

INSTALLATION AND
OPERATING MANUAL



PROVIDING **GLOBAL SYSTEM** SOLUTIONS

FLATAIR
FLC / FLH

GREAT BRITAIN , IRELAND : LENNOX INDUSTRIES LTD
tel. : + 44 1604 599400
fax : + 44 1604 594200
e-mail : marketing@lennoxind.com

BELGIUM : LENNOX BENELUX N.V./S.A.
tel. : + 32 3 633 30 45
fax : + 32 3 633 00 89
e-mail : info.be@lennoxbenelux.com

CZECH REPUBLIC : JANKA RADOTIN AS
tel. : + 420 2 510 88 111
fax : + 420 2 579 10 393
e-mail : janka@janka.cz

FRANCE : LENNOX FRANCE
tel. : + 33 1 60 17 88 88
fax : + 33 1 60 17 86 58
e-mail : accueil@lennoxfrance.com

GERMANY : LENNOX DEUTSCHLAND GmbH
tel. : + 49 69 42 09 79 0
fax : + 49 69 42 09 79 40
e-mail : info.de@lennoxdeutschland.com

NETHERLANDS : LENNOX BENELUX B.V.
tel. : + 31 33 2471 800
fax : + 31 33 2459 220
e-mail : info@lennoxbenelux.com

POLAND : LENNOX POLSKA Sp. z o. o.
tel. : + 48 22 832 26 61
fax : + 48 22 832 26 62
e-mail : lennoxpolska@inetia.pl

PORTUGAL : LENNOX CLIMATIZAÇÃO LDA.
tel. : +351 22 999 84 60
fax : +351 22 999 84 68
e-mail : info@lennoxportugal.com

RUSSIA : LENNOX DISTRIBUTION MOSCOW
tel. : + 7 095 246 07 46
fax : + 7 502 933 29 55
e-mail : lennox.dist.moscow@mtu-net.ru

SLOVAKIA : LENNOX SLOVAKIA
tel. : + 421 7 44 87 19 27
fax : + 421 7 44 88 64 72

SPAIN : LENNOX REFAC S.A.
tel. : + 34 902 400 405
fax : + 34 91 542 84 04
e-mail : marketing@lennox-refac.com

UKRAINE : LENNOX DISTRIBUTION KIEV
tel. : + 380 44 213 14 21
fax : + 380 44 213 14 21
e-mail : jankauk@uct.kiev.ua

OTHER EUROPEAN COUNTRIES,
AFRICA,
MIDDLE-EAST : LENNOX DISTRIBUTION
tel. : + 33 4 72 23 20 14
fax : + 33 4 72 23 20 28
e-mail : marketing@lennoxdist.com



LENNOX[®]

www.Lennox.com

COD: MIL60E-0501
09-2001

TABLE OF CONTENTS

DATA PAGE FOR UNIT COMMISSIONING

PAGE 2

1.- GENERAL CHARACTERISTICS

PAGE

1.1.- PHYSICAL DATA	3
1.2.- ELECTRICAL DATA	4
1.3.- FAN SERVICES	5
1.4.- OPERATING LIMITS	6
1.5.- UNIT DIMENSIONS	7-10
1.6.- SIZES OF STANDARD AND OPTIONAL OPENINGS	11-14
1.7.- AVAILABLE OPTIONS	15-16

2.- INSTALLATION

PAGE

2.1.- INSTALLATION GUIDELINES	17
2.2.- UNIT INSTALLATION	17
2.3.- OPTIONAL TASK PRIOR TO UNIT INSTALLATION: CHANGING THE POSITION OF BLOWERS AND AIR INTAKE	18-19
2.4.- UNIT LOCATION AND WEIGHT DISTRIBUTION	20
2.5.- INSTALLATION CLEARANCES	21
2.6.- DRAINS	21
2.7.- ELECTRICAL CONNECTIONS	22-22

3.- COMMISSIONING AND OPERATION

PAGE

3.1.- PRELIMINARY CHECKS	24
3.2.- STEPS TO FOLLOW FOR COMMISSIONING THE UNIT	25

4.- MAINTENANCE

PAGE

4.1.- PREVENTIVE MAINTENANCE	26
4.2.- CORRECTIVE MAINTENANCE	27
4.3.- FAILURE DIAGNOSIS	28

DATA PAGE FOR UNIT COMMISSIONING

UNIT: _____ SERIAL No.: _____

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"/>
CLEAN INTERIOR AIR FILTER	<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:

COLD CYCLE

Air Intake Temperature, Outdoor Coil: _____ °C
 Air Output Temperature, Outdoor Coil: _____ °C
 Air Intake Temperature, Indoor Coil: _____ °C
 Air Output Temperature, Indoor Coil: _____ °C
 High Pressure: _____
 Low Pressure: _____

heating CYCLE

Air Intake Temperature, Outdoor Coil: _____ °C
 Air Output Temperature, Outdoor Coil: _____ °C
 Air Intake Temperature, Indoor Coil: _____ °C
 Air Output Temperature, Indoor Coil: _____ °C
 High Pressure: _____
 Low Pressure: _____

ELECTRIC POWER CONSUMPTION (Amps)

Compressor _____ / _____ / _____
 Fan outdoor section _____ / _____ / _____
 Fan indoor section _____ / _____ / _____

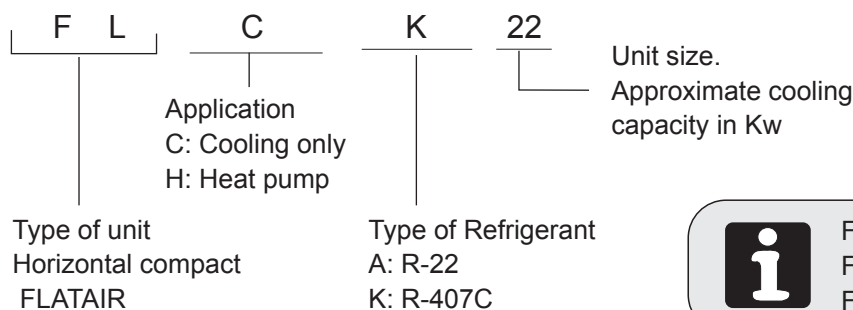
Compressor _____ / _____ / _____
 Fan outdoor section _____ / _____ / _____
 Fan indoor section _____ / _____ / _____

Options Installed: _____

Comments: _____

1.- GENERAL CHARACTERISTICS

1.1.- PHYSICAL DATA



FLHA: Heat pump unit R-22
FLCK: Cooling only unit R-407C
FLHK: Heat pump unit R-407C

UNIT MODELS		10	12	16	22	24	28	30
COMPRESSOR	No. / Type	1 / Scroll	1 / Scroll	1 / Scroll	1 / Scroll	1 / Scroll	1 / Scroll	1 / Scroll

FAN OUTDOOR SECTION

Maximum air flow	m³/h.	3500	3400	4950	5900	6600	6400	6400
Minimum air flow	m³/h.	2350	2400	3750	4350	4500	5000	5250
Maximum available pressure (1)	Pa	100	90	120	150	160	120	100

FAN OUTDOOR SECTION

Maximum air flow	m³/h.	2.350	2300	3700	5.350	6300	6000	6000
Minimum air flow	m³/h.	1500	1650	2400	3200	4000	4250	4500
Maximum available pressure (1)	Pa	120	110	160	180	240	200	180

(1) With minimum allowed air flow

NET WEIGHT

Cooling only units FLC	Kg	200	205	280	325	405	425	430
Heat pump units FLH	Kg	205	210	285	330	410	430	435

UNIT MODELS		FLHA 10	FLHA 12	FLHA 16	FLHA 22	FLHA 24	FLHA 28	FLHA 30
Cooling capacity	(*) Kw	9,4	11,3	14,7	19,2	21,0	26,0	27,6
Heating capacity	(**) Kw	10,3	12,3	15,6	20,0	22,8	27,0	29,8
Refrigerant charge R-22	gr.	2900	3100	3900	5400	8400	8600	8700

UNIT MODELS		FLCK 10 FLHK 10	FLCK 12 FLHK 12	FLCK 16 FLHK 16	FLCK 22 FLHK 22	FLCK 24 FLHK 24	FLCK 28 FLHK 28	FLCK 30 FLHK 30
Cooling capacity	(*) Kw	9,8	11,8	15,3	19,5	22,0	26,3	28,1
Heating capacity	(**) Kw	10,0	12,0	15,5	20,2	22,5	27,0	28,7
Refrigerant charge R-407C	gr.	FLCK	2240	2560	3550	5000	---	7000
		FLHK	2620	2920	4000	5500	7500	8200

(*) Air intake temperature in the indoor exchanger: 27°C DB/19 °C WB

(*) Air intake temperature in the outdoor exchanger: 35 °C DB

(**) Air intake temperature in the indoor exchanger: 20°C DB / 12 °C WB

(**) Air intake temperature in the outdoor exchanger: 7°C DB / 6 °C WB

DB.- Dry bulb temperature

WB.- Wet bulb temperature


1.- GENERAL CHARACTERISTICS


1.2.- ELECTRICAL DATA

UNIT MODELS		FLHA 10	FLHA 12	FLHA 16	FLHA 22	FLHA 24	FLHA 28	FLHA 30
Voltage	V/f (50 Hz)	230V/ 1Ph						
		230V-400V/ 3Ph						
Rated absorbed power								
Compressor (cooling cycle)	Kw	2,60	3,41	4,11	5,02	5,85	7,41	8,83
Compressor (heating cycle)	Kw	2,03	2,54	2,94	3,70	4,85	5,48	6,48
Fan outdoor section	Kw	0,52	0,52	1,10	1,60	1,60	1,60	1,60
Fan indoor section	Kw	0,38	0,38	0,90	1,30	1,35	1,35	1,35
Total power in cooling cycle	Kw	3,50	4,31	6,11	7,92	8,80	10,36	11,78
Total power in heating cycle	Kw	2,93	3,44	4,94	6,60	7,80	8,43	9,43
Maximum current								
Compressor	A	18,6						
		16,7/7,2	19,3/8,7	19,9/11,5	22,4/12,9	25,3/14,6	28,5/16,3	36,5/21,0
Fan outdoor section	A	3,1	3,1					
				4,8/2,8	7,4/4,3	8,1/4,7	8,1/4,7	8,1/4,7
Fan indoor section	A	2,6	2,6					
				7/4	7,4/4,3	7,4/4,3	7,4/4,3	7,4/4,3
Total current	A	24,3						
		22,4/12,9	25,0/14,4	31,7/18,3	37,2/21,5	39,8/23,0	44,0/25,4	52,0/30,0
Start up current	A	99						
		96/47	102/54	148/77	193/110	181/109	183/83	177/109
UNIT MODELS		FLCK 10 FLHK 10	FLCK 12 FLHK 12	FLCK 16 FLHK 16	FLCK 22 FLHK 22	FLCK 24 FLHK 24	FLCK 28 FLHK 28	FLCK 30 FLHK 30
Voltage	V/f (50 Hz)	230V/ 1Ph						
		230V-400V/ 3Ph						
Rated absorbed power								
Compressor (Cooling cycle)	Kw	2,79	3,68	4,41	5,20	6,05	7,43	9,25
Compressor (heating cycle)	Kw	2,26	3,21	3,60	3,84	5,65	6,25	7,37
Fan outdoor section	Kw	0,52	0,52	1,10	1,60	1,60	1,60	1,60
Fan indoor section	Kw	0,38	0,38	0,90	1,30	1,35	1,35	1,35
Total power in Cooling cycle	Kw	3,69	4,58	6,41	8,10	9,00	10,38	12,20
Total power in heating cycle	Kw	3,16	4,11	5,60	6,74	8,60	9,20	10,32
Maximum current								
Compressor	A	18,6						
		16,7/7,2	19,3/8,7	19,9/11,5	22,4/12,9	25,3/14,6	28,5/16,3	36,5/21,0
Fan outdoor section	A	3,1	3,1					
				4,8/2,8	7,4/4,3	8,1/4,7	8,1/4,7	8,1/4,7
Fan indoor section	A	2,6	2,6					
				7/4	7,4/4,3	7,4/4,3	7,4/4,3	7,4/4,3
Total Current	A	24,3						
		22,4/12,9	25,0/14,4	31,7/18,3	37,2/21,5	39,8/23,0	44,0/25,4	52,0/30,0
Start up current	A	99						
		96/47	102/54	148/77	193/110	181/109	183/83	177/109

1.- GENERAL CHARACTERISTICS

1.3.- FAN SERVICES

INDOOR UNITS		AIR FLOW m ³ /h							
		MODELS	10	12	16	22	24	28	30
 NOMINAL AIR FLOW	AVAILABLE STATIC PRESSURE Pa.	0	2350	2300	3700	5350	6300	6000	6000
		10	2275	2250	3625	5200	6225	5925	5925
		20	2240	2200	3550	5090	6140	5860	5860
		30	2190	2150	3475	4960	6100	5800	5800
		40	2140	2100	3400	4850	6010	5725	5725
		50	2080	2040	3320	4725	5930	5650	5650
		60	2025	1975	3240	4610	5875	5600	5600
		70	1975	1925	3160	4505	5790	5510	5510
		80	1925	1860	3090	4400	5710	5440	5440
		90	1840	1800	3000	4300	5620	5350	5350
		100	1775	1730	2915	4160	5540	5275	5275
		110	1625	1650	2825	4040	5450	5190	5190
		120	1500	---	2750	3925	5350	5100	5100
		130	---	---	2670	3800	5320	5000	5000
		140	---	---	2580	3700	5150	4910	4910
		160	---	---	2400	3525	4940	4700	4700
		180	---	---	---	3200	4700	4500	4500
		200	---	---	---	---	4425	4250	---
		220	---	---	---	---	4175	---	---
		240	---	---	---	---	4000	---	---

