

INSTALLATION AND
OPERATING MANUAL



PROVIDING **GLOBAL SYSTEM** SOLUTIONS

**COMPACTAIR
LVCK
LVHA / LVHK**

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POINTS TO KEEP IN MIND



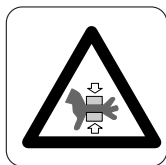
Abrasive surfaces



Low temperatures



High temperatures



Risk of injury with moving objects



Electrical voltage



Risk of injury with rotating objects

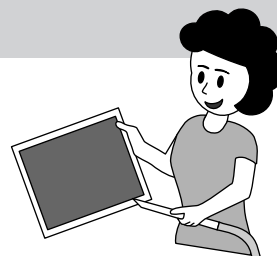
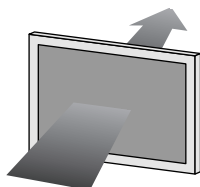
WARNING

Electric shock hazard can cause injury or death. Before attempting to perform any service or maintenance on the unit, turn OFF the electrical power, and check that the fan has stopped.

The air filter cleaning operations do not require technical service; however when an electrical or mechanical operation is required call an Engineer.

FILTER CLEANING

Check the air filter and make sure it is not blocked with dust or dirt.



If the filter is dirty, wash it in a bowl with neutral soap and water, drying it in the shade before inserting it in 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 modifications without notice.

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

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

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

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

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

DATE PAGE FOR UNIT COMMISSIONING

UNIT: _____ SERIAL Nr.: _____

CONTROL PANEL IDENTIFICATION CODE _____

INSTALLATION ADDRESS: _____

INSTALLER: _____ INSTALLER TEL.: _____

INSTALLER ADDRESS: _____

DATE OF COMMISSIONING: _____

CHECKS:

SUPPLY VOLTAGE: _____ RATED VOLTAGE OF THE UNIT: _____

	YES	NO
UNIT ON SHOCK ABSORBERS	<input type="checkbox"/>	<input type="checkbox"/>
DRAINAGE WITH TRAP	<input type="checkbox"/>	<input type="checkbox"/>
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: < 1 ___ °C
 2 ___ °C

Air Output Temperature, Outdoor Coil: < 1 ___ °C
 2 ___ °C

Air Intake Temperature, Indoor Coil: _____ °C

Air Output Temperature, Indoor Coil: _____ °C

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

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

HEATING CYCLE

Air Intake Temperature, Outdoor Coil: < 1 ___ °C
 2 ___ °C

Air Output Temperature, Outdoor Coil: < 1 ___ °C
 2 ___ °C

Air Intake Temperature, Indoor Coil: _____ °C

Air Output Temperature, Indoor Coil: _____ °C

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

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

ELECTRIC POWER CONSUMPTION (Amps)

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

Fan outdoor section 1 _____ / _____ / _____

Fan outdoor section 2 _____ / _____ / _____

Fan indoor section _____ / _____ / _____

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

Fan outdoor section 1 _____ / _____ / _____

Fan outdoor section 2 _____ / _____ / _____

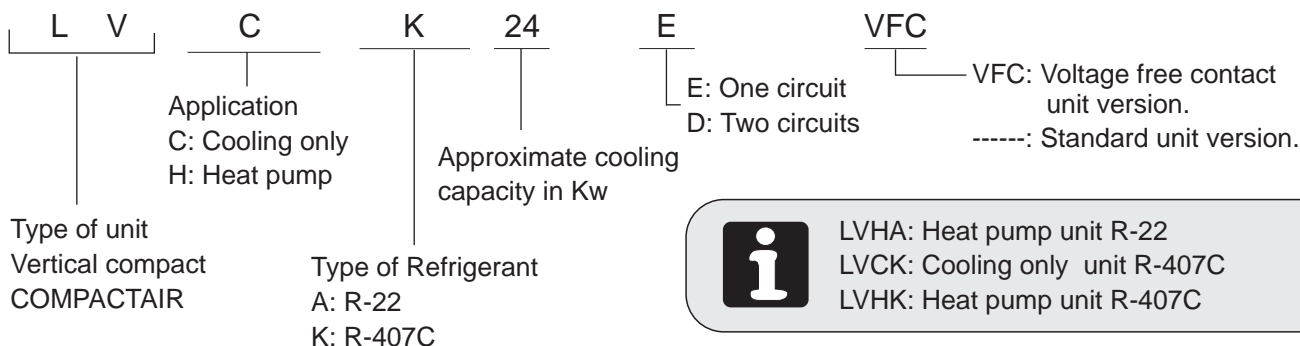
Fan indoor section _____ / _____ / _____

Options Installed: _____

Comments: _____

1.- GENERAL CHARACTERISTICS

1.1.- PHYSICAL DATA



UNIT MODELS		22E	24E	28E	32E	38E
COMPRESSOR	Nr. / Type	1 / Scroll	1 / Scroll	1 / Scroll	1 / Scroll	1 / Scroll

FAN OUTDOOR SECTION

Maximum air flow	m³/h.	7550	7350	7100	8000	11000
Minimum air flow	m³/h.	5600	5600	5600	6500	9000
Maximum available pressure (1)	Pa	170	160	140	300	300

FAN OUTDOOR SECTION

Maximum air flow	m³/h.	4700	5100	5850	6000	7300
Minimum air flow	m³/h.	3500	3900	4500	4750	5800
Maximum available pressure (1)	Pa	205	195	250	220	240

(1) With minimum air flow admissible.

NET WEIGHT

Cooling only units	Kg	310	370	385	390	505
Heat pump units	Kg	315	375	390	395	510

UNIT MODELS		LVHA 22E	LVHA 24E	LVHA 28E	LVHA 32E	LVHA 38E
Cooling capacity	(*) Kw	19,20	21,50	26,00	28,10	35,80
Heating capacity	(**) Kw	20,40	22,70	27,30	30,90	37,60
Refrigerant charge R-22	gr.	6000	6550	7500	8900	10900

UNIT MODELS		LVCK 22E LVHK 22E	LVCK 24E LVHK 24E	LVCK 28E LVHK 28E	LVCK 32E LVHK 32E	LVCK 38E LVHK 38E
Cooling capacity	(*) Kw	19,50	22,00	26,50	28,70	36,50
Heating capacity	(**) Kw	20,20	22,50	27,00	30,30	36,90
Refrigerant charge R-407C	gr. LVCK	5100	5600	6700	7600	9500
	LVHK	5700	6250	7400	8450	10500

(*) 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

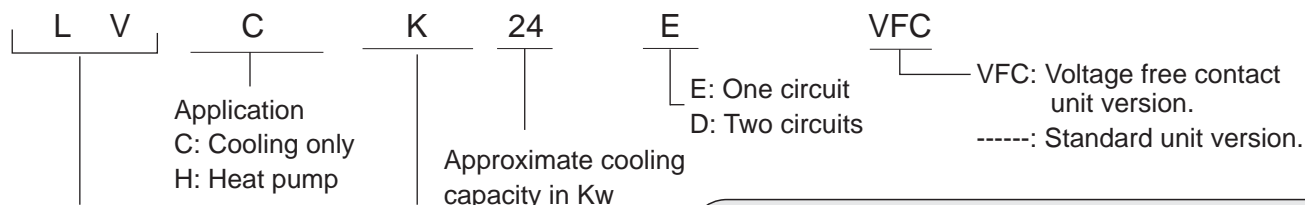
(**) Air intake temperature in the outdoor exchanger: 7°C DB / 6 °C WB

DB.- Dry bulb temperature

WB.- Wet bulb temperature

1.- GENERAL CHARACTERISTICS

1.1.- PHYSICAL DATA



Type of unit

Vertical compact
COMPACTAIR

Type of Refrigerant

A: R-22
K: R-407C



LVHA: Heat pump unit R-22
LVCK: Cooling only unit R-407C
LVHK: Heat pump unit R-407C

UNIT MODELS		44D	48D	56D	64D	76D
COMPRESSOR	Nr. / Type	2 / Scroll	2 / Scroll	2 / Scroll	2 / Scroll	2 / Scroll

FAN OUTDOOR SECTION

	m ³ /h.	44D	48D	56D	64D	76D
Minimum air flow	m ³ /h.	11200	11200	11200	13000	18000
Maximum available pressure (1)	Pa	170	160	140	300	300

FAN OUTDOOR SECTION

	m ³ /h.	44D	48D	56D	64D	76D
Minimum air flow	m ³ /h.	7000	7800	9000	9500	11600
Maximum available pressure (1)	Pa	205	195	250	220	240

(1) With minimum air flow admissible.

