



**INSTALLATION
OPERATION &
MAINTENANCE MANUAL**



PROVIDING **GLOBAL SYSTEM** SOLUTIONS

**AIRCOOLAIR
KNCK / KNHK**

WARNING: Read this manual before installation, reparation o maintenance works.

TABLE OF CONTENTS

POINTS TO KEEP IN MIND	PAGE 2
DATA PAGE FOR UNIT COMMISSIONING	PAGE 3
1.- GENERAL CHARACTERISTICS	PAGE
1.1.- PHYSICAL DATA	4
1.2.- ELECTRICAL DATA	4
1.3.- TECHNICAL DATA	5
1.4.- OPERATING LIMITS	6
1.5.- UNIT DIMENSIONS	7
1.6.- AVAILABLE OPTIONS	8-10
2.- INSTALLATION	PAGE
2.1.- INSTALLATION GUIDELINES	11
2.2.- UNIT INSTALLATION	11
2.3.- UNIT LOCATION	12
2.4.- INSTALLATION CLEARANCES	12
2.5.- REFRIGERANT CONNECTIONS	13-15
2.6.- ELECTRICAL CONNECTIONS	16-20
3.- COMMISSIONING AND OPERATION	PAGE
3.1.- PRELIMINARY CHECKS	21
3.2.- STEPS TO FOLLOW FOR COMMISSIONING THE UNIT	21
4.- MAINTENANCE	PAGE
4.1.- PREVENTIVE MAINTENANCE	22
4.2.- CORRECTIVE MAINTENANCE	22
4.3.- FAILURE DIAGNOSIS	23

Lennox have been providing environmental solutions since 1895, our range of AIRCOOLAIR continues to meet the standards that have made LENNOX a household name. Flexible design solutions to meet YOUR needs and uncompromising attention to detail. Engineered to last, simple to maintain and Quality that comes as standard. Information on local contacts at www.lennox europe.com.

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POINTS TO KEEP IN MIND

DANGER AND WARNING SIGNS



Abrasive surfaces



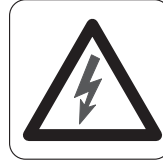
Low temperatures



High temperatures



Risk of injury with moving objects



Electrical voltage



Risk of injury with rotating objects

ELECTRICAL CONNECTIONS



Make sure to open the power off switch before to install, repair or make maintenance works in the unit, in order to prevent serious electrical injuries.

To install the unit, keep in mind local and national legislation.

Standard Guidelines to Lennox equipment

All technical data contained in these operating instructions including the diagrams and technical description remains the property of Lennox and may not be used (except for the purpose of familiarizing the user with the equipment), reproduced, photocopied, transferred or transmitted to third parties without prior written authorization from Lennox.

The data published in the operating instructions is based on the latest information available. We reserve the right to make modifications without notice.

We reserve the right to modify our products without notice without obligation to modify previously supplied goods.

These operating instructions contain useful and important information for the smooth operation and maintenance of your equipment.

The instructions also include guidelines on how to avoid accidents and serious damage before commissioning the equipment and during its operation and how to ensure smooth and fault-free operation. Read the operating instructions carefully before starting the equipment, familiarize yourself with the equipment and handling of the installation and carefully follow the instructions. It is very important to be properly trained in handling the equipment. These operating instructions must be kept in a safe place near the equipment.

Like most equipment, the unit requires regular maintenance. This section concerns the maintenance personnel and management.

If you have any queries or would like to receive further information on any aspect relating to your equipment, do not hesitate to contact us.

DATA PAGE FOR UNIT COMMISSIONING

UNIT: _____ SERIAL Nr.: _____

CONTROL PANEL IDENTIFICATION CODE _____

INSTALLATION ADDRESS: _____

INSTALLER: _____ INSTALLER TEL.: _____

INSTALLER ADDRESS: _____

DATE OF COMMISSIONING: _____

CHECKS:

SUPPLY VOLTAGE: _____ RATED VOLTAGE OF THE UNIT: _____

	YES	NO
UNIT ON SHOCK ABSORBERS	<input type="checkbox"/>	<input type="checkbox"/>
DRAINAGE WITH TRAP	<input type="checkbox"/>	<input type="checkbox"/>
GENERAL POWER SUPPLY CONNECTION	<input type="checkbox"/>	<input type="checkbox"/>
CONTROL PANEL CONNECTION	<input type="checkbox"/>	<input type="checkbox"/>
COMPRESSOR OIL LEVEL INDICATOR	<input type="checkbox"/>	<input type="checkbox"/>

DATA INPUT:

COOLING CYCLE

Air intake temperature to the outdoor coil: < 1 ___ °C
2 ___ °C

Air output temperature to the outdoor coil: < 1 ___ °C
2 ___ °C

High pressure: < **circuit 1** _____
circuit 2 _____

Low pressure: < **circuit 1** _____
circuit 2 _____

HEATING CYCLE

Air intake temperature to the outdoor coil: < 1 ___ °C
2 ___ °C

Air output temperature to the outdoor coil: < 1 ___ °C
2 ___ °C

High pressure: < **circuit 1** _____
circuit 2 _____

Low pressure: < **circuit 1** _____
circuit 2 _____

ELECTRIC POWER CONSUMPTION (Amps)

Compressor 1 ___/___/___ Compressor 2 ___/___/___

Fan outdoor section 1 ___/___/___

Fan outdoor section 2 ___/___/___

Compressor 1 ___/___/___ Compressor 2 ___/___/___

Fan outdoor section 1 ___/___/___

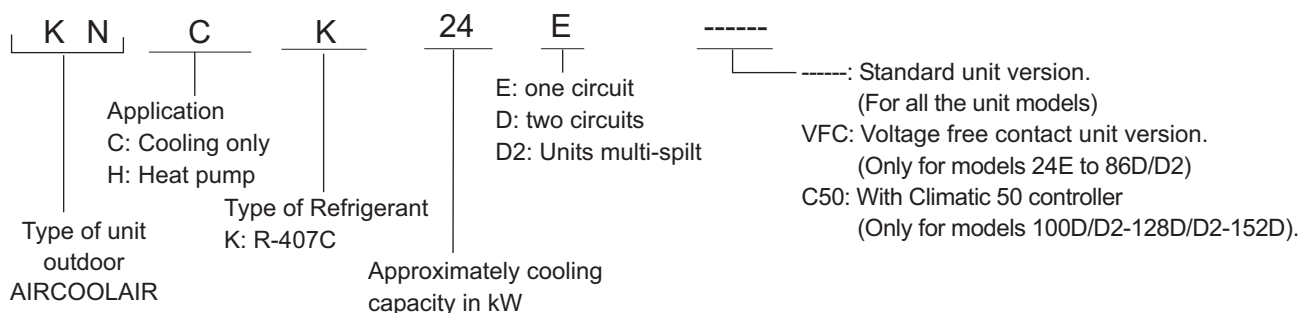
Fan outdoor section 2 ___/___/___

Options installed: _____

Comments: _____

1.- GENERAL CHARACTERISTICS

1.1.- PHYSICAL DATA



KNCK: Cooling only unit R-407C
KNHK: Heat pump unit R-407C

UNIT MODEL		KNCK KNHK 24E	KNCK KNHK 32E	KNCK KNHK 38E	KNCK KNHK 43E	KNCK KNHK 48D/D2	KNCK KNHK 64D/D2	KNCK KNHK 76D/D2	KNCK KNHK 86D/D2	KNCK KNHK 100D/D2	KNCK KNHK 128D/D2	KNCK KNHK 152D
Compressor	Nr. / Type	1 / Scroll	1 / Scroll	1 / Scroll	1 / Scroll	2 / Scroll	2 / Scroll	2 / Scroll	2 / Scroll	2 / Scroll	3 / Scroll	3 / Scroll
Net weight												
Cooling only units KNCK	Kg	225	250	270	300	485	490	530	590	650	922	956
Heat pump units KNHK	Kg	230	255	275	305	495	500	545	605	675	950	980
Air flow	m ³ /h	6300	11500	11000	10500	19000	23000	22000	21000	32000	36000	40000
Refrigerant charge		NITROGEN (*)										

(*) The units are supplied with nitrogen gas; this must be removed and charge the unit with **refrigerant R-407C** depending on unit model.

(see page 15 to calculate model refrigerant charge for KNCK / KNHK units to work with indoor units LECK / LEHK.)

As an option, kit R-407C refrigerant factory precharge is available.

1.2.- ELECTRICAL DATA

ELECTRICAL CONSUMPTION FOR STANDARD UNITS

UNIT MODELS		KNCK KNHK 24E	KNCK KNHK 32E	KNCK KNHK 38E	KNCK KNHK 43E	KNCK KNHK 48D/D2	KNCK KNHK 64D/D2	KNCK KNHK 76D/D2	KNCK KNHK 86D/D2	KNCK KNHK 100D/D2	KNCK KNHK 128D/D2	KNCK KNHK 152D
Voltage	V/f (50 Hz)	230V / 400V+N-3Ph								400V+N-3Ph		
Maximum absorbed power												
Compressor	kW	8,62	12,90	15,55	19,07	17,24	25,80	31,10	38,14	39,6	52,5	63,5
Fan	kW	0,28	0,90	0,85	0,83	1,50	1,80	1,70	1,66	2,1	3,1	4
Total power	kW	8,90	13,80	16,40	19,90	18,74	27,60	32,80	39,80	41,7	55,6	67,5
Maximum current												
Compressor	A 230 / III 400 / III	24,30 14	36,50 21	46,10 25,60	53,30 30	48,60 28	73 42	92,20 51,20	106,60 60	59,6	80,3	98,5
Fan	A	1,60	3,50	3,50	3,50	6	7	7	7	4,8	6,4	8
Total current	A 230 / III 400 / III	25,90 15,60	40 24,50	49,60 29,10	56,80 33,50	54,60 34	80 49	99,20 58,20	113,60 67	64,4	86,7	106,5
Start up current	A 230 / III 400 / III	167,60 100,60	227,50 130,50	282,50 161,50	333,50 192,50	196,30 119	267,50 155	332,10 190,60	390 226	190,8	210	282,1

ADDITIONAL ELECTRICAL CONSUMPTION FOR THE OPTIONS

OPTION FP1-FP2		KNCK KNHK 100D/D2 FP1-FP2	KNCK KNHK 128D/D2 FP1-FP2	KNCK KNHK 152D FP1-FP2
Voltage	V/f (50 Hz)	400V+N-3Ph		
Maximum absorbed power	kW	2,9-7,1	1,9-6,1	1-5,2
Maximum current	A	4,8-11,4	3,2-9,8	1,6-8,2

1.- GENERAL CHARACTERISTICS

1.3.- TECHNICAL DATA

SOUND PRESSURE / SOUND POWER LEVELS FOR OUTDOOR UNIT

KNCK/ KNHK		Spectrum per octave band (dBA)							Sound Power Lw dB(A)	Sound pressure at 10m Lp dB(A)	
		125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz			
24E	(1)	67,6	71,1	74,9	73,2	72,5	69,6	57,0	78,6	50,6	
	(2)	67,6	70,9	73,2	71,3	70,3	66,9	55,7	76,6	48,6	
	(3)	61,8	69,9	71,9	68,8	67,6	65,3	53,6	74,6	46,6	
32E	(1)	80,3	72,4	76,7	75,9	75,4	70,2	62,3	81,0	53,0	
	(2)	80,3	72,3	75,2	74,9	73,9	68,0	61,3	79,7	51,7	
	(3)	71,6	66,6	72,4	68,4	68,4	64,3	53,9	74,6	46,6	
38E	(1)	80,3	72,6	76,1	75,8	77,6	74,2	67,3	82,5	54,5	
	(2)	80,3	72,4	74,8	74,9	75,4	71,2	64,8	80,6	52,6	
	(3)	71,8	67,0	69,7	68,2	71,5	68,4	59,4	76,0	48,0	
43E	(1)	80,3	73,5	77,1	76,3	77,2	71,4	65,0	82,1	54,1	
	(2)	80,3	72,9	75,4	75,1	75,1	68,9	63,1	80,4	52,4	
	(3)	73,7	67,7	72,1	69,7	70,7	64,8	57,2	75,8	47,8	
48D/D2	(1)	71,9	67,9	74,1	72,5	73,8	69,5	57,0	78,7	50,7	
	(2)	71,9	67,9	72,3	69,9	69,8	66,1	56,0	75,7	47,7	
	(3)	62,0	63,0	70,4	67,4	68,6	65,0	55,0	74,0	46,0	
64D/D2	(1)	83,3	75,4	79,7	78,9	78,4	73,2	65,3	84,0	56,0	
	(2)	83,3	75,3	78,2	77,9	76,9	71,0	64,3	82,7	54,7	
	(3)	74,6	69,6	75,4	71,4	71,4	67,3	56,9	77,6	49,6	
76D/D2	(1)	83,3	75,6	79,1	78,8	80,6	77,2	70,3	85,5	57,5	
	(2)	83,3	75,4	77,8	77,9	78,4	74,2	67,8	83,6	55,6	
	(3)	74,8	70,0	72,7	71,2	74,5	71,4	62,4	79,0	51,0	
86D/D2	(1)	83,3	76,5	80,1	79,3	80,2	74,4	68,0	85,1	57,1	
	(2)	83,3	75,9	78,4	78,1	78,1	71,9	66,1	83,4	55,4	
	(3)	76,7	70,7	75,1	72,7	73,7	67,8	60,2	78,8	50,8	
100D/D2	(1)	76,3	75,5	79,7	80,1	79,2	73,8	66,8	84,7	56,7	
	(2)	76,3	74,7	77,8	79,1	76,3	70,7	64,1	82,8	54,8	
	(3)	70,6	70,7	75,6	75,2	75,3	70,0	63,2	80,4	52,4	
128D/D2	(1)	81,9	79,1	81,8	83,1	81,4	75,7	68,6	87,2	59,2	
	(2)	81,9	78,8	80,2	82,4	79,4	73,3	66,7	85,9	57,9	
	(3)	73,4	72,6	77,5	77,4	76,4	71,4	64,1	82,1	54,1	
152D	(1)	84,2	81,0	82,3	85,5	84,4	77,3	69,6	89,5	61,5	
	(2)	84,2	80,8	81,0	84,6	82,0	75,1	68,0	88,0	60,0	
	(3)	75,0	73,7	77,1	80,0	79,0	72,7	64,1	84,1	56,1	
OPTION FP1	100D/D2	(1)	84,2	81,0	82,0	84,4	82,0	75,6	69,3	88,0	
		(2)	84,2	80,8	81,0	84,1	80,7	73,9	67,9	87,2	
	128D/D2	(1)	84,2	81,1	82,7	84,6	82,4	76,4	69,6	88,4	
		(2)	84,2	80,8	81,4	84,2	81,0	74,4	68,2	87,5	
	152D	(1)	84,2	80,9	81,9	84,4	81,5	75,2	68,5	87,8	
		(2)	84,2	80,7	80,9	84,1	80,4	73,6	67,5	87,1	
OPTION FP2	100D/D2	(1)	96,4	93,6	91,7	93,1	89,5	86,4	81,9	97,0	
		(2)	96,4	93,6	91,6	93,0	89,3	86,3	81,8	96,9	
	128D/D2	(1)	96,4	93,6	91,8	93,1	89,6	86,5	81,9	97,0	
		(2)	96,4	93,6	91,6	93,0	89,4	86,3	81,8	96,9	
	152D	(1)	96,4	93,6	91,7	93,1	89,4	86,3	81,9	97,0	
		(2)	96,4	93,6	91,6	93,0	89,3	86,2	81,8	96,9	