OUTDOOR UNITS		AIR FLOW m ³ /h							
		MODELS	10	12	16	22	24	28	30
 NOMINAL AIR FLOW	AVAILABLE STATIC PRESSURE Pa.	0	3500	3400	4950	5900	6600	6400	6400
		10	3410	3325	4850	5800	6490	6300	6300
		20	3300	3160	4750	5700	6340	6200	6200
		30	3190	3075	4625	5600	6225	6100	6100
		40	3080	2980	4525	5495	6100	5980	5980
		50	2970	2890	4425	5390	5960	5870	5870
		60	2840	2790	4325	5280	5850	5725	5725
		70	2700	2690	4225	5180	5710	5600	5600
		80	2560	2580	4125	5075	5600	5490	5490
		90	2410	2400	4040	4975	5480	5375	5375
		100	2350	---	3940	4875	5350	5250	5250
		110	---	---	3840	4775	5200	5100	---
		120	---	---	3750	4675	5090	5000	---
		130	---	---	---	4575	4950	---	---
		140	---	---	---	4460	4800	---	---
		150	---	---	---	4350	4650	---	---
		160	---	---	---	---	4500	---	---

1.- GENERAL CHARACTERISTICS

1.4.- OPERATING LIMITS

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)	0° C (MODELS 22/24/28/30) 19° C (MODELS 10/12/16) (*)

(*) With condensation pressure control (optional), 0 °C minimum outdoor operating temperature

OPERATING LIMITS FOR (heating PUMP) 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)	0° C (MODELS 22/24/28/30) 19° C (MODELS 10/12/16) (*)
heating CYCLE OPERATION	INDOOR TEMPERATURE	27° C DB	21° C BD / 15°C WB
	OUTDOOR TEMPERATURE	24° C DB / 18°C WB	-10° C DB / -11°C WB

(*) With condensation pressure control (optional), 0 °C minimum outdoor operating temperature

DB.- Dry Bulb Temperature
WB.- Wet Bulb Temperature

TABLE 1-COOLING CYCLE MAXIMUM OUTDOOR OPERATING TEMPERATURES

MODELS WITH Refrigerant R-407C

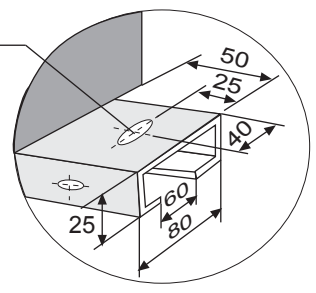
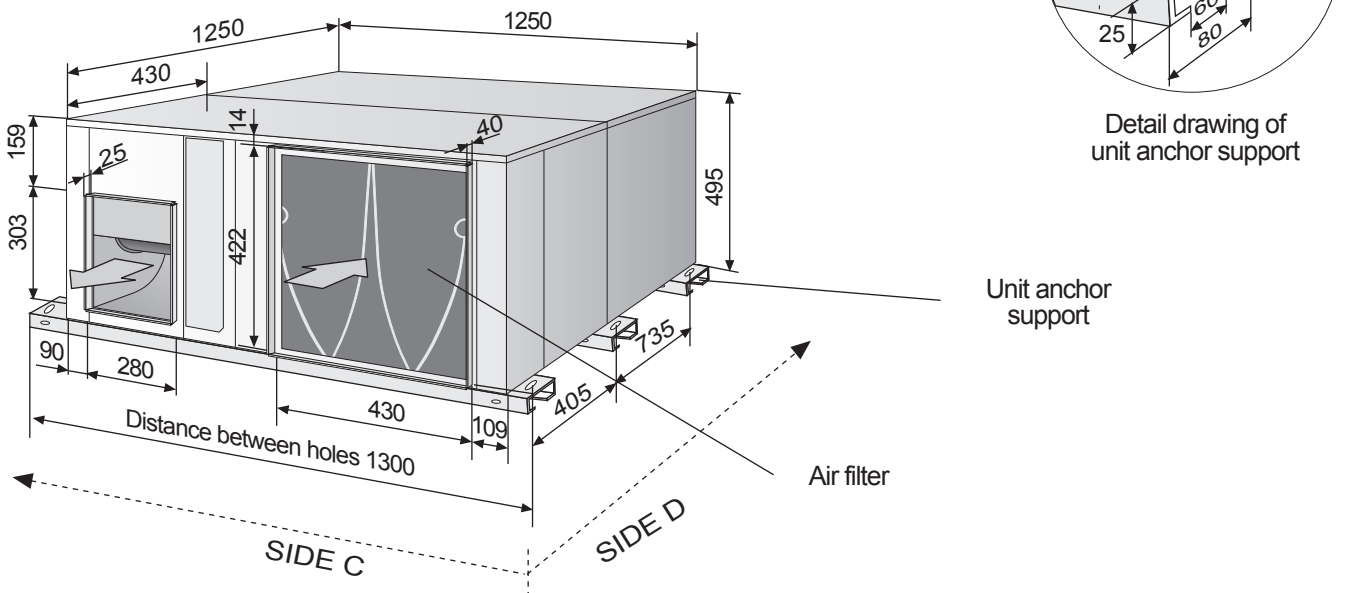
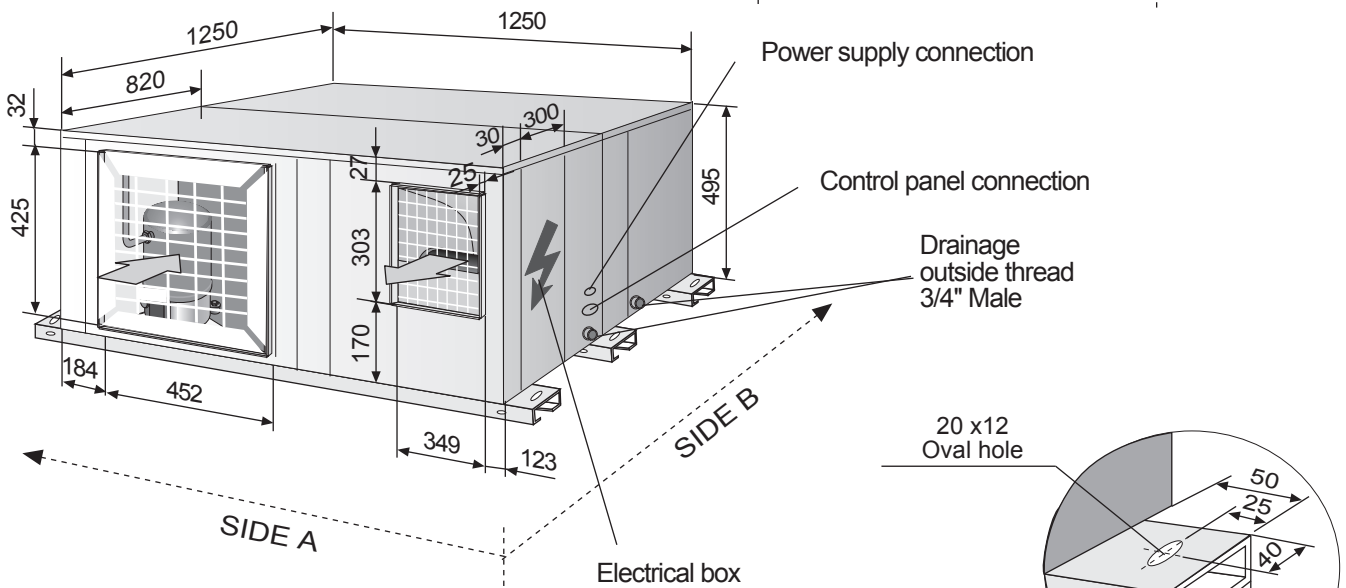
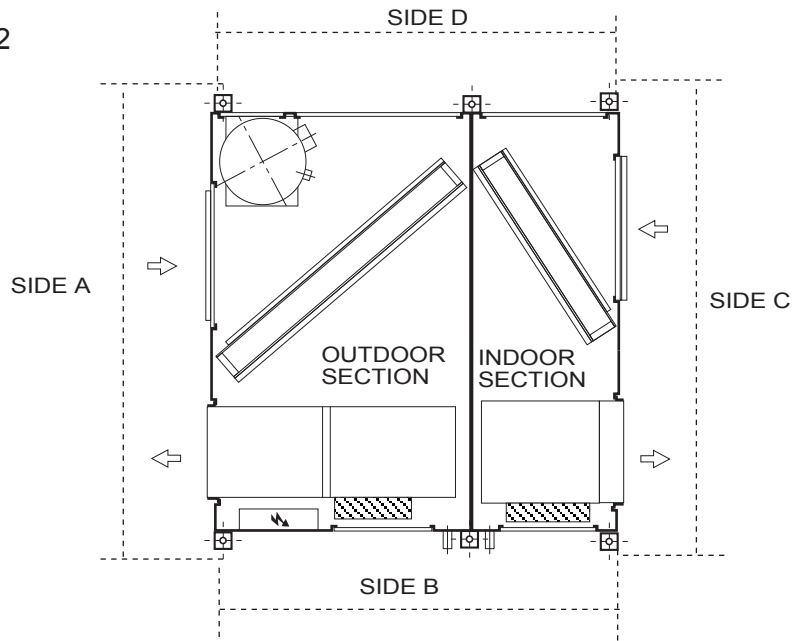
MODELS	10	12	16	22	24	28	30
With rated outdoor flow	45	43	44	45	46	42	41
With minimum outdoor flow	43	43	41	41	42	39	38

MODELS WITH Refrigerant R-22

MODELS	10	12	16	22	24	28	30
With rated outdoor flow	48	48	47	48	48	46	44
With minimum outdoor flow	46	45	45	46	44	42	40

1.- GENERAL CHARACTERISTICS

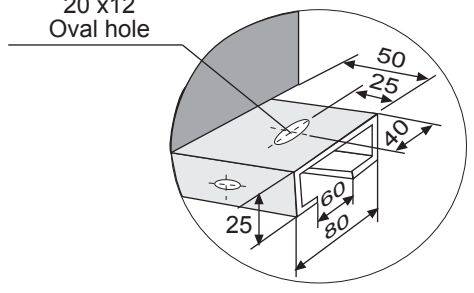
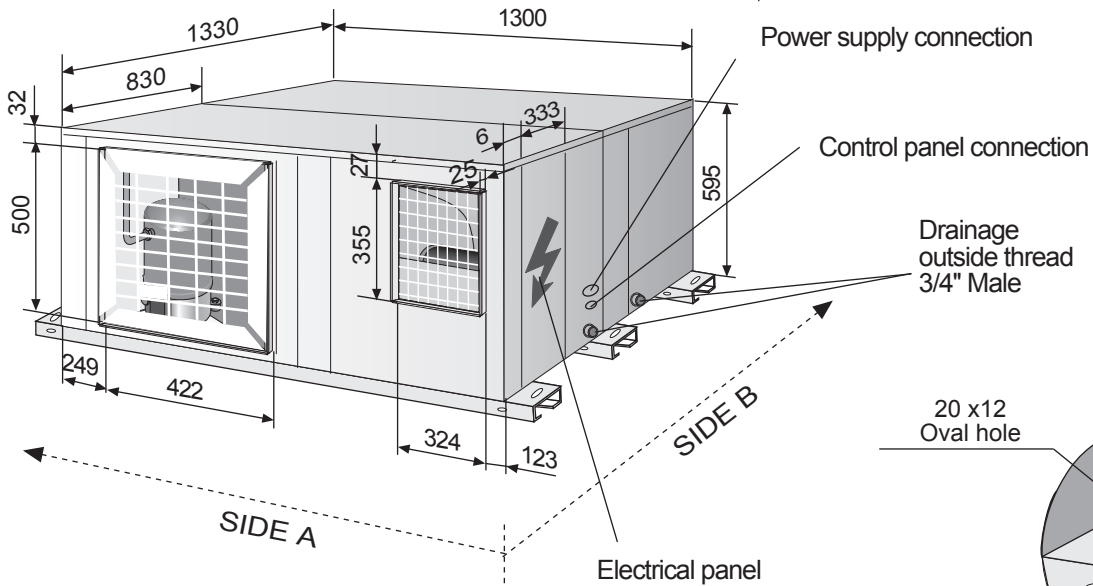
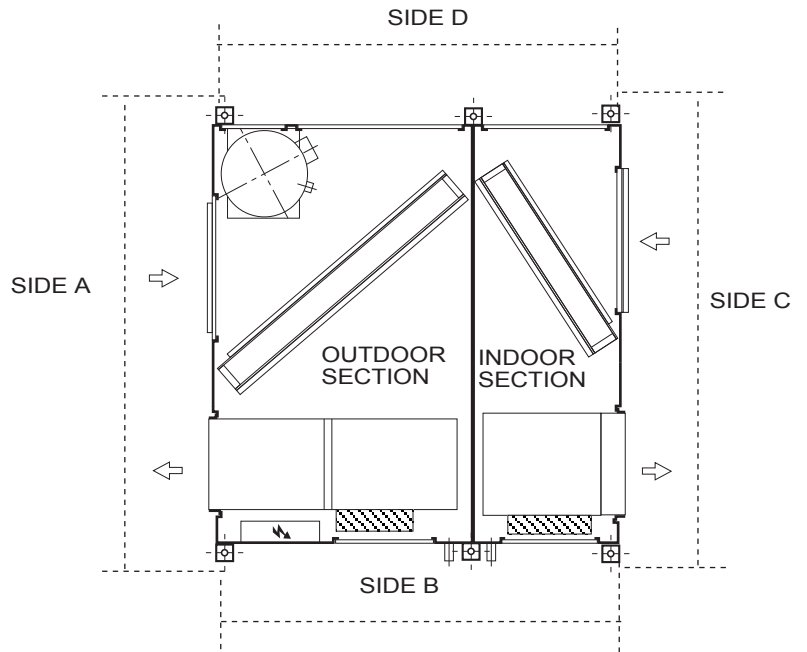
1.5.- UNIT DIMENSIONS MODELS 10-12