NET WEIGHT

	Kg	44D	48D	56D	64D	76D
Cooling only units	Kg	620	740	780	785	935
Heat pump units	Kg	630	750	790	795	945

UNIT MODELS		LVHA 44D	LVHA 48D	LVHA 56D	LVHA 64D	LVHA 76D
Cooling capacity	(*) Kw	38,40	43,00	52,00	56,20	71,60
Heating capacity	(**) Kw	40,80	45,40	54,60	61,80	75,20
Refrigerant charge R-22	gr.	12000	13100	15000	17800	21800

UNIT MODELS		LVCK 44D LVHK 44D	LVCK 48D LVHK 48D	LVCK 56D LVHK 56D	LVCK 64D LVHK 64D	LVCK 76D LVHK 76D
Cooling capacity	(*) Kw	39,00	44,00	53,00	57,40	73,00
Heating capacity	(**) Kw	40,40	45,00	54,00	60,60	73,80
Refrigerant charge R-407C	gr. LVCK	10200	11200	13400	15200	19000
	gr. LVHK	11400	12500	14800	16900	21000

(*) 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

**R-407C
R-22**

1.2.- ELECTRICAL DATA

UNIT MODELS		LVCK 22E LVHK 22E LVHA 22E	LVCK 24E LVHK 24E LVHA 24E	LVCK 28E LVHK 28E LVHA 28E	LVCK 32E LVHK 32E LVHA 32E	LVCK 38E LVHK 38E LVHA 38E
Voltage	V/f (50 Hz)	230V-400V/ 3Ph				
Maximum absorbed power						
Compressor	Kw	7,6	8,62	11,15	12,9	15,55
Fan outdoor section	Kw	2,2	2,2	2,2	2,5	2,8
Fan indoor section	Kw	1,3	1,4	1,5	1,8	2
Total power	Kw	11,1	12,2	14,9	17,2	20,4
Maximum current						
Compressor	A	22,4/12,9	24,3/14	28,5/16,4	36,5/21	46,1/25,6
Fan outdoor section	A	6,4/3,7	6,4/3,7	6,4/3,7	8,8/5,1	12,5/7,2
Fan indoor section	A	4,3/2,5	4,3/2,5	6,2/3,6	6,2/3,6	6,2/3,6
Total current	A	33,1/19,1	35,0/20,2	41,1/23,7	51,5/29,7	64,8/36,4
Start up current	A	188,7/107,2	176,7/105,2	222,6/130,3	239,0/135,7	297,7/168,8

UNIT MODELS		LVCK 44D LVHK 44D LVHA 44D	LVCK 48D LVHK 48D LVHA 48D	LVCK 56D LVHK 56D LVHA 56D	LVCK 64D LVHK 64D LVHA 64D	LVCK 76D LVHK 76D LVHA 76D
Voltage	V/f (50 Hz)	230V-400V/ 3Ph				
Maximum absorbed power						
Compressor	Kw	15,2	17,24	22,3	25,8	31,1
Fan outdoor section	Kw	4,4	4,4	4,4	5	5,6
Fan indoor section	Kw	2,6	2,8	3	3,6	4
Total power	Kw	22,2	24,4	29,7	34,4	40,7
Maximum current						
Compressor	A	44,8/25,8	48,6/28	57/32,8	73/42	92,2/51,2
Fan outdoor section	A	12,8/7,4	12,8/7,4	12,8/7,4	17,6/10,2	24,9/14,4
Fan indoor section	A	8,8/5,1	8,8/5,1	12,5/7,2	12,5/7,2	12,5/7,2
Total Current	A	66,4/38,3	70,2/40,5	82,3/47,4	103,1/59,4	129,6/72,8
Start up current	A	222,0/126,4	211,9/125,5	263,8/154,0	290,6/165,4	362,5/205,2

1.- GENERAL CHARACTERISTICS

1.3.- STANDARD INDOOR FAN PERFORMANCES

		22E				24E							
AIR FLOW		R.P.M.	M ³ /H	3500	3900	4300	4700	R.P.M.	M ³ /H	3900	4300	4700	5100
PULLEY POSITION	PULLEY CLOSED	890	205*	195*	165*	130*		890	195*	165*	130*	85*	
	1 TURN	840	165*	150*	125*	90*		840	150*	125*	90*	50*	
	2 TURNS	790	130*	115*	90*	55*		790	115*	90*	55*	15*	
	3 TURNS	740	105*	80*	60*	20*		740	80*	60*	20*	—	

		28E				32E							
AIR FLOW		R.P.M.	M ³ /H	4500	4950	5400	5850	R.P.M.	M ³ /H	4750	5250	5750	6000
PULLEY POSITION	PULLEY CLOSED	1010	250*	200*	95*	30*		1010	220*	175*	115*	70*	
	1 TURN	955	190*	145*	40*	—		955	165*	115*	50*	0*	
	2 TURNS	900	145*	100*	0*	—		900	125*	65*	0*	—	
	3 TURNS	845	105*	55*	—	—		845	80*	25*	—	—	

		38E				44D							
AIR FLOW		R.P.M.	M ³ /H	5800	6400	7000	7300	R.P.M.	M ³ /H	7000	7800	8600	9400
PULLEY POSITION	PULLEY CLOSED	1010	240*	220*	●	●		890	205*	195*	165*	130*	
	1 TURN	955	190*	150*	100*	●		840	165*	150*	125*	90*	
	2 TURNS	900	150*	110*	65*	40*		790	130*	115*	90*	55*	
	3 TURNS	845	105*	60*	15*	0*		740	105*	80*	60*	20*	

		48D				56D							
AIR FLOW		R.P.M.	M ³ /H	7800	8600	9400	10200	R.P.M.	M ³ /H	9000	9900	10800	11700
PULLEY POSITION	PULLEY CLOSED	890	195*	165*	130*	85*		1010	250*	200*	95*	30*	
	1 TURN	840	150*	125*	90*	50*		955	190*	145*	40*	—	
	2 TURNS	790	115*	90*	55*	15*		900	145*	100*	0*	—	
	3 TURNS	740	80*	60*	20*	—		845	105*	55*	—	—	

		64D				76D							
AIR FLOW		R.P.M.	M ³ /H	9500	10500	11500	12000	R.P.M.	M ³ /H	11600	12800	14000	14600
PULLEY POSITION	PULLEY CLOSED	1010	220*	175*	115*	70*		1010	240*	200*	●	●	
	1 TURN	955	165*	115*	50*	0*		955	190*	150*	100*	●	
	2 TURNS	900	125*	65*	0*	—		900	150*	110*	65*	40*	
	3 TURNS	845	80*	25*	—	—		845	105*	60*	15*	0*	

(*) STATIC PRESSURE AVAILABLE PA.

(●) WRONG STATUS ON ACCOUNT OF MOTOR POWER LIMIT.

NOTE: The unit leaves factory with pulley two turns opened.