(1) The above data shows noise levels **without** isolation for compressor (standard unit).

(2) The above data shows noise levels **with** isolation for compressor (optional).

(3) The above data shows noise levels **with** Kit "low noise" (optional).

- Global sound power level measured in compliance with ISO standard 3744 and under Eurovent certification program.

- Sound pressure in dB(A) calculated at 10 m, in a free field on a reflecting surface, is given as a guide only and with a directivity of +/- 3 dBA.

- Only the sound power spectrum and the global sound power value are used in determining pressure characteristics on site.

- The above data shows noise levels of standard unit and unit with compressor isolation when unit's fan is working on cooling or heating mode at maximum speed.

- The above data shows noise levels of unit with Kit "low noise" when cooling only units, or heat pump units (on cooling mode) are working with outdoor temperatures of 35°C, because on heating mode the Kit "low noise" is disabled.

1.- GENERAL CHARACTERISTICS

1.4.- OPERATING LIMITS

(To install with LECK - LEHK units)

OPERATING LIMITS FOR (COOLING ONLY) UNITS

		MAXIMUM TEMPERATURES	MINIMUM TEMPERATURES
COOLING CYCLE OPERATION	INDOOR TEMPERATURE	32°C DB / 23°C WB	21°C DB / 15°C WB
	OUTDOOR TEMPERATURE	DEPENDING ON MODEL (TABLE 1)	+19°C STANDARD UNIT +15°C WITH MINIMUM INDOOR TEMPERATURES 24°C DB / 18°C WB 0°C WITH OPTIONAL ON/OFF CPC -10°C (*)

(*) With kit hot gas by pass or proportional CPC (options).

OPERATING LIMITS FOR (HEATING PUMP) UNITS

		MAXIMUM TEMPERATURES	MAXIMUM TEMPERATURES
COOLING CYCLE OPERATION	INDOOR TEMPERATURE	32°C DB / 23°C WB	21°C DB / 15°C WB
	OUTDOOR TEMPERATURE	DEPENDING ON MODEL (TABLE 1)	+19°C STANDARD UNIT +15°C WITH MINIMUM INDOOR TEMPERATURES 24°C DB / 18°C WB 0°C WITH OPTIONAL ON/OFF CPC -10°C (*)
HEATING CYCLE OPERATION	INDOOR TEMPERATURE	27°C DB	15°C DB
	OUTDOOR TEMPERATURE	DEPENDING ON MODEL (TABLE 2)	-10°C DB / -11°C WB

(*) With kit hot gas by pass or proportional CPC (options).

DB.- Dry Bulb Temperature

WB.- Wet Bulb Temperature

TABLE 1 - Maximum outdoor operating temperatures (°C) on cooling cycle working at maximum indoor temperatures (32°C DB / 23°C WB)

MODELS	24E	32E	38E	43E	48D/D2	64D/D2	76D/D2	86D/D2	100D/D2	128D/D2	152D
Maximum temperatures	45	44	44	43	45	44	44	43	45	44	44

TABLE 2 - Maximum outdoor operating temperatures (°C) on heating cycle working at maximum indoor temperatures (27°C DB)

MODELS	24E	32E	38E	43E	48D/D2	64D/D2	76D/D2	86D/D2	100D/D2	128D/D2	152D
Maximum temperatures	17	16	17	13	17	16	17	16	18	16	16

AMBIENT TEMPERATURE WITH AIR DUCTS IN OUTDOOR UNIT

Available pressure up to 50 Pa

Available static pressure Pa	Description	COOLING MODE									
		24E	32E 38E	43E	48D/D2	64D/D2 76D/D2	86D/D2	100D/D2	128D/D2 152D		
30	Maximum ambient temperature °C	44	43	42	44	43	42	44	43		
50	Maximum ambient temperature °C	43	42	41	43	42	41	43	42		

Available pressure up to 50 Pa

HEATING MODE

Presión estática disponible Pa	Description	24E to 152D 48D2 to 128D2	
		30	Minimum ambient temperature °C
50	Minimum ambient temperature °C	-8	

UNITS WITH HIGH PRESSURE FANS (OPTION)

COOLING MODE

Available pressure up to 120 Pa (FP1)

Available static pressure Pa	Description	100D/D2-128D/D2 152D	
		50	Maximum ambient temperature °C
	Minimum ambient temperature °C	(*)	
75	Maximum ambient temperature °C	41	
	Minimum ambient temperature °C	(*)	
100	Maximum ambient temperature °C	40,5	
	Minimum ambient temperature °C	(*)	
125	Maximum ambient temperature °C	40	
	Minimum ambient temperature °C	(*)	

Available pressure up to 250 Pa (FP2)

Available static pressure Pa	Description	100D/D2-128D/D2 152D	
		150	Maximum ambient temperature °C
	Minimum ambient temperature °C	(*)	
200	Maximum ambient temperature °C	45	
	Minimum ambient temperature °C	(*)	
250	Maximum ambient temperature °C	42	
	Minimum ambient temperature °C	(*)	

(*) +19°C standard unit.
+15°C with minimum indoor temperatures 24°C DB / 18°C WB.
0°C with optional ON/OFF CPC.
-10°C with kit hot gas by pass or proportional CPC (options).

HEATING MODE

Available pressure up to 120 Pa (FP1)

Available static pressure Pa	Description	100D/D2	128D/D2	152D
		50	Minimum ambient temperature °C	-10
75	Minimum ambient temperature °C	-10	-8	-5
100	Minimum ambient temperature °C	-10	-6	-5
125	Minimum ambient temperature °C	-8	-6	-5

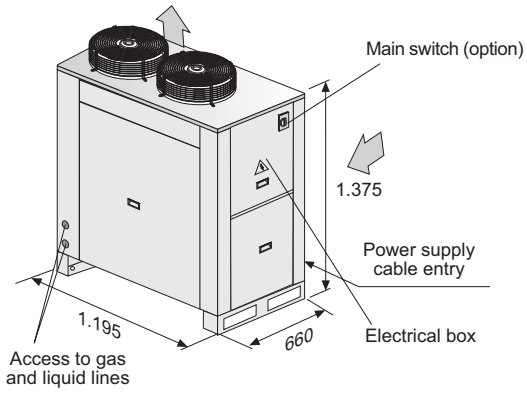
Available pressure up to 250 Pa (FP2)

Available static pressure Pa	Description	100D/D2 128D/D2	152D
		150	Minimum ambient temperature °C
200	Minimum ambient temperature °C	-10	-8
250	Minimum ambient temperature °C	-10	-8

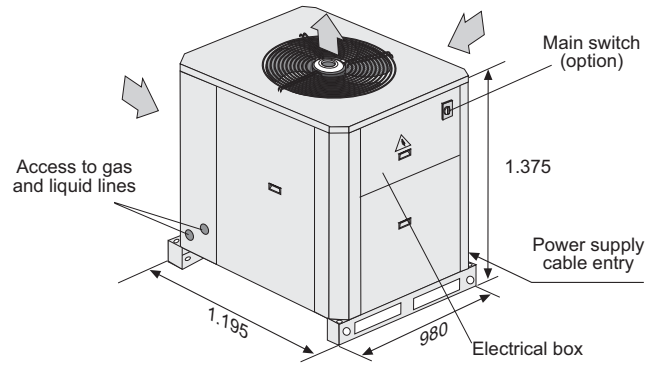
1.- GENERAL CHARACTERISTICS

1.5.- UNIT DIMENSIONS

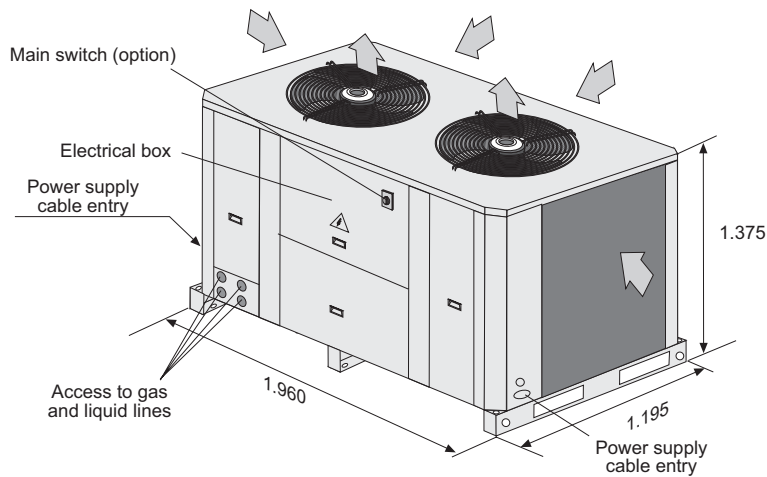
MODELS KNCK/KNHK 24E



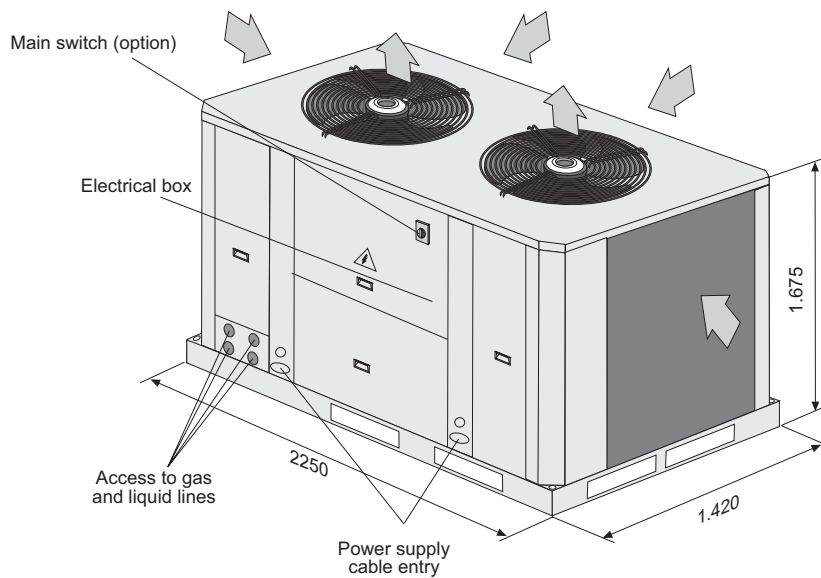
MODELS KNCK/KNHK 32E-38E-43E



MODELS KNCK/KNHK 48D/D2-64D/D2-76D/D2-86D/D2



MODELS KNCK/KNHK 100D/D2-128D/D2-152D



1.- GENERAL CHARACTERISTICS

1.6.- AVAILABLE OPTIONS

MAIN SWITCH

The main switch is located on the access panel to the electrical box of the outdoor unit.

The main switch is equipped with a clutch gadget, which allows opening the panel of the electrical box, when it is on OFF position.

Verify that the main switch is large enough to handle the current for the unit if electric heaters are installed.

