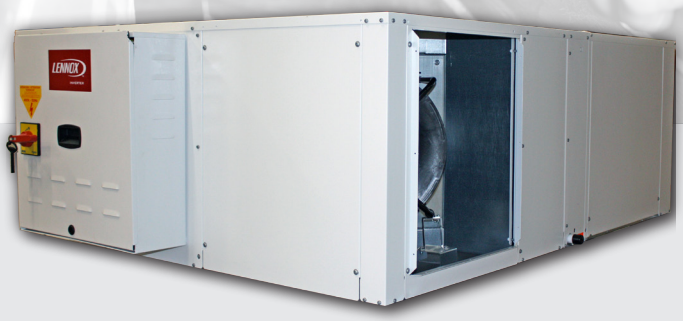
LENNOX
EMEA

INSTALLATION, OPERATING AND MAINTENANCE



HORIZONTAL PACKAGED AIR CONDITIONER

FLATAIR2

ADVANCED
ULTRA HIGH EFFICIENCY & COMFORT

8 - 34 kW

FLATAIR ADV2 IOM-
MIL161E-0920-09/2020

www.lennoxemea.com

LENNOX

Read this manual before installation, reparation o maintenance works.

Lennox have been providing environmental solutions since 1895, our FLATAIR ADVANCED 2 range 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. For information on local contacts at www.lennoxeurope.com.

The manufacturing of these units is made under the requirements of the ISO 9001 and ISO 14001.

The English version is the original version. Existing versions in other languages are translations of the original version. In the event of a conflict of interpretation between the translated versions and the original version, the original version shall prevail.

LENNOX, in its commitment to preserve the environment, has an Environmental Management System based on ISO 14001, through which all environmental aspects generated during its activity are managed and continuously improved, taking into account the life cycle of the products we manufacture and market.

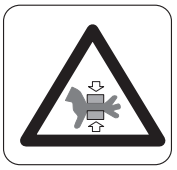
For this reason, you: customer, user and / or maintainer of the equipment, are invited to join our commitment to conserve our environment, and follow the indications that we expose throughout this manual.

DANGER AND WARNING SIGNS


Abrasive surfaces


Low temperatures


High temperatures


Risk of injury by moving objects


Electrical voltage


Risk of injury by rotating objects

ELECTRICAL CONNECTIONS

Make sure to switch off the power before installing, repairing or carrying out maintenance on the unit, in order to prevent serious electrical injury.

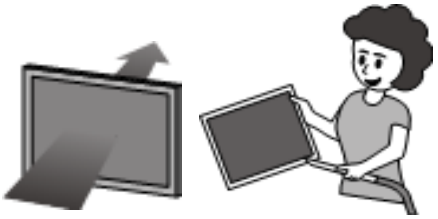
Keep local and national legislation in mind when installing the unit.

WARNING - REMEMBER

Switch off the general power switch of the air conditioning unit on the electrical panel of the location.
The cleaning of filters does not require specialized personnel. For any other types of interventions like electrical or mechanical, advise the specialized technician.

FILTER CLEANING

To avoid possible death or injuries from electric shock, ensure to open the electrical disconnect switch of the network before accessing the unit for its installation, repair or maintenance.
If the filter is too dirty, wash it in a container with water and neutral soap, drying it in the shade before inserting it back into the unit.



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 modifi cations 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 maintenance and management personnel.

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.

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	☐	☐
DRAINAGE WITH TRAP	☐	☐
MAIN POWER SUPPLY CONNECTION	☐	☐
CONTROL PANEL CONNECTION	☐	☐
COMPRESSOR OIL LEVEL INDICATOR	☐	☐
	☐	☐

DATA INPUT:

COOLING CYCLE

Air intake temperature to the outdoor coil: < **1** __ºC / **2** __ºC

Air output temperature to the outdoor coil: < **1** __ºC / **2** __ºC

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

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

ELECTRIC POWER CONSUMPTION (Amps)

Compressor 1 __/__/__ Compressor 2 __/__/__

Compressor 3 __/__/__

Outdoor fan section 1 ____/____/____

Outdoor fan section 2 ____/____/____

HEATING CYCLE

Air intake temperature to the outdoor coil: < **1** __ºC / **2** __ºC

Air output temperature to the outdoor coil: < **1** __ºC / **2** __ºC

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

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

Compressor 1 __/__/__ Compressor 2 __/__/__

Compressor 3 __/__/__

Outdoor fan section 1 ____/____/____

Outdoor fan section 2 ____/____/____

Options installed: _____

Comments: _____

THE UNIT MUST BE INSTALLED IN ACCORDANCE WITH LOCAL SAFETY CODES AND REGULATIONS AND CAN ONLY BE USED IN WELL VENTILLATED AREA.
PLEASE READ CAREFULLY THE MANUFACTURER'S INSTRUCTIONS BEFORE STARTING THIS UNIT.
INSPECTIONS AND REQUALIFICATION ACCORDING PRESSURE EQUIPMENT DIRECTIVE MUST FOLLOW THE LOCAL REGULATIONS WHERE THE UNIT IS INSTALLED.

EMC DIRECTIVE COMPLIANCE

WARNING:
The units FLATAIR ADVANCED 2 range are designed to heat or cool buildings in industrial, commercial and residential environments. What differentiates these environments is the position of the HT / LV transformer in the power supply to the buildings. In the case of the industrial environment, the HT / LV transformer is dedicated and installed in the industry itself. On the other hand, for the residential, commercial and light industry, the HT / LV transformer is common to a zone and supplies both commercial, light industrial buildings and houses (individual houses and buildings) in parallel.
So to meet all of these environments, the units have been tested according to the most stringent standards of the 2 environments that are:

- EN61000-6-3: emission for residential, commercial and light industry environments:
- EN61000-6-2: immunity for industrial environment.

As regards immunity, all the tests carried out were in conformity.
As regards emissions:

- Meets the EN61000-6-3 (emission for residential, commercial and light industry environments)
- The short-circuit ratio Rsce > 350 corresponding to the standard EN 61000-3-12 concerning the measurement of harmonics on the network.
- No maximum permissible impedance of the network Zmax is necessary to declare from standard EN 61000-3-11 because the equipments tested are in conformity with the standard. The connection to the main is not a conditional connection (the connection is possible to all the mains without restriction on the impedance value).

All units are compliant with the PED directive.

1. Attention: The high-pressure safety switches are essential elements which guarantee the system remains within the admissible operating limits. Before switching on the installation, always ensure all electrical connections are correct on these elements which are used to isolate the electrical power supply to the compressor(s) they protect. Carry out a test to ensure the electrical power supply is effectively isolated when the pressure switch attains its set value.
2. In case of installation in a seismic zone or in a zone which may be effected by violent natural occurrences such as storms, tornados, floods, tidal waves, etc…, the installer and/or operator will refer to valid standards and regulations in order to ensure the devices required are available as our units are not designed to operate under such conditions without prior precautions.
3. The equipment is not designed to resist fire. The installation site will therefore have to respect valid standards with regard to protection against fire (emergency instructions, map…).
4. In case of exposure to corrosive external atmospheres or products, the installer and/or operator shall take the necessary precautions to avoid damage to the equipment and will make sure the equipment provided has the necessary and sufficient anti-corrosion protection.
5. To respect a sufficient number of supports for the piping according to their size and weight under operating conditions and to design the piping to avoid a water hammer phenomenon
6. For technical reasons, it is not possible to carry out hydrostatic tests on all our units so leak tests are carried out as a compensatory measure. (The entire circuit is checked using leak detectors). For machines charged with refrigerant, at the end of the test, an HP test is carried out in the factory to make sure the pressure switch is working properly.
7. Before any work is carried out on the refrigeration circuit, the dry air or nitrogen pressure our units are supplied with must be released (For units not charged with refrigerant in the factory.)
8. The emissions of refrigerant via the safety relief valves must be channeled to the exterior of the machine room. The outlet relief valve will have to be sized in compliance with EN13136.
9. Installation and maintenance of these machines must be carried out by personnel qualified to work on refrigeration equipment.
10. All interventions must be carried out in conformity with valid safety regulations (e. g.: NF EN 378), as well as the recommendations indicated on the labels and handbooks provided with the machine. All actions shall be taken to avoid access of unauthorized persons.
11. It is essential that any pipework or ot
her components of the refrigeration circuit hazardous to people because of their surface temperature are insulated or identified.
12. Ensure that the installation zone (room or area) of the machine has restricted access and ensure the good condition of the covering.

F-Gas REGULATION
Operators of refrigeration equipment's must comply with the obligations defined in:
- EU Regulation No 517/2014 on fluorinated greenhouse gases
- EC 1005/2009 on substances that deplete the ozone layer

Non-compliance with these requirements is an offence and liable of financial penalties.

Moreover, in case of problem it is mandatory to prove to the insurance company that the equip ment complies with the F gas Regulation.

WARRANTY

The warranty of the unit is subject to the warranty definitions as agreed upon in the order. It is expected that the design and installation of the unit utilise good working practices. The warranty will be legally null and void if:
• Service and maintenance have not been executed in accordance with the regulations; repairs have not been carried out by LENNOX personnel or have been implemented without prior written permission by LENNOX.
• Modifications have been made to the equipment without prior written permission by LENNOX.
• Settings and protections have been modified without prior written permission by LENNOX.
• Non-original or other than the prescribed refrigerants or lubricants are used.
• The equipment has not been installed and/or connected in accordance with the installation instructions.
• The equipment is being used improperly, incorrectly, negligently or not in accordance with its nature and/or purpose.
• A flow protection device is not fitted.
In these circumstances LENNOX is indemnified from any product liability claims from third parties.
In the event of a warranty claim the machine serial number and LENNOX order number must be quoted.
WARNING - All the technical and technological information contained in this manual, including any drawing and technical descriptions provided by us, remain the property of LENNOX and must not be utilised (except in operation of this product),reproduced, issued to or made available to third parties without the prior written agreement of LENNOX. The technical information and specifications contained in this manual are for reference only. The manufacturer reserves the right to modify these without warning and without obligation to modify equipment already sold.

SAFETY

It is essential to follow non exhaustive recommendations hereunder:
• Never work on a unit that is still energized.
• Anymanipulation (opening or closing) of a shut-off valvemust be carried out by a qualified and authorised engineer.These procedures must be carried out with the unit shut-down.
• Never work on any of the electrical components, until the general power supply to the unit has been cut. During any maintenance operations on the unit, lock the power supply circuit in the open position ahead of the machine. If the work is interrupted, check the lock before resuming the work.
• WARNING: Even if the unit has been switched off, the power circuit remains energized, unless the unit or circuit disconnect switch is open. Refer to the wiring diagram for further details.
• For some units, a separate 220V power supply may exist, check the electrical wiring for more information's
• In case of maintenance operations on fans (grills replacement …) ensure that the power is shut off to avoid automatic restart.
• Before the opening of the refrigerant circuit, check the pressure with manometers or pressure sensors, and purge the circuit.
• Never leave a unit stopped with valves closed on the liquid line, refrigerant could be trapped and the pressure would rise.
• All installation parts must be maintained by the personnel in charge, in order to avoid material deterioration and injuries to people. Faults and leaks must be repaired immediately. The authorized technician must have the responsibility to repair the fault immediately. Each time repairs have been carried out to the unit, the operation of the safety devices must be re-checked.
• Follow guidance and recommendations given in safety and machine standards such as EN378, ISO5149, etc.
• Do not use oxygen to purge lines or to pressurize a machine for any purpose. Oxygen gas reacts violently with oil, grease, and other common substances.
• Never exceed the specified maximum operating pressures. Verify the allowable maximum high- and low-side test pressures by
• Checking the instructions in this manual and the pressures given on the unit name plate.
• Do not use air for leak testing. Use only refrigerant or dry nitrogen.
• Do not unweld or flame cut the refrigerant lines or any refrigerant circuit component until all refrigerant (liquid and vapour) has been removed from rooftop. Traces of vapour should be displaced with dry air nitrogen. Refrigerant in contact with an open flame produces toxic gases.
• Do not siphon refrigerant
• Avoid spilling liquid refrigerant on skin or splashing it into the eyes. Use safety goggles.Wash any spills from the skin with soap and water. If liquid refrigerant enters the eyes, immediately and abundantly flush the eyes with water and consult a doctor.

Main Safety Recommendations

All work on the unit must be carried out by a qualified and authorised employee.
Non-compliance with the following instructions may result in injury or serious accidents.

Work on the unit:
• The unit shall be isolated from the electrical supply by disconnection and locking using the main isolating switch.
• Workers shall wear the appropriate personal protective equipment (helmet, gloves, glasses, etc.).
Work on the electrical system:
• Work on electric components shall be performed with the power off (see below) by employees having valid electrical qualification and authorisation.

Work on the refrigerating circuit(s):
• Monitoring of the pressures, draining and filling of the system under pressure shall be carried out using connections provided for this purpose and suitable equipment.
• To prevent the risk of explosion due to spraying of coolant and oil, the relevant circuit shall be drained and at zero pressure before any disassembly or unbrazing of the refrigerating parts takes place.
• There is a residual risk of pressure build-up by degassing the oil or by heating the exchangers after the circuit has been drained. Zero pressure shall be maintained by venting the drain connection to the atmosphere on the low pressure side.
• The brazing shall be carried out by a qualified brazier. The brazing shall comply with standard NF EN1044 AG107 (minimum 30% silver).

Replacing components:
• Replacement of components shall be carried out using spare parts, or using parts approved by LENNOX.
• Only the refrigerant shown on the manufacturer's nameplate shall be used, to the exclusion of all other products (refrigerant blends, hydrocarbons, etc.).

Transport – Handling- Access:
• Installation of the unit and accessibility must be compliant with the local regulations. Ensure that all access equipments allow maintainance operation in safety (electrical cabinet, main switch, panels, filter, refrigerant circuit…)
• It is strictly forbidden to walk or store equipment or material on top of the rooftop unit

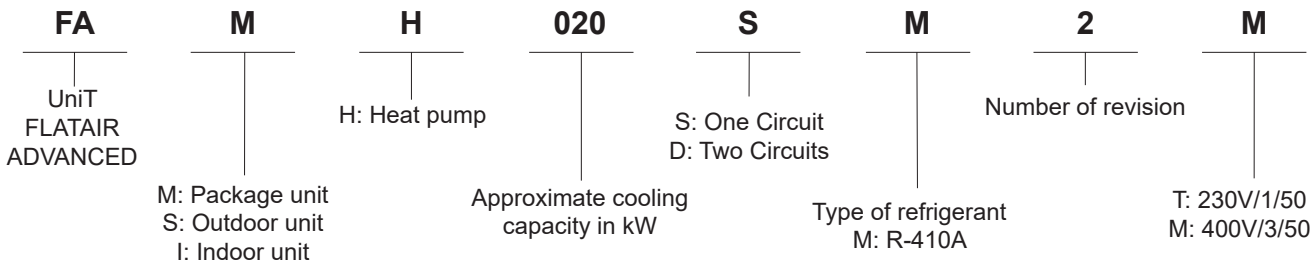
Filters:
• Do the filters fire classification's choice according to local regulations.

the unit is working under pressure. Never open the panels when the unit is working. Even after shutting down the unit, wait for 2 minutes until the fans are completely stopped before opening any panel.