1.- GENERAL CHARACTERISTICS

1.3.- STANDARD OUTDOOR FAN PERFORMANCES

22E

	AIR FLOW M ³ /H	5600	6325	7050	7550
STATIC PRESSURE AVAILABLE Pa		170	120	50	0

24E

	AIR FLOW M ³ /H	5600	6325	6800	7350
STATIC PRESSURE AVAILABLE Pa		160	110	50	0

28E

	AIR FLOW M ³ /H	5600	6125	6650	7100
STATIC PRESSURE AVAILABLE Pa		140	90	50	0

32E

AIR FLOW	R.P.M.	M ³ /H	6500	7000	7500	8000
PULLEY POSITION	PULLEY CLOSED	1140	300*	275*	225*	●
	1 TURN	1070	230*	200*	140*	85*
	2 TURNS	995	175*	140*	75*	25*
	3 TURNS	920	115*	75*	20*	—

38E

AIR FLOW	R.P.M.	M ³ /H	9000	9600	10300	11000
PULLEY POSITION	PULLEY CLOSED	1000	300*	270*	●	●
	1 TURN	930	250*	200*	165*	110*
	2 TURNS	870	160*	120*	70*	25*
	3 TURNS	800	90*	40*	0*	—

44D

	AIR FLOW M ³ /H	11.200	12.650	14.100	15.100
STATIC PRESSURE AVAILABLE Pa		170	120	50	0

48D

	AIR FLOW M ³ /H	11.200	12.650	13.600	14.700
STATIC PRESSURE AVAILABLE Pa		160	110	50	0

56D

	AIR FLOW M ³ /H	11.200	12.250	13.300	14.200
STATIC PRESSURE AVAILABLE Pa		140	90	50	0

64D

AIR FLOW	R.P.M.	M ³ /H	13000	14000	15000	16000
PULLEY POSITION	PULLEY CLOSED	1140	300*	275*	225*	●
	1 TURN	1070	230*	200*	140*	85*
	2 TURNS	995	175*	140*	75*	25*
	3 TURNS	920	115*	75*	20*	—

76D

AIR FLOW	R.P.M.	M ³ /H	18000	19200	20600	22000
PULLEY POSITION	PULLEY CLOSED	1000	300*	270*	●	●
	1 TURN	930	250*	200*	165*	110*
	2 TURNS	870	160*	120*	70*	25*
	3 TURNS	800	90*	40*	0*	—

(*) STATIC PRESSURE AVAILABLE PA.

(●) WRONG STATUS ON ACCOUNT OF MOTOR POWER LIMIT.

NOTE: The unit leaves factory with pulley two turns opened.

1.- GENERAL CHARACTERISTICS

1.3.- INDOOR FAN PERFORMANCES WITH KIT HIGH STATIC PRESSURE TO 400Pa (OPTION)

		22E					24E						
AIR FLOW		R.P.M.	M ³ /H	3500	3900	4300	4700	R.P.M.	M ³ /H	3900	4300	4700	5100
PULLEY POSITION	PULLEY CLOSED	1140	420*	405*	385*	360*		1140	405*	385*	360*	●	
	1 TURN	1070	360*	340*	315*	290*		1070	340*	315*	290*	●	
	2 TURNS	995	290*	275*	250*	205*		995	275*	250*	205*	195*	
	3 TURNS	920	240*	215*	190*	160*		920	215*	190*	160*	130*	

		28E					32E						
AIR FLOW		R.P.M.	M ³ /H	4500	4950	5400	5850	R.P.M.	M ³ /H	4750	5250	5750	6000
PULLEY POSITION	PULLEY CLOSED	1200	410*	390*	320*	290*		1200	400*	365*	300*	270*	
	1 TURN	1125	340*	305*	240*	210*		1125	330*	290*	220*	190*	
	2 TURNS	1050	275*	240*	165*	130*		1050	265*	225*	145*	110*	
	3 TURNS	970	215*	175*	100*	60*		970	205*	160*	80*	40*	

		38E					44D						
AIR FLOW		R.P.M.	M ³ /H	5800	6400	7000	7300	R.P.M.	M ³ /H	7000	7800	8600	9400
PULLEY POSITION	PULLEY CLOSED	1200	450*	425*	385*	●		1140	420*	405*	385*	360*	
	1 TURN	1125	380*	360*	310*	●		1070	360*	340*	315*	290*	
	2 TURNS	1050	310*	280*	220*	205*		995	290*	275*	250*	205*	
	3 TURNS	970	245*	215*	155*	140*		920	240*	215*	190*	160*	

		48D					56D						
AIR FLOW		R.P.M.	M ³ /H	7800	8600	9400	10200	R.P.M.	M ³ /H	9000	9900	10800	11700
PULLEY POSITION	PULLEY CLOSED	1140	405*	385*	360*	●		1200	410*	390*	320*	290*	
	1 TURN	1070	340*	315*	290*	●		1125	340*	305*	240*	210*	
	2 TURNS	995	275*	250*	205*	195*		1050	275*	240*	165*	130*	
	3 TURNS	920	215*	190*	160*	130*		970	215*	175*	100*	60*	

		64D					76D						
AIR FLOW		R.P.M.	M ³ /H	9500	10500	11500	12000	R.P.M.	M ³ /H	11600	12800	14000	14600
PULLEY POSITION	PULLEY CLOSED	1200	400*	365*	300*	●		1200	450*	425*	●	●	
	1 TURN	1125	330*	290*	220*	190*		1125	380*	360*	310*	●	
	2 TURNS	1050	265*	225*	145*	110*		1050	310*	280*	220*	●	
	3 TURNS	970	205*	160*	80*	40*		970	245*	215*	155*	140*	

(*) STATIC PRESSURE AVAILABLE PA.

(●) WRONG STATUS ON ACCOUNT OF MOTOR POWER LIMIT.

NOTE: The unit leaves factory with pulley two turns opened.

1.- GENERAL CHARACTERISTICS

1.3.- OUTDOOR FAN PERFORMANCES WITH KIT HIGH STATIC PRESSURE TO 350Pa (OPTION)

		22E					24E						
AIR FLOW		R.P.M.	M ³ /H	5600	6325	7050	7550	R.P.M.	M ³ /H	5600	6325	6800	7350
PULLEY POSITION	PULLEY CLOSED	1140	365*	330*	290*	●		1140	365*	325*	290*	●	
	1 TURN	1070	290*	255*	210*	195*		1070	290*	250*	210*	195*	
	2 TURNS	995	240*	195*	165*	135*		995	240*	190*	165*	135*	
	3 TURNS	920	185*	145*	105*	70*		920	185*	140*	105*	70*	

		28E					44D						
AIR FLOW		R.P.M.	M ³ /H	5600	6125	6650	7100	R.P.M.	M ³ /H	11200	12650	14100	15100
PULLEY POSITION	PULLEY CLOSED	1140	365*	325*	290*	270*		1140	365*	330*	●	●	
	1 TURN	1070	290*	250*	210*	195*		1070	290*	255*	210*	●	
	2 TURNS	995	240*	190*	165*	135*		995	240*	195*	165*	135*	
	3 TURNS	920	185*	140*	105*	70*		920	185*	145*	105*	70*	

		48D					56D						
AIR FLOW		R.P.M.	M ³ /H	11200	12650	13600	14700	R.P.M.	M ³ /H	11200	12250	13300	14200
PULLEY POSITION	PULLEY CLOSED	1140	365*	330*	290*	●		1140	365*	330*	290*	●	
	1 TURN	1070	290*	255*	210*	●		1070	290*	255*	210*	195*	
	2 TURNS	995	240*	195*	165*	135*		995	240*	195*	165*	135*	
	3 TURNS	920	185*	145*	105*	70*		920	185*	145*	105*	70*	

(*) STATIC PRESSURE AVAILABLE PA.

(●) WRONG STATUS ON ACCOUNT OF MOTOR POWER LIMIT.

NOTE: The unit leaves factory with pulley two turns opened.

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)	+19° C STANDARD UNIT 0° C WITH OPTIONAL CPC ON/OFF -10° C (*)

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

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)	+19° C STANDARD UNIT 0° C WITH OPTIONAL CPC ON/OFF -10° C (*)
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 kit hot gas by pass or proportional winter control (options).