PHASE SEQUENCER

The phase sequencer is located in the electrical box in the outdoor section, thus assuring that the unit will not begin operation while the phase connection of the compressor is not correct. Should this occur, then just switch two phase connections.

ON/OFF CONDENSATION PRESSURE CONTROL

The condensation pressure control consists of one or two pressure switches, which starts and stops the outdoor fan, regulating the condensation temperature; thus the unit will be able to operate in the cooling cycle when the outdoor temperature is below 19°C (until 0°C).

It includes crankcase heater for cooling only units. The purpose of the heater is to keep the oil in the compressor at the correct temperature while the compressor is stopped, so that it can be properly lubricated when starts again.

When the unit is operating at low outdoor temperatures (below 19°C), it is advisable to fit a crankcase heater.

PROPORTIONAL CONDENSING PRESSURE CONTROL

It is an element which regulates outdoor fan speed, in order to control condensation temperature. Thus, the unit will be able to operate in the cooling cycles when the outdoor temperature is below 19°C (until -10°C). This kit includes crankcase heater for cooling only units.

COMPRESSOR STARTING CURRENT CONSTRAINED

("SOFT STARTER") 400V-III

It is an electronic element, which reduces the peak compressor starting current up to 40% (see pages of electrical data without soft starter).

MODELS	WEIGHTS (*)
24E-32E-38E-43E	3
48D/D2-64D/D2-76D/D2 86D/D2-100D/D2	6
128D/D2-152D	9

(*) Add to the unit's weight.

HOT GAS BYPASS VALVE

The purpose of the BYPASS valve is to let the unit operate at low outdoor temperatures (until -10°C), to be used in cooling only and heat pump units in cooling cycle.

It regulates the capacity of the compressor by injecting hot gas from the compressor discharge side to the coil.

REMOTE AMBIENT SENSOR AND REMOTE DUCT SENSOR

These sensors may be used in conjunction with remote controller or allowing the controller to be mounted in a room away from the conditioned space.

Standard version with Climatic 10: Both of them are available as option.

C50 version: Ambient sensor is included as standard and only remote duct sensor is available as option.

- REMOTE DUCT SENSOR: The sensor will be located in the return-air duct, detecting the air temperature of the air being air-conditioned.

- REMOTE AMBIENT SENSOR: The sensor will be placed in the area to be air-conditioned.

CONTROL USING A PROGRAMMABLE CONTROLLER (for Standard version with Climatic 10)

With the programmable controller option, the desired temperature can be programmed in the area 24 hours a day, 7 days a week.

CONDENSER COIL GUARD

The condenser coil protection grill prevents light damage to the coil when shipping and when installed.

It cannot protect against very heavy impacts.

PRECOATED COIL

Special protection of the aluminum condenser coil fins, to protect it from aggressive external environmental conditions.

RUBBER DAMPERS

To install under the unit to avoid transmission of vibrations to the floor where unit is installed, while unit is operating.

COMPRESSOR ACOUSTIC JACKET

Each compressor is fitted with a compressor acoustic jacket this provides attenuation of the compressor noise that radiates from the unit when in operation.

R-407C REFRIGERANT FACTORY PRECHARGED

This option includes service valves and R-407C refrigerant charged in outdoor unit (for 0 meters of connection lines).

1.- GENERAL CHARACTERISTICS

1.6.- AVAILABLE OPTIONS

KIT LOW NOISE

With this kit (for models 24E to 86D), each compressor is fitted with a compressor acoustic jacket and also includes proportional pressure control, which through a special regulation decreases the fan speed and provides attenuation of sound level. Regulation used on cooling mode with outdoor temperatures below 35°C. See page 5 for Noise level performances.

This kit includes for 100D to 152D models compressor acoustic jacket and on/off condensing pressure control. The fan works in low speed with ambient temperatures below 40°C in cooling mode and higher than 6°C in heating mode.

SERVICE VALVES

The unit is fitted with gas and liquid service valves, in order to make easier installation and maintenance operations.



KIT HIGH PRESSURE 120Pa FP1 (Only available for units 100D/D2-128D/D2-152D)

Units with high pressure fans.

Available static pressure up to 120Pa.

MODELS KNCK/HK	100D/D2	128D/D2	152D
POWER (kW)	44,6	57,5	68,5
MAXIMUM CURRENT (A) 400 / III	69,2	89,9	108,1
WEIGHTS Kg (*)	40	40	40

(*) Add to the unit's weight.

KIT HIGH PRESSURE 250Pa FP2 (Only available for units 100D/D2-128D/D2-152D)

Units with high pressure fans.

Available static pressure up to 250Pa.

MODELS KNCK/HK	100D/D2	128D/D2	152D
POWER (kW)	48,8	61,7	72,7
MAXIMUM CURRENT (A) 400 / III	75,8	96,5	114,7
WEIGHTS Kg (*)	40	40	40

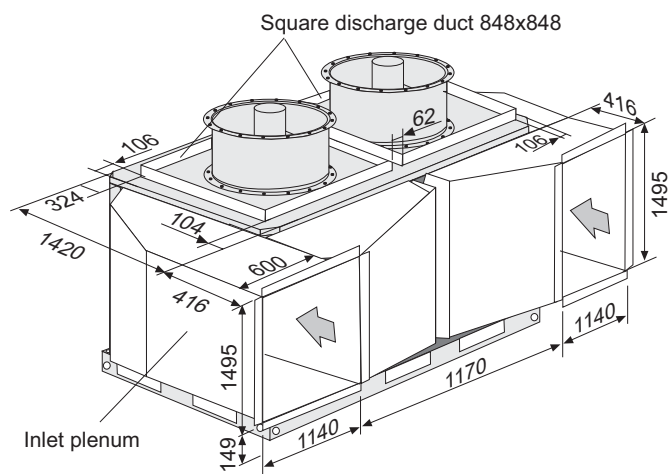
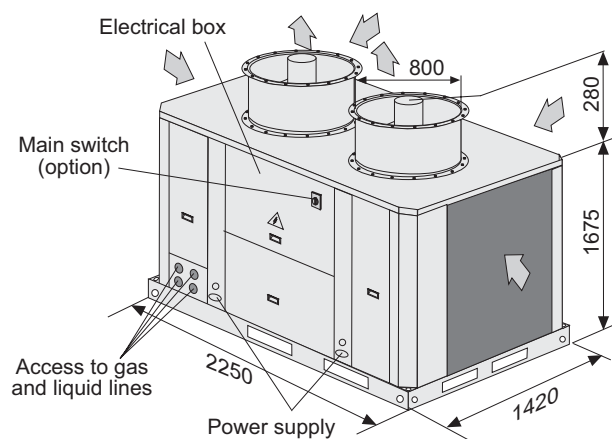
(*) Add to the unit's weight.

INLET PLENUM (FP1 and FP2 unit versions only)

It is a accessory for adapting the condenser air intake to accept a duct.

SQUARE DISCHARGE DUCT (FP1 and FP2 unit versions only)

It is formed by 1 or 2 square frames, for adapting discharge air from the unit to a square duct.



LONG DISTANCE KIT (65m) (Only for models 100D/D2-128D/D2-152D)

With this option the distance between indoor and outdoor units can be up to 65 m.

AUXILIARY DRIP TRAY (Only available for heat pump units with FP1/FP2 option)

Heat pump units during defrost cycle produce a lot of quantity of water. You can use an auxiliary drip tray under the unit in order to get all the defrost water and take it where you decided.

PRINT BOARD FOR LONG DISTANCES CONNECTIONS (DT50) (Only C50 version)

This option includes a print board to connect the control for long distances up to 200m.

AIR QUALITY PROBE CO₂ (Only for C50 version with freecooling)

It includes an air quality probe (CO₂).

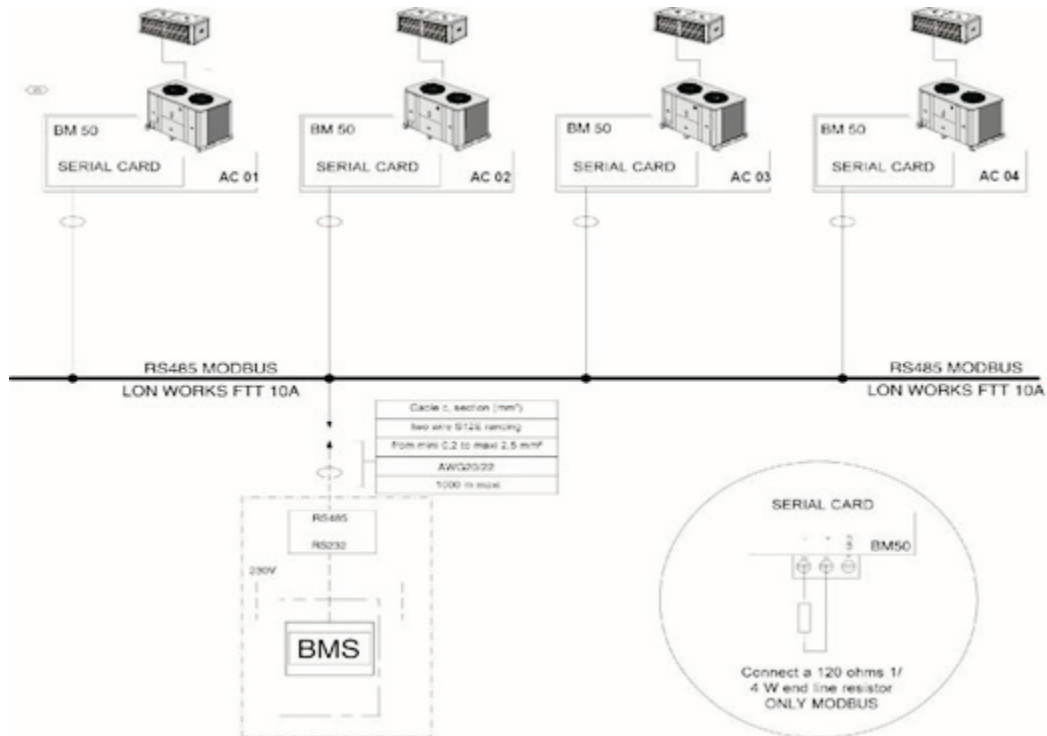
Air fresh damper is opened when the air quality is below the desired value.

1.- GENERAL CHARACTERISTICS

1.6.- AVAILABLE OPTIONS

COMUNICATIONS (Only C50 version):

1. BMS: MODBUS_RS485 connection
2. BMS: LONWORKS_Echelon connection



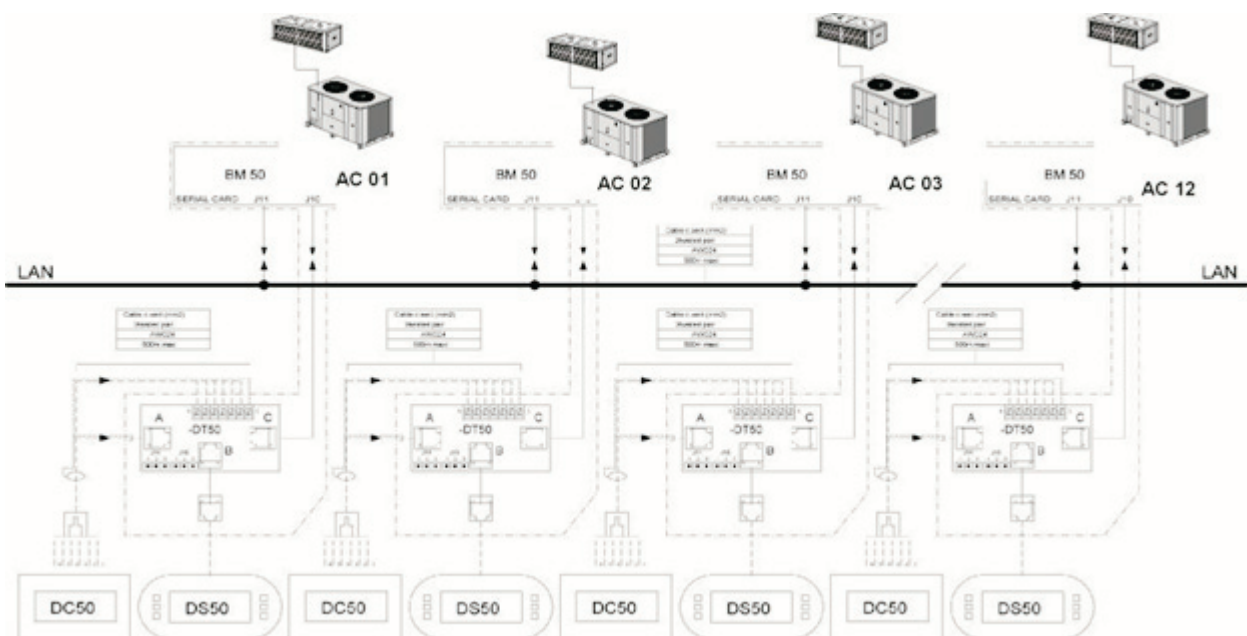
TCB CONNECTION FOR "Voltage Free Contact" (Only C50 version)

SERVICE DISPLAY DS50 (Only C50 version)

As an option it is available a service display controller, which allows service personal to set up to 90 settings, read up to 125 variables, up to 45 faults and read the history of the last 16 faults.