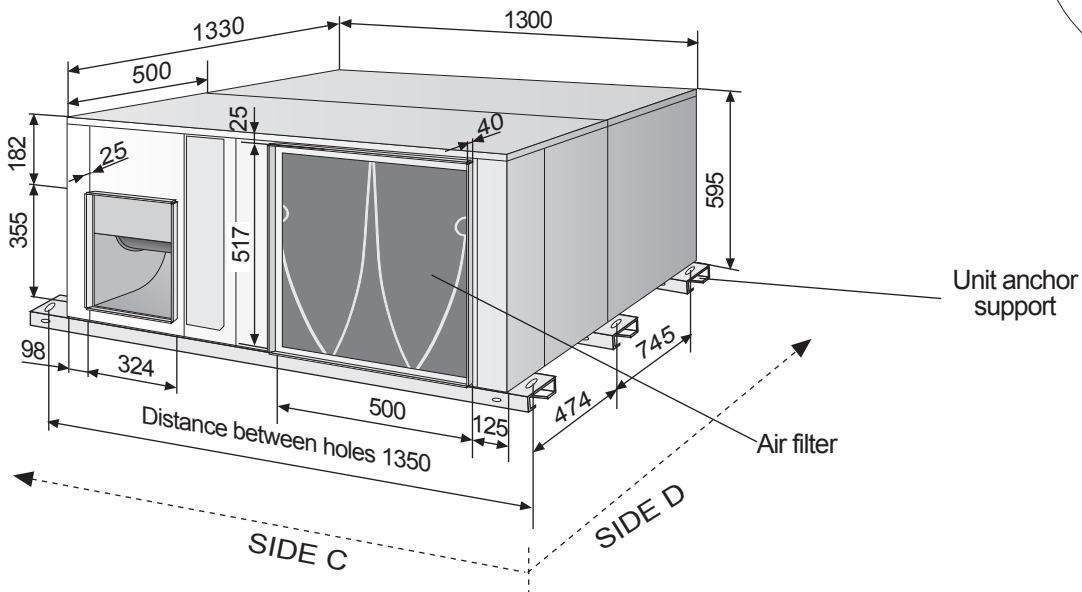
Detail drawing of unit anchor support

1.- GENERAL CHARACTERISTICS

1.5.- UNIT DIMENSIONS MODEL 16

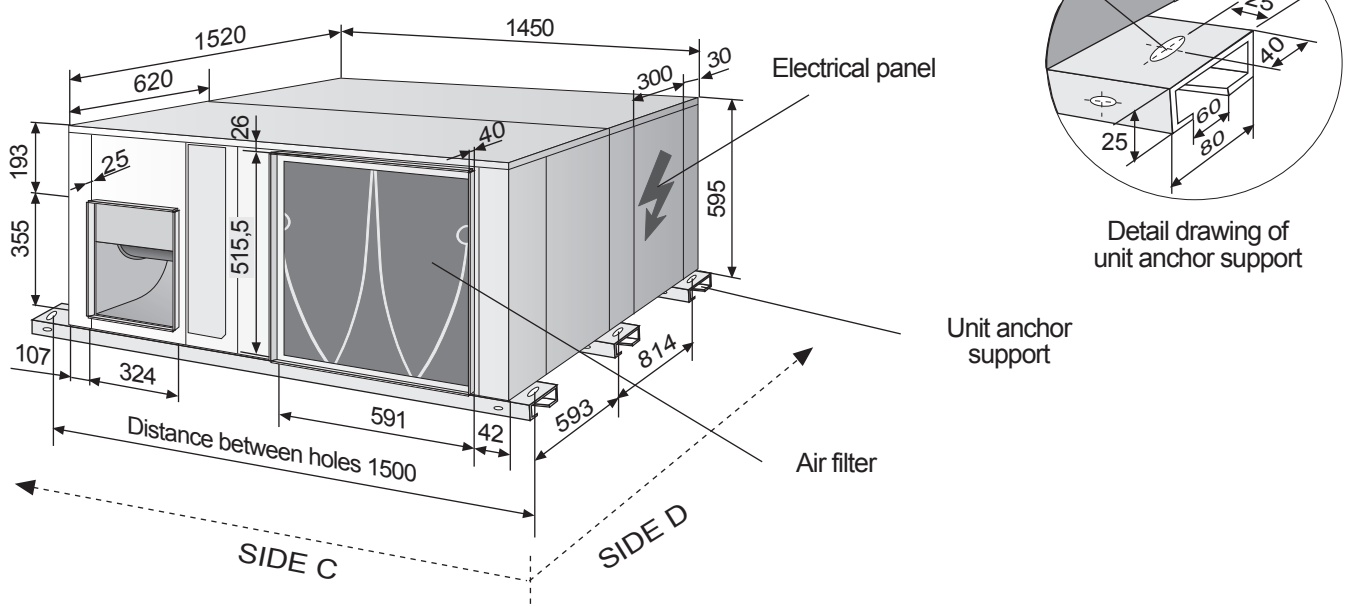
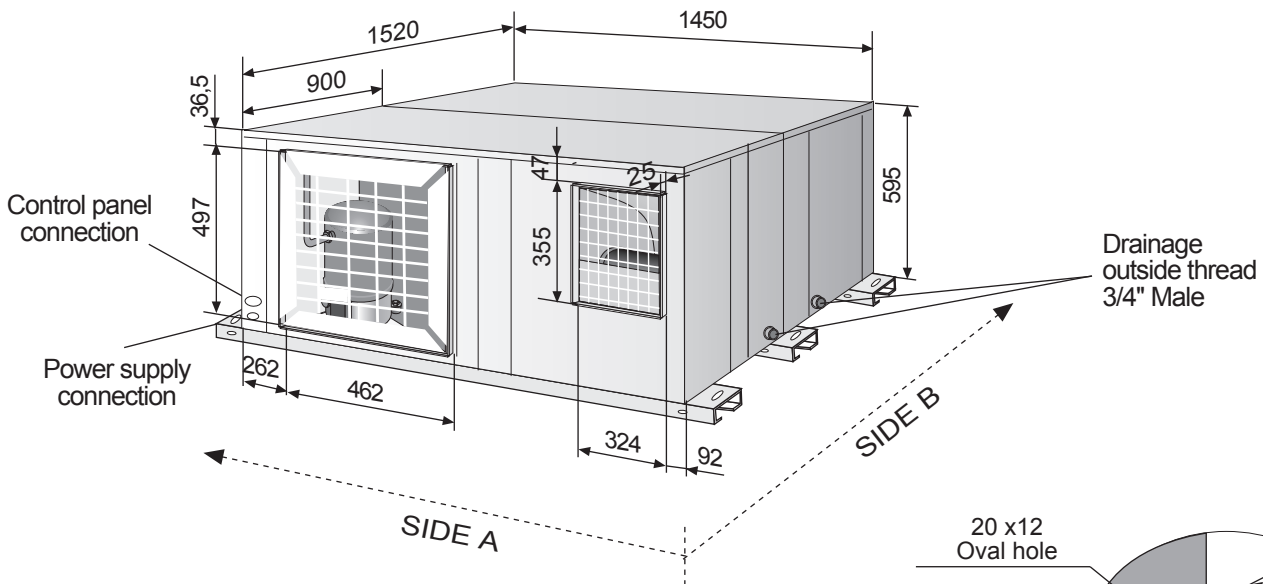
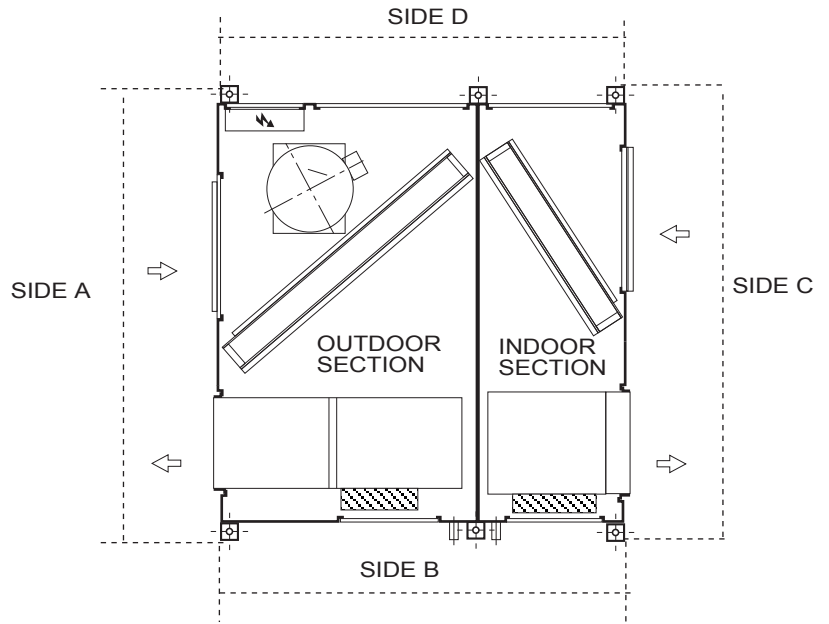


Detail drawing of unit anchor support



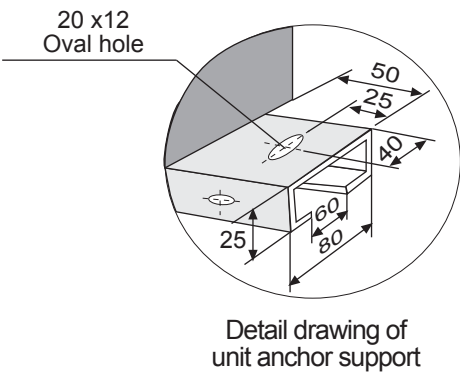
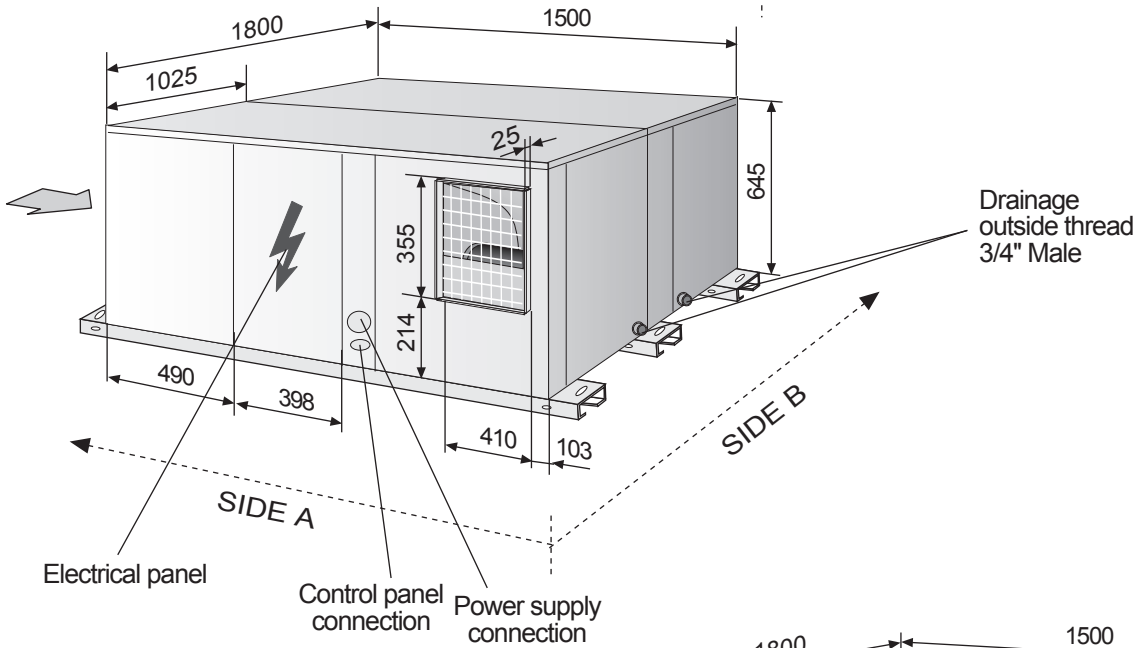
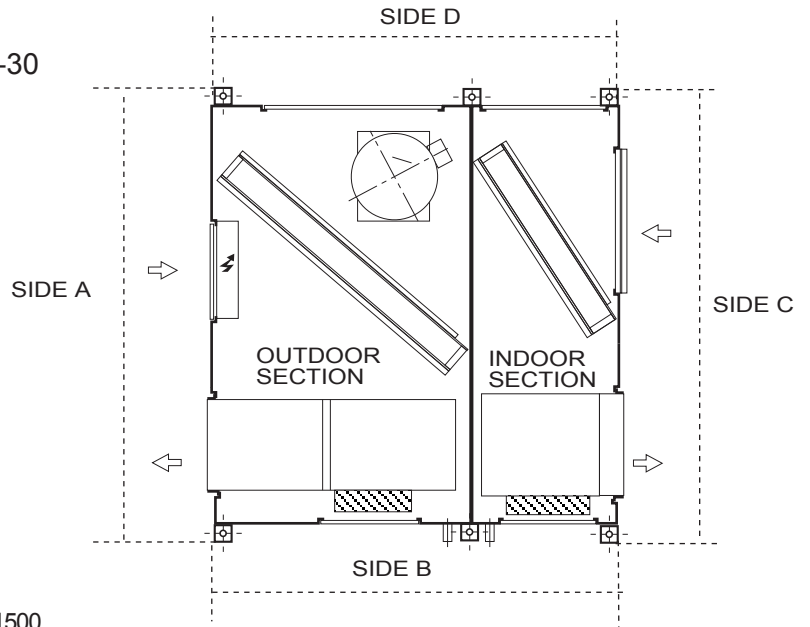
1.- GENERAL CHARACTERISTICS