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

TABLE 1-COOLING CYCLE MAXIMUM OUTDOOR OPERATING TEMPERATURES

MODELS WITH Refrigerant R-407C

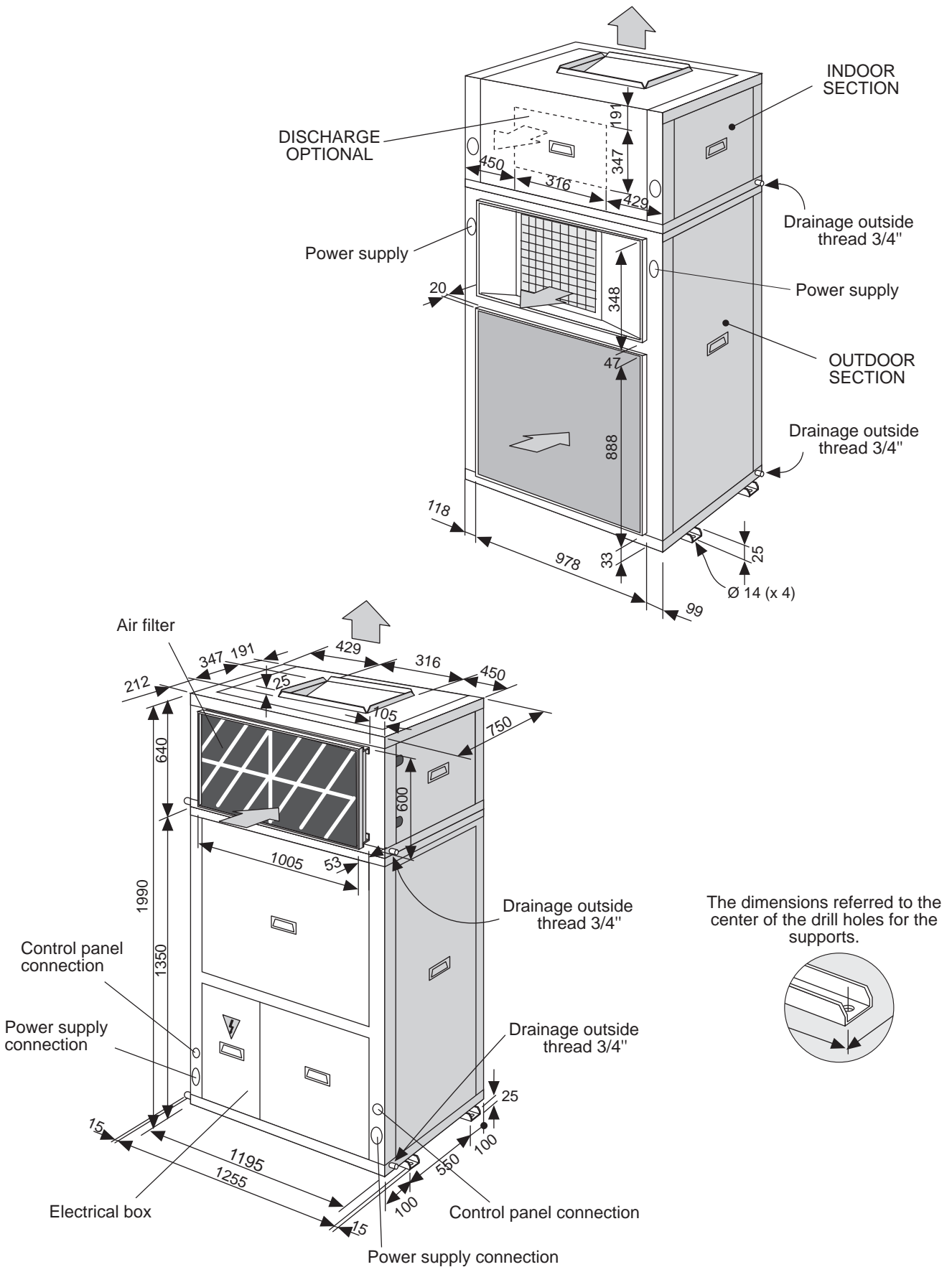
MODELS	22E	24E	28E	32E	38E	44D	48D	56D	64D	76D
With rated outdoor flow	45	45	43	43	42	45	45	43	43	42
With minimum outdoor flow	43	43	41	40	39	43	43	41	40	39

MODELS WITH Refrigerant R-22

MODELS	22E	24E	28E	32E	38E	44D	48D	56D	64D	76D
With rated outdoor flow	48	48	46	46	45	48	48	46	46	45
With minimum outdoor flow	46	45	44	44	42	46	45	44	44	42