- The units are not designed to resist to a fire. The installation site must comply with the standards relating to fire protection.
- In case of installation of the units in an area recognized as being potentially at risk for natural phenomena (tornado, earthquake, tidal wave, lightning...), please follow the standards and regulations, and provide the necessary devices to prevent from these risks.

CAUTION :
In the event of fire, refrigerating circuits can cause an explosion and spray coolant gas and oil.

1.1. PRODUCT RANGE



UNIT HEAT PUMP.

UNITS		V/Ph/50 Hz	Cooling capacity (kW)			Heating capacity (kW)		
			min	nom	max	min	nom	max
PACKAGED								
FAMH020SM2M		400 V 3 Ph	7.6	17.7	22.2	6.1	16.1	20.5
FAMH035SM2M		400 V 3 Ph	10.5	27.2	32.4	9.8	22.6	29.0
OUTDOOR UNIT	INDOOR UNIT							
FASH020SM2M	FAIH020SM2M	400 V 3 Ph	7.6	17.7	22.2	6.1	16.1	20.5
FASH035SM2M	FAIH035SM2M	400 V 3 Ph	10.5	27.2	32.4	9.8	22.6	29.0

UNITS		V/Ph/50 Hz	EER Cooling mode (kW/kW)			COP Heating mode (kW/kW)		
			min	nom	max	min	nom	max
PACKAGED								
FAMH020SM2M		400 V 3 Ph	4.67	2.81	2.67	4.15	3.60	2.23
FAMH035SM2M		400 V 3 Ph	3.27	2.91	2.47	4.71	3.20	2.46
OUTDOOR UNIT	INDOOR UNIT							
FASH020SM2M	FAIH020SM2M	400 V 3 Ph	4.67	2.81	2.67	4.15	3.60	2.23
FASH035SM2M	FAIH035SM2M	400 V 3 Ph	3.27	2.91	2.47	4.71	3.20	2.46

Cooling: Indoor Tª: 27ºC DB / 19ºC WB. Outdoor Tª: 35ºC DB.
Heating: Indoor Tª: 20ºC DB / 12ºC WB. Outdoor Tª: 7ºC DB / 6ºC WB.

1.2. GENERAL DESCRIPTION

The horizontal self-contained conditioners, FLATAIR ADVANCED 2 range, in the heat pump version are air condensed units that have been designed for small commercial and residential installations. The units consist of two sections, an indoor section and an outdoor section, are units that by their design can be supplied in package and split version. Due to their tight dimensions, they are designed for false ceiling installation, suitable for operation coupled to a network of air distribution ducts in indoor and outdoor sections. With the option of incorporating a wide range of accessories and options available and assembled in your factory for your convenience.

The manufacturing of these units is made under the strict quality requirements of the standard **ISO 9001**.

1.2. GENERAL DESCRIPTION

CASING
Galvanized and painted sheetmetal casing. The units incorporate metal supports attached to the base, for its correct handling and hoisting. These supports allow to install the unit on the floor or hanging from the ceiling, providing great rigidity to the installation of the unit. The panels are easily interchangeable allowing several alternatives of impulsion and return air. The outdoor and indoor sections are insulated thermally and acoustically. In the indoor units, an insulation with aluminum mesh protection with M1 and F1 classification is used, certifying that this material is self-extinguishing in case of fire, avoiding the formation of fumes that could enter the premises to be conditioned. In the outdoor units, insulation with M1 classification is used.

MAIN SWITCH
Located in the access panel to the electrical board and equipped with a mechanism which only allows the opening of the panel of the electrical board when the switch is OFF position.

INDOOR - OUTDOOR UNIT INTERCONNECT CABLE
The connection between indoor and outdoor units, must be carried out using a shielded cable of 3 x 0.5 mm^2.

COMPRESSORS
All the models incorporate a Inverter compressor type Scroll with “brushless” motor (BLDC), which by means of an electronic system regulates the engine revolutions and through the frequency variation adapts to the needs of the installation and modulates the gasflow of the refrigerant in all moment.
The compressor is mounted on silentblocks.

AIR FILTER
Washable air filter, self-extinguishing material in case of fire with M1 classification, high filtering efficiency, with G2 classification. With the possibility of extracting it from the bottom and lateral side.
Optional: High Efficiency Filter M5+F7.

FANS
The fans of the indoor and outdoor sections are of EC Plug Fan type. The fans are regulated automatically to obtain a variable air volume in indoor and outdoor unit.
Optional: Fan with metal blades, for outdoor and indoor units size 020.

REFRIGERANT CIRCUIT
Made with dehydrated copper tubes welded with pressure sockets with a shutter valve on the suction and unloading lines, in outdoor and indoor section. The unit incorporates a high-pressure minipresostat and high-pressure and low-pressure transducers. It incorporates dehydrator filter, expansion system with electronic valves, one in the package units and two in the split units. The units in heat pump incorporate suction accumulator to avoid the migration of liquid to the compressor, reversible valve for inversion cycle and unidirectional valves. The split units also include an oil separator.

EXCHANGERS
Manufactured with copper tubes and corrugated or lourvered aluminum fins, designed to get high heat transfer. Their dimensions and design of the circuits have been specially studied to obtain the maximum performance of the exchangers, increasing the capacity of the unit and reducing the consumption.

ELECTRICAL CIRCUIT
Designed according to standard EN-60204-1. With thermal protection magnets for compressors and fans. All compressor and fan motors incorporate internal thermal protectors. An electronic control governs the operation of the unit, manages the “driver“ of the compressor, the fans EC Plug Fan and the electronic expansion valves.

1.2. GENERAL DESCRIPTION

OPTIONS

Fresh air:
- Kit Freecooling 1 damper

Filtration:
- High efficiency filter: M5+F7

Auxiliary Heat :
- Electrical resistance mounted inside the standard, medium or high capacity unit

Air Configuration :
- Return airflow - Air treatment unit (D1)
- Supply airflow - Air treatment unit (C1)
- Air inlet - Condensing unit (B1)
- Air outlet - Condensing unit (A1)

Security and electricity :
- Air quality sensor (CO_2)
- Smoke detector
- Analog dirty filter sensor
- Three phases relay for unit electrical protection

Coils treatment:
- Anticorrosion protection condensor & evaporator coils.

Control and comunication:
- Remote display DC for user.
- Service display DS.
- Multi Unit Display DM.
- Remote probe in environment.
- Modbus RS485 comunication interface.
- LonWorks FTT10 comunication interface.
- BACnet MSTP comunication interface.
- Modbus/BACnet/Ethernet TCP/IP comunication interface.
- Remote control board.

Others:
- A1 Insulation air treatment unit.
- Low noise: compressor acoustic insulation.
- Fan with metal blades, for outdoor and indoor units size 020.

DC

DM

DS

1.3. PHYSICAL DATA

PACKAGED UNIT		FAMH020SM2M	FAMH035SM2M
Cooling capacity (*)	kW	22.2	32.4
Heating capacity (**)		20.5	29.0
Nominal absorbed power (Cold) (*)		8.3	13.1
Nominal absorbed power (Heating) (**)		9.2	11.8
DIMENSIONS			
Height	mm	670	770
Width		1500	1950
Depth		1980	2050
Net weight	kg	340	573
OUTDOOR UNIT		**FASH020SM2M**	**FASH035SM2M**
Number and type of compressor		1 / Scroll BLDC	1 / Scroll BLDC
Number and type of fan		1 / EC Plug Fan	1 / EC Plug Fan
Nominal airflow	m^3/h	5600	9600
Available preassure	Pa	30	30
DIMENSIONS			
Height	mm	670	770
Width		1500	1950
Depth		1205	1060
Net weight	kg	220	348
PIPING CONNECTIONS			
LIquid	"	1/2"	5/8"
Gas		7/8"	1 1/8"
INDOOR UNIT		**FAIH020SM2M**	**FAIH035SM2M**
Number and type of fan		1 / EC Plug Fan	1 / EC Plug Fan
Airflow rate (low / medium / high speed)	m^3/h	1800 / 3700 / 4500	2800 / 5600 / 6200
Available preassure (***)	Pa	40 / 300	40 / 300
DIMENSIONS			
Height	mm	670	770
Width		1500	1950
Depth		775	990
Net weight	kg	135	243
PIPING CONNECTIONS			
Liquid	"	1/2"	5/8"
Gas		7/8"	1 1/8"
NET WEIGHT OF OPTIONS			
Free-cooling, 1 damper	kg	14	14
Electrical Coil		7	7
Filter M5+F7		31	31
Fan with Metal Blades		8.4	

(*) At 120 rps, air intake temperature in indoor exchanger: 27ºC BS / 19ºC BH.
(*) At 120 rps, air intake temperature in outdoor exchanger: 35ºC BS.
(**) At 120 rps, air intake temperature in indoor exchanger: 20ºC BS / 12ºC BH.
(**) At 120 rps, air intake temperature in outdoor exchanger: 7ºC BS / 6ºC BH.
(***) Adjustable by DS terminal.

BS - Dry bulb temperature.
BH - Wet bulb temperature.

1.4. ELECTRICAL DATA

ELECTRICAL CONSUMPTIONS.

PACKAGED UNIT		FAMH020SM2M	FAMH035SM2M
Voltage	V/f (50 Hz)	400V / 3Ph ± 10%	400V / 3Ph ± 10%
Total maximum power	KW	12.41	19.67
Total maximum current	A	23.32	35.03
OUTDOOR UNIT		**FASH020SM2M**	**FASH035SM2M**
Voltage	V/f (50 Hz)	400V / 3Ph ± 10%	400V / 3Ph ± 10%
MAXIMUM POWER CONSUMED			
Maximum compressor power	KW	9.64	14.24
Outdoor fan power		1.32	2.65
Total maximum power		11.09	17.02
MAXIMUM CURRENT			
Maximum compressor current	A	18.79	26.5
Outdoor fan current		2.1	4.1
Total maximum current		21.22	30.93
INDOOR UNIT		**FAIH020SM2M**	**FAIH035SM2M**
Voltage	V/f (50 Hz)	400V / 3Ph ± 10%	400V / 3Ph ± 10%
Total maximum power	KW	1.4	2.73
Total maximum current	A	2.3	4.3
OPTIONAL ELECTRICAL COIL		**FAMH020SM2M**	**FAMH035SM2M**
POWER			
Standard	KW	4.5	4.5
Medium		9.0	9.0
High		15.0	15.0
CURRENT			
Standard	A	6.5	6.5
Medium		13.0	13.0
High		21.5	21.65
OPTIONAL FAN WITH METAL BLADES		**FAMH020SM2M**	
POWER			
Total maximum power	KW	0.58	
CURRENT			
Total maximum current	A	0.9	

1.5. OPERATING LIMITS.

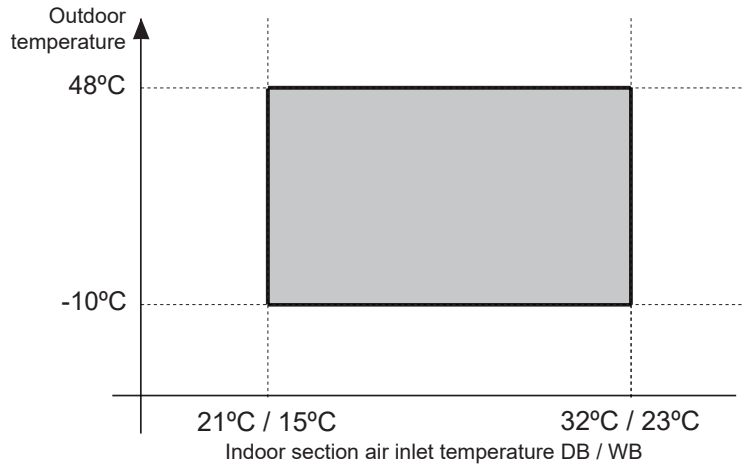
Operating Limits		Maximum temperatures	Minimum temperatures
Cooling Cycle Operation	Indoor temperature	32ºC BS / 23ºC BH	21ºC BS / 15ºC BH
	Outdoor temperature	48ºC	-10ºC
Heating Cycle Operation	Indoor temperature	24ºC BS	15ºC BS
	Outdoor Temperature	25ºC	-12ºC

BS: Dry Bulb Temperature

BH: Wet bulb temperature

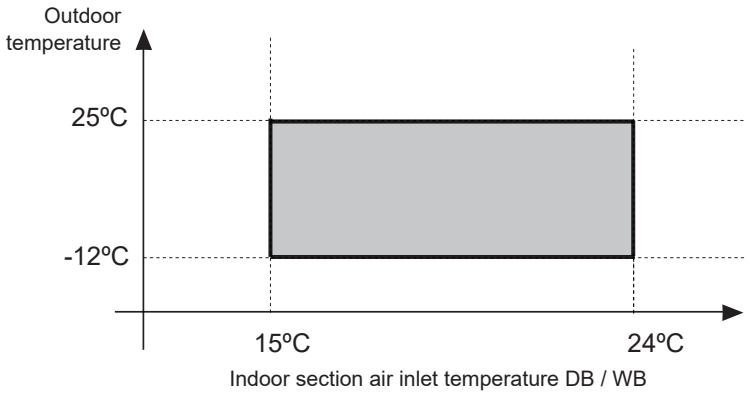
COOLING MODE

B.H: Wet bulb temperature.
B.S: Dry bulb temperature.



HEATING MODE

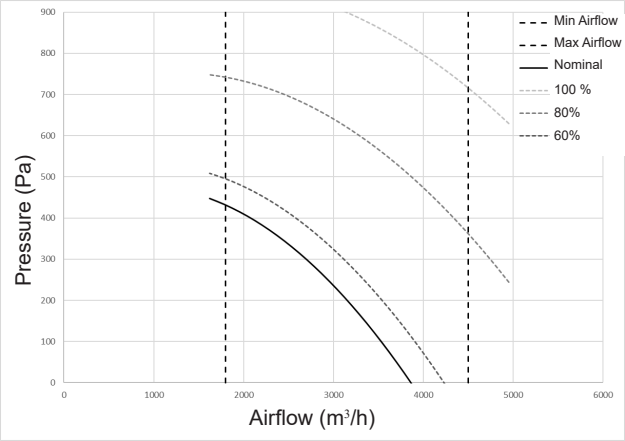
B.H: Wet bulb temperature.
B.S: Dry bulb temperature.



1.6. FAN PERFORMANCES.

INDOOR FANS (Nominal speed).