It is possible a master-slave connection:



2.- INSTALLATION

2.1.- PRELIMINARY PREPARATIONS



All INSTALLATION, SERVICE and MAINTENANCE operations must be carried out by QUALIFIED PERSONNEL.

The unit must be transported in a VERTICAL POSITION on its metal bedplate profiles. Any other position may cause serious damage to the machine. When the unit is received, it should be checked to assure that there are no bumps or other damage, following the instructions on the packaging. If there is damage, the unit may be rejected by notifying the LENNOX Distribution Department and reporting why the machine is unacceptable on the transport agent's delivery notice. Any later complaint or claim made to the LENNOX Distribution Department, for this type of anomaly, cannot be considered under the Guarantee. Sufficient space must be allowed to facilitate placement of the unit.

The unit may be mounted outdoors. There should be NO possibility of flooding if floor mounted.



When positioning the unit, be sure that the Rating Plate will always be visible since this data will be necessary to assure proper maintenance.

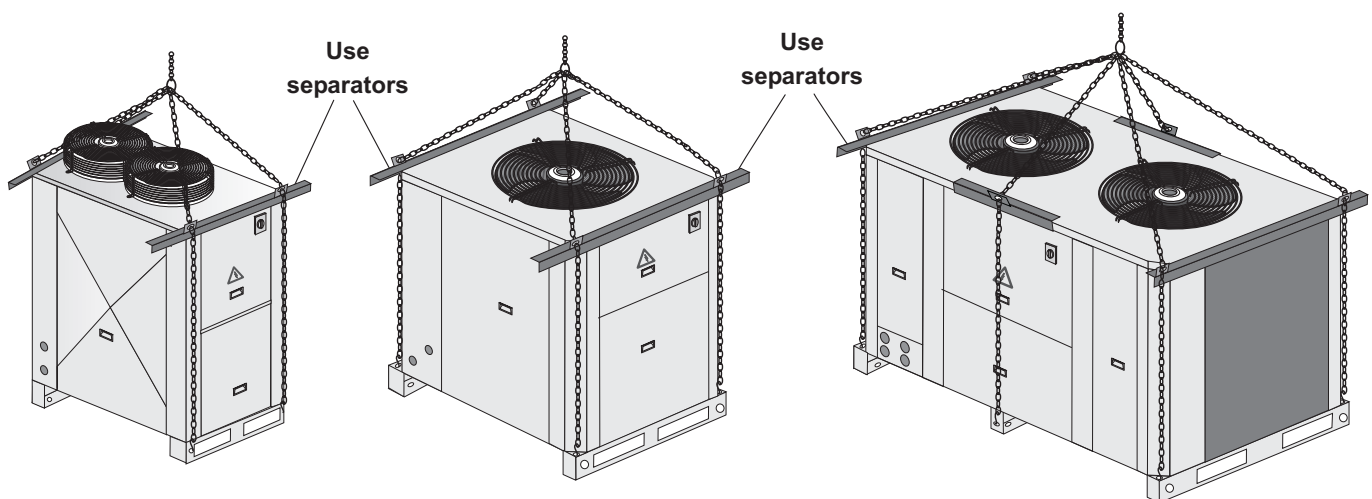
The units are designed to be installed with ducts, calculated by qualified technical staff. The joints to be used between ducts and the openings to the unit should be Elastic Joints. Avoid the use of BYPASS joints between the extraction air and input air in both the outdoor and indoor sections. The structure where the unit is placed must be able to support the weight of the unit during operation.

2.2.- UNIT RECEPTION

All the units have Metal Bedplate Profiles.

If unloading and placement require the use of a crane, then secure the suspension cables as shown in the figure.

How to hoist the unit



2.- INSTALLATION

2.3.- UNIT LOCATION

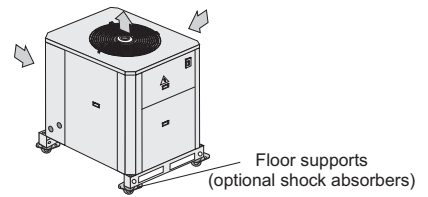
- The bedplate is made up of metal channels, capable of withstanding the weight of the units.

- If the unit is floor mounted, then the profiles should be isolated with shock absorbing material such as anti-vibration pads. Keep in mind that fans rotate at approximately 850 rpm.

- The unit is able to work in normal radioelectronics conditions for commercials and residential installations. For any other conditions please consult.

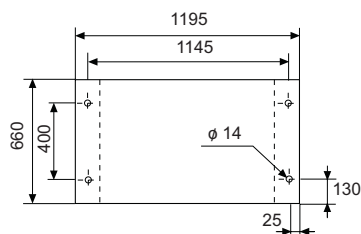
- If the outside temperature in the area where the heat pump unit is to be installed is low or the cycle functioning are too long, it may necessary to install an electrical heater, below the likely coils on the drip tray, which avoids the causing of ice in the coil during defrost cycle.

UNIT INSTALLED ON SHOCK ABSORBERS

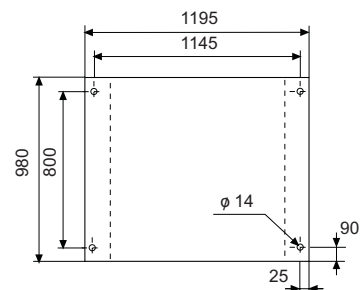


MOUNTING PLATES

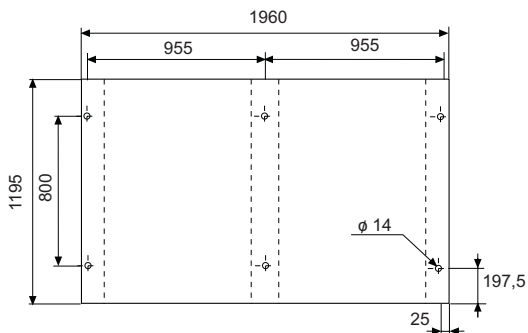
MODEL 24E



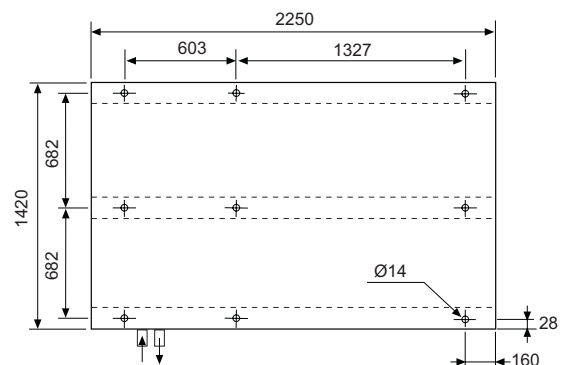
MODELS 32E-38E-43E



MODELS 48D/D2-64D/D2-76D/D2-86D/D2



MODELS 100D/D2-128D/D2-152D



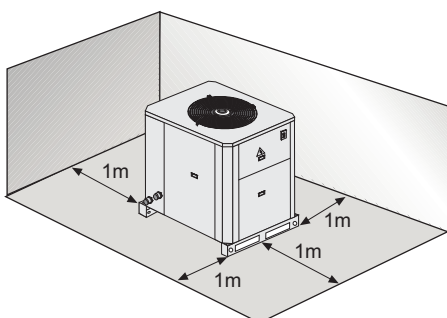
Sizes in mm

2.4.- INSTALLATION CLEARANCES

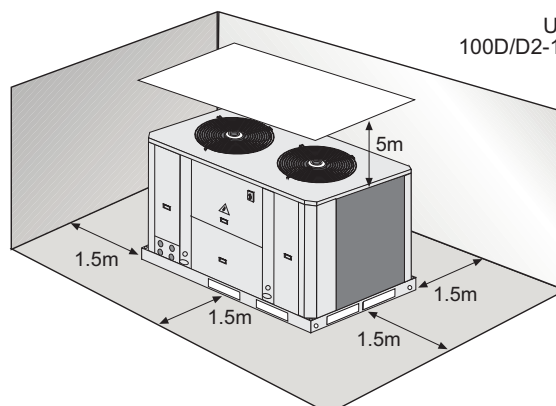
Clearance around the unit for service and maintenance.

SERVICE SPACE

Space should be left free for access or servicing, to ease the installation of cables, drainage connections, electric installation and cleaning filters, as well as easy access to the unit.



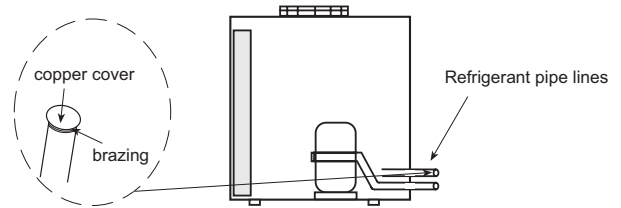
UNITS
100D/D2-128D/D2-152D



2.- INSTALLATION

2.5- REFRIGERANT CONNECTIONS

The unit is supplied with gas and liquid lines sealed with copper covers inside the casing with possibility to install pipe lines (unless the unit is supplied with kit refrigerant factory precharged (optional) or kit service valves (optional)).



Standard units are supplied with Nitrogen gas, which must be removed before any operation on the unit.



As an option, the unit can be supplied with service valves on gas and liquid lines, with Nitrogen charge (N₂) or with refrigerant (R-407C).

FOR STANDARD UNITS AND UNITS SUPPLIED WITH SERVICE VALVES PROCEED AS FOLLOW:

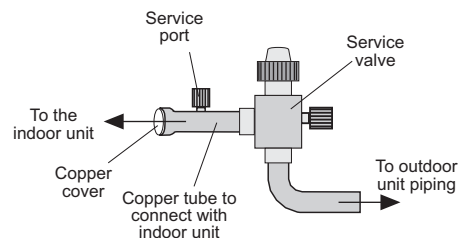
- 1st Remove the nitrogen gas, through the high and low 1/4" service ports located inside, and make a vacuum as security.
- 2nd Remove the covers from connecting lines.
- 3rd Braze the piping connection lines. Select piping diameter TABLE 1.
(When brazing refrigerant pipes, is necessary to supply nitrogen gas through the service ports into the pipes to remove the air).
- 4th Leak test:
Add nitrogen gas and check 5 kg/cm² pressure has been reached, and verify there are not leaks in the circuit or brazing, applying soapy water on pipes, because the leaks cause soapy water to form bubbles.
To detect small leaks proceed as follow:
Add nitrogen gas and check 32 kg/cm² pressure has been reached, there is not leak if pressure remains the same at least during 24 hours and final pressure is not less than 10% from the initial pressure.
- 5th Be sure that gas line is isolated.
- 6th Vacuuming:
Remove the nitrogen gas, connect the gauge manifold and vacuum pump to both liquid and gas line, fully open the valve of the gauge manifold and switch on the vacuum pump. Check to make sure the gauge shows a pressure level of -750mm Hg, after a level of -750mm Hg is reached, keep on the vacuum pump at least during an hour.
- 7th Refrigerant charge:
 - Check TABLE 3.1. and 3.2. to verify the amount of refrigerant charge, depending on length and size of the piping connections.
 - Disconnect the vacuum pump and connect to the refrigerant-charging cylinder. Open the charging cylinder and purge the air from the hose at the gauge manifold.
 - Set up the amount of additional refrigerant on the weighing scale, open the high pressure (liquid) and low pressure side (suction) of the gauge valve to start the process of refrigerant from outdoor unit. If the total amount of refrigerant charge have not been reached, because balance pressure, turn off the high side of the gauge manifold, turn on the unit, and add slowly through low side of the gauge the remain amount of the refrigerant charge needed. (With R-407C refrigerant, the charging cylinder must be on vertical position and it is important to charge in liquid state). Close the sides of gauge valve from service port of the unit, and put the covers on service ports. Then the unit is ready to work.