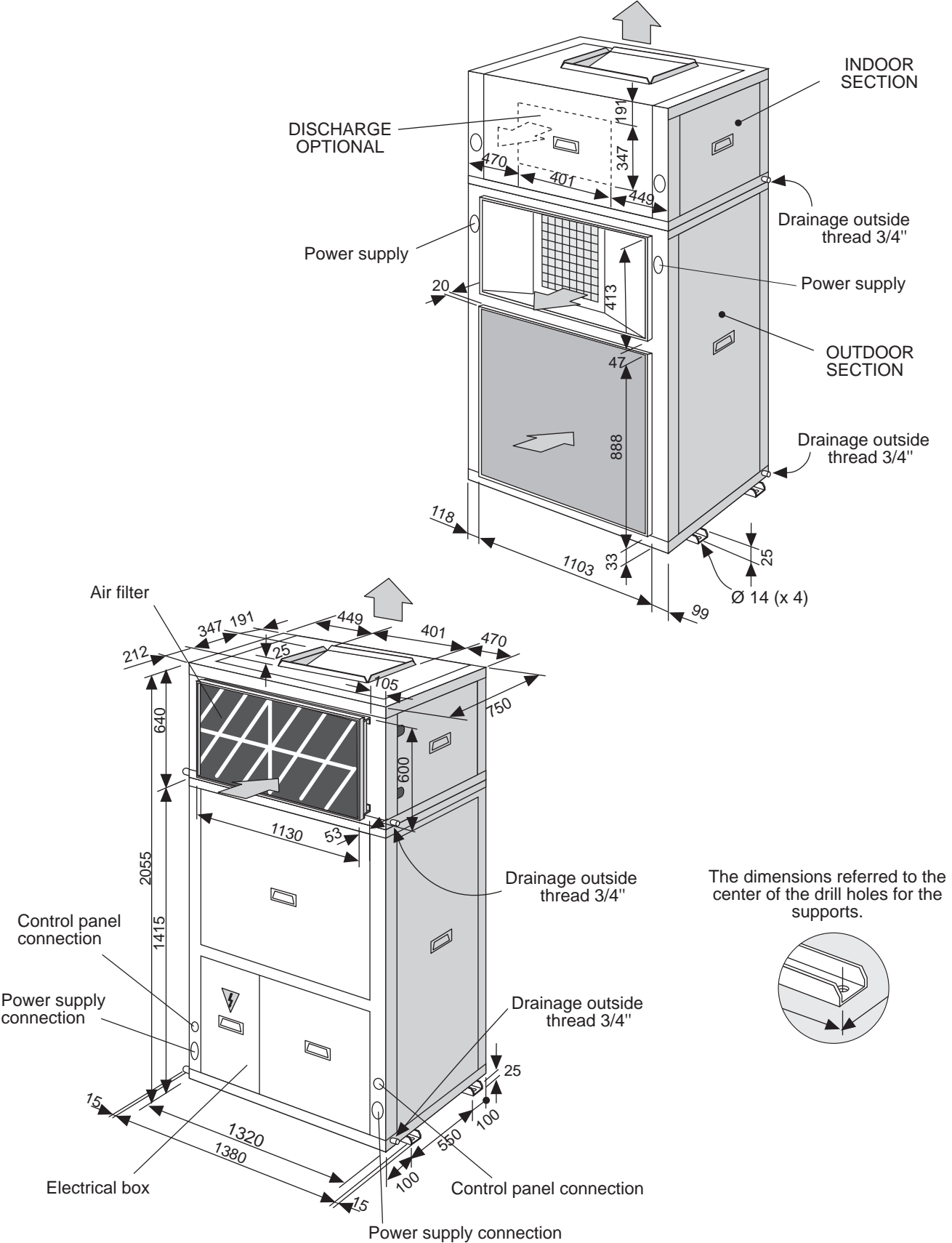
1.- GENERAL CHARACTERISTICS

1.5.- UNIT DIMENSIONS MODELS 22E-24E-28E-32E



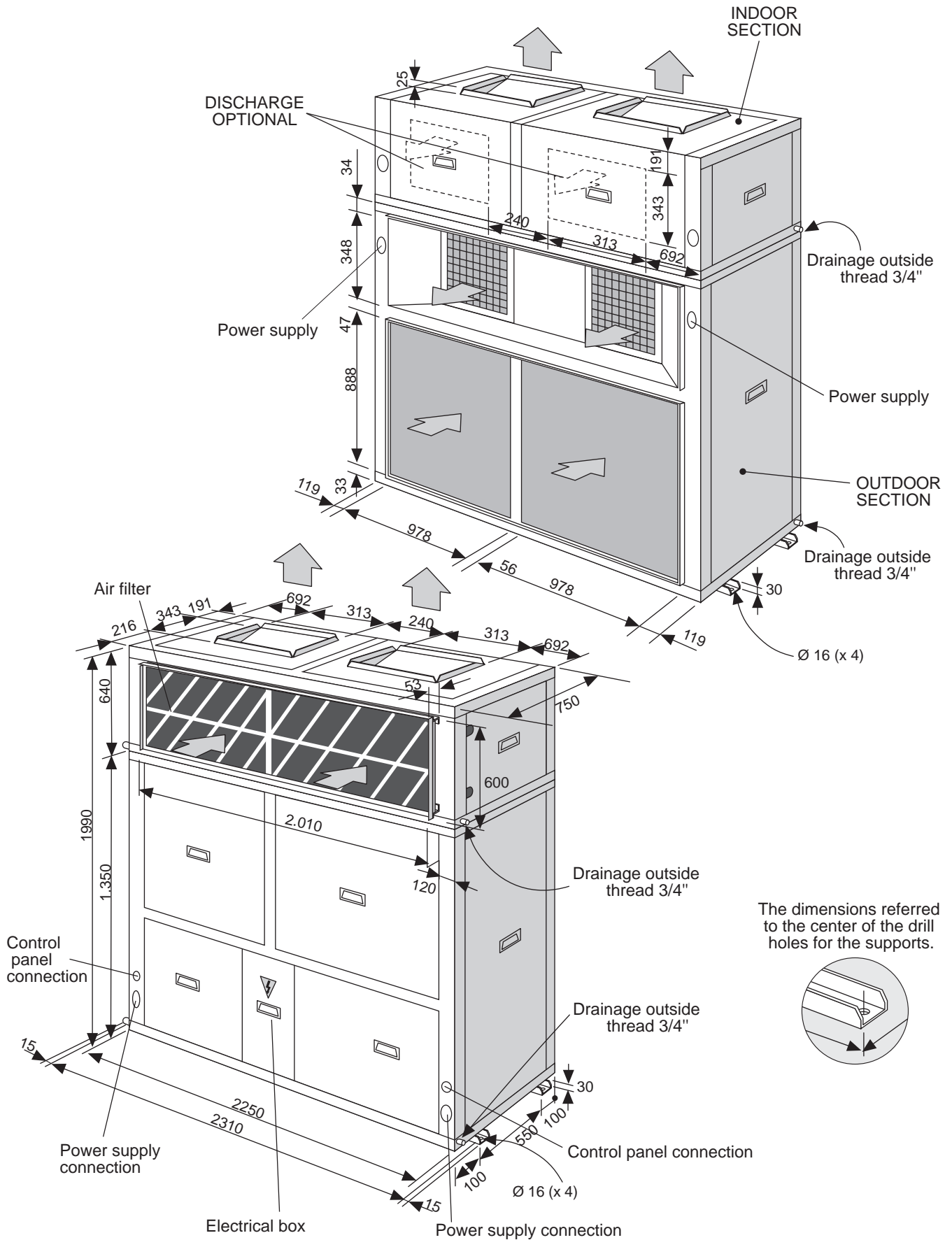
1.- GENERAL CHARACTERISTICS

1.5.- UNIT DIMENSIONS MODEL 38E



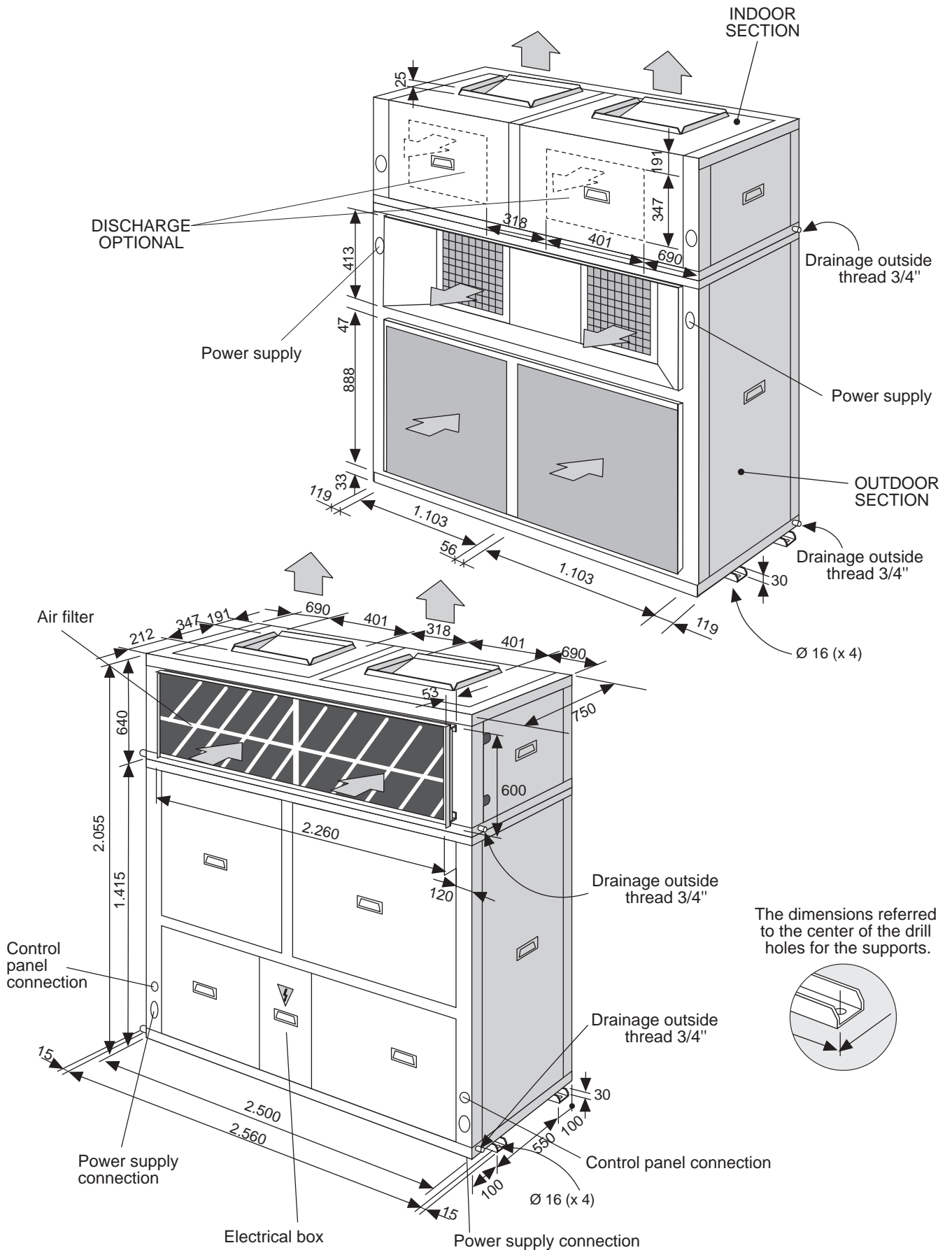
1.- GENERAL CHARACTERISTICS

1.5.- UNIT DIMENSIONS MODELS 44D-48D-56D-64D



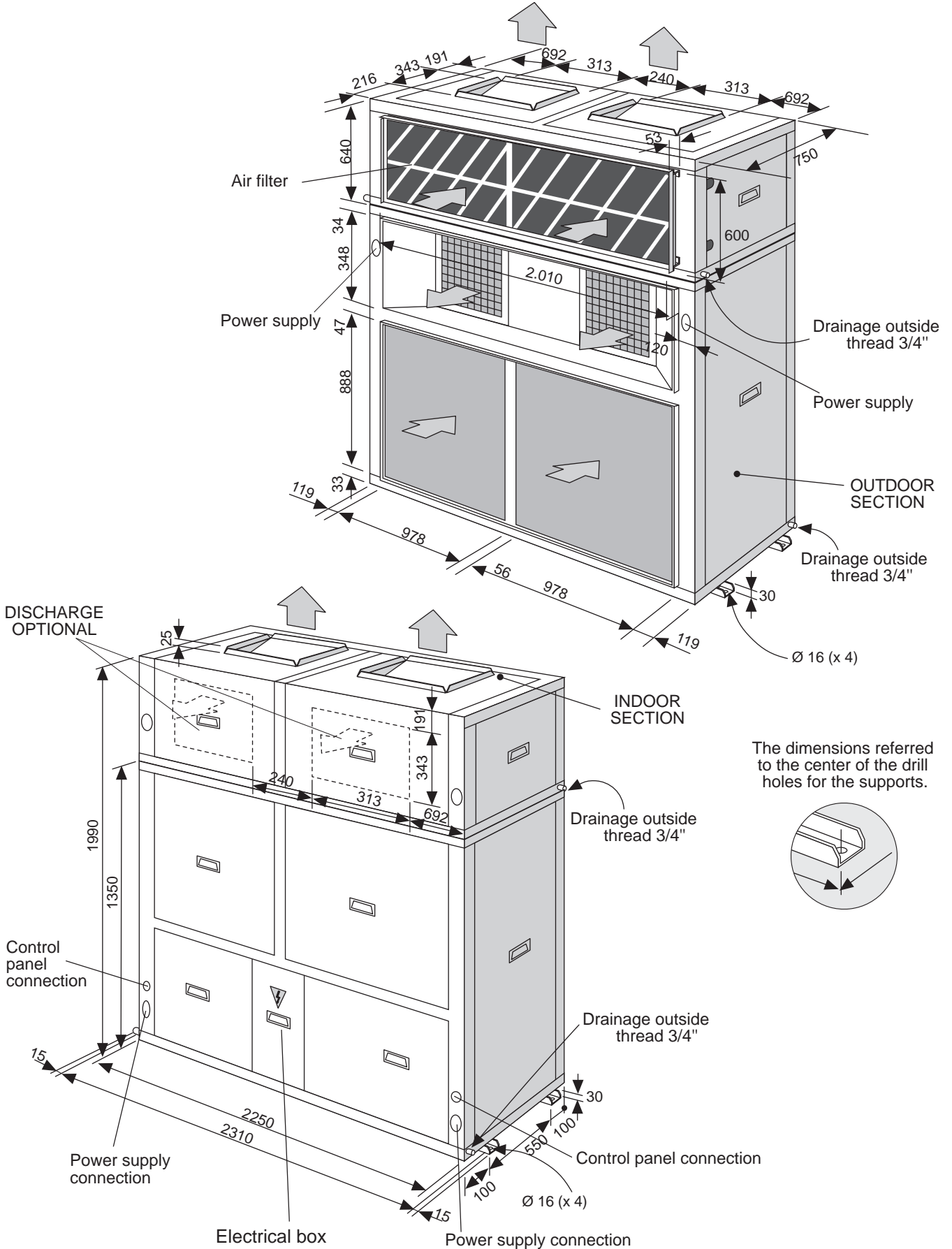
1.- GENERAL CHARACTERISTICS

1.5.- UNIT DIMENSIONS MODEL 76D



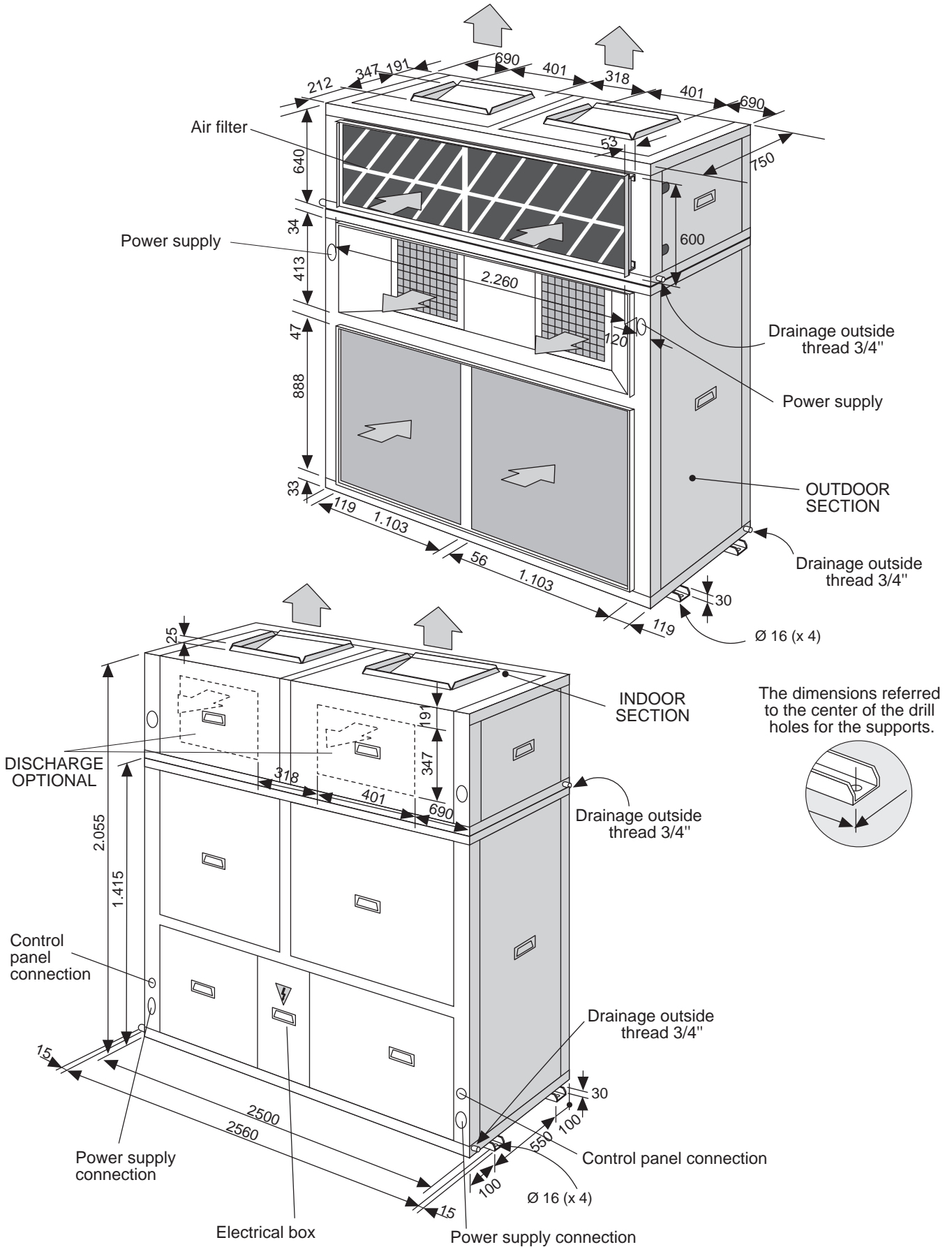
1.- GENERAL CHARACTERISTICS

1.5 UNIT DIMENSIONS MODELS 44D-48D-56D-64D WITH KIT 180° TURN FOR INDOOR UNIT (OPTION)



1.- GENERAL CHARACTERISTICS