FAMH020SM2M
FAIH020SM2M



FAMH035SM2M
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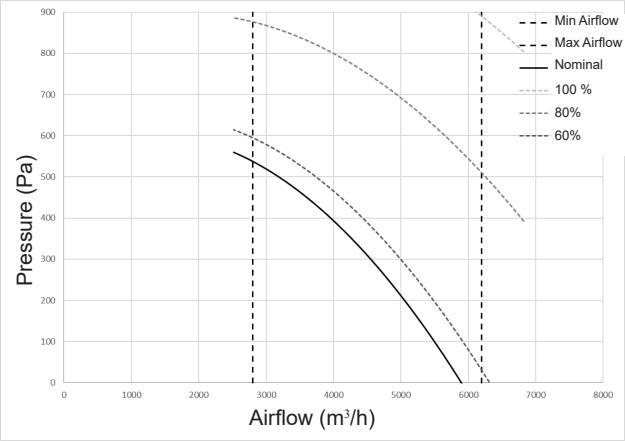
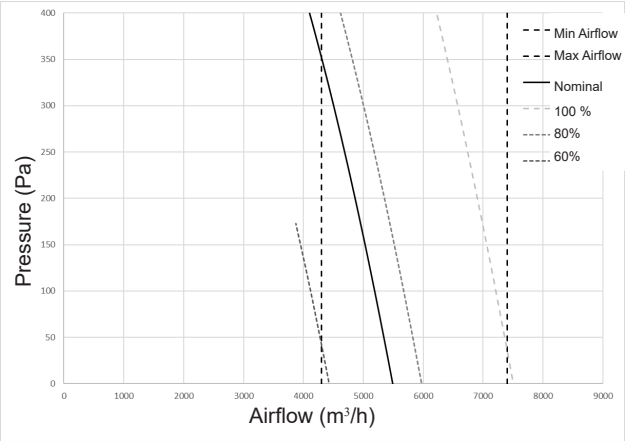
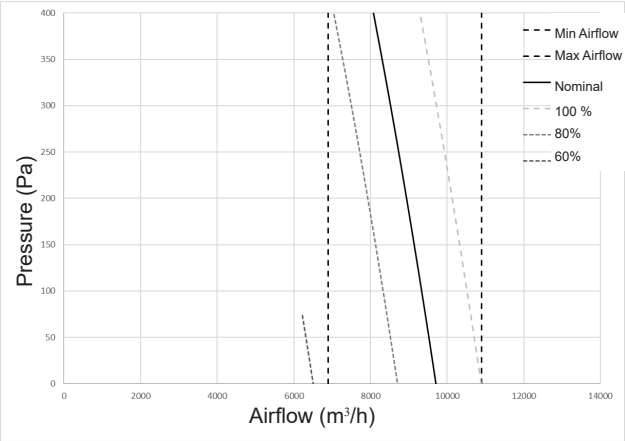


OUTDOOR FANS.

FAMH020SM2M
FASH020SM2M



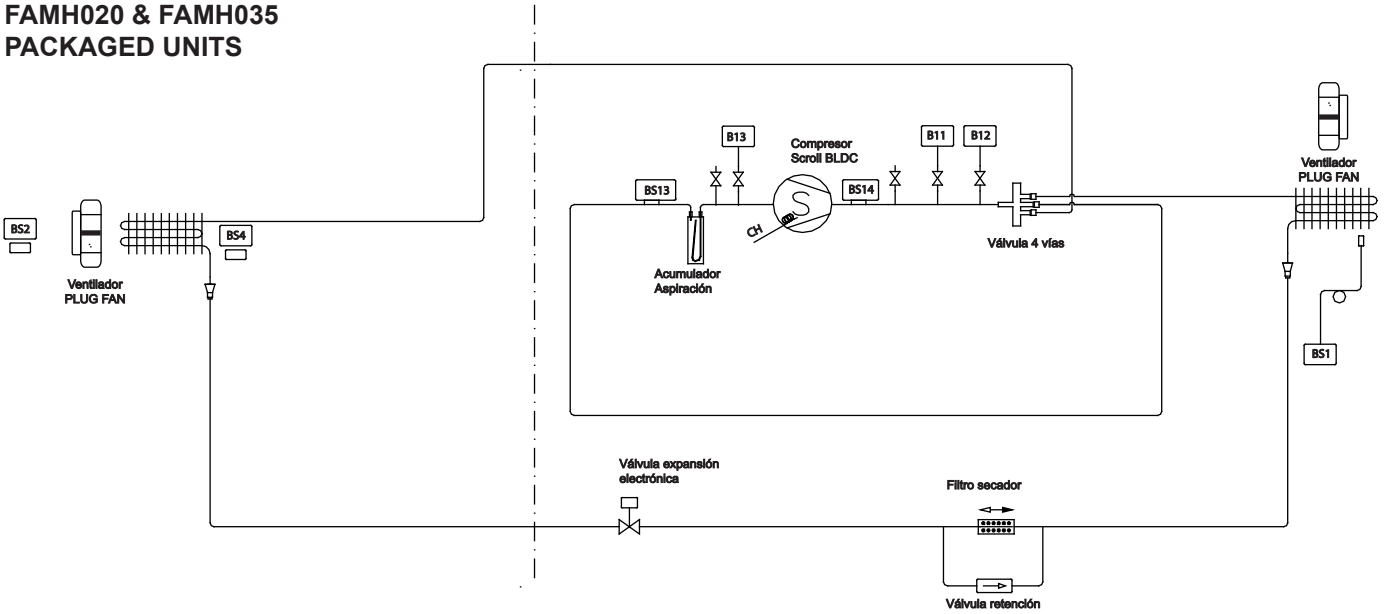
FAMH035SM2M
FASH035SM2M



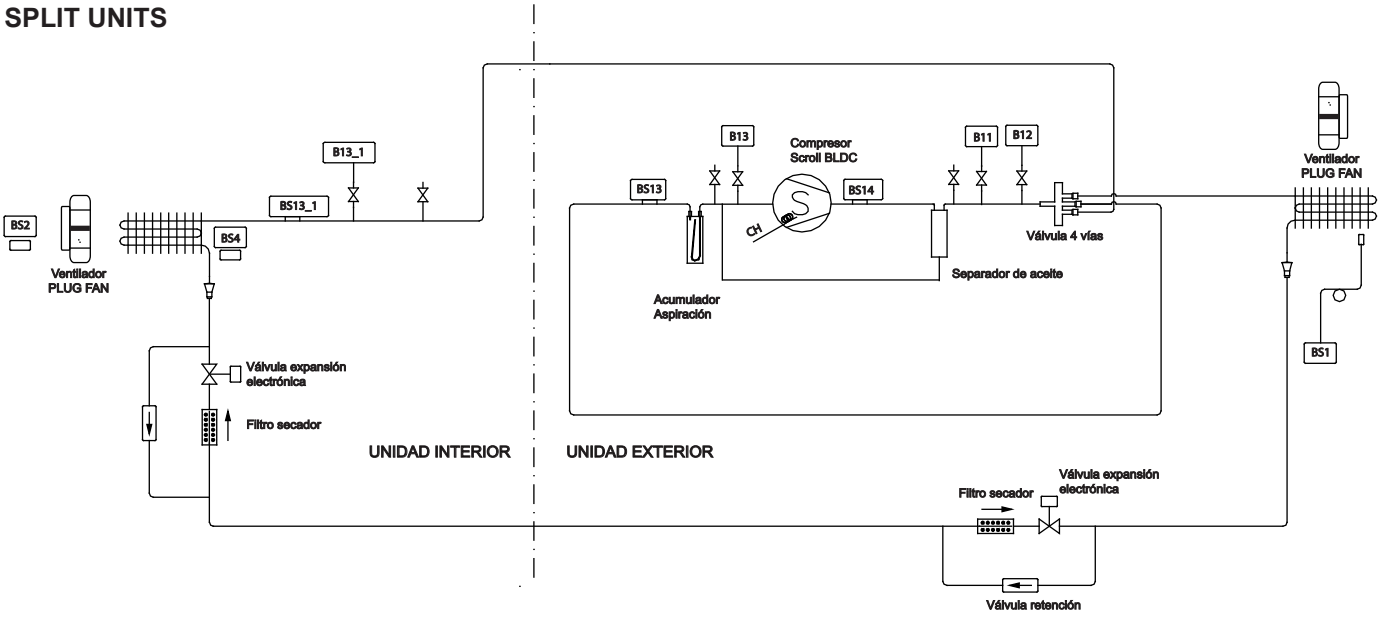
The curves show the adjustment for the nominal airflow. Other regulations are possible to reduce or increase fan performances.

1.7. PIPING DRAWINGS

FAMH020 & FAMH035 PACKAGED UNITS



FASH/FAIH020 & FASH/FAIH035 SPLIT UNITS



	Pressure gauge (5/16" to be fitted by the installer)
B11	High pressure switch
B12	High pressure transducer
B13	Low pressure transducer
B13_1	
CH	Crankcase heater

BS1	Outdoor temperature sensor
BS14	Unloading sensor
BS13	Suction sensor
BS13_1	
BS4	Air return sensor
BS2	Impulsion air sensor

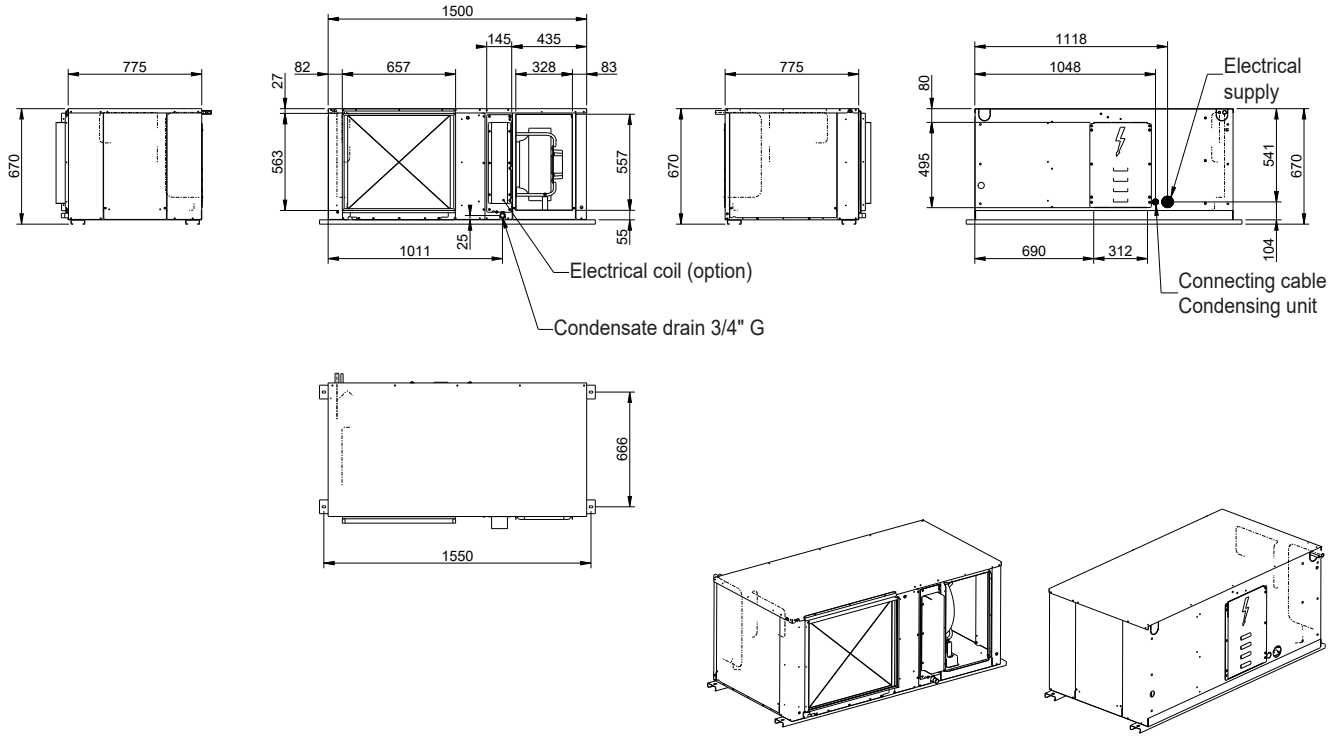
1.8. ACOUSTIC DATA

		020								
	Hz	63	125	250	500	1000	2000	4000	8000	Lwa dB(A)
Standard unit	Indoor side in duct	56,9	58,5	67,2	68,1	67,1	67	66,5	60,3	73
	Outdoor side in duct	64,4	67	74,7	75,9	76,6	78,1	75,8	73,7	83
	Outdoor side radiated	54,5	59,5	64,8	66,6	70,3	72,8	69,2	69,3	77
Low noise option	Indoor side in duct	56,9	58,5	67,2	68,1	67,1	67	66,5	60,3	73
	Outdoor side in duct	64,4	66,3	74,7	75,7	75,3	75,5	74,3	69,4	82
	Outdoor side radiated	54,4	57,2	64,7	65,9	67,1	67,8	65,4	62,5	73
		035								
	Hz	63	125	250	500	1000	2000	4000	8000	Lwa dB(A)
Standard unit	Indoor side in duct	65	66,1	69,3	70,9	71,8	69,4	67,9	74	78
	Outdoor side in duct	75,2	76,8	79,5	81,1	82,3	80,7	79	84,6	89
	Outdoor side radiated	65,3	68,4	69,8	71,4	73,3	73,1	71,3	75,8	80
Low noise option	Indoor side in duct	65	66,1	69,3	70,9	71,8	69,4	67,9	74	78
	Outdoor side in duct	75,2	76,4	79,5	81,1	82,1	79,8	78,2	84,2	88
	Outdoor side radiated	65,2	66,9	69,5	71,2	72,4	70,6	68,8	74,5	79