1.5.- UNIT DIMENSIONS MODEL 22



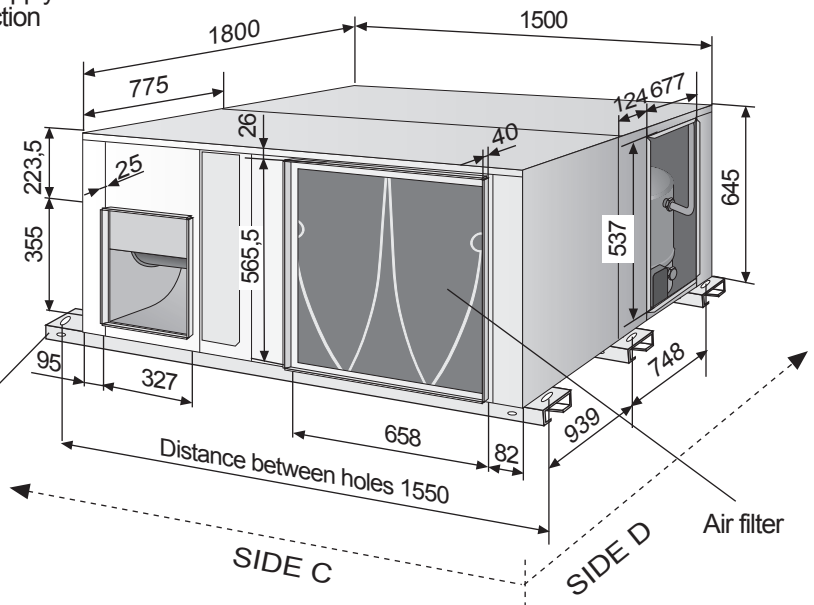
1.- GENERAL CHARACTERISTICS

1.5.- UNIT DIMENSIONS MODELS 24-28-30



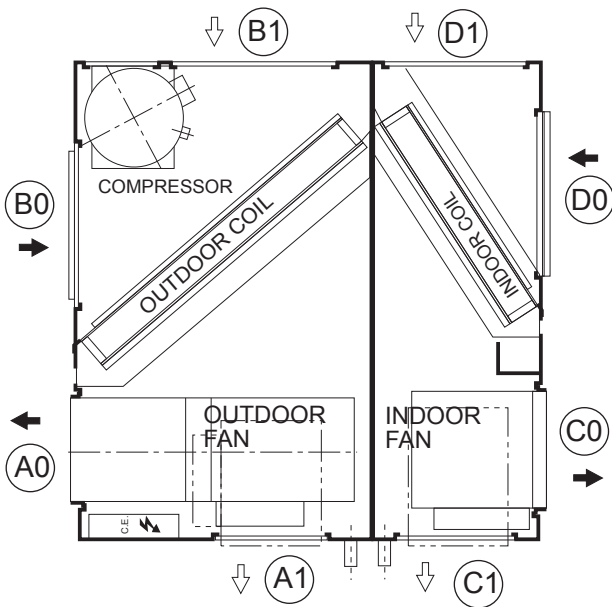
Detail drawing of unit anchor support

Unit anchor support

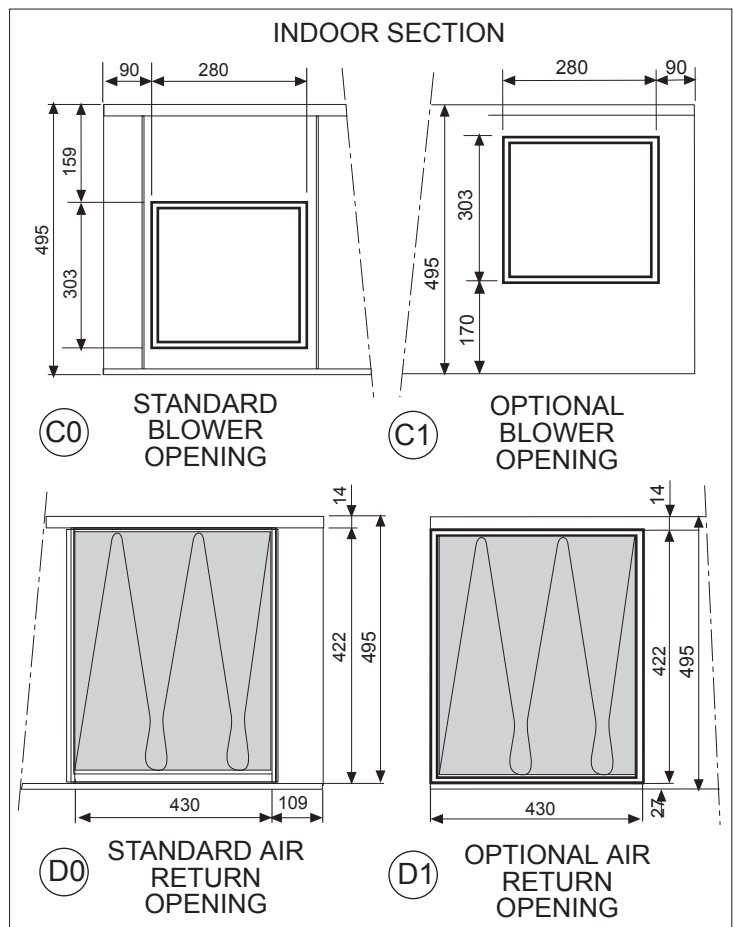
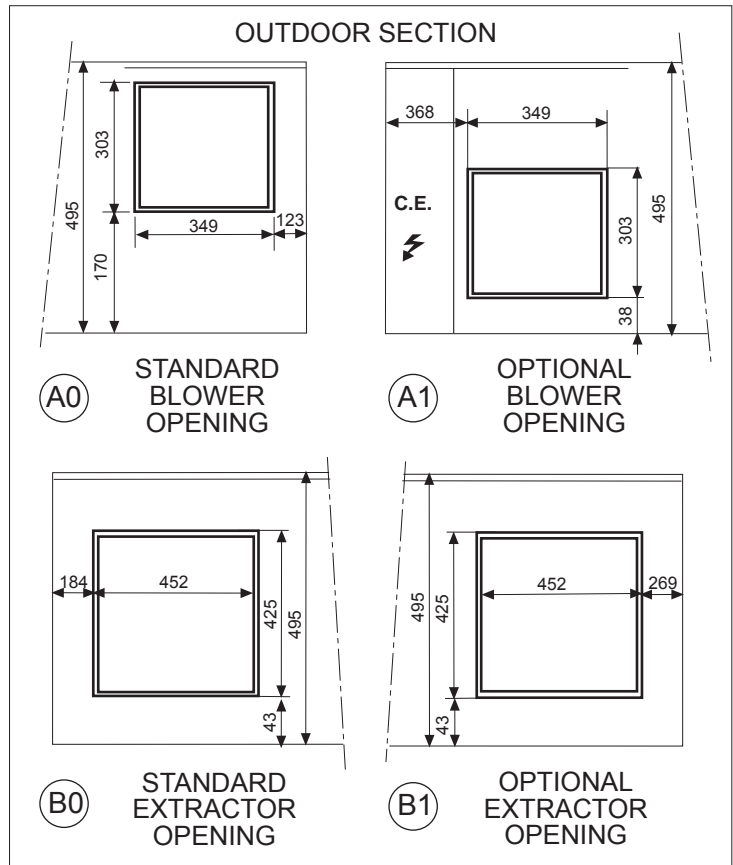


1.- GENERAL CHARACTERISTICS

1.6.- UNIT OPENING SIZES MODELS 10-12



- ← STANDARD CONFIGURATION
- ⇐ OPTIONAL CONFIGURATION
- ⚡ ELECTRICAL BOX

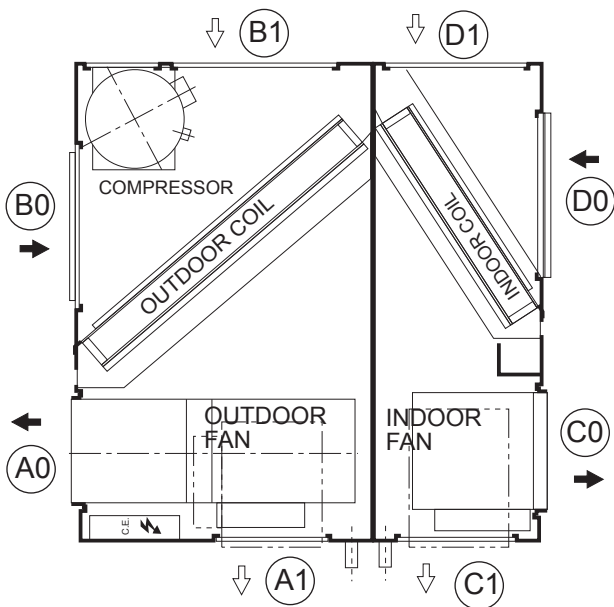


If the unit is going to be hung using the anchor supports and the optional air return opening, the supports must be repositioned so that the air filter may be removed.

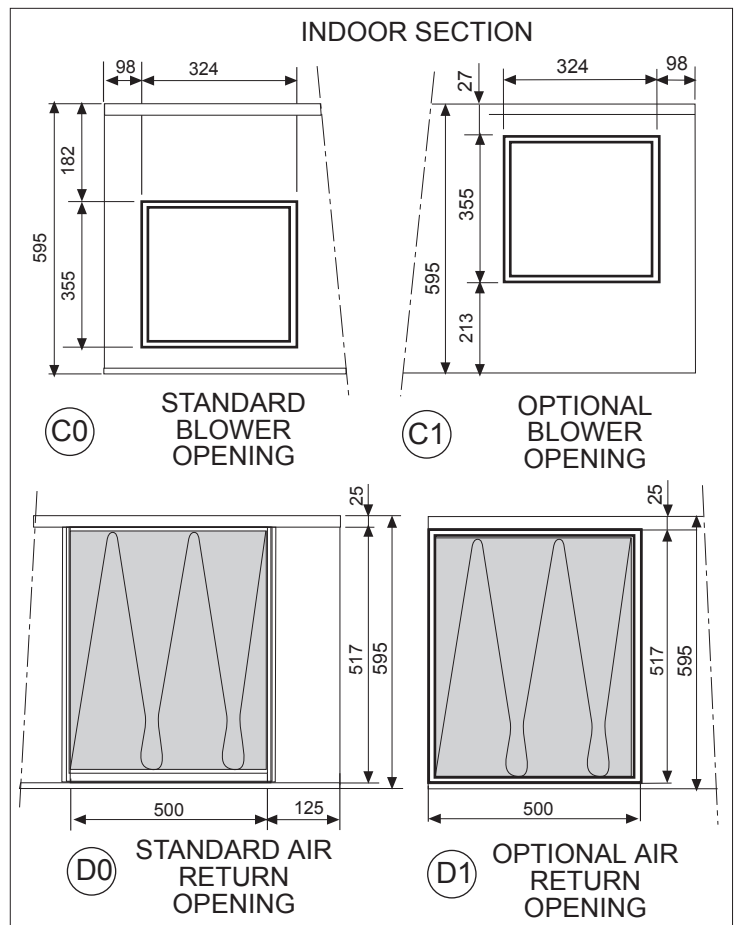
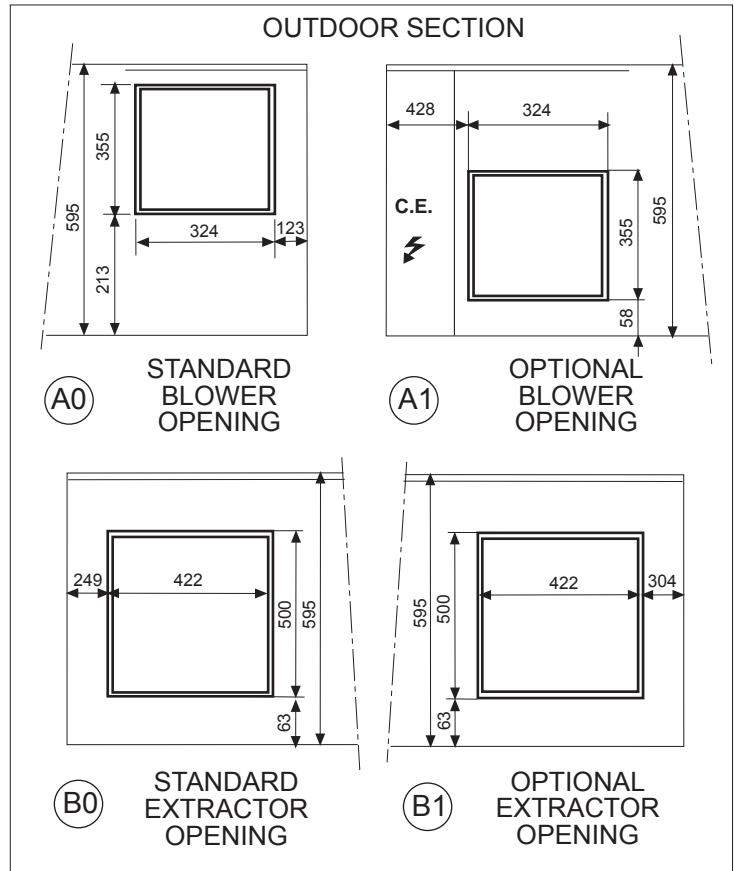
To move the supports, unscrew them from the inside and fix them again using the holes located next to the initial position.