1.5 UNIT DIMENSIONS MODEL 76D WITH KIT 180° TURN FOR INDOOR UNIT (OPTION)



1.- GENERAL CHARACTERISTICS

1.6.- AVAILABLE OPTIONS

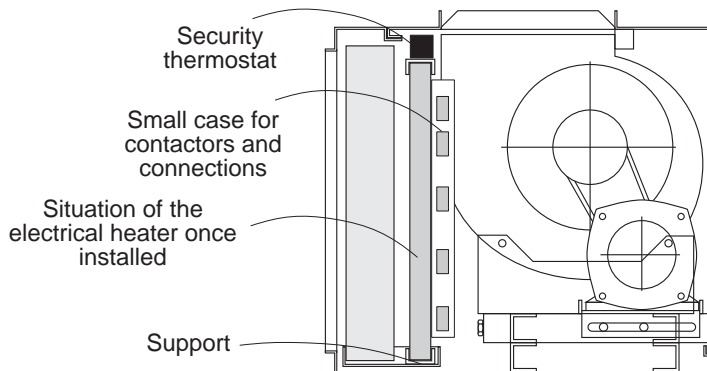
ELECTRICAL HEATER

Made of align shielded elements, supplied mounted on the unit as drawing shows.

All the range have three security elements: 2 security thermostat, one automatic other manual reset and an air flow security pressostat, which make the electrical heater stops when air flow is not enough.

The electrical heater must be supply on from the unit's electrical box.

An small case on the electrical heater protects contactors and electrical connections.