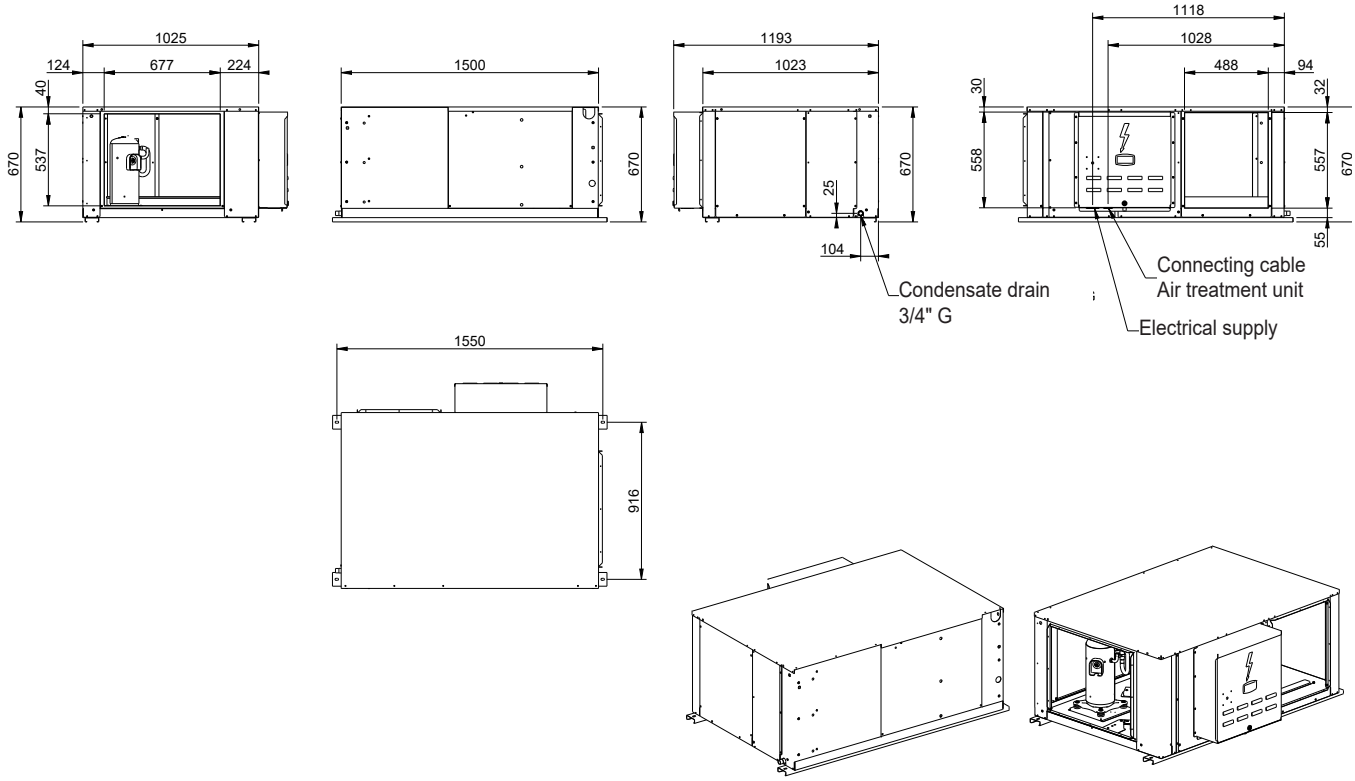
Values for the nominal conditions

1.9. SPLIT UNITS DIMENSIONS

FAIH 020

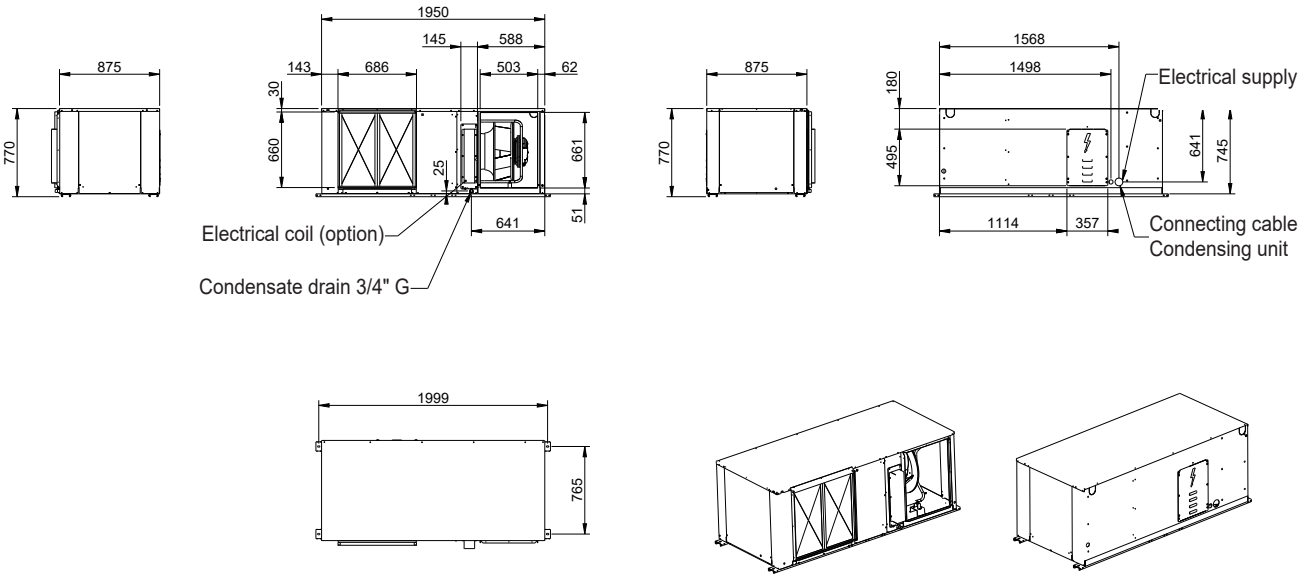


FASH 020

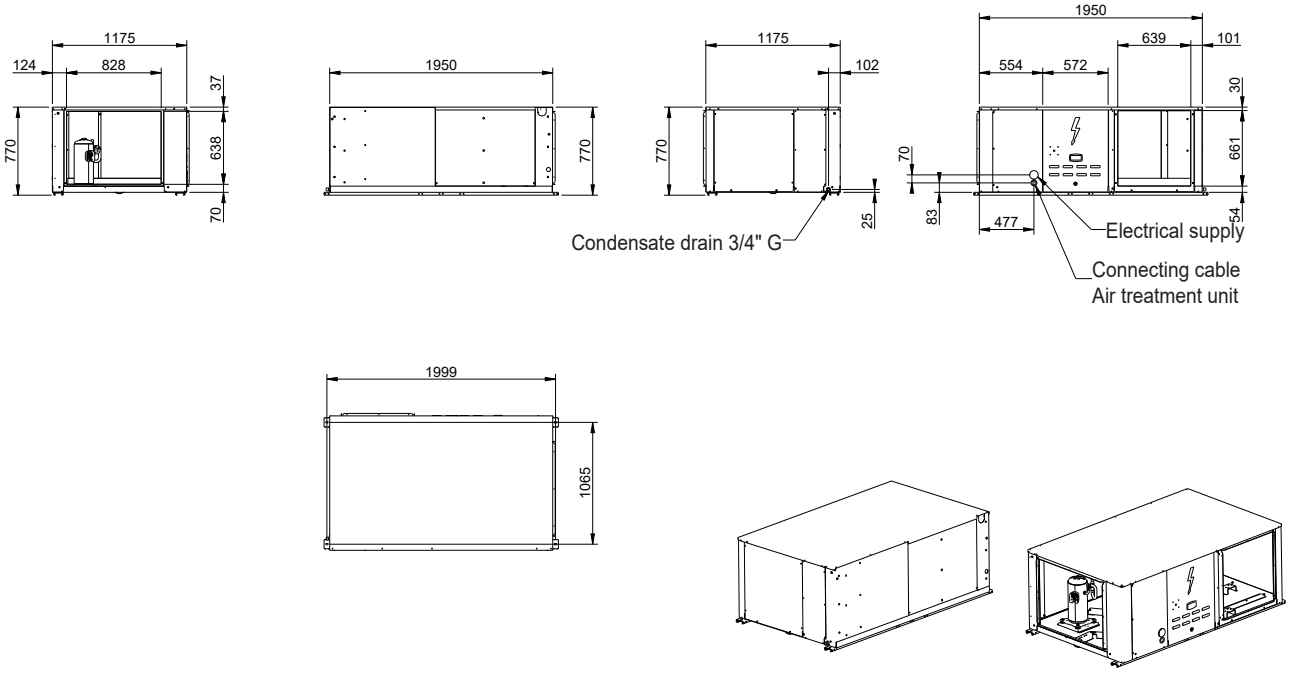


1.9. SPLIT UNITS DIMENSIONS

FAIH 035

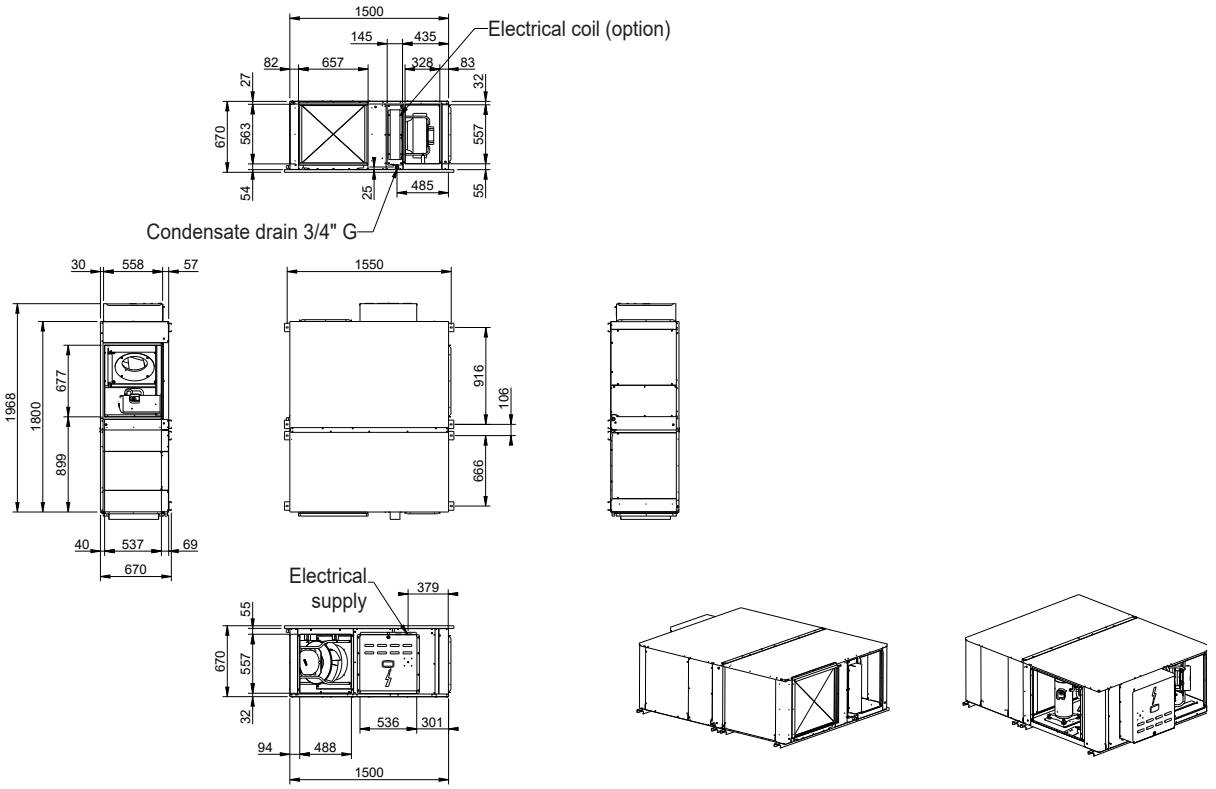


FASH 035

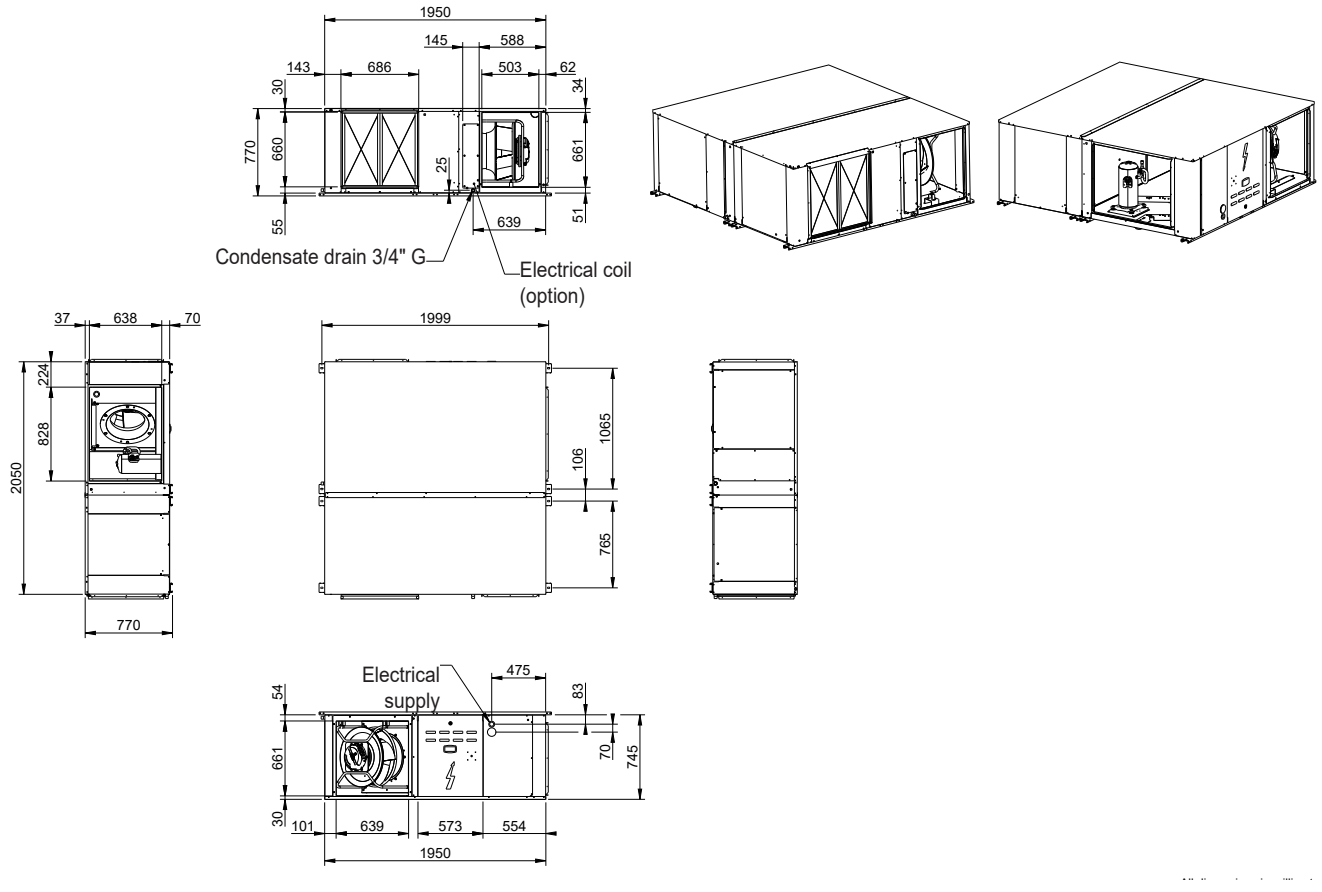


1.10. PACKAGED UNITS DIMENSIONS

FAMH 020

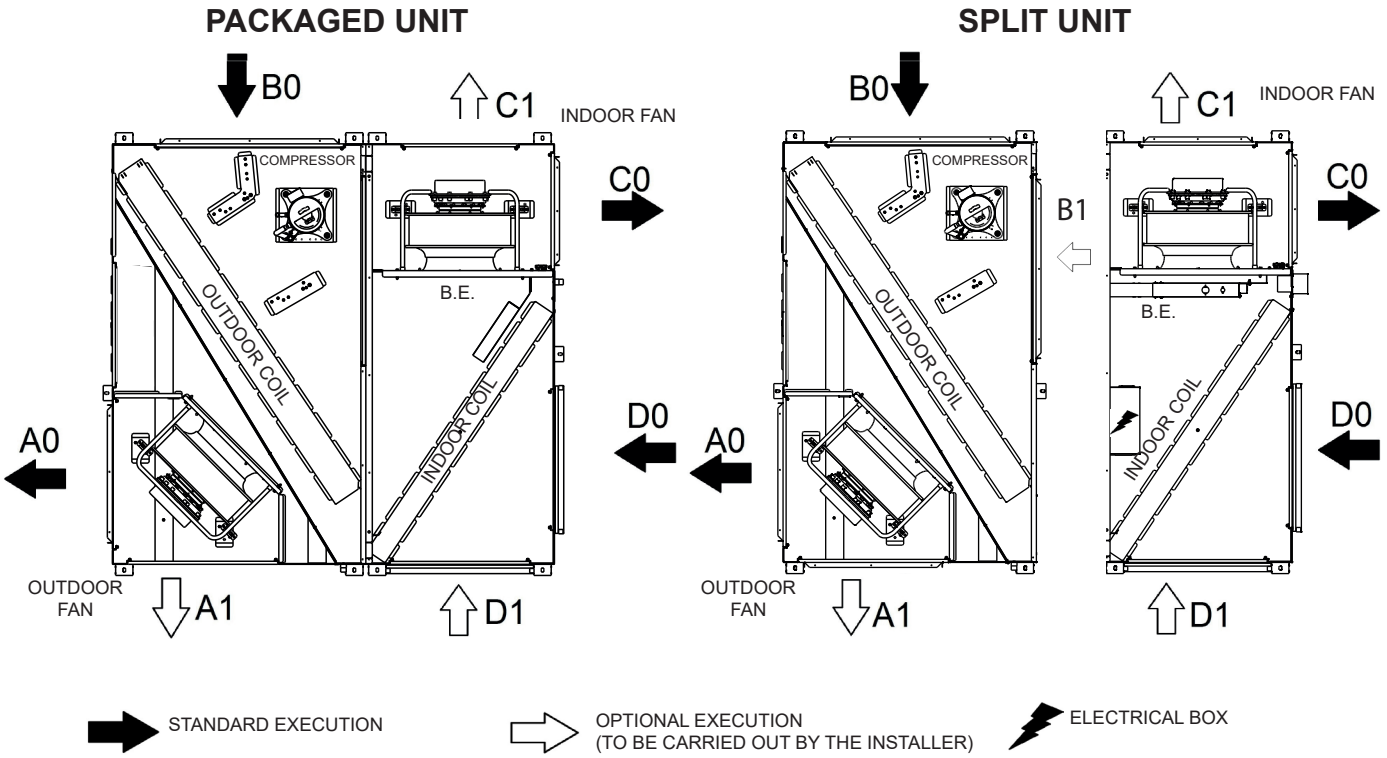


FAMH 035

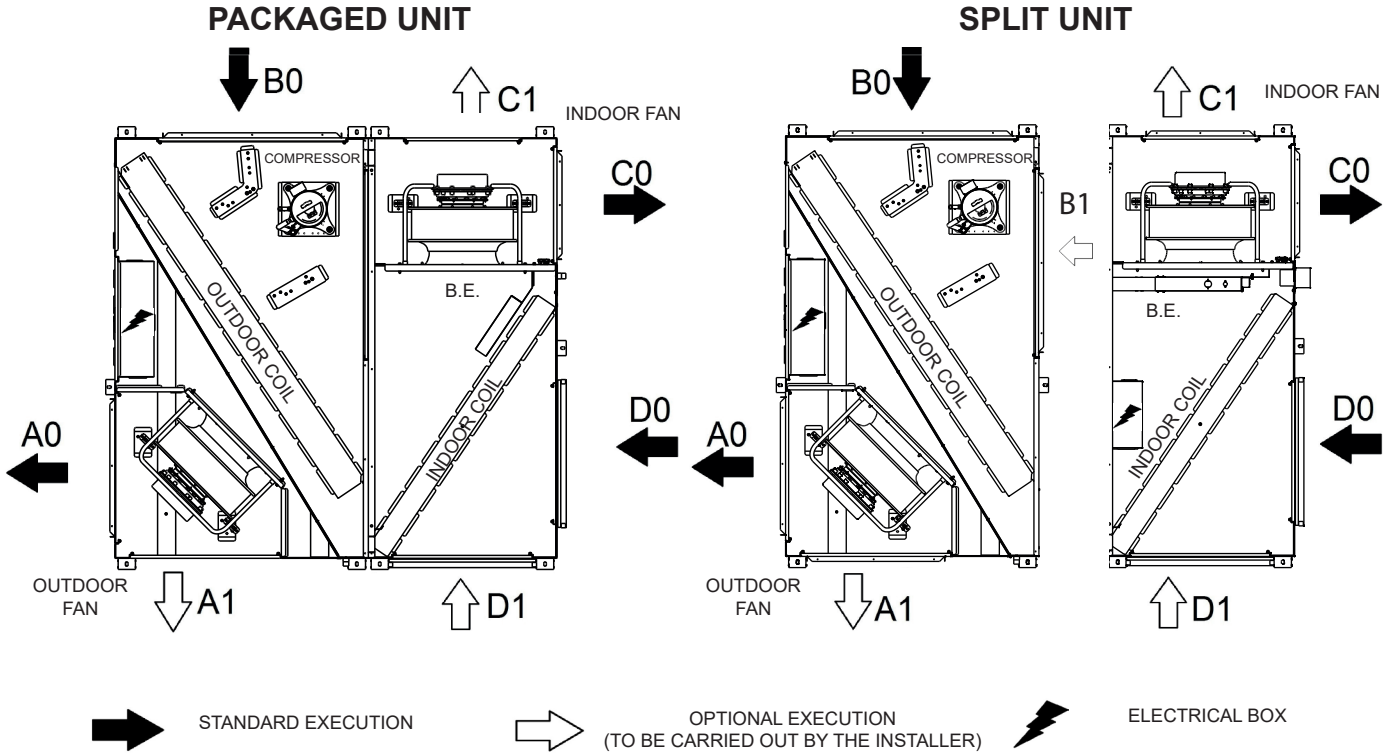


1.11. AIRFLOW CONFIGURATION - DUCT POSITIONS

MODEL 020



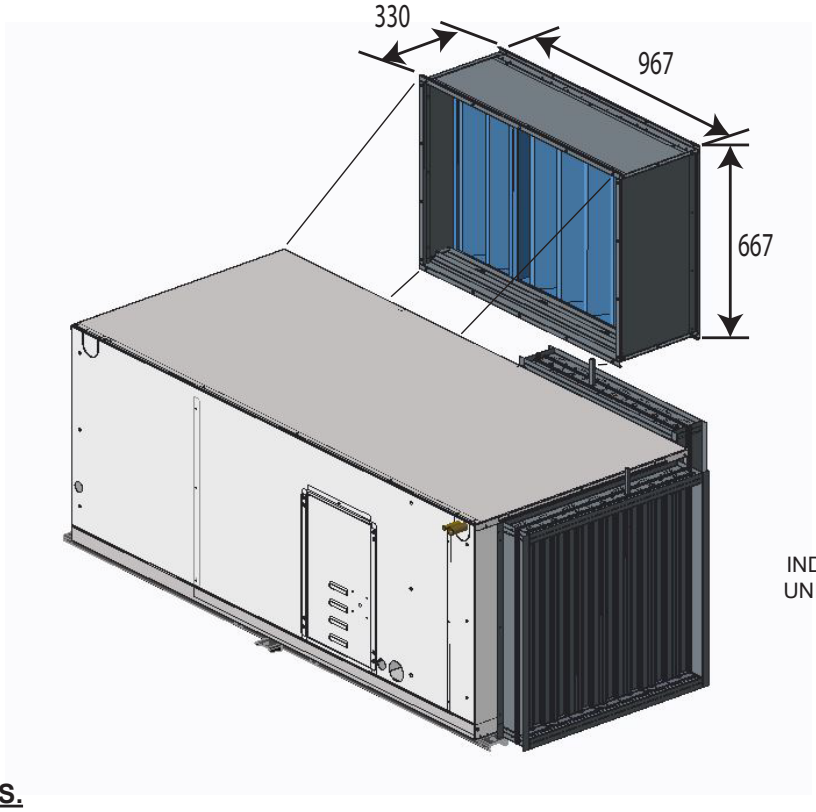
MODEL 035



1.12. OPTIONS.

FILTRATION OPTIONS.

High Efficiency Filter: M5+F7.
The filter is supplied alone and must be placed in the fan exit.



CONTROL OPTIONS.

DC - User terminal.
Remote controller very easy to use, with the following features:

- o Switched on/Switvhed off.
- o Operation selection mode: (Cold/Heat/Auto).
- o Airflow manual adjustment (3 speeds).
- o Environment temperature selection.
- o Airflow settings (Mini/Nominal/Max/Auto).
- o Time setting.
- o Environment temperature display.
- o Alarm codes display.
- o Conected units supervision (until 10).

A control DS is requered to activate this function (Expert mode) and it must be adjust by a Lennox technician.

DC

DS - Service terminal.
Terminal which allows the access to the control menu and adjustment all parameters. 24V customer display situated to a maximum distance of 30 meters to the unit. Remote reading and modification of the customer parameters.

DS

DM - Terminal to view time and zone settings.
It is possible to configure until 7 time zones each day with 4 operating modes per zone. It can be configured with the DM or during installation by a Lennox technician.

DM

CONTROL OPTIONS.

Communications: MODBUS / BACNET / LONWORKS.
The control board is equipped with a RS485 serial communications port which allows remote management through a communications bus. Depending on the desired communication protocol, the board can be equipped with the ModBUS®, LonWorks® or BacNET® communications interface.

Expansion Band.
In the package units, the expansion board is located in its electrical board and in the split units, the expansion board is situated in the electrical board of the outdoor unit.

AUXILIARY HEATING OPTIONS.

Electric resistance.
It is supplied mounted on the unit.

Units	020	035
ELHS2 (Kw)	4.5 Kw	4.5 Kw
ELHM2 (Kw)	9 Kw	9 Kw
ELHH2 (kW)	15 Kw	15 Kw

DIRTY FILTER ANALOGICAL INDICATION.

A differential pressure controller measures the charge loss through the evaporator coil and the pre-filters. The set point between dirty and clean can be checked by the installer.
With dirty filter alarm, check coils and other filters if selected in option.

ELECTRIC AND SECURING OPTIONS.

Indoor air quality sensor.
The indoor air quality is controlled with the CLIMATIC ™ main controller through a COV (volatile organic compound) sensor which detects the amount of CO2 in the air between 0 and 2000 ppm. (This value varies depending on the occupancy levels of the space). The sensor sends a signal (0-20 mA) to the controller to modulate the outside air.

Environment remote sensor.