1.- GENERAL CHARACTERISTICS

1.6.- UNIT OPENING SIZES MODEL 16



- ← STANDARD CONFIGURATION
- ← OPTIONAL CONFIGURATION
- ⚡ ELECTRICAL BOX

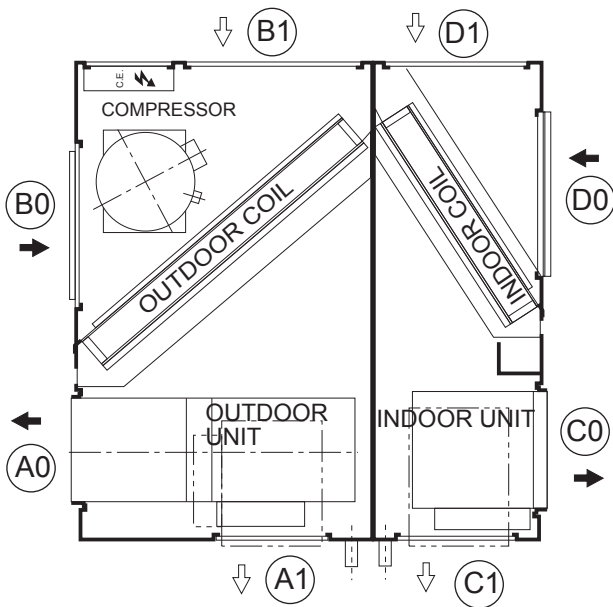


If the unit is going to be hung using the anchor supports and the optional air return opening, the supports must be repositioned so that the air filter may be removed.

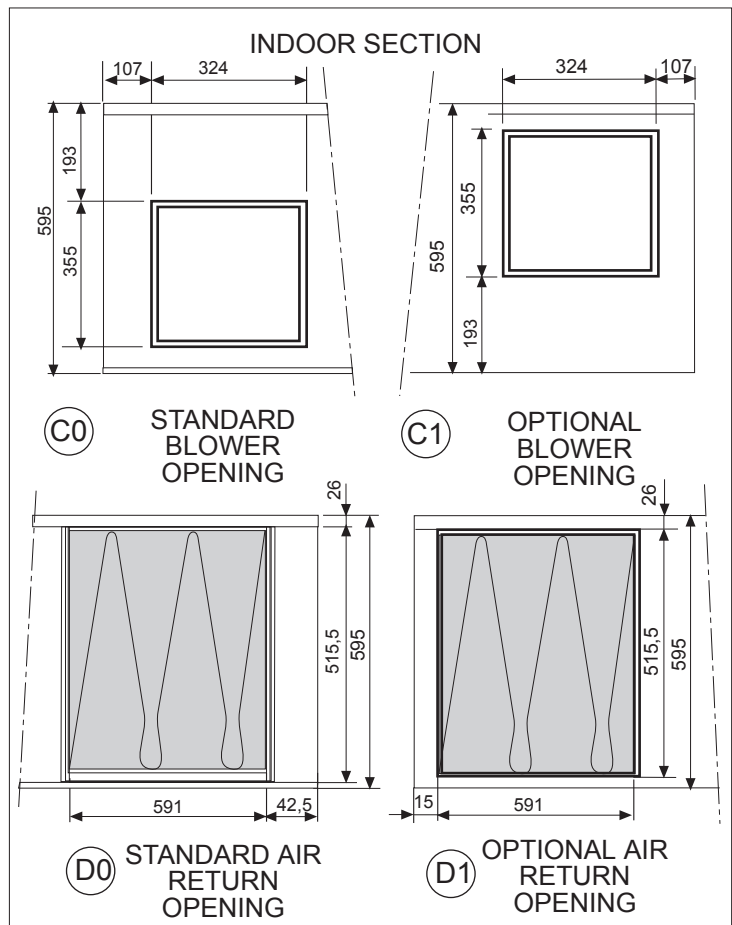
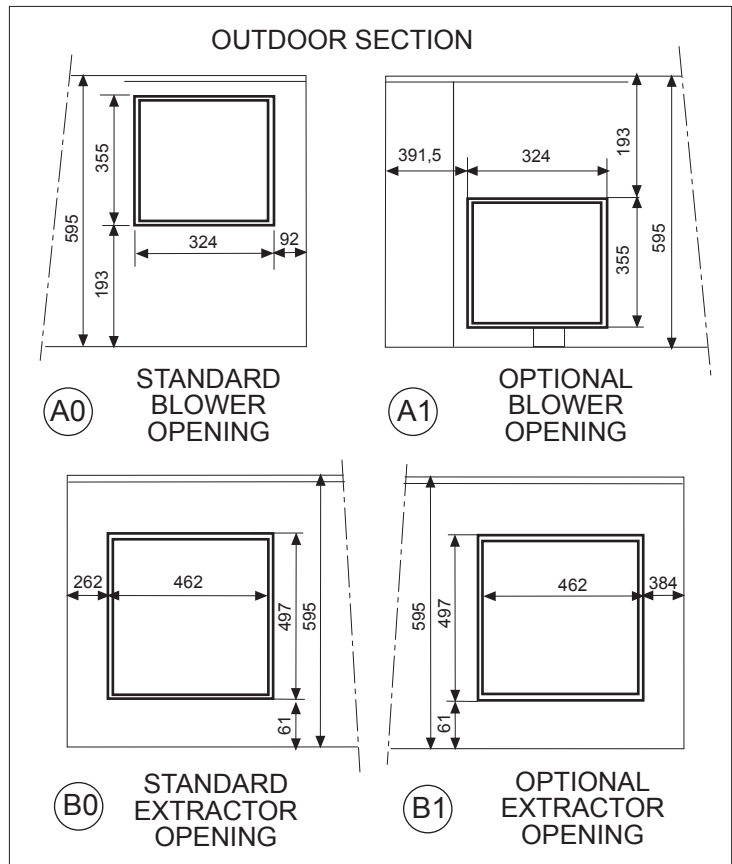
To move the supports, unscrew them from the inside and fix them again using the holes located next to the initial position.

1.- GENERAL CHARACTERISTICS

1.6.- UNIT OPENING SIZES MODEL 22



- ← STANDARD CONFIGURATION
- ⇐ OPTIONAL CONFIGURATION
- ⚡ ELECTRICAL BOX

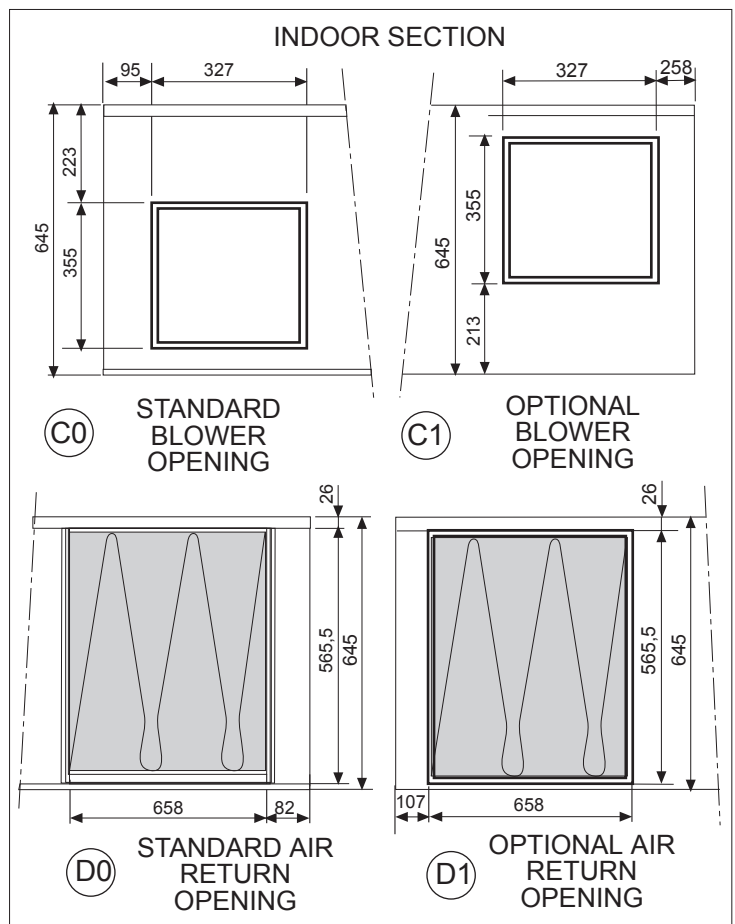
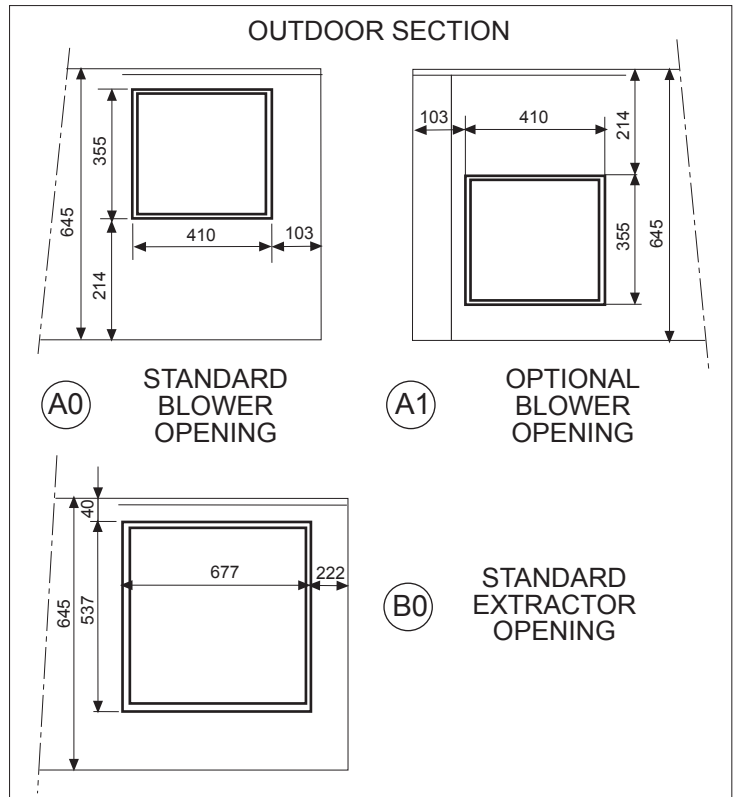
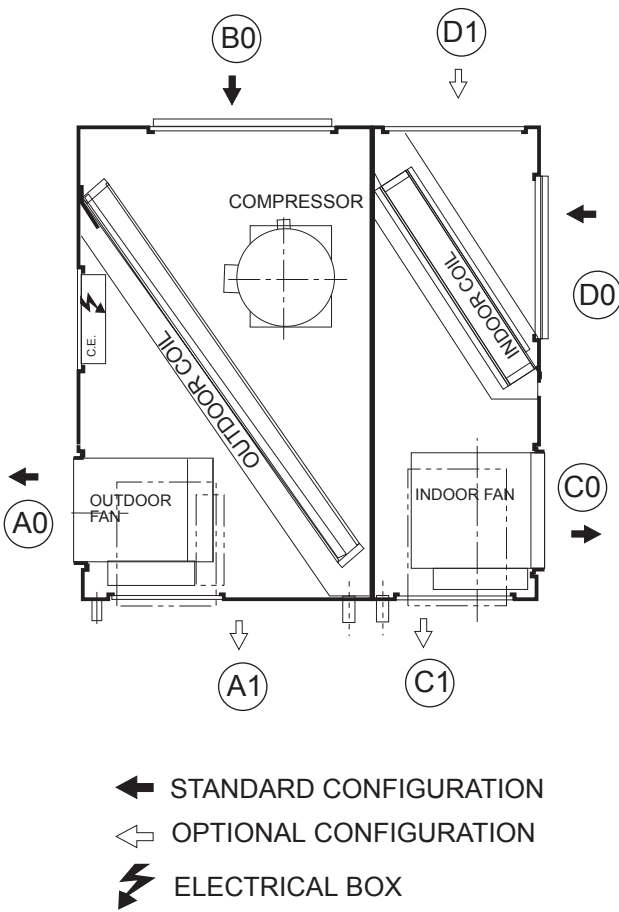


If the unit is going to be hung using the anchor supports and the optional air return opening, the supports must be repositioned so that the air filter may be removed.

To move the supports, unscrew them from the inside and fix them again using the holes located next to the initial position.

1.- GENERAL CHARACTERISTICS

1.6.- UNIT OPENING SIZES MODELS 24-28-30



If the unit is going to be hung using the anchor supports and the optional air return opening, the supports must be repositioned so that the air filter may be removed.

To move the supports, unscrew them from the inside and fix them again using the holes located next to the initial position.

