: Programming mode key.
- Copy key: "Copy" key, enabling zone parameters to be duplicated for other zones.
- MODE: Operating mode selection.
- NIGHT: Day /Night key.
- ▲: Current zone setting: zone above.
- ▼: Current zone setting: zone below.
- Swing icon: Louver : step by step or horizontal.
- Vertical icon: Louver : vertical.

13.3 RCW/RCW2 Wiring Connections as Shown on Kit





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