**During installation operations, keep gas and liquid pipes covered, in order to prevent humidity and dirt, get into them.
Take special concern about refrigerant pipes are isolated.
Avoid collapse on lines installation.**

FOR UNITS SUPPLIED WITH SERVICE VALVES AND KIT REFRIGERANT FACTORY PRECHARGED, PROCEED AS FOLLOW:

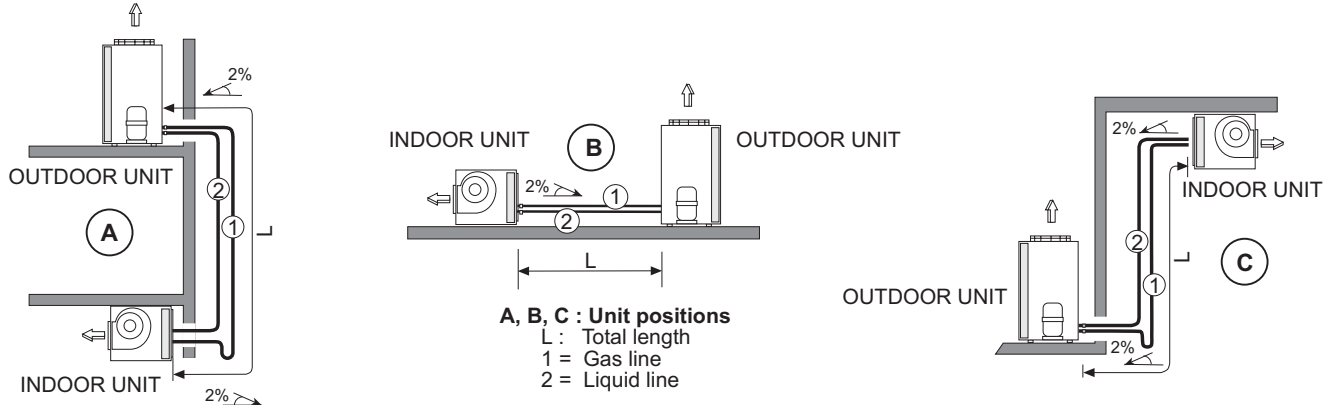
- 1st Remove the pressure of refrigerant from the connecting line through the service port located on that line.
- 2nd Remove the covers from the connecting lines.
- 3rd Braze the piping connection lines to the indoor unit.
- 4th With the service ports closed make vacuum, and connect the vacuum pump to the 1/4" service port on the connecting line to achieve -750mm Hg; after that, keep the vacuum pump working at least for one hour in order to make the vacuum to the connecting lines and to the indoor unit. Disconnect the vacuum pump.
- 5th Refrigerant charge:
Remove vacuum pump and connect the refrigerant bottle. Check TABLE 2 for charge of refrigerant per meter line for each model.
Set up the amount of additional refrigerant on the weighting scale and open the high pressure side (suction).
(with R-407C refrigerant, the charging cylinder must be on vertical position and it is important to charge in liquid state).
Close the sides of gauge valve from the service port of the unit, and put the covers.
- 6th Open the service valves.
- 7th The unit is ready to work.



2.- INSTALLATION

2.5- REFRIGERANT CONNECTIONS

To locate the outdoor and the indoor units, refer to the following information:



POSITION A : A siphon suction must be installed on the vertical line of the gas line, and siphons must be installed every 8 meters upward. The minimum speed suction must not be below 6m/s.

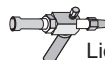
POSITION B : Tip the lines toward the outdoor unit. Make special attention to line length longer than 10m, and avoid collapse on pipe lines installation.

POSITION C : Install a siphon at the base of the vertical of the gas line, no more siphons are necessary.

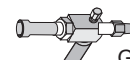
TABLE 1: REFRIGERANT LINES SELECTION

REFRIGERANT LINES			UNIT - MODEL										
			24E	32E	38E	43E	48D 48D2	64D 64D2	76D 76D2	86D 86D2	100D 100D2	128D 128D2	152D
Total line length	0 to 10 m.	Ø Liquid	5/8"	5/8"	3/4"	7/8"	2x5/8"	2x5/8"	2x3/4"	2x7/8"	2x3/4"	7/8" 3/4"	2x7/8"
		Ø Gas	1-1/8"	1-1/8"	1-3/8"	1-5/8"	2x 1-1/8"	2x 1-1/8"	2x 1-3/8"	2x 1-5/8"	2x 1-3/8"	1-5/8" 1-3/8"	2x 1-5/8"
	10 to 30 m.	Ø Liquid	5/8"	3/4"	7/8"	7/8"	2x5/8"	2x3/4"	2x7/8"	2x7/8"	2x3/4"	7/8" 3/4"	2x7/8"
		Ø Gas	1-1/8"	1-3/8"	1-5/8"	1-5/8"	2x 1-1/8"	2x 1-3/8"	2x 1-5/8"	2x 1-5/8"	2x 1-3/8"	1-5/8" 1-3/8"	2x 1-5/8"
	30 to 50 m. 	Ø Liquid	3/4"	3/4"	7/8"	7/8"	2x3/4"	2x3/4"	2x7/8"	2x7/8"	2x7/8"	1-1/8" 7/8"	2x 1-1/8"
		Ø Gas	1-3/8"	1-3/8"	1-5/8"	2-1/8"	2x 1-3/8"	2x 1-3/8"	2x 1-5/8"	2x 2-1/8"	2x 1-5/8"	2-1/8" 1-5/8"	2x 2-1/8"
Unit connections	Ø Liquid	5/8"	5/8"	3/4"	7/8"	2x5/8"	2x5/8"	2x3/4"	2x7/8"	2x3/4"	7/8" 3/4"	2x7/8"	
	Ø Gas	1-1/8"	1-1/8"	1-3/8"	1-5/8"	2x 1-1/8"	2x 1-1/8"	2x 1-3/8"	2x 1-5/8"	2x 1-3/8"	1-5/8" 1-3/8"	2x 1-5/8"	
Maximum vertical line length (m.)			16	16	16	16	16	16	16	16	16	16	16
Maximum number of bends			12	12	12	12	12	12	12	12	12	12	12

NOTE: The units are supplied with welded connections. As an option, service valves are available for liquid and gas lines.



Liquid service valve



Gas service valve

- 128D/D2 UNIT MODELS USES DIFFERENT SIZES OF PIPE CONNECTIONS: BIG SIZE FOR CIRCUIT 1 AND SMALL SIZE FOR CIRCUIT 2.
- THE GAS LINE ALWAYS MUST BE INSULATED.
- THE HORIZONTAL LINES MUST BE TIPPED AT LEAST 2% TOWARD THE OUTDOOR UNIT.
- THE MAXIMUM SPEED INSIDE LINES, SHOULD NOT BE MORE THAN 15 m/seg.



Between lengths of 30 and 50 m or superior, you have to make a recalculation according to our technical commercial department or distribution itself to maintain certain aspects how to make the installation (additional charge of oil, solenoid valves etc...)



PRECAUTIONS TO BE TAKEN IN THE USE OF R-407C REFRIGERANT:

R-407C Refrigerant is used in the unit; therefore, the following precautions characteristic of this gas should be taken:

- The Vacuum Pump must have a Check Valve or Solenoid Valve.
- Pressure Gauges and Hoses for the exclusive use with R-407C Refrigerant should be used.
- The charge should be carried out in the Liquid Phase.
- Always use scales to weight-in charge.
- Use the Leak Detector exclusive for R-407C Refrigerant.
- Do not use mineral oil, only synthetic oil to ream, expand or make connections.
- Keep pipes wrapped before using them and be very thorough about any possible dirt (dust, filings, burrs, etc.).
- When there is a leak, gather what is left of the charge, create a vacuum in the unit and completely recharge with new R-407C Refrigerant.
- Brazing should always be carried out in a nitrogen atmosphere.
- Reamers should always be well sharpened.

2.- INSTALLATION

2.5- REFRIGERANT CONNECTIONS

The unit is supplied as standard with welded connections. As an option, factory pre-charged kit is available. If so, TABLE 2 is the only to take care about (this option includes service valves).

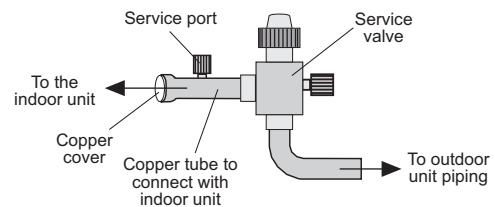
TABLE 2: WEIGHT OF REFRIGERANT R-407C PER METER OF LINE

	FROM 0 TO 10M			FROM 10 TO 30M			FROM 30 TO 50M		
	Suction	Liquid	gr/m	Suction	Liquid	gr/m	Suction	Liquid	gr/m
MODEL 24E	1-1/8"	5/8"	155	1-1/8"	5/8"	155	1-3/8"	3/4"	232
MODEL 32E	1-1/8"	5/8"	155	1-3/8"	3/4"	232	1-3/8"	3/4"	232
MODEL 38E	1-3/8"	3/4"	232	1-5/8"	7/8"	327	1-5/8"	7/8"	327
MODEL 43E	1-5/8"	7/8"	327	1-5/8"	7/8"	327	2-1/8"	7/8"	340
MODELS 48D / D2	2x1-1/8"	2x5/8"	2x155	2x1-1/8"	2x5/8"	2x155	2x1-3/8"	2x3/4"	2x232
MODELS 64D / D2	2x1-1/8"	2x5/8"	2x155	2x1-3/8"	2x3/4"	2x232	2x1-3/8"	2x3/4"	2x232
MODELS 76D / D2	2x1-3/8"	2x3/4"	2x232	2x1-5/8"	2x7/8"	2x327	2x1-5/8"	2x7/8"	2x327
MODELS 86D / D2	2x1-5/8"	2x7/8"	2x327	2x1-5/8"	2x7/8"	2x327	2x2-1/8"	2x7/8"	2x340
MODELS 100D / D2	2x1-3/8"	2x3/4"	2x232	2x1-3/8"	2x3/4"	2x232	2x1-5/8"	2x7/8"	2x327
MODELS 128D / D2	1-5/8"	7/8"	1x327	1-5/8"	7/8"	1x327	2-1/8"	1-1/8"	1x581
	1-3/8"	3/4"	1x232	1-3/8"	3/4"	1x232	1-5/8"	7/8"	1x327
MODEL 152D	2x1-5/8"	2x7/8"	2x327	2x1-5/8"	2x7/8"	2x327	2x2-1/8"	2x1-1/8"	2x581

- 128D/D2 UNIT MODELS USES DIFFERENT SIZES OF PIPE CONNECTIONS: BIG SIZE FOR CIRCUIT 1 AND SMALL SIZE FOR CIRCUIT 2.

NOTE: The units are supplied with welded connections. **As an option,** service valves are available for liquid and gas lines; in this case:

- 1st Remove the pressure of refrigerant from the connecting line through the service port located on that line.
- 2nd Remove the covers from the connecting lines.
- 3rd Braze the piping connection lines to the indoor unit.



Indoor and outdoor units are factory pre-charged with Nitrogen (N2). The installer should remove this gas and charge the units with refrigerant R-407C shown on the following tables.

TABLE 3.1.: CHARGE OF REFRIGERANT

Charge of refrigerant (gr) R-407C for 0 meters of line KNCK + LECK										
24E	32E	38E	43E	48D	64D	76D	86D	100D	128D	152D
6200	8250	11100	11850	2x6450	2x8250	2x11100	2x11850			

Charge of refrigerant (gr) R-407C for 0 meters of line KNHK + LEHK										
24E	32E	38E	43E	48D	64D	76D	86D	100D	128D	152D
7000	9300	12500	13400	2x7300	2x9300	2x12500	2x13400			2x20500

TABLE 3.2.: CHARGE OF REFRIGERANT FOR MULTI-SPLIT SYSTEM

Charge of refrigerant (gr) R-407C KNCK + 2 x LECK					
48D2	64D2	76D2	86D2	100D2	128D2
2 x 6450	2 x 8250	2 x 11100	2 x 11850		

Charge of refrigerant (gr) R-407C KNHK + 2 x LEHK					
48D2	64D2	76D2	86D2	100D2	128D2
2 x 7300	2 x 9300	2 x 12500	2 x 13400		

- 128D/D2 UNIT MODELS USES DIFFERENT SIZES OF PIPE CONNECTIONS: BIG SIZE FOR CIRCUIT 1 AND SMALL SIZE FOR CIRCUIT 2.

CHARGE OF REFRIGERANT FOR THE SET:

EXAMPLE:

To install a KNHK 32E + LEHK 32E set, with a 22m refrigerant line length between outdoor and indoor unit, then the refrigerant charge must be calculated as follow:

1st The TABLE 2 shows, that for 22m of line length between indoor unit and outdoor unit, the line sizes are: liquid 3/4", and gas 1-3/8".

2nd TABLE 2 shows, for line sizes of 3/4"- 1-3/8", the charge per meter line is: 232 gr/m.

3rd TABLE 3.1. shows, charge of refrigerant for the set with 0m of line length is 9300 gr.

4th To determine the charge of the set:

Add charge of the refrigerant lines + charge of refrigerant indoor unit and outdoor unit.

$$\text{Total charge for the set: } (232 \text{ gr/m}) \times 22 \text{ m} + 9300 \text{ gr} = 14404 \text{ gr}$$

Note: if the outdoor unit includes factory pre-charged kit, only take care of weight of refrigerant per meter of line in TABLE 2.

2.- INSTALLATION

2.6.- ELECTRICAL CONNECTIONS



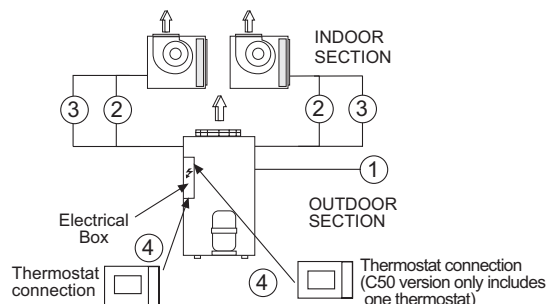
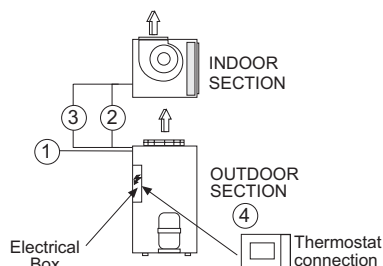
- BEFORE MAKING ANY ELECTRICAL CONNECTIONS, BE SURE THAT ALL CIRCUIT BREAKERS ARE OPEN.
- IN ORDER TO CARRY OUT THE ELECTRICAL CONNECTIONS, FOLLOW THE ELECTRICAL DIAGRAM SUPPLIED WITH THE UNIT.