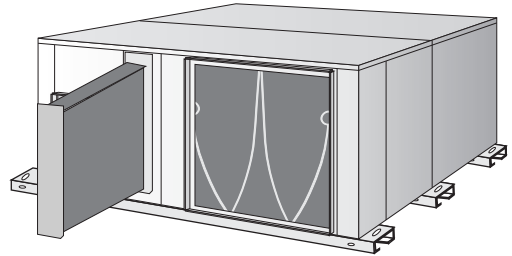
1.- GENERAL CHARACTERISTICS

1.7.- AVAILABLE OPTIONS

ELECTRIC HEATER

Optionally, these units can contain shielded element electric heating batteries that are mounted on the inside of the unit in the schematic opposite.

The electric heater must get its power from the unit's electrical box.



MAIN SWITCH

The main switch is located on the access panel to the electrical box in such a way that the unit is disconnected when the panel is opened.

(Refer to the size diagram on pages 7 to 10 to see the position of the electrical box access panel).

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

PHASE SEQUENCER (THREE-PHASE UNIT)

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 (MODELS 10-12-16)

The condensation pressure control consists of a pressure switch, 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.

HOT GAS BYPASS VALVE

The purpose of the BYPASS valve is to make it possible for the unit to operate at low outdoor temperatures (under 0°C), to be used in cooling-only and heat-pump units.

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

CONTROL USING A PROGRAMABLE CONTROLLER:

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

REMOTE ROOM-TEMPERATURE SENSOR, REMOTE DUCT SENSOR

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

- **REMOTE DUCT SENSOR:** The sensor will be located in the return-air duct, detecting the air temperature of the air being air-conditioned.
- **REMOTE ROOM-TEMPERATURE SENSOR:** The sensor will be placed in the area to be air-conditioned.

FREECOOLING THERMOSTAT KIT

The Freecooling Thermostat Kit will only operate in cooling-only or heat-pump units. This is an energy saving system that regulates the dampers doors through which outdoor air is taken in when the outdoor temperature is lower than the area to be air-conditioned.

This kit consists of the damper, a motor, power card and a controller with specific programming, safety thermostat for air discharge and outdoor sensor, completely factory-assembled.

1.- GENERAL CHARACTERISTICS

1.7.- AVAILABLE OPTIONS

CRANKCASE HEATER (COOLING-ONLY UNITS)

When the unit is operating at low outdoor temperatures it is advisable to fit a crankcase heater.

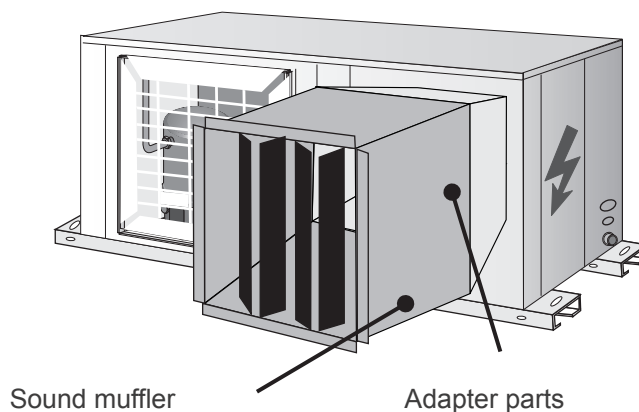
The purpose of the heater is to keep the oil in the compressor at the correct temperature while the compressor is stopped so that it can be properly lubricated when started again.

SOUND MUFFLER

Available for models 16, 22, 24, 28, 30.

Field assembled, designed to be installed at the extractor opening of the outdoor unit in order to reduce noise, particularly when the outdoor unit is installed without ducts, free discharge.

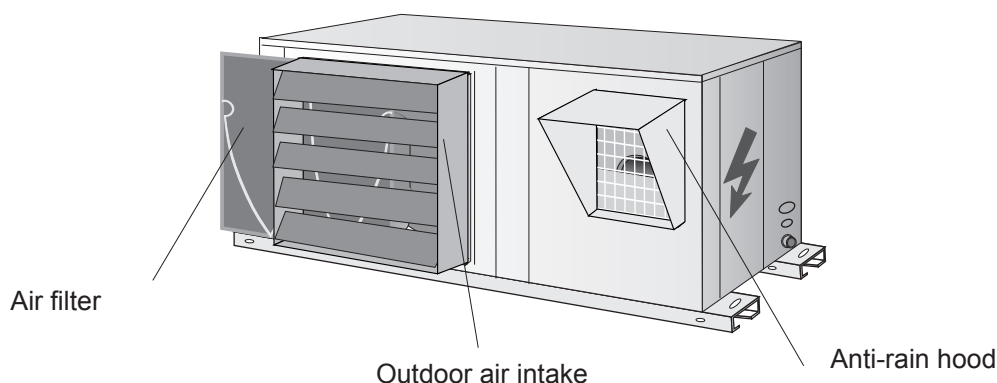
This kit contains the sound muffler and adapter parts for fixing it to the unit.



OUTDOOR MOUNTING KIT

Field assembly.

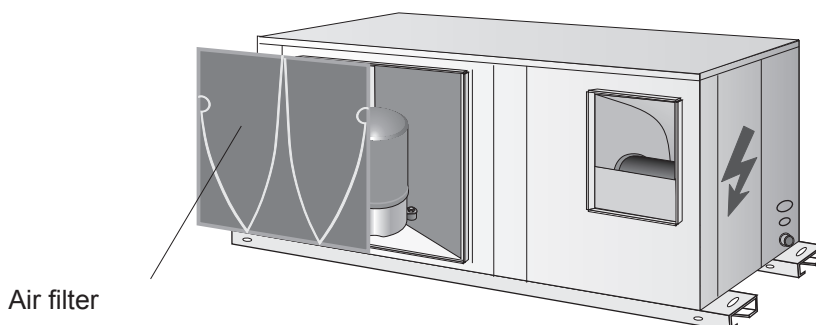
This kit is comprised of an air filter and grille for outdoor air intake which should be installed on the suction side of the outdoor unit, and the anti-rain hood which should be installed on the discharge side of the outdoor fan.



OUTDOOR AIR FILTER KIT

Field assembly.

The outdoor air filter should be installed on the outdoor air inlet of the outdoor unit and is recommended when working in heavily contaminated areas that may soil or clog the outdoor Coil.



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 HORIZONTAL POSITION on its metal bedplate profiles and TRANSPORTATION BLOCKS. 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.

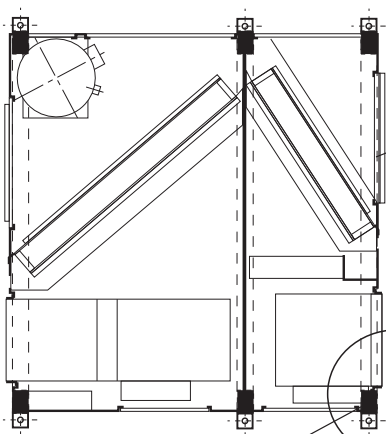
The units are designed to be installed with ducts, calculated by qualified technical staff. The joints to be used between ducts and the openings to the unit should be Elastic Joints. Avoid the use of BYPASS joints between the extraction air and input air in both the outdoor and indoor sections. The structure 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 and Wooden Blocks for transportation.

These wooden blocks must be removed when positioning the unit in its final position.

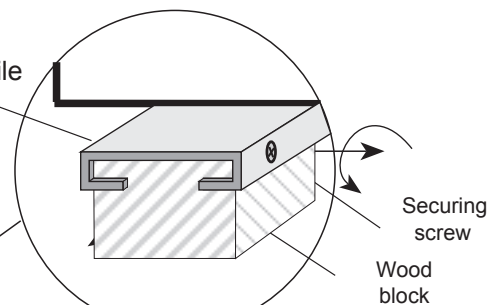
PLACEMENT OF THE BEDPLATE AND TRANSPORTATION BLOCKS



Wood block

Bedplate profile

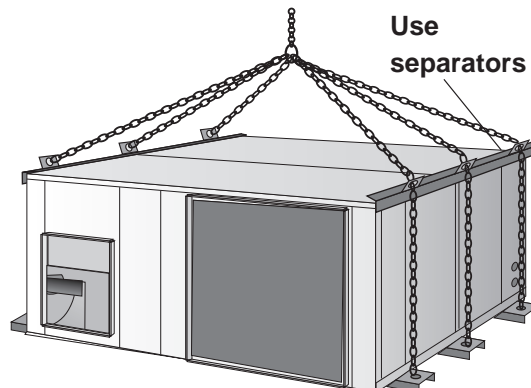
To remove the transportation blocks, remove the screw and slide the block along the metal profile.



Securing screw

Wood block

Use separators



How to hoist the unit

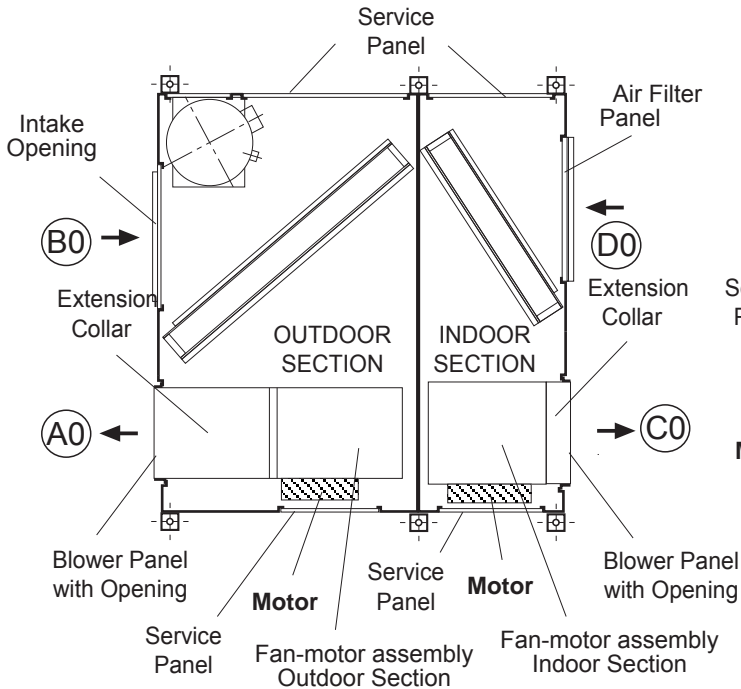
If unloading and placement require the use of a crane, then secure the suspension cables as shown in the figure.

2.- INSTALLATION

2.3.- OPTIONAL OPERATIONS PRIOR TO UNIT INSTALLATION:

CHANGE IN THE POSITION OF BLOWERS AND AIR INTAKE FOR **UNIT MODELS 10-12-16-22**

STANDARD AIR INTAKE AND BLOWERS



OUTDOOR SECTION

BLOWER:

From the position (A0) to the position (A1)

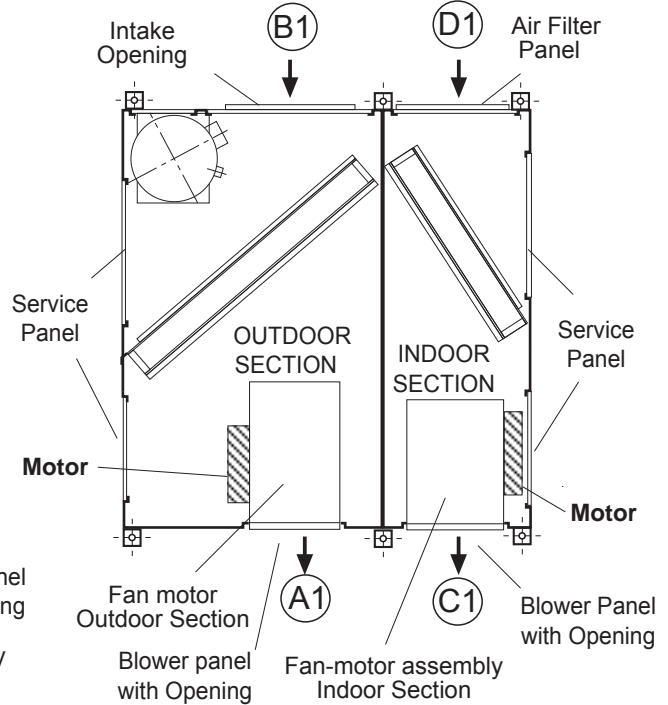
- 1) Remove the ceiling of the unit, the Blower Panel with Opening and the Service Panel.
- 2) Remove the motor-fan assembly from the unit unscrewing the supports from the base, and throwing away the extension collar, if there is one.
- 3) Unscrew the supports that have been left on the fan-motor assembly.
- 4) Turn the fan-motor assembly to its new position 90° horizontally and 180° on its shaft. The motor should now be accessible from the Service Panel in this new position.
- 5) Screw down the fan-motor assembly in its new position using the supports.
- 6) Assemble the Blower Panel with Opening and the Service Panel in its new position, taking special care with the weather striping.

INLET:

From the position (B0) to the position (B1)

- 1) Remove the Intake Opening and the Service Panel.
- 2) Switch the position of the Opening and Service Panels.

OPTIONAL AIR INTAKE AND BLOWERS



INDOOR SECTION

BLOWER:

From the position (C0) to the position (C1)

- 1) Remove the ceiling of the unit, the Blower Panel with Opening and the Service Panel.
- 2) Remove the motor-fan assembly from the unit unscrewing the supports from the base, and throwing away the extension collar, if there is one.
- 3) Unscrew the supports that have been left on the fan-motor assembly.
- 4) Turn the fan-motor assembly to its new position 90° horizontally and 180° on its shaft. The motor should now be accessible from the Service Panel in this new position.
- 5) Screw down the fan-motor assembly in its new position using the supports.
- 6) Assemble the Blower Panel with Opening and the Service Panel in its new position, taking special care with the weather striping.