It can be used when you want to regulate through the temperature where the sensor is situated and not through the return temperature, which is how the standard unit comes out.

Freecooling.
It is a energy saving system through a regulation of dampers, through which outside air is introduced to the local when the outside temperature is lower than the local. This option is composed of regulating gate or gates and a servomotor. Available in two versions with an external air damper, or adding a second damper for the return of the local.

Smoke detector.

Three phases relay for unit electrical protection.

COILS TREATMENT.

Anticorrosion protection condensor & evaporator coils.

OTHER OPTIONS.

Compressor acoustic insulation.
Attenuates the sound level produced by the unit through an insulation that covers the compressor.

Insulation air treatment unit.
This insulation, which covers the indoor unit, provides a fire propagation rating A1.

Fan with metal blades.
For outdoor and indoor units size 020. To comply with local fire regulation in some countries for public area application.

2.1. PRELIMINARY PREPARATIONS

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

Warranty will be validated only with commissioning report done by Lennox or a company qualified

The unit must be transported in a HORIZONTAL POSITION on its metal mounting frame. Any other position may cause serious damage to the machine.

When the unit is received, it should be checked to assure that it has received no shocks 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 stating why the machine is unacceptable on the transport agent's delivery note. Any later complaint or claim made to the LENNOX Distribution Department for this type of damage cannot be considered under the Guarantee.

The modifications that the customer makes in the units will be under his responsibility and in this case, the declaration of conformity certificate of Lennox manufacturer will not be valid.

Suffi cient space must be allowed to facilitate installation of the unit.

When unpacking the machine, have a correct segregation of non-hazardous waste coming from packaging: Plastic film or other plastic elements, metal strips, wood and pallets, through authorized dealers, or segregate them in the containers destined for this purpose

Follow the installation instructions established in this manual to avoid disturbing noise caused by movement or shocks due to deficient installation of the unit.

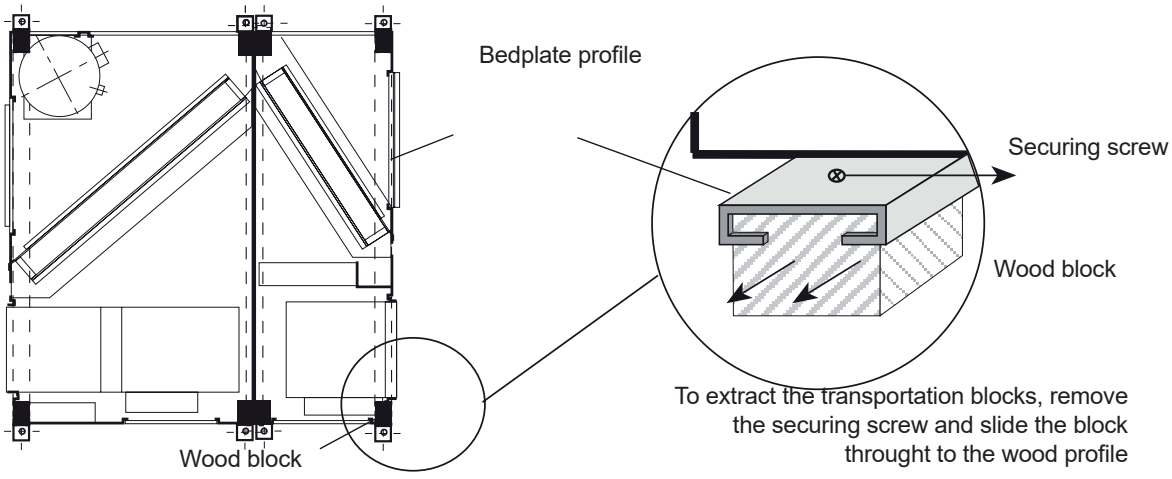
When positioning the unit, be sure that the Rating Plate is always visible since this data will be necessary to ensure correct maintenance.

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

Defrosting: To avoid ice accumulation in the driptray , it may be necessary to install an electrical heater and inside the drainage connection , to drain correctly the water. The drainage must be always accessible through the indoor part , in order to remove easily the dirty than may be accumulated.

2.2. UNIT ACCEPTANCE.

For transportation, the units 020 have metal bedplate profiles and wooden blocks, while the units 035 have metal bedplate profiles and wooden bedplate. These wooden blocks and wooden bedplate must be removed when positioning the unit in its final position.