FOR UNIT MODELS:

24E-32E-38E-43E-48D-64D-76D-86D-100D-128D-152D

48D2-64D2-76D2-86D2-100D/D2-128D/D2

- ① Power supply.
- ② Indoor motor fan electrical connection.
- ③ Electrical heater connection (optional).
- ④ Terminal-Thermostat connection
(See electrical connection for the controller)



POWER SUPPLY 230V THREE-PHASE UNITS	UNIT MODEL	Nr OF CABLES X SECTION (mm ²)				
		① Power supply without electrical heater (*)	① Power supply with electrical heater (*)	② Indoor motor fan electrical connection	③ Power supply electrical heater (optional)	
					1 STAGE	2 STAGES
<p>3 ~ 230V - 50 Hz + PE</p>	24E	4 x 10	3 x 25 + 1 x 16	4 x 1,5	4 x 10 + 3 x 1,5	-----
	32E	4 x 16	3 x 25 + 1 x 16	4 x 1,5	4 x 10 + 3 x 1,5	-----
	38E	4 x 16	3 x 35 + 1 x 16	4 x 1,5	4 x 10 + 3 x 1,5	-----
	43E	3 x 25 + 1 x 16	3 x 35 + 1 x 16	4 x 2,5	4 x 10 + 3 x 1,5	-----
	48D	3 x 25 + 1 x 16	3 x 70 + 1 x 35	4 x 2,5	4 x 16 + 3 x 1,5	2 x (4 x 10) + 4 x 1,5
	64D	3 x 50 + 1 x 25	3 x 95 + 1 x 50	4 x 2,5	4 x 16 + 3 x 1,5	2 x (4 x 10) + 4 x 1,5
	76D	3 x 50 + 1 x 25	3 x 95 + 1 x 50	4 x 2,5	4 x 16 + 3 x 1,5	2 x (4 x 10) + 4 x 1,5
	86D	3 x 95 + 1 x 50	3 x 120 + 1 x 70	4 x 2,5	4 x 16 + 3 x 1,5	2 x (4 x 10) + 4 x 1,5

POWER SUPPLY 400V THREE-PHASE UNITS	UNIT MODEL	Nr OF CABLES X SECTION (mm ²)				
		① Power supply without electrical heater (*)	① Power supply with electrical heater (*)	② Indoor motor fan electrical connection	③ Power supply electrical heater (optional)	
					1 STAGE	2 STAGES
<p>3N ~ 400V - 50 Hz + PE</p>	24E	5 x 4	5 x 10	4 x 1,5	4 x 4 + 3 x 1,5	-----
	32E	5 x 6	5 x 16	4 x 1,5	4 x 4 + 3 x 1,5	-----
	38E	5 x 10	5 x 16	4 x 1,5	4 x 4 + 3 x 1,5	-----
	43E	5 x 10	3 x 25 + 2 x 16	4 x 2,5	4 x 4 + 3 x 1,5	-----
	48D	5 x 10	3 x 25 + 2 x 16	4 x 2,5	4 x 6 + 3 x 1,5	2 x (4 x 4) + 4 x 1,5
	64D	5 x 25	3 x 35 + 2 x 16	4 x 2,5	4 x 6 + 3 x 1,5	2 x (4 x 4) + 4 x 1,5
	76D	5 x 25	3 x 50 + 2 x 25	4 x 2,5	4 x 6 + 3 x 1,5	2 x (4 x 4) + 4 x 1,5
	86D	3 x 35 + 2 x 16	3 x 50 + 2 x 25	4 x 2,5	4 x 6 + 3 x 1,5	2 x (4 x 4) + 4 x 1,5
	100D	3 x 35 + 2 x 16	3 x 70 + 2 x 35	4 x 2,5	4 x 16 + 3 x 1,5	2 x (4 x 10) + 4 x 1,5
	128D	3 x 35 + 2 x 16	3 x 70 + 2 x 35	4 x 2,5	4 x 16 + 3 x 1,5	2 x (4 x 10) + 4 x 1,5
152D	3 x 50 + 2 x 25	3 x 70 + 2 x 35	4 x 2,5	4 x 16 + 3 x 1,5	2 x (4 x 10) + 4 x 1,5	

POWER SUPPLY 230V THREE-PHASE UNITS	UNIT MODEL	Nr OF CABLES X SECTION (mm ²)				
		① Power supply without electrical heater (*)	① Power supply with electrical heater (*)	② Indoor motor fan electrical connection	③ Power supply electrical heater (optional)	
					1 STAGE	2 STAGES
<p>3 ~ 230V - 50 Hz + PE</p>	48D2	3 x 25 + 1 x 16	3 x 70 + 1 x 35	4 x 1,5	4 x 10 + 3 x 1,5	-----
	64D2	3 x 50 + 1 x 25	3 x 95 + 1 x 50	4 x 1,5	4 x 10 + 3 x 1,5	-----
	76D2	3 x 50 + 1 x 25	3 x 95 + 1 x 50	4 x 1,5	4 x 10 + 3 x 1,5	-----
	86D2	3 x 95 + 1 x 50	3 x 120 + 1 x 70	4 x 2,5	4 x 10 + 3 x 1,5	-----

POWER SUPPLY 400V THREE-PHASE UNITS	UNIT MODEL	Nr OF CABLES X SECTION (mm ²)				
		① Power supply without electrical heater (*)	① Power supply with electrical heater (*)	② Indoor motor fan electrical connection	③ Power supply electrical heater (optional)	
					1 STAGE	2 STAGES
<p>3N ~ 400V - 50 Hz + PE</p>	48D2	5 x 10	3 x 25 + 2 x 16	4 x 1,5	4 x 4 + 3 x 1,5	-----
	64D2	3 x 25 + 2 x 16	3 x 35 + 2 x 16	4 x 1,5	4 x 4 + 3 x 1,5	-----
	76D2	3 x 25 + 2 x 16	3 x 50 + 2 x 25	4 x 1,5	4 x 4 + 3 x 1,5	-----
	86D2	3 x 35 + 2 x 16	3 x 50 + 2 x 25	4 x 2,5	4 x 4 + 3 x 1,5	-----
	100D2	3 x 35 + 2 x 16	3 x 70 + 2 x 35	4 x 2,5	4 x 6 + 3 x 1,5	-----
	128D2	3 x 35 + 2 x 16	3 x 70 + 2 x 35	4 x 2,5	4 x 6 + 3 x 1,5	2 x (4 x 4) + 4 x 1,5

- Connect the power supply cables to the terminals in the electric box through the grommet.
- The sections have been calculated for a length no longer than 50m and a voltage drop of 10V. Do not start the unit if the drop is greater than this.
- The wiring and circuit breakers to be mounted in the installation must comply with the Regulations in force.
- Ground wires must be properly connected and have a greater length than the phase wires.
- (*) According to standards, you can use different sections for PE and N.

VOLTAGE OPERATING LIMITS

MODELS	VOLTAGE	LIMIT
24E/48D/48D2	230 V-3Ph-50Hz	180-242 V -3Ph- 50Hz
32E/64D/64D2	230 V-3Ph-50Hz	198-264 V -3Ph- 50Hz
38E/76D/76D2	400 V-3Ph-50Hz	342-462 V -3Ph- 50Hz
86D/86D2	230 V-3Ph-50Hz	198-264 V -3Ph- 50Hz
86D/86D2/100D/100D2/128D/128D2/152D	400 V-3Ph-50Hz	342-462 V -3Ph- 50Hz

2.- INSTALLATION

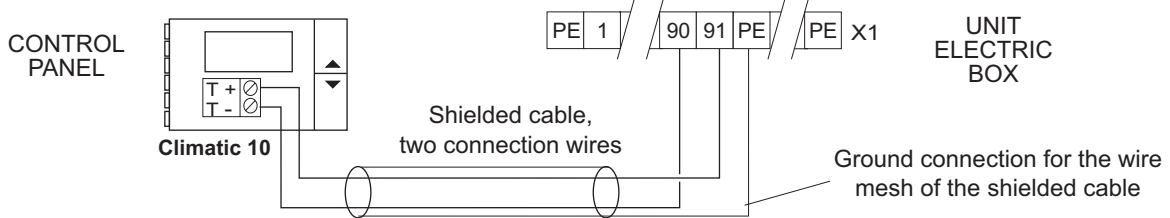
2.6.- ELECTRICAL CONNECTIONS

CONTROL PANEL

CLIMATIC 10 ELECTRICAL CONNECTION (Standard version)



IMPORTANT
THE SHIELDED CONNECTION CABLE BETWEEN THE CONTROL PANEL AND THE UNIT MUST BE SEPARATE FROM ANY OTHER TYPE OF ELECTRICAL WIRING.
CONNECT IT TO THE ELECTRIC BOX LOCATED IN THE OUTDOOR UNIT.

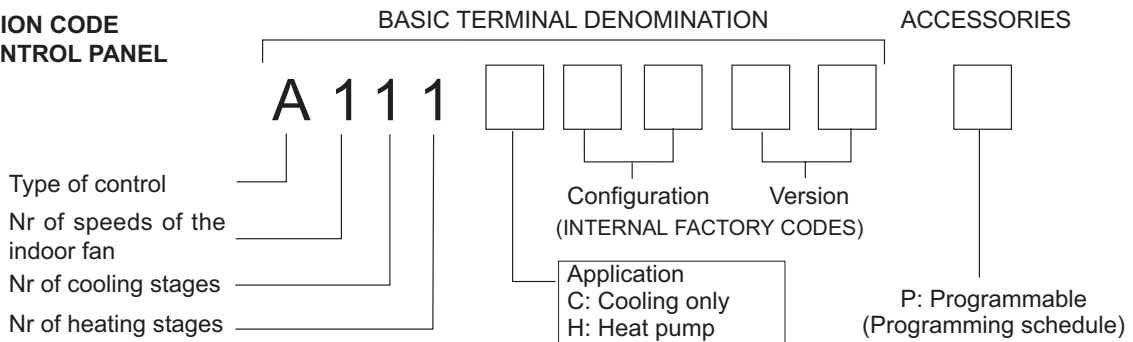


- For securing and connecting the Control Panel, consult the control Panel Manual supplied with the unit.
- Keep in mind that the Control Panel cable is a SHIELDED CABLE and the wire mesh is only grounded through the electric box.
- The T+ and T- polarity must strictly agree with the electrical diagram supplied with the unit.

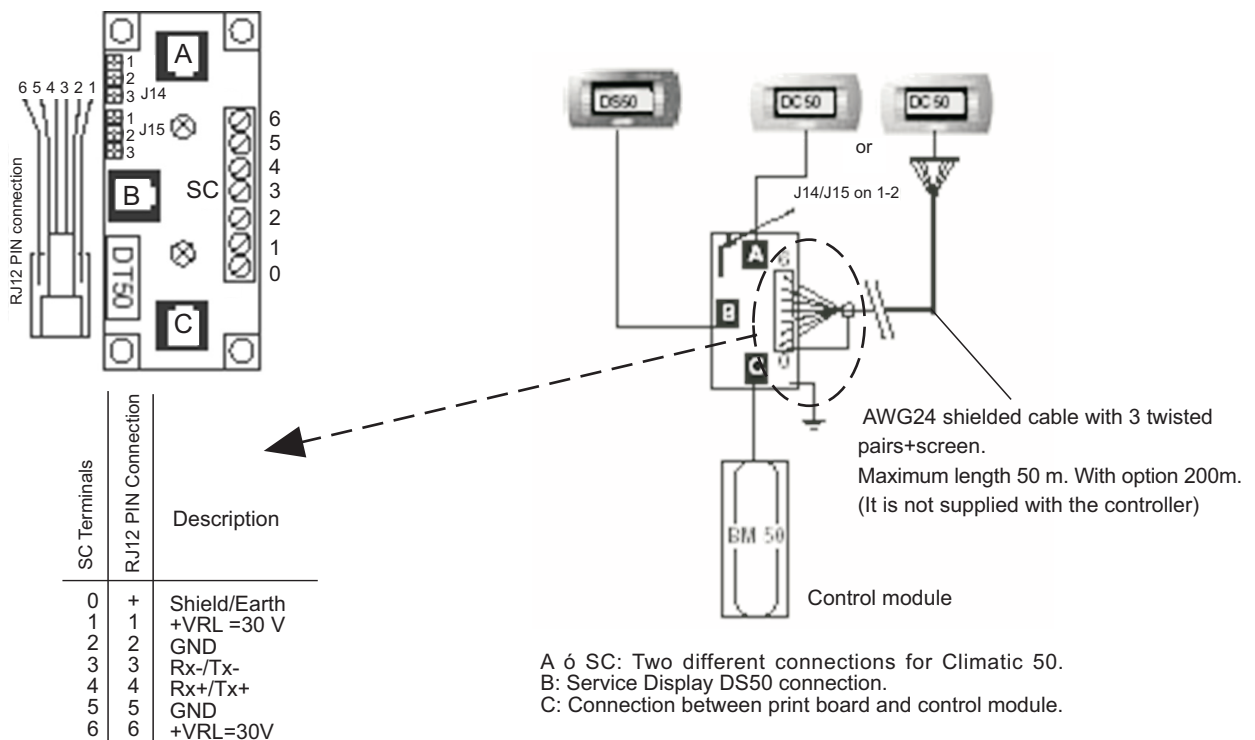


Since this type of control panel is factory-configured for each application, an identification code located on the control plate of the terminal itself has been given to each panel.
Any query or request for a replacement of the control panel must be accompanied by this identification code.