RETURN:

From the position (D0) to the position (D1)

- 1) Remove the Intake Opening and the Service Panel.
- 2) Switch the position of the Air Filter and Services Panels.



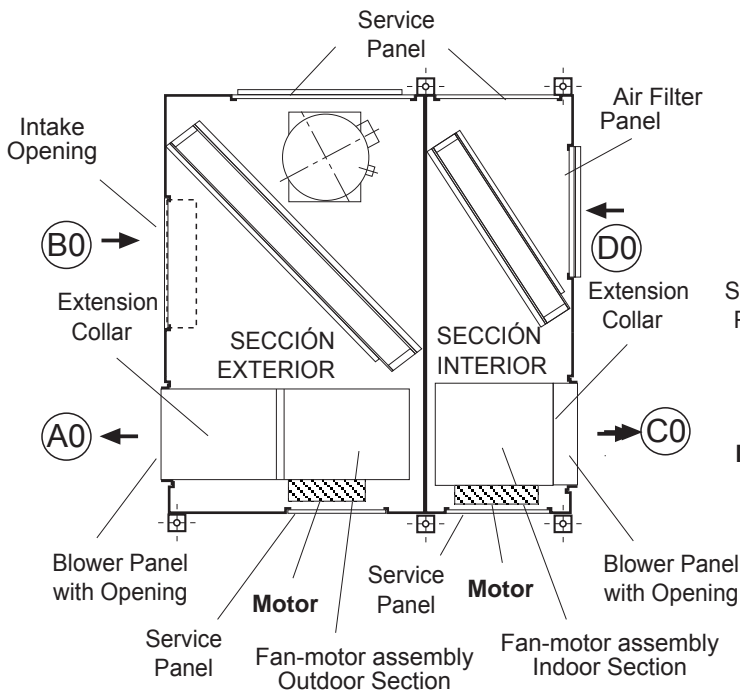
SEE LOCATIONS AND SIZES FOR THE OPENINGS IN THEIR STANDARD AND OPTIONAL POSITIONS ON THE GENERAL MEASUREMENT DRAWINGS.

2.- INSTALLATION

2.3.- OPTIONAL OPERATIONS PRIOR TO UNIT INSTALLATION:

CHANGE IN THE POSITION OF BLOWERS AND AIR INTAKE FOR **UNIT MODELS 24-28-30**

STANDARD AIR INTAKE AND BLOWERS



OUTDOOR SECTION

BLOWER:

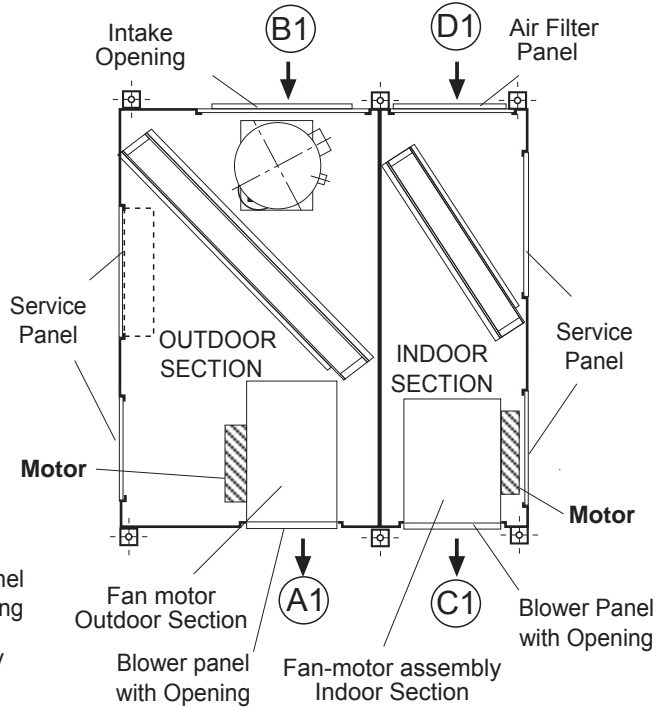
From the position (A0) to the position (A1)

- 1) Remove the ceiling of the unit, the Blower Panel with Opening and the Service Panel.
- 2) Remove the motor-fan assembly from the unit unscrewing the supports from the base, and throwing away the extension collar, if there is one.
- 3) Unscrew the supports that have been left on the fan-motor assembly.
- 4) Turn the fan-motor assembly to its new position 90° horizontally and 180° on its shaft. The motor should now be accessible from the Service Panel in this new position.
- 5) Screw down the fan-motor assembly in its new position using the supports.
- 6) Assemble the Blower Panel with Opening and the Service Panel in its new position, taking special care with the weather stripping.

INLET:

Not available

OPTIONAL AIR INTAKE AND BLOWERS



INDOOR SECTION

BLOWER:

From the position (C0) to the position (C1)

- 1) Remove the ceiling of the unit, the Blower Panel with Opening and the Service Panel.
- 2) Remove the motor-fan assembly from the unit unscrewing the supports from the base, and throwing away the extension collar, if there is one.
- 3) Unscrew the supports that have been left on the fan-motor assembly.
- 4) Turn the fan-motor assembly to its new position 90° horizontally and 180° on its shaft. The motor should now be accessible from the Service Panel in this new position.
- 5) Screw down the fan-motor assembly in its new position using the supports.
- 6) Assemble the Blower Panel with Opening and the Service Panel in its new position, taking special care with the weather stripping.

RETURN:

From the position (D0) to the position (D1)

- 1) Remove the Intake Opening and the Service Panel.
- 2) Switch the position of the Air Filter and Services Panels.



SEE LOCATIONS AND SIZES FOR THE OPENINGS IN THEIR STANDARD AND OPTIONAL POSITIONS ON THE GENERAL MEASUREMENT DRAWINGS.

2.- INSTALLATION

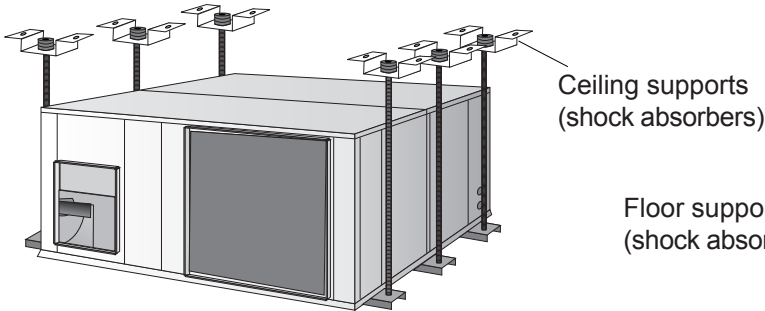
2.4.- UNIT LOCATION AND WEIGHT DISTRIBUTION

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 floor mounted, then the profiles should be isolated with shock absorbing material such as anti-vibration or pads. If used, consult the weight distribution table below to make the correct selection. 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.

UNIT HUNG WITH RODS



UNIT INSTALLED ON SHOCK ABSORBERS

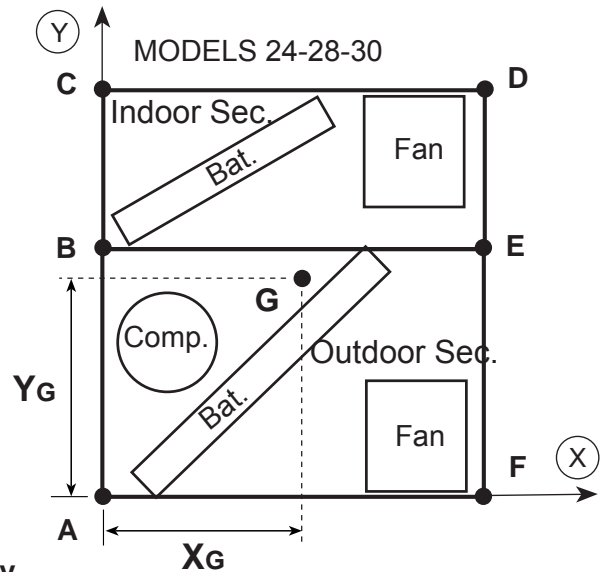
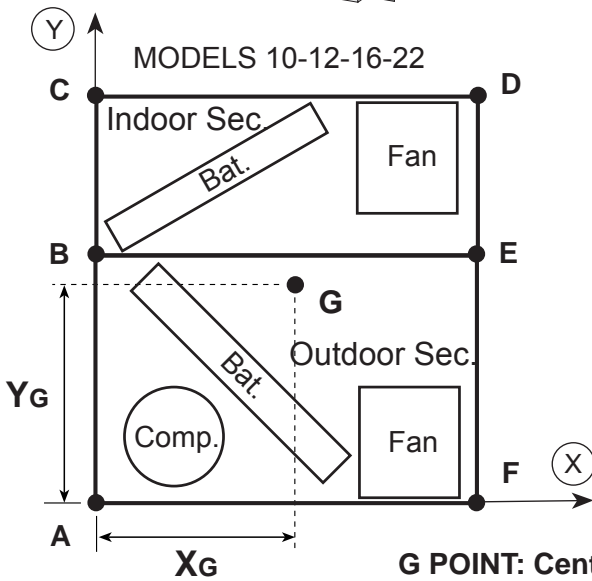
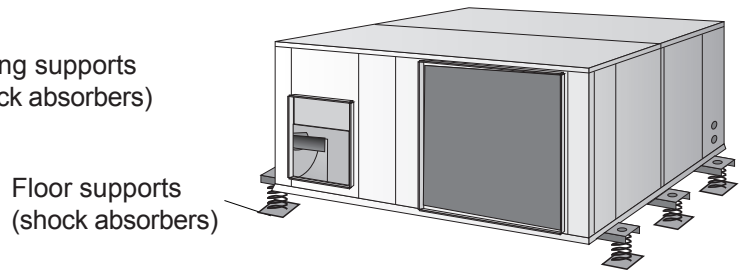


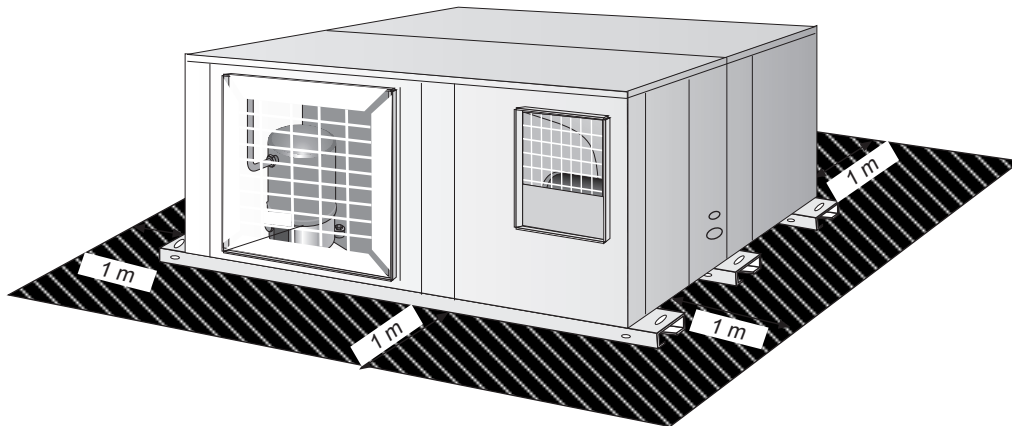
TABLE 1:
WEIGHT DISTRIBUTION
AND CENTRE OF
GRAVITY COORDINATES

Point Model	WEIGHT DISTRIBUTION (Kg)							CENTRE OF GRAVITY COORDINATES (G) (mm.)	
	A	B	C	D	E	F	Total	Xg	Yg
10	35	65	10	20	40	35	205	585	590
12	35	65	15	20	40	35	210	565	615
16	70	60	15	30	80	30	285	630	600
22	80	70	20	40	75	45	330	710	685
24	90	100	15	65	85	55	410	760	815
28	95	110	20	65	85	55	430	715	825
30	95	110	25	70	80	55	435	705	825

2.- INSTALLATION

2.5.- INSTALLATION CLEARANCES

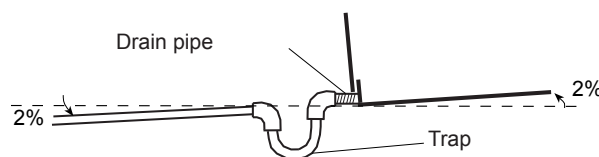
Clearance around the unit for service and maintenance.



For the unit with **optional FREECOOLING**, it should be kept in mind that the bedplate anchors cannot be used to **hang** the unit. Consult other options for outdoor mounting or changes in position of the air return duct if the unit is to be hung.

2.6.- DRAINS

All indoor sections of these units (and the outdoor sections for the Heat Pump) have a $\frac{3}{4}$ " steel threaded drain pipe welded to the condensation tray.



One PVC drain trap is supplied with the Cooling-only units, and two with the heat pump. Connect the trap/s to the drain pipe/s on the unit and mount the drain pipe with at least a 2% incline from the trap. 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.

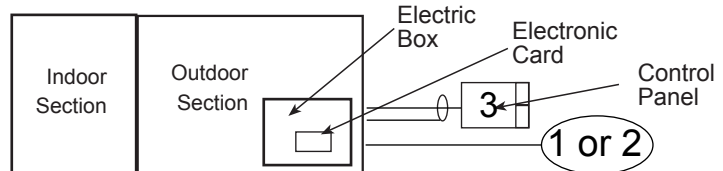
2.- INSTALLATION

2.7.- ELECTRICAL CONNECTION



- 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.