MODELS LEC (INDOOR UNIT)	22E-24E-28E-32E-38E			44D-48D-56D-64D-76D				
POWER Kw	7,5	11	15	11	15	20	30	
MAXIMUM CURRENT (A)	230 / III	18,8	27,6	37,7	27,6	37,7	50,2	75,3
	400/ III	10,8	15,9	21,7	15,9	21,7	28,9	43,3
WEIGHTS Kg (*)	10			20				
STAGES	1			2				

(*) Add to the unit's weight.

MODELS LEH (INDOOR UNIT)	22E-24E-28E-32E-38E			44D-48D-56D-64D-76D			
POWER Kw	7,5	11	15	11	15	20	
MAXIMUM CURRENT (A)	230 / III	18,8	27,6	37,7	27,6	37,7	50,2
	400/ III	10,8	15,9	21,7	15,9	21,7	28,9
WEIGHTS Kg (*)	10			20			
STAGES	1			1			

(*) Add to the unit's weight.

DIRTY FILTER INDICATION

To install on the indoor unit.

Based on an air flow security pressostat which detect, the static pressure available through the air filter.

In case the filters are dirties, the detector is activate, showing an alarm, if the fan is ON.

MAIN SWITCH

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

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



ATTENTION! WITH MAIN SWITCH ON. DO NOT REMOVE THE PANEL

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

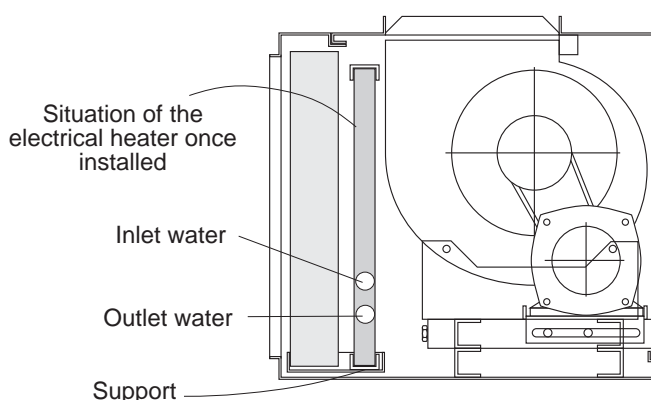
1.- GENERAL CHARACTERISTICS

1.6.- AVAILABLE OPTIONS

HOT WATER COIL

Base on a refrigerating coil. made of copper tubing with aluminum swirl fins with inlet and outlet water connections.

It is supply mounted inside the unit as picture shows.



MODELS LEC / LEH INDOOR UNIT	DIFFERENCE IN TEMPERATURES BETWEEN HOT WATER INTAKE AND THE AIR WHICH ENTERS THE BATTERY			WATER FLOW L/H	WATER COIL PRESSURE DROP Kpa	AIR PRESSURE DROP Pa (*)	Nº ROWS	WEIGHT Kg	OUTLET WATER DIAMETER Inches
	50°C	60°C	70°C						
22E-24E	CAPACITY IN -W			2.200	8	32-40	2	10	2
	29.000	36.000	44.000						
28E-32E	CAPACITY IN -W			2.500	10	32-40	2	10	2
	33.000	40.000	47.000						
38E	CAPACITY IN -W			3.000	15	40	2	12	2
	40.000	48.000	56.000						
44D-48D	CAPACITY IN -W			4.400	8	32-40	2	20	2
	58.000	62.000	88.000						
56D-64D	CAPACITY IN -W			5.000	10	32-40	2	20	2
	66.000	80.000	94.000						
76D	CAPACITY IN -W			6.000	15	39	2	24	2
	80.000	96.000	112.000						

(*) Nominal air flow volume

PHASE SEQUENCER

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

ON/OFF CONDENSATION PRESSURE CONTROL

The condensation pressure control consists of one or two pressures 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, (Until 0°C).

CRANK CASE HEATER (COOLING-ONLY UNITS)

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

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

COMPRESSOR STARTING CURRENT CONSTRAINED (“SOFT STARTER”) 400V-III

Is an electronic element, which reduce the pick compressor starting current up to 40%

(see pages of electrical data without soft starter)

Only available for 400V-III units.

MODELS (OUTDOOR UNIT)	WEIGHTS (*)
22E-24E-28E-32E-38E	3
44D-48D-56D-64D-76D	6


(*) Add to the unit's weight.

1.- GENERAL CHARACTERISTICS

1.6.- AVAILABLE OPTIONS

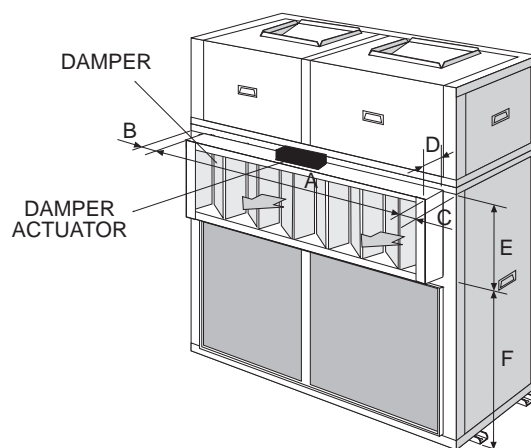
PROPORTIONAL CONDENSING PRESSURE CONTROL BY DAMPERS

Based on one or two dampers located on the outdoor unit discharge air, which lets you control condensation temperature through the air flow. The damper is moving by a servomotor, which receives a proportional signal through a pressure detector.

 This kit is not available with kit vertical discharge outdoor unit at the same time.

Thus the unit will be able to operate in the cooling cycles when the outdoor temperature is below -10°C .

Dimensions of dampers for this kit:



MODELS (OUTDOOR UNIT)	22E-24E-28E-32E	38E	44D-48D-56D-64D	76D	
DIMENSIONS	A	970	1095	1949	2199
	B	102,5	102,5	150,5	150,5
	C	122,5	122,5	150,5	150,5
	D	165	165	165	165
	E	342	407	342	407
	F	996,5	996,5	996,5	996,5
WEIGHTS kg (*)	15	20	30	40	

(*) Add to the unit's weight.

KIT MORE STATIC PRESSURE OF AIR DISCHARGE

It is a specific fan to obtain more static available pressure up to 350Pa for outdoor unit and 400Pa for indoor unit.

See air flow data section for optional fan performances.

Electrical data for these optional fans:

MODELS LEC / H (INDOOR)	22E	24E	28E	32E	38E	44D	48D	56D	64D	76D
POWER (*) Kw	0,2	0,4	0,8	1,0	1	0,4	0,8	1,5	1,5	1,7
MAXIMUM CURRENT (*) (A)	230 / III	0,5	1,0	2,0	2,5	2,5	1,0	2,0	3,8	4,3
	400 / III	0,3	0,6	1,2	1,4	1,4	0,6	1,2	2,2	2,5
WEIGHTS Kg (*)	0	0	2	2	0	5	5	9	9	9

MODELS KVC / H (OUTDOOR)	22E	24E	28E	32E	38E	44D	48D	56D	64D	76D
POWER (*) Kw	0,4	0,6	0,8	—	—	0,8	1,2	1,6	—	—
MAXIMUM CURRENT (*) (A)	230 / III	1,0	1,5	2,0	—	—	2,0	3,0	4,0	—
	400 / III	0,6	0,9	1,2	—	—	1,2	1,7	2,3	—
WEIGHTS Kg (*)	15	15	15	—	—	30	30	30	—	—

(*) Add to the unit data.

1.- GENERAL CHARACTERISTICS

1.6.- AVAILABLE OPTIONS

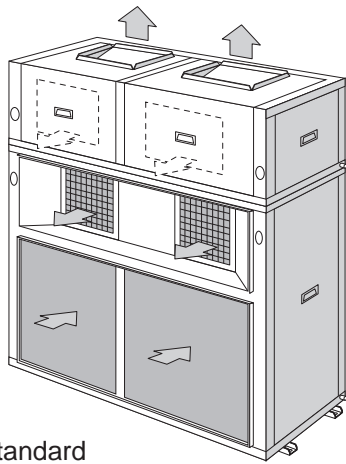
HOT GAS BYPASS VALVE

The purpose of the BYPASS valve is to make it possible for the unit to operate at low outdoor temperatures (under -10°C), to be used in cooling-only and head-pump units.