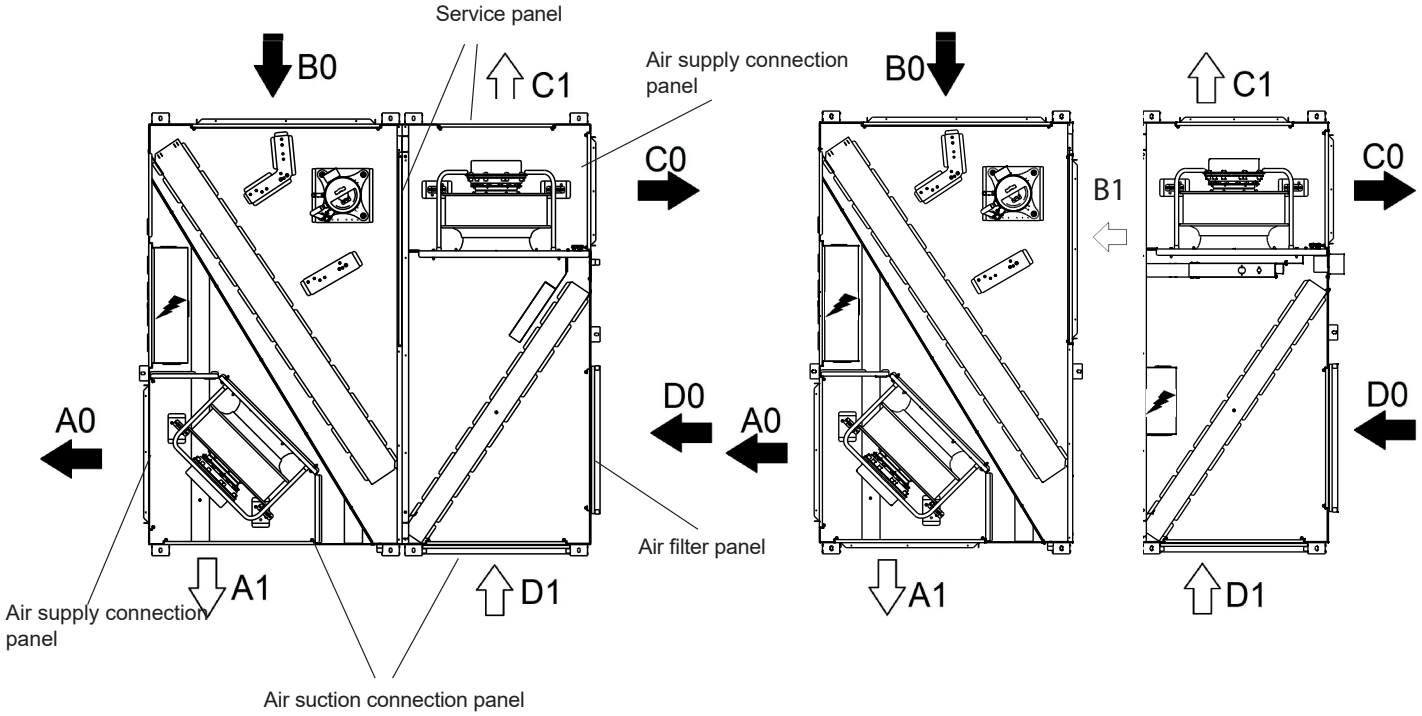
PLACEMENT OF BEDPLATE AND TRANSPORTATION BLOCKS

How to hoist the unit

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

2.3. OPTIONAL OPERATIONS PRIOR TO UNIT INSTALLATION
INTAKE FAN AND PENINGS POSITION CHANGE

020 - 035



OUTDOOR SECTION

SUPPLY.

From the position A0 to the position A1.

1. Remove the intake opening and the service panel.
2. Switch the position of the intake opening and service panels.

INLET.

From the position B0 to the position B1.

1. Remove the intake opening and the service panel.
2. Switch the position of the intake opening and service panels.

INDOOR SECTION

SUPPLY.

From the position C0 to the position C1.

1. Remove the intake opening and the service panel.
2. Switch the position of the intake opening and service panels.

RETURN.

From the position D0 to the position D1.

1. Remove the intake air filter and the service panel.
2. Switch the position of the air filter and service panels.

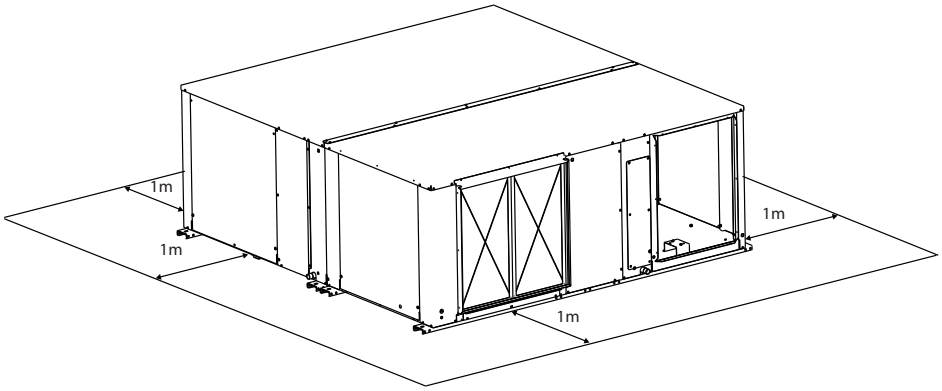
The FLATAIR ADVANCED 2 units have been designed for only indoor installation. For outdoor installation, you can provide a structure or roof, that prevents water or other external, in sensitive elements of the unit, like the electrical panel.

2.4. UNIT LOCATION

The bedplate is made up of three galvanized metal channels, capable of withstanding the weight of the units whether hung from the ceiling or mounted on the floor.
If the unit is fl oor mounted, then the profi les should be isolated with shock absorbing material such as anti-vibration or pads. Keep in mind that fans rotate at approximately 850 rpm.
If the unit is hung, M-10 threaded rods should be used along with shock absorbing ceiling supports.

2.5. 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 ducts, drainage connections, electric installation and cleaning filters, as well as easy access to the unit.



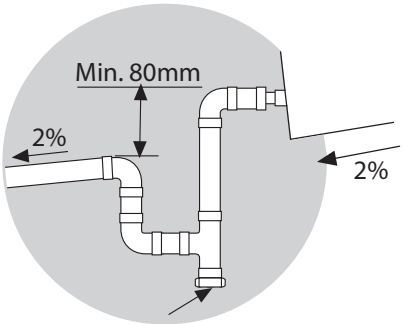
For the unit with option FREECOOLING, it should be kept in mind, that bedplate anchors cannot be used to hang the unit.

2.6. DRAINS.

All the outdoor and indoor sections of these units have a 3/4” steel threaded drain pipe welded to the condensation tray.
Drainage pipes will be fi tted for each tray through a siphon.
The pipes should have an inclination of 2% to ease drainage of condensation.

Also slightly tip the unit (2%) toward the drainage side. Check that the condensation trays are clean and free from dirt and other debris from the works and that water drains correctly.

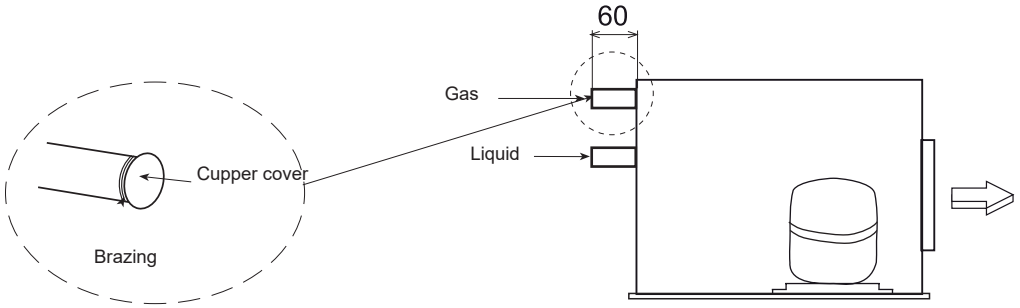
The drains must be independents, no connect the condenser drain with the evaporator drain.



Inspection and cleaning stopper

2.7. COOLING CONNECTIONS

Split units are supplied with gas and liquid lines sealed with copper covers, and located 60mm from casing.



Split units are supplied with nitrogen gas, which must be removed before carrying other operation and then proceed as follow.

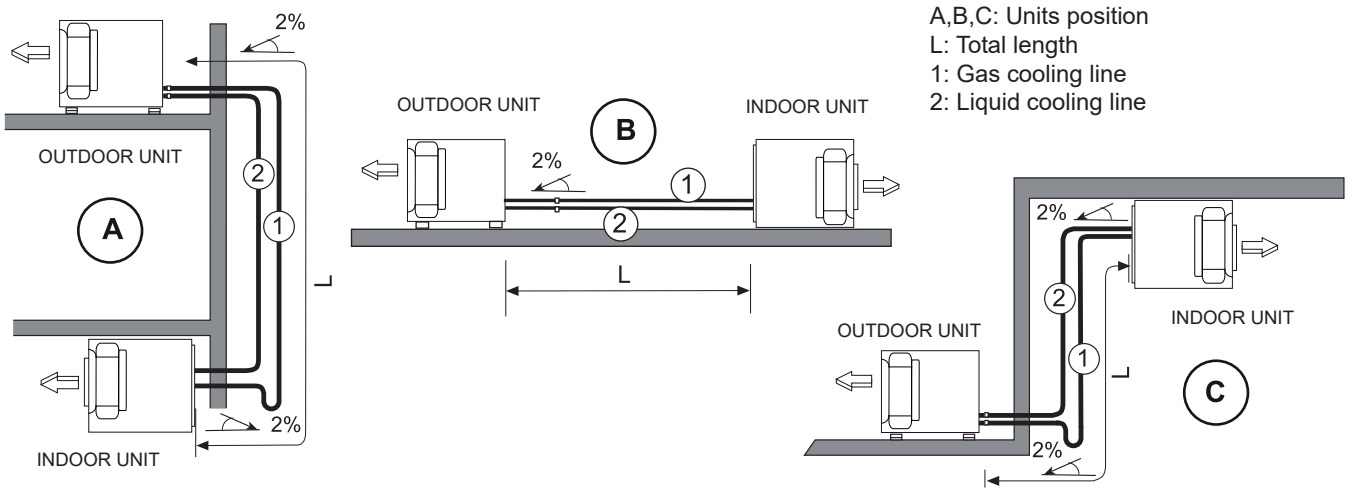
1. Remove the nitrogen gas through the high and low 5/16” service ports located inside and provide a low vacuum for safety.
2. Remove the caps from the connecting lines.
3. Braze the piping connection lines. Select piping diameter from table 2.7.1.
   (When brazing refrigerant pipes, nitrogen gas must be supplied into the pipes through the service ports to remove the air).
4. Leak test:
   Add nitrogen gas, check that a pressure of 5 kg/cm^2 has been reached and that there are no leaks in the circuit or brazing by applying soapy water to the pipes which will cause the bubbles to form where there are leaks. To detect small leaks, proceed as follows :
   Add nitrogen gas and check that a pressure of 25 kg/cm2 has been reached, there are no leaks if the pressure remains the same for at least 24 hours and the fi nal pressure is not less than 10% below the initial pressure.
5. Ensure that the gas line is insulated.
6. Evacuation:
   Remove the nitrogen gas, connect the gauge manifold and vacuum pump to both the liquid and gas lines, fully open the gauge manifold valve and switch on the vacuum pump. Check to make sure the gauge shows a pressure of -750mm Hg. Once a level of -750mm Hg is reached, keep the vacuum pump running for at least one hour.
7. Refrigerant charge:
   - Check TABLE 3.1. and 3.2. for the amount of refrigerant charge, depending on the length and size of the pipe connections.
   - Disconnect the vacuum pump and connect to the refrigerant-charging bottle. Open the charging pump and purge the air from the hose at the pressure gauge manifold.
   - Set up the amount of additional refrigerant on the weighing scale, open the high pressure and charged in the liquid state. If the total amount of refrigerant charge has not been reached because the pressure is balanced, turn off the high side of the gauge manifold, turn on the unit, and add the remaining amount of the refrigerant charge required slowly through the low side of the pressure gauge (With R-410A refrigerant, the charging bottle must be in a vertical position and charged in the liquid state).
   Close the pressure gauge, disconnect it from the from the service port of the unit and fi t caps on the service ports. The unit is then ready to operate.

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 line installation.

Legislation does not allow refrigerant gas emissions to the atmosphere, so the refrigerants have to be recycled to avoid being released to the atmosphere. Those recycled refrigerants shall be processed afterwards by an authorized waste manager.
Those components derived from the recycling of the unit have to be managed by authorized waste manager or be left in local waste facilities according the local normative in each country.

2.7. COOLING CONNECTIONS

To determinate the cooling lines between outdoor and the indoor units, refer to the following information:



POSITION A:
A syphon suction must be installed on the vertical line of the gas line 1, and syphons must be installed every 8 meters upward. The minimum speed suction must not be below 6 m/s.

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

POSITION C:
Install a syphon at the base of the vertical line, no more syphons are necessary.

TABLE 2.7.1. COOLING LINES

COOLING LINES			UNIT -MODEL		UNIT -MODEL Position A Vertical line	
			020	035	020	035
Total Length	0 a 30m	Liquid	1/2”	5/8”	1/2”	5/8”
		Gas	7/8”	1 1/8”	5/8”	7/8”
Maximum vertical length (m)			15	15	15	15
Maximum number of bends			12	12	12	12

For lengths between 30 and 50 m or longer, it should carry out a previous calculation, according to our commercail-technical department or corresponding distribution, with the prupose of determinating other aspects to carry out in the installation (oil adittional charge, solenoid valve, etc.)

Split units are supplied with nitrogen gas. The installer should remove this gas and charge the units with the corresponding charge of refrigerant R410A , shown in the table 2.7.2 plus the charge by additional meter shown in the table 2.7.3.