- ① Power supply WITHOUT electric Coil.
- ② Power supply WITH electric Coil.
- ③ Connection to the Control Panel.



POWER SUPPLY 230V SINGLE PHASE UNITS	UNIT MODEL	No. OF CABLES x SECTION (mm ²)		
		① Power supply without electric heater	② Power supply with electric heater	③ Shielded Cable
<p>1N ~ 230V - 50 Hz + PE</p>	10	3 x 4	3 x 16	2 x 1

POWER SUPPLY 230V THREE-PHASE UNITS	UNIT MODEL	No. OF CABLES x SECTION (mm ²)		
		① Power supply without electric heater	② Power supply with electric heater	③ Shielded Cable
<p>3 ~ 230V - 50 Hz + PE</p>	10	4 x 4	4 x 10	2 x 1
	12	4 x 4	4 x 10	2 x 1
	16	4 x 6	4 x 16	2 x 1
	22	4 x 10	4 x 16	2 x 1
	24	4 x 10	4 x 25	2 x 1
	28	4 x 10	4 x 25	2 x 1
	30	4 x 16	4 x 25	2 x 1

POWER SUPPLY 400V THREE-PHASE UNITS	UNIT MODEL	No. OF CABLES x SECTION (mm ²)		
		① Power supply without electric heater	② Power supply with electric heater	③ Shielded Cable
<p>3N ~ 400V - 50 Hz + PE</p>	10	5 x 2,5	5 x 4	2 x 1
	12	5 x 2,5	5 x 4	2 x 1
	16	5 x 4	5 x 6	2 x 1
	22	5 x 4	5 x 10	2 x 1
	24	5 x 4	5 x 10	2 x 1
	28	5 x 4	5 x 10	2 x 1
	30	5 x 6	5 x 10	2 x 1

- Connect the power supply cables to the terminals in the electric box through the rubber 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.

2.- INSTALLATION

2.7- ELECTRICAL CONNECTION

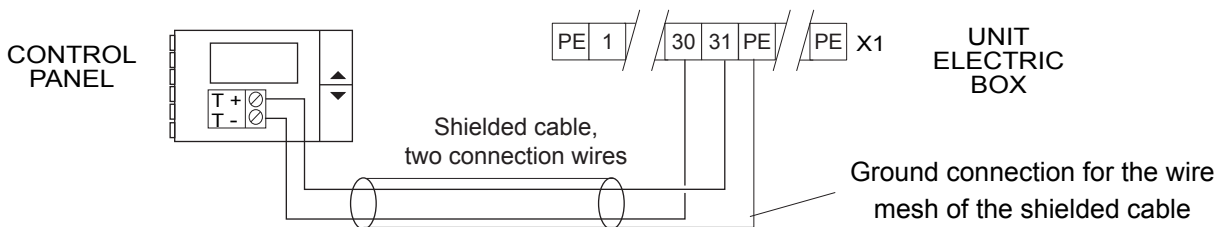
VOLTAGE OPERATING LIMITS

MODELS	VOLTAGE	LIMIT
10	230V-1Ph-50Hz	198-264V -1Ph- 50Hz
10-12-16-22	230V-3Ph-50Hz	180-242V -3Ph- 50Hz
	400V-3Ph-50Hz	342-462V -3Ph- 50Hz
24-28-30	230V-3Ph-50Hz	198-264V -3Ph- 50Hz
	400V-3Ph-50Hz	342-462V -3Ph- 50Hz



IMPORTANT

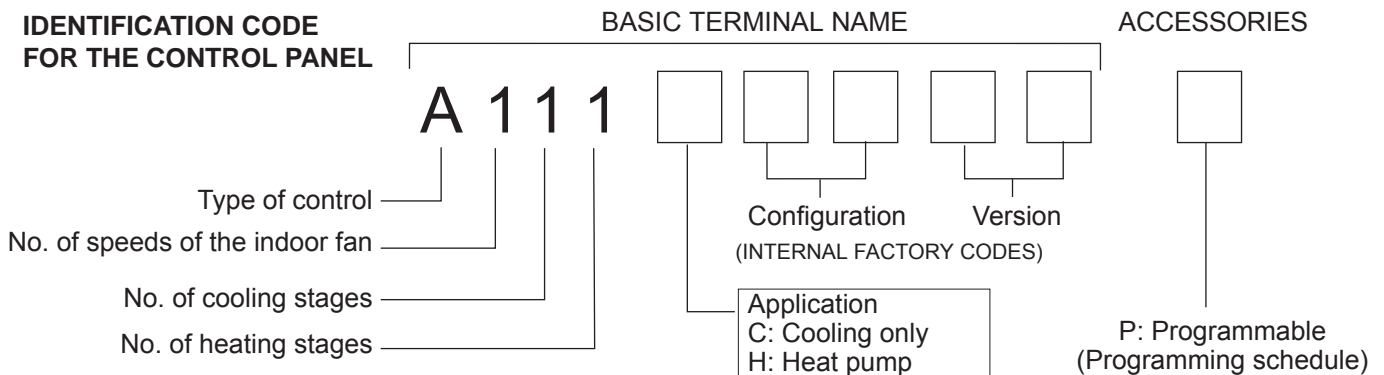
THE SHIELDED CONNECTION CABLE BETWEEN THE CONTROL PANEL AND THE UNIT MUST BE SEPARATE FROM ANY OTHER TYPE OF ELECTRICAL WIRING. CONNECT IT TO THE ELECTRIC BOX LOCATED IN THE OUTDOOR UNIT.



- 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 on the electric box side.
- 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 panel 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.

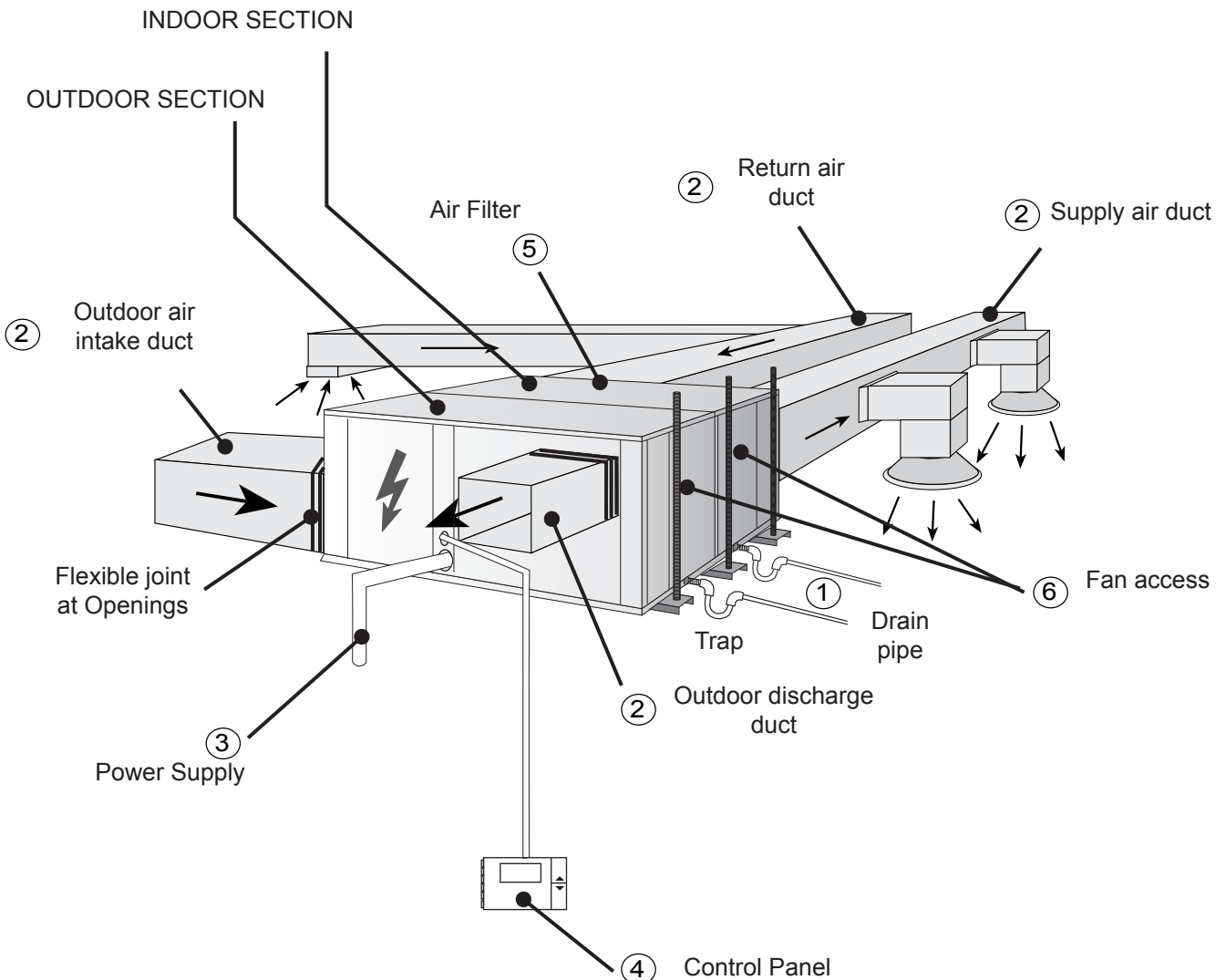


3.- COMMISSIONING AND OPERATION

3.1.- PRELIMINARY CHECKS

- ① Check that drain pipe connections and their fixtures are secure 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 Rating 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 Check the control panel connections.
(If the connection is wrong, the unit will not operate and the control panel display will not light).
- ⑤ Inspect the Air Filter, which should be in its housing and correctly positioned (the metal grille should be toward the inside).
- ⑥ Check **with your hand** that the fans turn freely.

FIGURE FOR THE STANDARD UNIT CONFIGURATION FOR MODELS 24-28-30



Close the unit and check that there are no loose panels.
Units have the correct refrigerant charge. Do not change it.

3.- COMMISSIONING AND OPERATION

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, 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 pressure switch should stop the compressor at 27.5 kg/cm^2 . Reconnect the fan and electrically reset the pressure switch by pressing the "RESUME" button on the Control Panel for 5 seconds 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/cm^2 . The unit will start up again when the pressure rises and the pressure gauge indicates 2 kg/cm^2 . 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.**

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 batteries 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.

- DRAINS :

Check that water drains correctly and that the drain trays are clean.

- FANS :

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

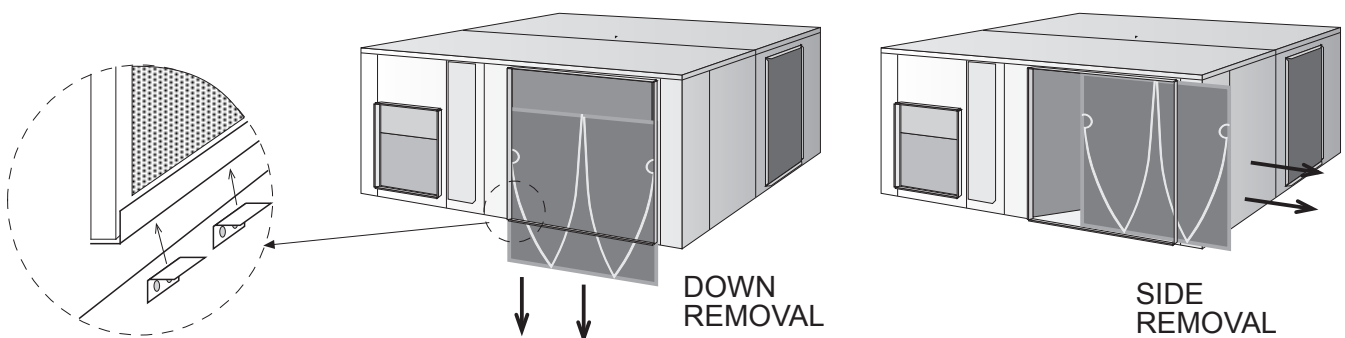
- CONTROL :

Check Set Points and normal operation.

- AIR FILTER :

The air filter can be removed through the side by sliding it over the rail or down. (See figure).

For down removal, remove the two profiles supporting it (depending on the model) which are under the filter guide rail and screwed into the unit.



The filter should be cleaned with a vacuum cleaner or washed in soapy water.

The frequency for cleaning or changing the air filters will depend on the quality air in the area (fumes, vapors, suspended dust particles, etc.).

Remember that the metal grille should always be toward the inside of the unit.



Remember that the Control Panel may program a notification parameter, for cleaning or replacement of air filters depending on the number of hours of fan operation in the indoor section.

4.- MAINTENANCE

4.2.- CORRECTIVE MAINTENANCE

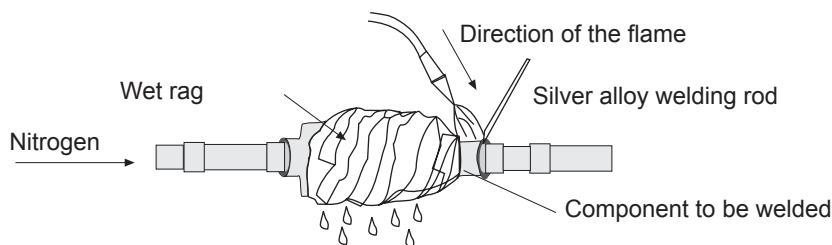


IMPORTANT

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 from 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 pipework, 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

If R-407C Refrigerant is used in the unit, 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 capped 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 batteries 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.
WATER LEAKS	Clogged drainage.	Inspect and Clean.
	Loose drainage pipe connections.	Correct connection.
	Dirty and overflowing trays.	Inspect and Clean.