IDENTIFICATION CODE FOR THE CONTROL PANEL



CLIMATIC 50 ELECTRICAL CONNECTION (C50 version)



2.- INSTALLATION

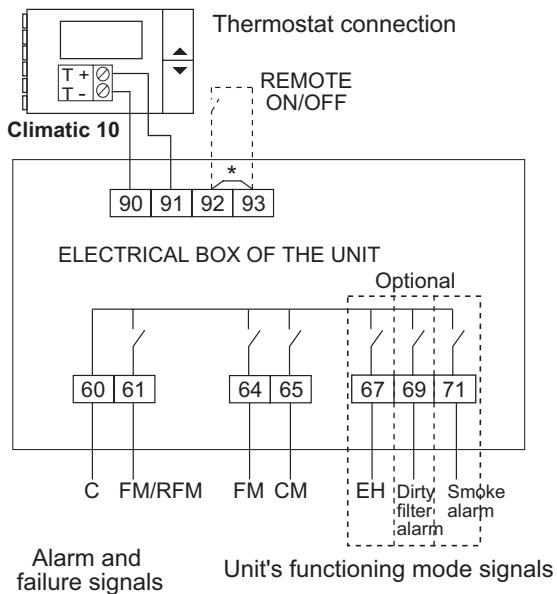
2.6.- ELECTRICAL CONNECTIONS

ELECTRICAL CONNECTION " REMOTE SIGNALS"

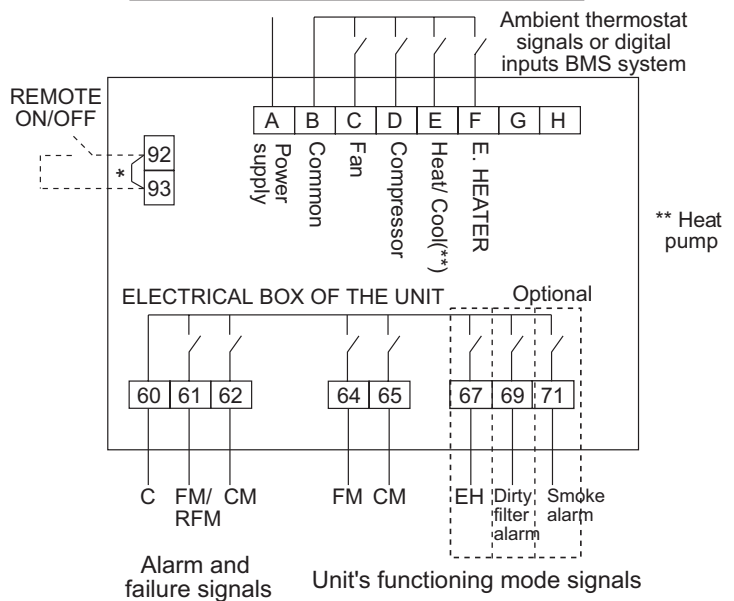
The electrical box of all the range, lets you obtain the following functions:

- Remote ON / OFF.
- Alarm and failure signals for the unit's components: FM, CM.
- The unit's functioning mode signals: FM,CM, EH.
- Dirty air filter indication (option).
- Manage the unit operation, through the supplied thermostat or through the digital inputs for a BMS system (only for VFC unit version).

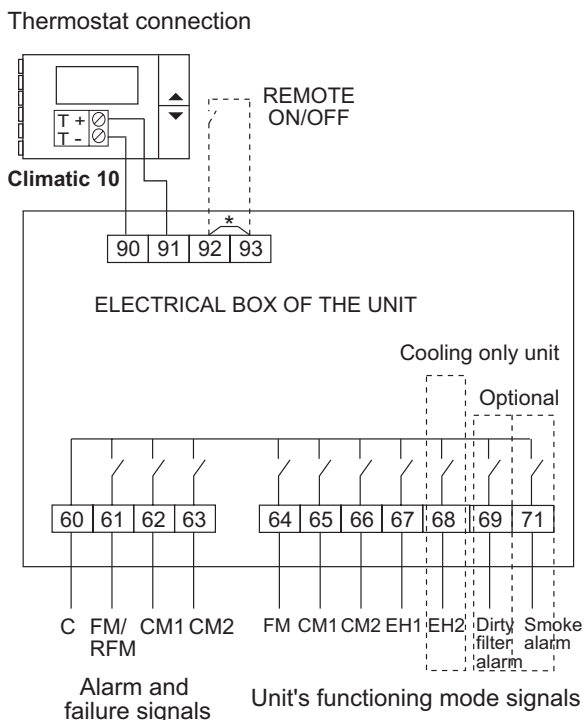
SINGLE CIRCUIT UNIT, STANDARD VERSION



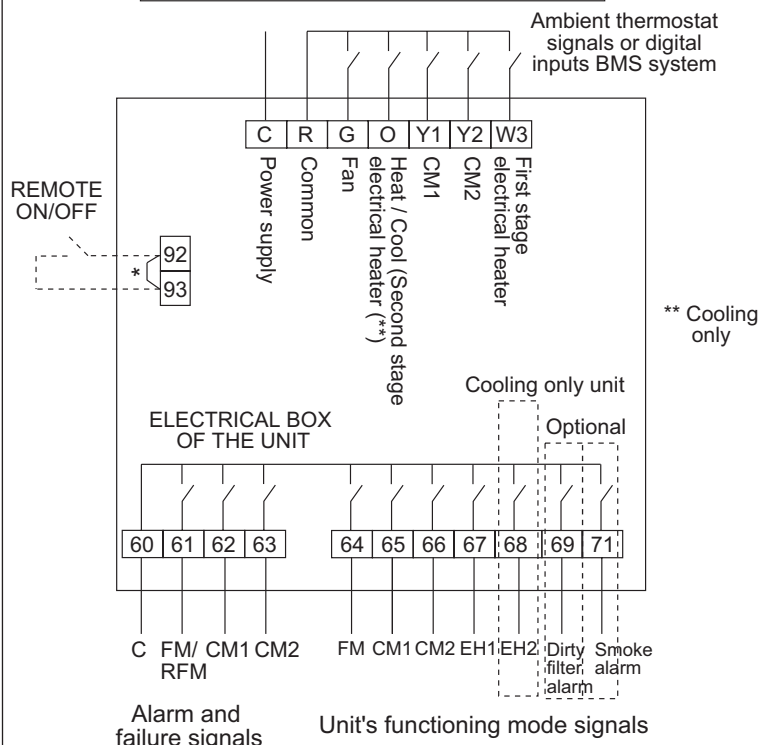
SINGLE CIRCUIT UNIT, VFC VERSION



DOUBLE CIRCUIT UNIT, STANDARD VERSION



DOUBLE CIRCUIT UNIT, VFC VERSION



C: Common
 FM: Indoor fan
 RFM: Return fan motor
 CM: Compressor
 CM1: Compressor 1
 CM2: Compressor 2

EH1: Electrical heater 1
 EH2: Electrical heater 2

When unit switches off, the system will show CM, CM1 and CM2 failure signal.

* Remove wire, if ON/OFF remote is used.

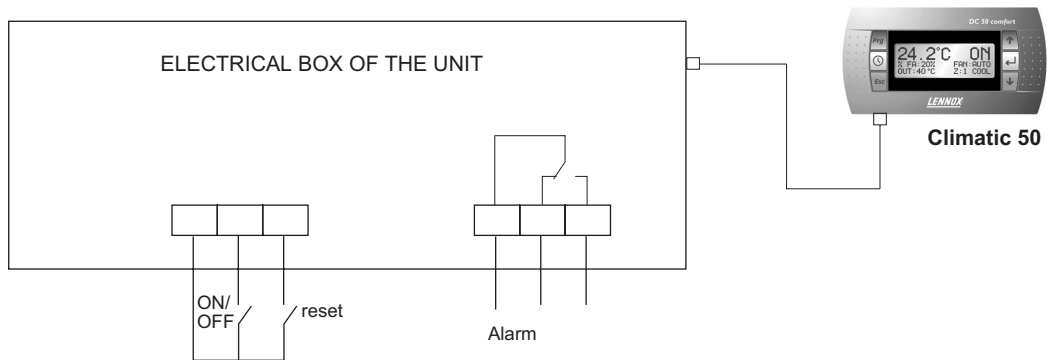
Compressor alarm may indicate thermic CM, CFM, High pressure, Low pressure.

2.- INSTALLATION

2.6.- ELECTRICAL CONNECTIONS

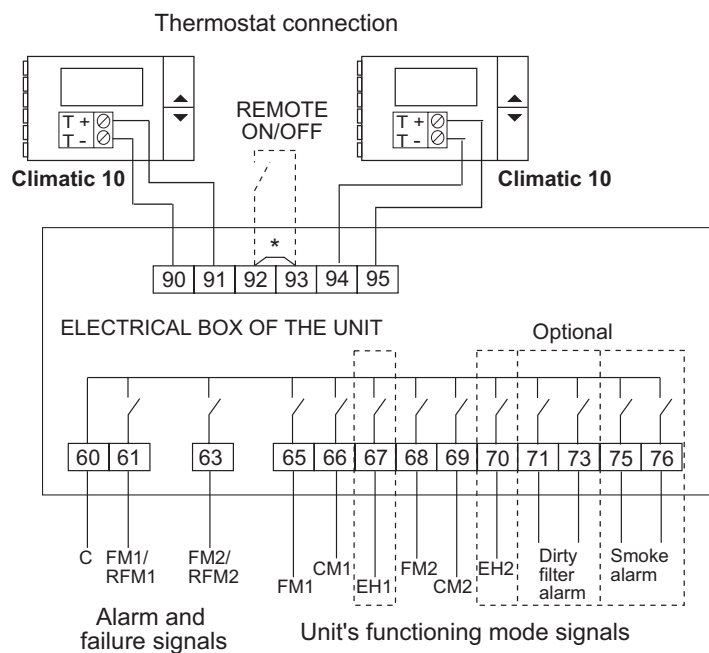
ELECTRICAL CONNECTION " REMOTE SIGNALS"

DOUBLE CIRCUIT UNIT, C50 VERSION



ELECTRICAL CONNECTION " REMOTE SIGNALS" MULTI-SPLIT SYSTEMS

STANDARD VERSION UNIT MULTI-SPLIT SYSTEM



C: Common
 FM: Indoor fan
 RFM: Return fan motor
 CM1: Compressor 1
 CM2: Compressor 2

EH1: Electrical heater 1
 EH2: Electrical heater 2

When unit switches off, the system will show CM1 and CM2 failure signal.

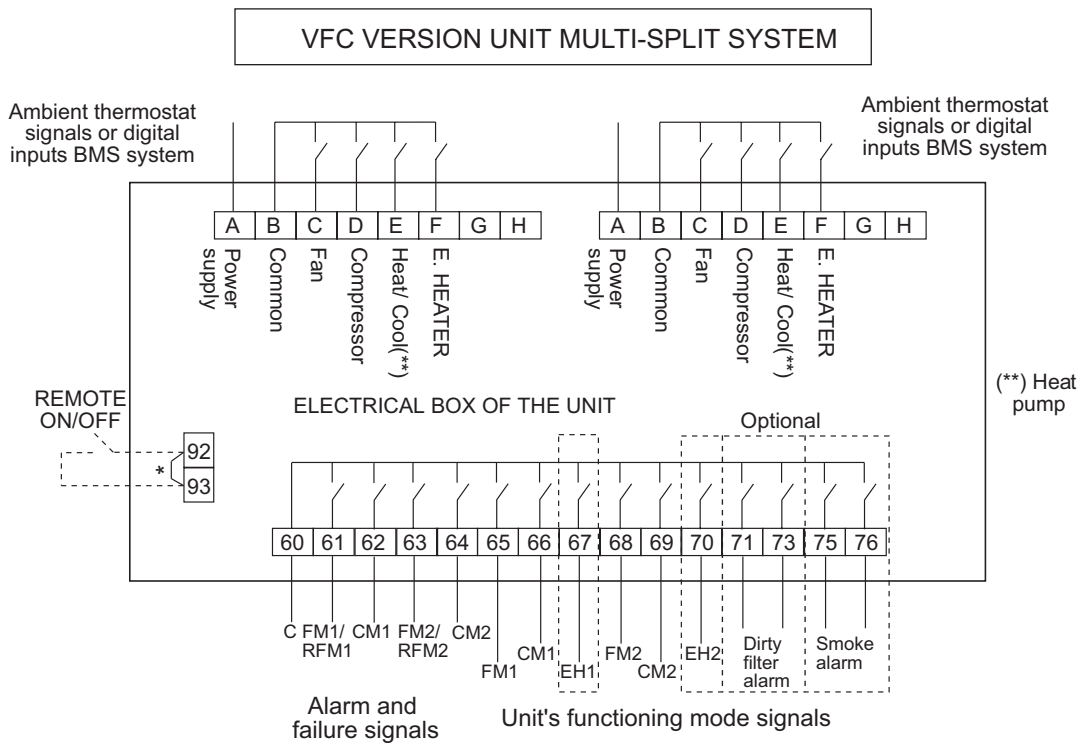
* Remove wire, if ON/OFF remote is used.