TABLE 2.7.2 : REFRIGERANT CHARGE

MODELS		020	035
Refrigerant charge R410A (kg)	Heat Pump	6.6	8

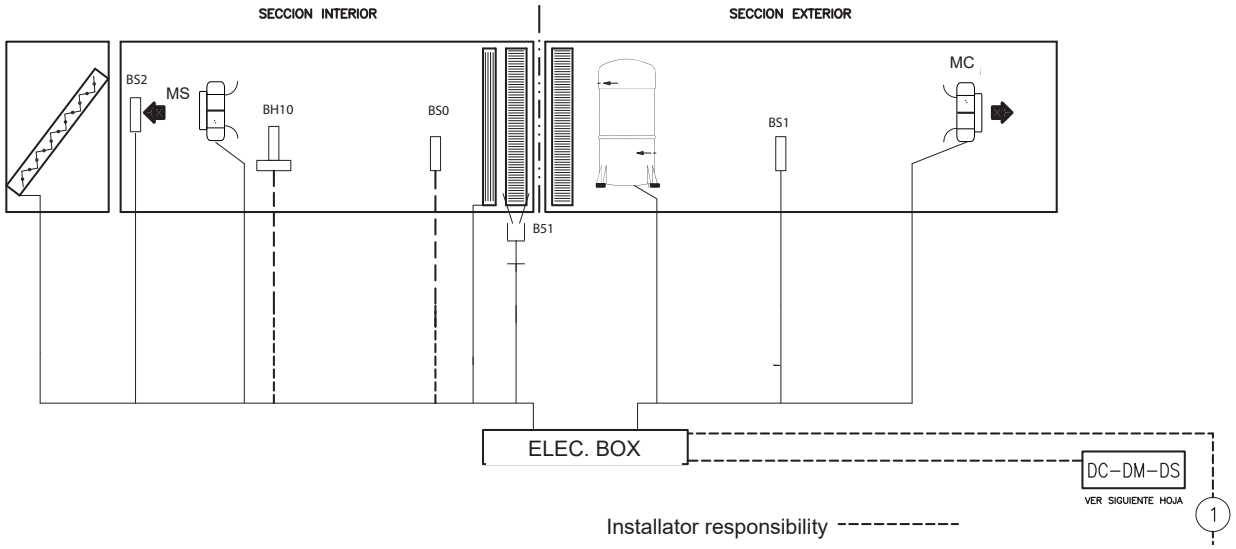
TABLE 2.7.3.: EXTRA REFRIGERANT CHARGE R-410A BY METER OF PIPING

Liquid	Gas	g/m
1/2”	7/8”	125
5/8”	1 1/8”	200

2.8. ELECTRICAL CONNECTIONS

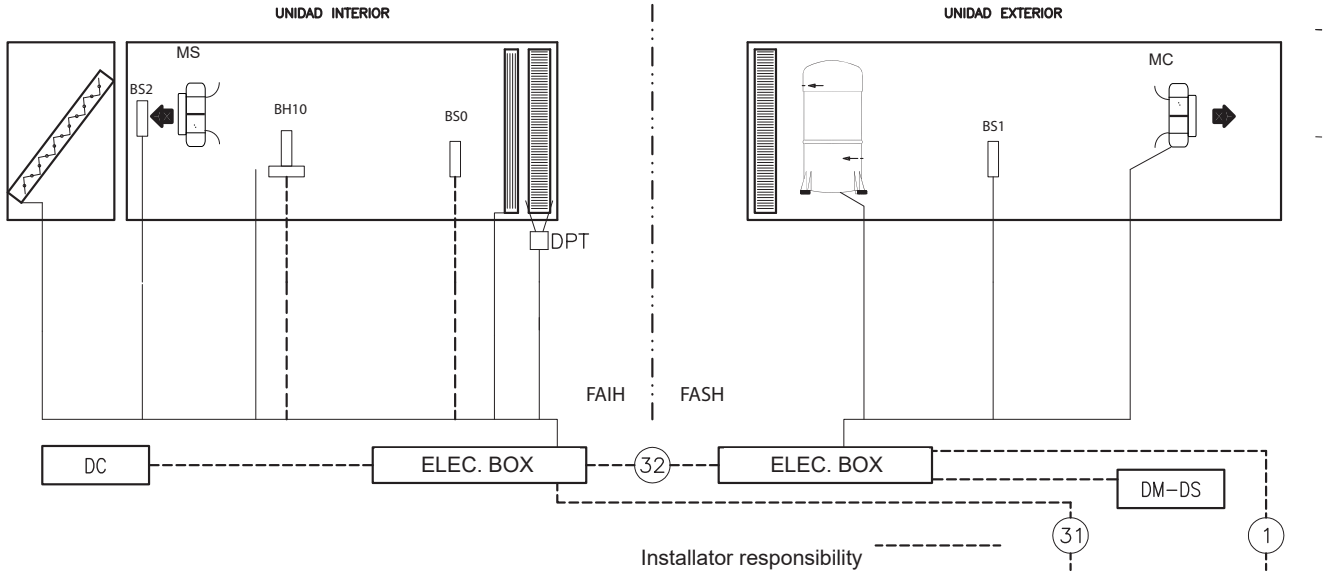
- **Before making the electrical connections, ensure that all circuit breakers are open.**
- **To make the elctrical connections, follow the electrical diagram supplied with the unit.**
- **Take into account the current standard for the installation of the unit, whether local, regional or national standards.**
- **USE SUPERINMUNIZED DIFFERENTIAL SWITCHES.**

2.8.1. ELECTRICAL CONNECTION FOR PACKAGED UNITS



	Connection 1	
Size	**Basic unit**	**Basic unit + E.H.**
020	4G x 6 mm²	4G x 10 mm²
035	4G x 10 mm²	4G x 16 mm²

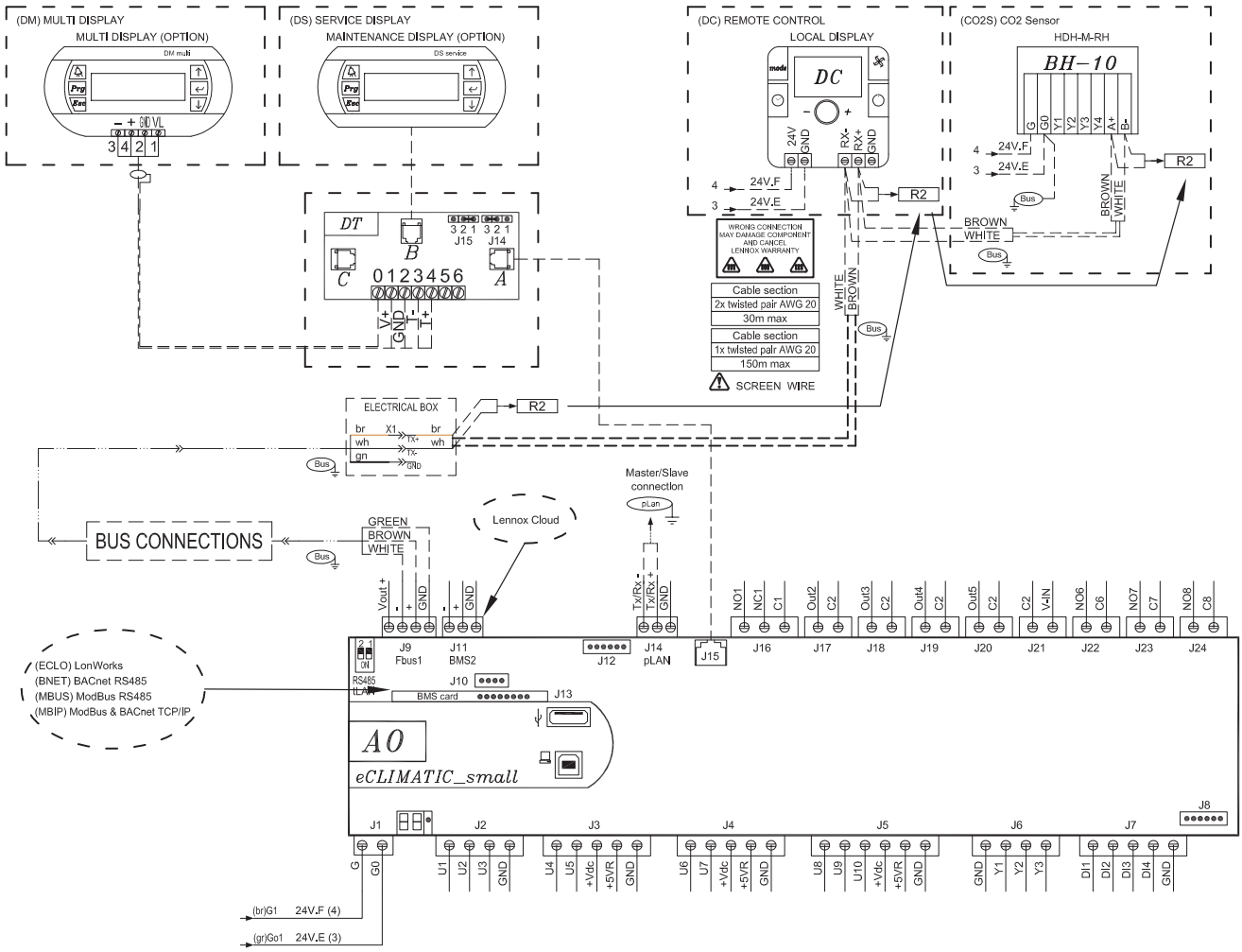
2.8.2. ELECTRICAL CONNECTION FOR SPLIT UNITS



	Connection 1	Connection 31		Connection 32
Size	**Base unit**	**Base unit**	**Basic unit + E.H.**	**Interconnection**
020	4G x 4mm²	4G x 2.5 mm²	4G x 4 mm²	3 x 0.5 mm² shielded
035	4G x 6mm²	4G x 2.5 mm²	4G x 4 mm²	3 x 0.5 mm² shielded

2.9. TERMINAL CONNECTION

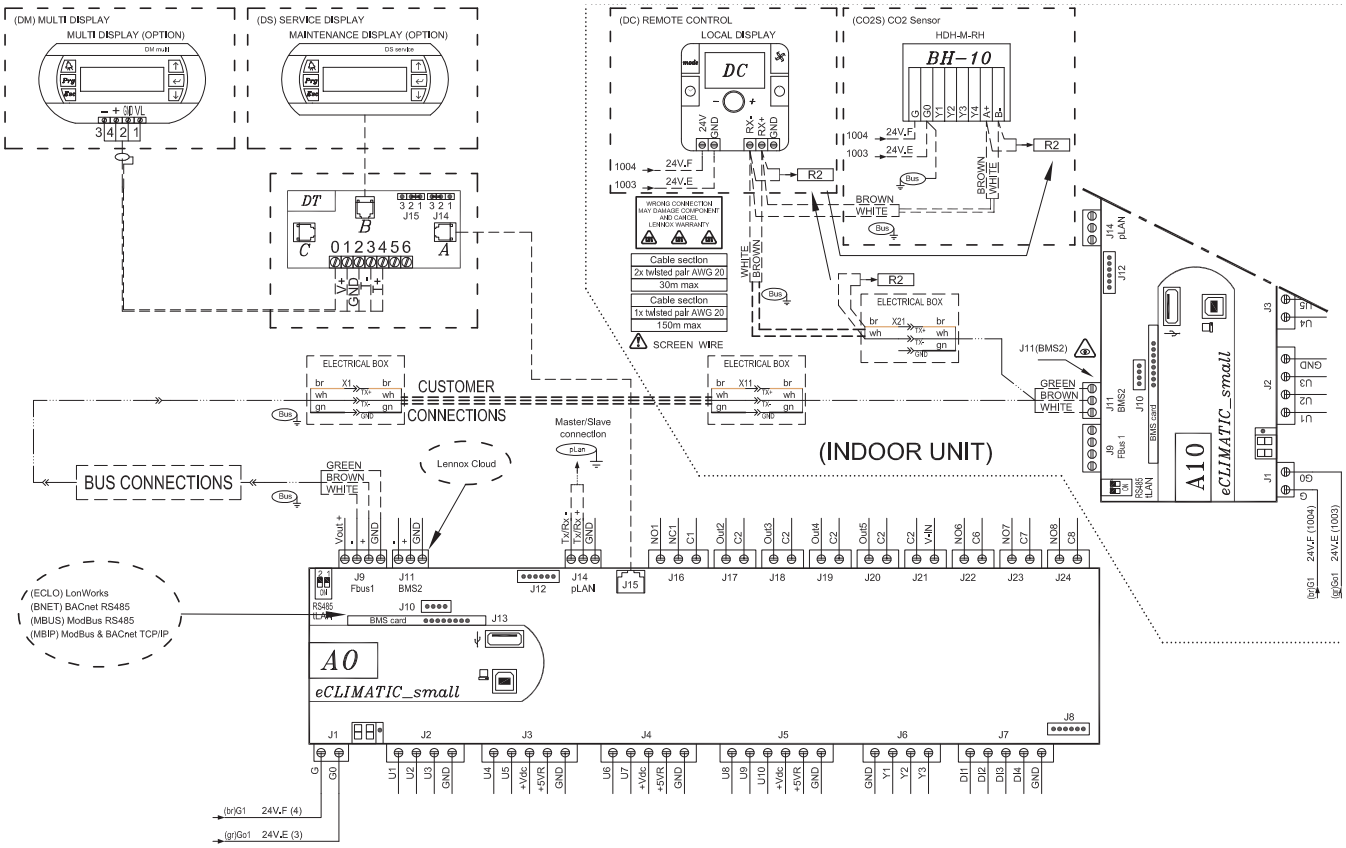
2.9.1. TERMINAL CONNECTION WITH PACKAGED UNIT



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

NOTES:
- For securing and connecting the Control Panel, consult the control panel Manual supplied with the unit.
- Connection between the DC and the unit must be made using shielded twisted pair cables and shielded (where the screens is connected to ground by the side of the electrical panel) and with a hose of two cables.
- The Tx+ and Tx- polarity must strictly comply with the electrical diagram supplied with the unit.
- Wiring the hose separated from the power cables a minimum of 500 mm.
- Wiring the hose separated from the halogen lamps a minimum of 500 mm.
- Wiring the hose separated from switchboard, antennas, transmitters... a minimum of 500 mm.
- NEVER ROLL UP THE EXCESSING HOSE, CUT THE HOSE FROM THE SIDE OF THE TERMINAL.

2.9. TERMINAL CONNECTION
2.9.2. TERMINAL CONNECTION WITH SPLIT UNIT



¡ IMPORTANT !
THE SHIELDED CONNECTING CABLE BETWEEN THE CONTROL PANEL AND THE UNIT MUST BE SEPARATED FROM ANY OTHER TYPE OF ELECTRICAL WIRING. CONNECT IT TO THE ELECTRIC PANEL LOCATED IN THE OUTDOOR UNIT.

NOTES:
- For securing and connecting the Control Panel, consult the control panel Manual supplied with the unit.
- Connection between the DC and the unit must be made using shielded twisted pair cables and shielded (where the screens is connected to ground by the side of the electrical panel) and with a hose of two cables.
- The Tx+ and Tx- polarity must strictly comply with the electrical diagram supplied with the unit.
- Wiring the hose separated from the power cables a minimum of 500mm.
- Wiring the hose separated from the halogen lamps a minimum of 500mm.
- Wiring the hose separated from switchboard, antennas, transmitters... a minimum of 500mm.
- NEVER ROLL UP THE EXCESSING HOSE, CUT THE HOSE FROM THE SIDE OF THE TERMINAL.

2.10. PROBES INSTALLATION

¡IMPORTANT!
THE AIR PROBES ARE SUPPLIED ALONE WITH THE UNIT. THEY MUST BE INSTALLED WITH THE METALLIC PART SUPPLIED IN THE DUCT FOR THE CORRECT DETECTION OF THE AIR TEMPERATURE.

3. COMMISSIONING AND OPERATION

3.1. PRELIMINARY CHECKS

1. Check that drain pipe connections, their fixtures and that the level of the unit is tipped toward the drain.
2. Inspect the state of the ducts and grilles (clean and open grilles, no breaks in the duct, etc.)
3. Check that the power supply is the same as stated on the firm plate which is in agreement with the electrical diagram for the unit and that cable sizes are correct. Check that tightness of the electrical connections to their terminals and to ground.
4. Inspect the air filter, which should be in its housing and properly positioned (the metal grille should be toward the inside).
5. Check that the fan turns freely with the hand.

3.2. PRELIMINARY CHECKS AT STARTUP

LENNOX Designs and develops its machines always looking for the greater comfort and well-being of its customers and users, at the same time as the greater energy efficiency of the elements that constitute the units. This effort would be fruitless if it was not united to a responsible use of these equipment. For this reason, we invite you to use these machines in a responsible way with the environment, combining the adequate comfort, with a responsible consumption of the energy resources.

To start the unit, follow the instructions given in the User Manual for the control supplied with the unit (requiring operation in any of the modes, cooling, heating, or automatic). After a time delay, the unit will start.

With the unit operating, **check that the fans are turning freely and in the correct direction**.

With **operating unit** , check:

- Low and high pressure.
- Evaporating and liquid temperature to calculate superheat and subcooling.
- Adjust the refrigerant charge and/or expansion valve according to the preceding values.

The unit must be installed in accordance with local safety codes and regulations and can only be used in a well ventilated area. Please read carefully the manufacturer's instructions before starting this unit.

All work on the unit must be carried out by a qualified and authorised employee.

Non-compliance with the following instructions may result in injury or serious accidents.

Work on the unit:

The unit shall be isolated from the electrical supply by disconnection and locking using the main isolating switch. Workers shall wear the appropriate personal protective equipment (helmet, gloves, glasses,etc.).

Electrical system:

Work on electric components shall be performed with the power off (see below) by employees having valid electrical qualification and authorisation.

Electrical connections can become loose during transport. Please check them before starting-up the unit Compressors with specific rotation direction. Check the correct rotation direction of the fan before closing the compressor circuit breakers. If the direction is incorrect, the phases must be reversed at the head of the main switch.

Refrigerating circuit(s):

After more than 12 hours of power cut, the cranckcase heater (compressor) should be powered for 5 hours before any return to service. Non-compliance with this instruction can cause deterioration of the compressors.

Monitoring of the pressures, draining and filling of the system under pressure shall be carried out using connections provided for this purpose and suitable equipment. To prevent the risk of explosion due to spraying of coolant and oil, the relevant circuit shall be drained and at zero pressure before any disassem bly or unbrazing of the refrigerating parts takes place.

To evoid the risks of explosion, cooling gases elements and oil, shall check, before carrying out any dismantling or dissamble any cooling elements, **that the circuit that cause the explosion and its pressure is zero**.

There is a residual risk of pressure build-up by degassing the oil or by heating the exchangers after the circuit has been drained. **Zero pressure shall be maintained** by venting the drain connection to the atmosphere on the low pressure side. The brazing shall be carried out by a qualified brazier.and shall comply according to code ASME section IX following the procedures specification.

Before the start up:

- Raise the system to the test maximum pressure (see firmplate).
- Check the correct behaviour of the high pressure device.
- Check the components general condition and circuit piping.

Spare parts:

In order to maintain CE marking compliance, replacement of components shall be carried out using spare parts, or using parts approved by Lennox.

Only the coolant shown on the manufacturer's nameplate shall be used, to the exclusion of all other products (mix of coolants, hydrocarbons, etc.).

CAUTION:

In case of fire, cooling circuits can cause an explosion and spray coolant gas and oil.

3.3.- CLIMATIC™ CONFIGURATION

Settings

1. Supply Air-flow adjustement (depending on customer requirements)
    a. 3333 = nominal air flow / pressure
    b. 3334 = reduced air flow / pressure

2. Scheduling (depending on customer requirements)
    a. Zones & Modes (Night/Day/Day I/ DayII)
    b. Setpoints per mode

3. Regulation temperature probe selection
    a. Select the regulation probe (DC, Return, Customer, etc.) in the Room Temp. Config screen

4. Outside temperature probe selection
    a. Select the outdoor temp probe (Unit, Customer) in the Outside Temp. Config screen

5. Air quality sensor selection (optional)
    a. Select the air quality CO2 sensor (Remote, Customer) in the CO2 Config screen

6. Remote display configuration
    a. 3151 = DC simple / DC full / DM

7.Minimum fresh air
    a. 3121 = minimum opening %

Commissioning

Check:

1. Airflow Vs Damper
    a. Test B.Nom100% :
        i. adjust the blower speed % (3333)to get the required air-flow
        ii. adjust the exhaust speed % (3864) to get the required air-flow
    b. Test B.Nom0%:
        i. adjust the damper compensation (3335) to maintain the required air-flow even with damper fully closed.
        ii. adjust the damper compensation (3336) to maintain the required air-flow even with damper fully closed.
2. Filter safety thresholds
    a. Test B.Nom100% and Test B.Nom0%: read filter ΔP (3442) and adjust the bigger measure multiplied by 2.5 at threshold 3345
3. Frigorific circuit tests
    a. Cooling mode
        i. Test C---Cool: (if variable speed compressor, set speed value)
            1. Check circuit pressures and temperatures
            2. Check electrical consumptions
    b. Heating mode
        i. Test C---Heat: (if variable speed compressor, set speed value)
            1. Check circuit pressures and temperatures
            2. Check electrical consumptions
4. Unit option tests
    a. Electrical Auxiliary heaters (Test H1-1 full)
        i. Check supply temperature
        ii. Check electrical consumption
5. Advanced regulation optimization
    a. Auxiliary heaters ΔT (Gas burner or electrical)
        i. Heating.
            1. Test H1-1: read |Mix-Supply| temp and adjust heaters stage ΔT at menu 3734
    b. Staging sequence(compressor/electrical)
        i. Aux Heaters Priority 3731= Never/ Always /OutTemp
    c. Dynamic setpoint
        i. 3225= ΔT between customer set point and outdoor temperature
    d. Fine temperature control
        i. Smooth 3231= No/ DeadZone/Comfort

Once all the settings have been adjusted, the list of parameters must be downloaded (Wizard tool), stored and signed by the customer.

WARNING! During the settings, wait until the economizer is fully closed or opened, since it takes 1-2 minutes to switch.

When carrying out maintenance works on these units, please make a correct segregation of the non-hazardous waste generated: insulation, air filters, plastic or metallic elements, packaging, etc., as well as waste considered hazardous: oils, filters and rags Impregnated with oils, welding elements such as filler material, strippers, electrical and electronic waste, batteries, lamps, etc., these must be managed by an authorized dealer.
The refrigerant gas can be reused, or collected in a bottle and managed as hazardous waste by an authorized dealer.

4.1. PREVENTIVE MAINTENANCE

**PREVENTIVE MAINTENANCE PREVENTS COSTLY REPAIRS,
THIS REQUIRES PERIODIC INSPECTIONS:**

GENERAL STATE OF THE CASING:
Casing, paint, damage due to shocks, rust spots, levelling and supporting, condition of the shock absorbers, if installed, screwed panels, etc.

ELECTRICAL CONNECTIONS:
State of hoses, tightness of screws, earthing, current consumption of the compressor and fans and check that the unit is receiving the correct voltage.

COOLING CIRCUIT:
Check that the pressures are correct and that there are no leaks. Check that there is no damage to the pipe insulation, that the condition of the coils is good and that they are not blocked by bits of paper or plastic drawn in by the air fl ow, etc.

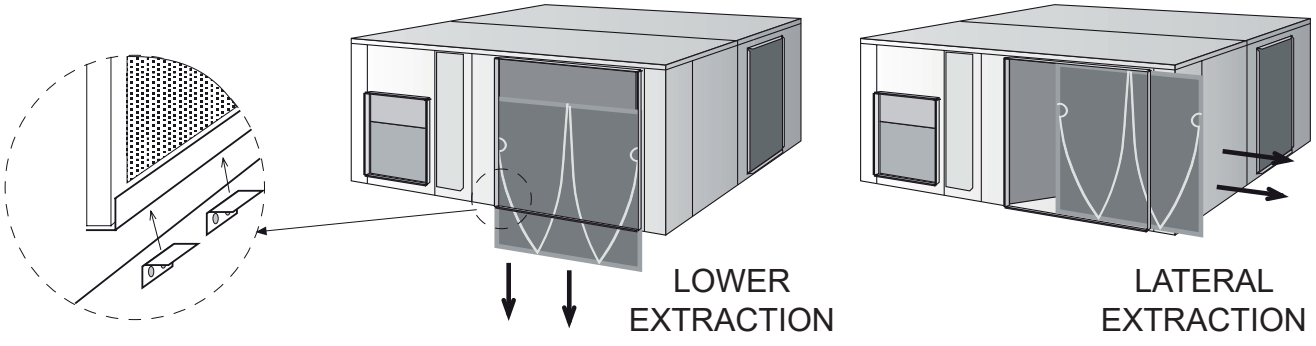
COMPRESSOR:
If a sight glass is fitted, check the oil level.
Check the condition of the silentblock mountings.

FANS:
Check that fans turn freely and in the correct direction without excessive noise.

CONTROL:
Check set points and normal operation.

ELECTRIC PANEL GRILLES:
They must be kept clean for the entrance of the air circulation.

AIR FILTER:
The air filter can be removed through the side by sliding it over the rail or downwards. (See figure).
For downwards removal, shall disassembleone or two profiles that support it (depending on the model) which are under the filter guide rail and screwed into the unit.



4.2. MAINTENANCE PLAN

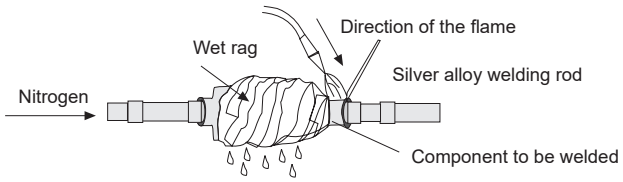
Task	Operating mode	Monthly	+ Quarterly	+ Half Yearly
Clean or replace filters: Disposable, or metal frame.	Replace filters with new ones if disposable. Vacuum clean or blow the dirt. Wash and dry carefully. Replace Filter if necessary by an original Lennox filter. Blocked filter will reduce the performance of the unit. THE UNIT SHOULD NEVER BE OPERATED WITHOUT FILTERS	●		
Visual check of the oil level (if sight glass fitted) and check the oil for acidity on the refrigerant circuits	Visually check the oil level through the sight glass on the side of the compressor casing Test the oil every 3 years and after each intervention on the refrigerant circuit	●		
Clean condensate drain, drain pan, indoor coils and outdoor coils (following local regulations)	It's mandatory to clean the external coils, according to the environment where the unit is located, the frequency of the cleanning varies from once in a month to minimum twice in a year. The performance and the sustainability of the machine is based on the perfect heat exchange. The use of a neutral pH cleaning product is mandatory (WARNING: Fins and copper tubes are very fragile! Any damage WILL reduce the performances of the unit).	▌	▌	▌
Check for the Amps consumed	Check for the Amps consumed on all three phases; compare with the nominal value given in the electrical wiring diagram.		▌	
Check Smoke detector (if fitted)	Start the unit. Trigger the smoke detector with an aerosol tester. Reset unit and control.		▌	
Check CLIMATIC™ control, set-points and variables	Refer to the commissioning sheet; Check all set points are set according to this document.		▌	
Check refrigeration system for proper functioning	Retrieve/Check the values of Overheating and subcooling		▌	
Check the position and tightness of refrigeration components	Check systematically all connections and fixings on the refrigeration circuit. Check for oil traces, eventually a leak test should be conducted. Check operating pressures correspond to the ones, indicated on the commissioning sheet		▌	
Check the position of the crankcase heaters (around the compressor, if fitted) and the proper functioning of it	Check the well fixation of the crankcase heaters , if it is tight enough And check the crankcase heaters overall working.		●	
Check defrost cycle with 4-way valve inversion.	Switch the unit to heat pump mode. Change the set point to obtain the standard defrost mode and reduce the cycle time to the min value. Check the operation of the defrost cycle.		▌	
Check the plug fans (freewheel)	Check the rotation of the fan (free rotation, detection of vibration or bearing noises) Check for the Amps consumed on all three phases; compare with the nominal value given in the electrical wiring diagram.			●
Check Airflow rate safety switch (if fitted).	Shut down supply fan. The fault must be detected within 5 seconds.			●
Check economizer actuator operation	Check all fixings and transmission. Stop the unit using the control. The fresh air damper must close. Start the unit, the fresh air damper should open. Make a forced opening and closure of the motorized dampers.			▌
Check tightness of all electrical connections	Power down the unit and check and tighten all screws, terminal and electric connections (including the terminal boxes) When turning on the unit, check the deterioration of the electrical components with a thermal camera, with the unit working at 100% of it's power.			▌
Check HP / LP safety switches	Install a pressure gauge HP / LP and check if the safety switches overall working.			▌
Check the value of the analogue sensors	Install the pressure gauge calibrated to check the analogue sensors . Install a thermometer calibrated to control the sensors.			▌
Check the position of all sensors	Check the good positioning and the fixation of all sensors.			●
Check electric heater element for excessive corrosion	Turn off the unit; Pull the electric heater out of the heater module box and check the resistances of traces of corrosion; Replace resistance as required;			▌
Check anti-vibration mountings, for wear and tear.	Visually check anti-vibration mountings on compressors. Replace if damaged.			●
Check casing and equipment corrosion	To treat and neutralize eventuals rust spots			●

4.3. CORRECTIVE MAINTENANCE

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

If any **component** in the cooling circuit **is to be replaced**, follow these recommendations:

- Always **use original replacement parts**.
- If the component can be isolated, it is not necessary to remove the entire **refrigerant charge**, if the component cannot be isolating and the refrigerant charge is removed, it should be removed through the Schrader valves located in the outdoor section. Create a slight vacuum as a safety measure.
- **Regulation imposes the recovery of refrigerant fluids and prohibits the release of 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 forming.
- Use **silver alloy brazing rod**.
- **Take special care that the flame** from the torch is directed away from the component to be welded and cover with a wet rag to prevent overheating.



- **Take very special care if 4-way or check valves are to be replaced** since these have internal components that are very heat-sensitive such as plastic, teflon, etc.
- If a **compressor is to 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.
- **Evacuate 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 running 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 WHEN USING OF R-410A REFRIGERANT:

R-410A refrigerant is used in the unit, the following standard precautions for this gas should therefore be taken:
- The Vacuum Pump must have a Check Valve or Solenoid Valve fitted.
- Pressure Gauges and Hoses for exclusive use with R-410A Refrigerant should be used.
- Charging should be carried out in the Liquid Phase.
- Always use scales to weigh-in charge
- Use the Leak Detector exclusive for R-410A 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, collect what remains of the charge, create a vacuum in the unit and completely recharge with new R-410A Refrigerant.
- Brazing should always be carried out in a nitrogen atmosphere.
- Reamers should always be well sharpened.

WASTE MANAGEMENT:

All the components derived from the recycling of the unit should be managed according local legislation, and have to be classified and separated while dealt by authorized waste manager or be left in local waste facilities.
Refrigerant fluids, electronic boards, heat exchangers and the oil extracted from the refrigerant circuit, as well as the oil recipients used must be recycled as hazardous waste according the local normative through an authorized waste manager or be left in local waste facilities. The rest of the components considered as non-hazardous wastes must be recycled according to the corresponding norms.
At the end of its life, the equipment should be recycled in local waste facilities or by an authorized waste manager.

4.4. FAILURE DIAGNOSIS

In case of failure or malfunction of the unit, the display on the control panel will show an error or alarm warning which is explained in the control panel manual.
Nevertheless, whenever there is a unit fault, the unit should be shut down and our service technicians consulted.

Fault	Possible causes	Possible solutions
Unit does no start.	Fault in the power supply or insuffi cient 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 switch or replace 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.	Reverse the power phases.
	Outdoor coil is dirty or clogged for passing air.	Inspect and clean.
	Excess refrigerant charge.	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 replace 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.	Reverse 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.	Check 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).	Check and reverse power phases.

5. END OF LIFE CYCLE OF THE UNIT

At the end of the useful life of the units, please take into account the correct segregation of the waste generated. Refrigerant fluids, electronic boards, heat exchangers and the oil extracted from the refrigerant circuit, as well as the oil recipients used must be recycled as hazardous waste according the local normative through an authorized waste manager or be left in local waste facilities. The rest of the components considered as non-hazardous wastes must be recycled according to the corresponding norms.

NOTES

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