Compressor alarm may indicate thermic CM, CFM, High pressure, Low pressure.

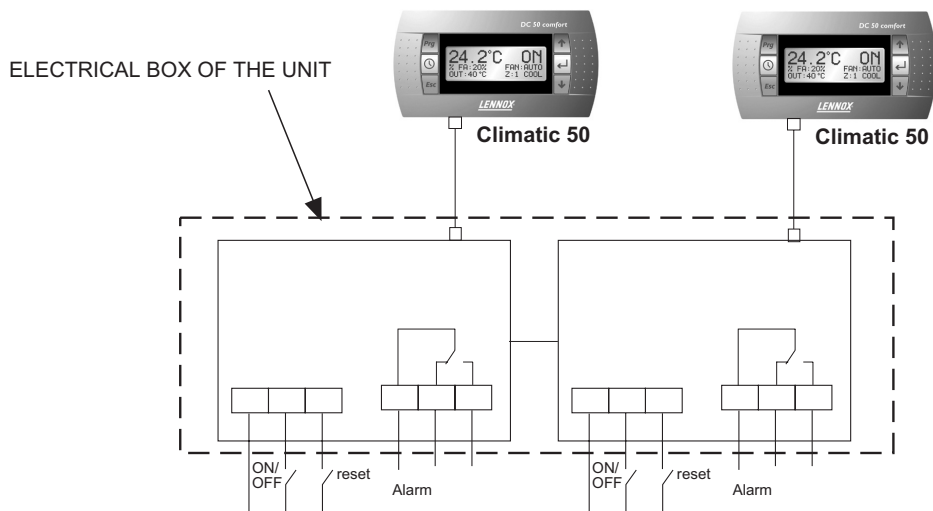
2.- INSTALLATION

2.6.- ELECTRICAL CONNECTIONS

ELECTRICAL CONNECTION "REMOTE SIGNALS" MULTI-SPLIT SYSTEMS



C50 VERSION UNIT MULTI-SPLIT SYSTEM



C: Common
 FM: Indoor fan
 RFM: Return fan motor
 CM1: Compressor 1
 CM2: Compressor 2

EH1: Electrical heater 1
 EH2: Electrical heater 2

When unit switches off, the system will show CM1 and CM2 failure signal.

* Remove wire, if ON/OFF remote is used.

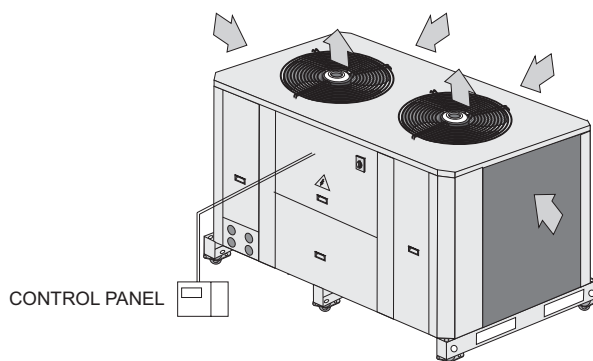
Compressor alarm may indicate thermic CM, CFM, High pressure, Low pressure.

3.- COMMISSIONING AND OPERATION

3.1.- PRELIMINARY CHECKS

- ① Check that the power supply is the same as stated on the Rating Plate which is in agreement with the electrical diagram for the unit and that cable sizes are correct.
- ② Check that tightness of the electrical connections to their terminals and to ground.
Check the control panel connections.
(If the connection is wrong, the unit will not operate and the control panel display will not light).
- ③ Check **with your hand** that the fans turn freely.

FIGURE FOR THE STANDARD UNIT CONFIGURATION FOR MODELS
48D-64D-76D-86D



3.2.- STEPS TO FOLLOW FOR COMMISSIONING THE UNITS

- On the heat pump units, the compressor has a single phase electric heating element to assure a separation between the Refrigerant and the oil in the housing. This heater is activated when the compressor is off and stops working when the compressor is on.
About eight hours before start up or after a long shutdown period, voltage should be supplied to the unit so that this heater will be activated.
- To start the unit, follow the instructions given in the Control Panel Manual supplied with the unit (requesting operation in any of the modes, cooling, heating, or automatic).
After a time lapse, the unit will start.
- With unit operating, check that the fans are turning freely and in the proper direction.



REMEMBER THAT THE COMPRESSOR IS A SCROLL TYPE COMPRESSOR:

Scroll type compressors only compress in one direction of the rotation. Single phase models are always started up in the proper direction; however, the three phase models, turn in either direction depending on the order of the power supply phases. Therefore, it is essential that the phase connection for scroll-type three-phase compressors be carried out correctly (the correct direction of rotation can be checked when the pressure on the suction side decreases and the pressure on the discharge side increases when the compressor is activated. If the connection is wrong, the rotation will be reversed causing a high noise level and a reduction in the amount of current consumed. If this occurs, the compressor's internal protection system will kick in shutting down the unit. The solution is to disconnect, switch the wires between two of the phases and connect again).

- Check compressor oil level, if sight glass included (on the sides of the compressor the level should be between 1/4 and 3/4 in the sight glass, while during operation the level should be between 3/4 and full).
- Connect high and low pressure gauges and check that operating pressure values are normal.
- Measure electrical consumption for the unit and check that it is near what is indicated on the Rating Plate.
- Check the electrical consumption of the compressor and the fans with what is specified in the physical data sheets.
- In the case of a Heat Pump unit, make a cycle change on the Control Panel checking that the 4-way valves make the change correctly. Check the pressure values in the new cycle.
- **Remember the low pressure switch is reset automatically and the high pressure switch is reset electronically.**
- Check that pressure switches stop the unit:
FOR THE COOLING CYCLE UNIT:
Stop the outdoor fan by disconnecting it. The high pressure should rise and the high pressure switch should stop the compressor at 27.5 kg/cm². Reconnect the fan and electrically reset the pressure switch by pressing the "RESUME" button on the Control Panel for 5 seconds for standard unit version, and press "OFF" for VFC version units and wait for the anti-cycle time (5 minutes), afterwards, the unit will start-up again.
Stop the indoor fan by disconnecting it. The low pressure should drop and the unit should stop when the pressure gauge reaches 1 kg/cm². The unit will start up again when the pressure rises and the pressure gauge indicates 2 kg/cm². Once this has been carried out, stop the unit and reconnect the fan.
- Start the unit again and when everything is operating normally, take a reading of all the data and **fill out the Commissioning Sheet** (page 3).

4.- MAINTENANCE

4.1.- PREVENTIVE MAINTENANCE



**PREVENTIVE MAINTENANCE PREVENTS COSTLY REPAIRS.
BECAUSE OF THIS PERIODIC INSPECTIONS ARE REQUIRED:**

- GENERAL STATE OF THE CASING:

Furniture, paint, deterioration due to bumps, rust spots, leveling and supporting, state of the shock absorbers, if installed, screwed panels, etc.

- ELECTRICAL CONNECTIONS:

State of hoses, tightness of screws, grounding, current draw of the compressor and fans and checking that the unit is receiving the correct voltage.

- COOLING CIRCUIT:

Check that pressure values are correct and that there are no leaks. Check that there is no damage to the pipe insulation, that the state of the coils is correct and that there are no chips or clogs retained by the air flow, etc.

- COMPRESSOR:

Inspect the oil level, if sight glass is present.
Inspect the state of the silent block fixtures.

- FANS:

Check that fans turn freely and in the correct direction without excessive noises.

- CONTROL:

Check Set Points and normal operation.

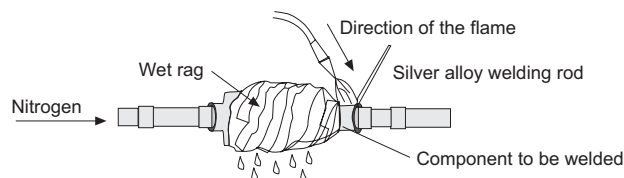
4.2.- CORRECTIVE MAINTENANCE



**IMPORTANT
MAKE SURE THAT THE UNIT IS COMPLETELY DISCONNECTED FROM THE POWER SUPPLY WHEN CARRYING OUT
ANY TYPE OF WORK ON THE MACHINE**

If some component in the cooling circuit must be replaced, follow these recommendations:

- Always use original replacement parts.
- Remove the entire refrigerant charge from the unit through the schrader valves located in the outdoor section. Create a slight vacuum as a safety measure.
- Regulation prohibits the release on the refrigerant into the atmosphere.
- If cuts must be made in the pipe work, use pipe cutters. Do not use saws or any other tools that produce filings.
- All brazing must be carried out in a nitrogen atmosphere to prevent corrosion from forming.
- Use silver alloy brazing rod.
- Take special care that the flame from the torch is aimed in the opposite direction from the component to be welded and is covered with a wet rag in order to avoid overheating.



- Take very special care if 4-way check valves are to be replaced since these have internal components that are very heat-sensitive such as plastic, teflon, etc.
- If a compressor must be replaced, disconnect it electrically and un-braze the suction and discharge lines. Remove the securing screws and replace the old compressor with the new one. Check that the new compressor has the correct oil charge, screw it to the base and connect the lines and electrical connections.
- Carry out the vacuum above and below through the schrader valves of the outdoor unit until -750 mm Hg is reached. Once this level of vacuum has been reached, keep the pump in operation for at least one hour.

DO NOT USE THE COMPRESSOR AS A VACUUM PUMP.

- Charge the unit with refrigerant according to the data on the Rating Plate for the unit and **check that there are no leaks.**



PRECAUTIONS TO BE TAKEN IN THE USE OF R-407C Refrigerant:

R-407C Refrigerant is used in the unit; therefore, the following precautions characteristic of this gas should be taken:

- The Vacuum Pump must have a Check Valve or Solenoid Valve.
- Pressure Gauges and Hoses for the exclusive use with R-407C Refrigerant should be used.
- The charge should be carried out in the Liquid Phase.
- Always use scales to weight-in charge
- Use the Leak Detector exclusive for R-407C Refrigerant.
- Do not use mineral oil, only synthetic oil to ream, expand or make connections.
- Keep pipes wrapped before using them and be very thorough about any possible dirt (dust, filings, burrs, etc.).
- When there is a leak, gather what is left of the charge, create a vacuum in the unit and completely recharge with new R-407C Refrigerant.
- Brazing should always be carried out in a nitrogen atmosphere.
- Reamers should always be well sharpened.

4.- MAINTENANCE

4.3.- FAILURE DIAGNOSIS

In case of failure or malfunction of the unit, the Display on the Control Panel will show an Error or Alarm warning explained in the Control Panel Manual. Nevertheless, whenever there is a unit failure, the unit should be shut down and our Service Technicians consulted.

FAILURE	POSSIBLE CAUSES	POSSIBLE SOLUTIONS
UNIT DOES NOT START	Failure in the power supply, or insufficient voltage.	Connect the power supply or check the voltage.
	Circuit breakers have opened.	Reset.
	Power cable or Control Panel cable is defective.	Inspect and Correct.
UNIT STOPS DUE TO HIGH PRESSURE DURING THE COOLING CYCLE	High Pressure switch is defective.	Check Cut-off Pressure or change Pressure Switch if necessary.
	Outdoor fan is not working.	Check for voltage, inspect the motor and turbine or replace if necessary.
	Outdoor Fan turns in the wrong direction.	Switch the power phases.
	Outdoor Coil is dirty or clogged for passing air.	Inspect and Clean.
	Excess charge of the Refrigerant.	Remove the charge and charge according to the data on the Rating Plate.
UNIT STOPS DUE TO HIGH PRESSURE DURING THE HEATING CYCLE	The same causes and solutions as the Cold Cycle but with reference to the coils and Indoor Fan.	
UNIT STOPS DUE TO LOW PRESSURE	Low pressure switch defective.	Check the Cut-off Pressure with a pressure gauge and change the Pressure switch if necessary.
	Indoor Fan is not working.	Check for voltage and inspect the motor, turbine and replace if necessary.
	Indoor Fan turns in the wrong direction.	Switch the power phases.
	Lack of refrigerant. Leak.	Correct leak, create vacuum and charge.
	Dirty Air Filter	Inspect and Clean.
	Clogged Cooling Circuit. Dirty filter drier.	Inspect and Correct or Change the Filter drier.
UNIT STARTS AND STOPS IN SHORT CYCLES	Compressor overcharged.	Inspect suction and discharge pressure values and correct.
	Compressor cuts off due to Klixon.	Inspect input voltage and voltage drop.
	Lack of Refrigerant.	Correct leak and replace.
LOAD AND ABNORMAL NOISE IN THE COMPRESSOR (SCROLL)	Power supply phases inverted (three-phase compressor).	Inspect and switch power phases.



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