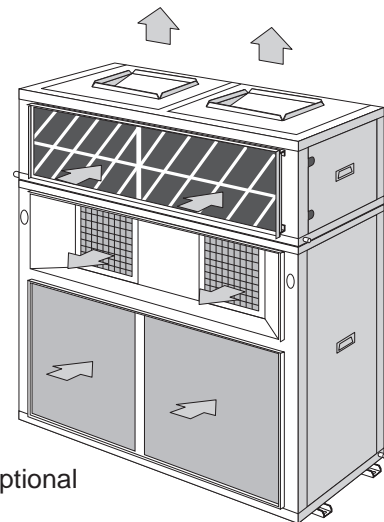
It regulates the capacity of the compressor by injecting hot gas from the compressor discharge side to the coil.

180° TURN OF INDOOR UNIT (Only for double circuit units “D”)

The unit is supplied such as, the return air to the indoor section and the intake air discharge air for the outdoor are located on the same side of the unit.



Placement standard



Placement optional

CONTROL USING A PROGRAMMABLE CONTROLLER:

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

REMOTE AMBIENT SENSOR AND REMOTE DUCT SENSOR

This sensors may be used in conjunction with remote controller or 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 AMBIENT SENSOR:** The sensor will be placed in the area to be air-conditioned.

1.- GENERAL CHARACTERISTICS

1.6.- AVAILABLE OPTIONS

FREECOOLING

1.- DEFINITION

FREE-COOLING is a saving system in the Cold cycle, this makes the unit take air from the outside to take advantage of its energy, this system acting as a first cold stage.

It is a saving energy system that's why many countries regulations recommended and others put under an obligation to install a freecooling system with the unit.

2.- TYPES OF FREECOOLING.

In order to outside air parameters which has to be measured, the types are:

- **Thermostatic freecooling :**

Measures and comparing the outside air temperature, with the temperature of the room that has to be aconditioned.

- **Enthalpic freecooling :**

Measures and comparing the outside air enthalpy, with the return air enthalpy from the room that has to be aconditioned.

The enthalpy measures temperature and humidity of air.

3.- COMPONENTS OF FREECOOLING.

The main components are:

-Electronic control and accessories: Their function is to detect the outside and indoor air conditions though the probes, to solve when freecooling should operate

-The servomotor and system transmission: They manage open and close the dampers

- Adjustable dampers

-Mixing section: Where outside and return air are mixed.

Also an extra fan is available, which applied an additional static pressure on the suction and return air duct.

For more details about components and drawings see pages 26,27,28,29.

4.- OPERATION

The control compares the values of temperature/enthalpy between outside air and room air through the probes, if it is a negative difference and the security elements allows (discharge temperature probes) then the control acts over the servomotor, which produces the opening of the outside damper and close the return one, entering cool outside air to the room.

The damper regulation is proportional.

If indoor air demand is not great, could be enough only the freecooling to aconditioned the room, if the air demand is greater it is possible need the freecooling working and the unit working on different cooling mode stages.

5.- THERMOSTAT TERMINAL .

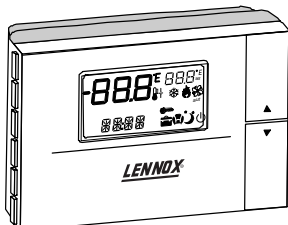
Depends on the type of freecooling selected, the thermostat and the electrical box supplied with the unit will be different.

With thermostatic freecooling the thermostat supplied has the same characteristics than the one supplied with the standard unit, except because the one for the freecooling is a programmable one.

With enthalpic freecooling the terminal is different than the one supplied with the unit VFC version, its principal characteristics are: OFF, COOL, HEAT, AUTOMATIC.

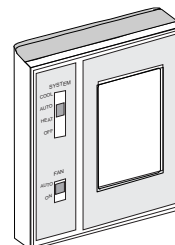
THERMOSTAT FOR THERMOSTATIC FREECOOLING

Thermostatic freecooling is supplied with sensor incorporated inside the thermostat.
Remote duct and ambient sensor are available as an option.



THERMOSTAT FOR ENTHALPIC FREECOOLING

Enthalpic freecooling is supplied with duct sensor.
Remote ambient sensor and sensor incorporated inside the thermostat are available as an option.



1.- GENERAL CHARACTERISTICS

1.6.- AVAILABLE OPTIONS

FREECOOLING

6.- SUPPLIED AND INSTALLATION

Configuration of freecooling supply for packaged system:

- Packaged system



UNITS

SM: Mixing section
 SR: Extra fan section
 UI: Indoor unit.
 UE: Outdoor unit.

- - - Mechanical installation to be carried out by the installer

① Freecooling supports, to be carried out by the installer

The electrical box for the freecooling is supplied apart and has to be fixed by the installer.

7.- FREECOOLING WITH EXTRA FAN

If an extra static pressure is required on the return air duct, the freecooling should add an extra fan section.

This extra fan section, include a discharge damper.

The operation dampers for this freecooling with extra fan is as follow:

As much as the air intake damper opens, that much the by-pass damper closes and the discharge air damper opens, for the air return suction (see drawing)

This means that at the same time reach a free cooled of the room, the discharge or return air and the air of the room gets removable.

The consumption of the extra fan by unit is:

MODELS	22E	24E	28E	32E	38E	44D	48D	56D	64D	76D
POWER Kw	1,3	1,4	1,5	1,8	2	2,6	2,8	3	3,6	4
MAXIMUM CURRENT (A)	230 / III	4,3	4,3	6,2	6,2	6,2	8,8	8,8	12,5	12,5
	400/ III	2,5	2,5	3,6	3,6	3,6	5,1	5,1	7,2	7,2

1.- GENERAL CHARACTERISTICS

1.6.- AVAILABLE OPTIONS

FEEOCOOLING

Extra fan performances for each models are:

		22E					24E						
AIR FLOW		R.P.M.	M³/H	3500	3900	4300	4700	R.P.M.	M³/H	3900	4300	4700	5100
PULLEY POSITION	PULLEY CLOSED	1010	175*	145*	115*	70*	1010	145*	115*	70*	35*		
	1 TURN	955	135*	105*	70*	35*	955	105*	70*	35*	0*		
	2 TURNS	900	110*	85*	33*	0*	900	85*	33*	0*			
	3 TURNS	845	75*	50*	5*		845	50*	5*				

		28E					32E						
AIR FLOW		R.P.M.	M³/H	4500	4950	5400	5850	R.P.M.	M³/H	4750	5250	5750	6000
PULLEY POSITION	PULLEY CLOSED	1140	175*	130*	85*	30*	1140	160*	80*	35*	0*		
	1 TURN	1070	130*	80*	30*	0*	1070	110*	40*	0*			
	2 TURNS	995	80*	30*	0*		995	60*	0*				
	3 TURNS	920	35*	0*			920	10*					

		38E					44D						
AIR FLOW		R.P.M.	M³/H	5800	6400	7000	7300	R.P.M.	M³/H	7000	7800	8600	9400
PULLEY POSITION	PULLEY CLOSED	890	210*	183*	145*	125*	1010	330*	320*	300*	280*		
	1 TURN	840	170*	140*	104*	85*	955	290*	275*	250*	230*		
	2 TURNS	790	130*	95*	45*	35*	900	250*	235*	210*	180*		
	3 TURNS	740	85*	60*	20*	0*	845	200*	195*	150*	130*		

		48D					56D						
AIR FLOW		R.P.M.	M³/H	7800	8600	9400	10200	R.P.M.	M³/H	9000	9900	10800	11700
PULLEY POSITION	PULLEY CLOSED	1010	320*	300*	280*	●	1010	280*	240*	220*	180*		
	1 TURN	955	275*	250*	230*	185*	955	250*	205*	160*	110*		
	2 TURNS	900	235*	210*	180*	130*	900	195*	160*	110*	70*		
	3 TURNS	845	195*	150*	130*	85*	845	150*	115*	70*	30*		

		64D					76D						
AIR FLOW		R.P.M.	M³/H	9500	10500	11500	12000	R.P.M.	M³/H	11600	12800	14000	14600
PULLEY POSITION	PULLEY CLOSED	1010	275*	245*	185*	155*	890	200*	175*	140*	120*		
	1 TURN	955	220*	175*	130*	105*	840	160*	135*	100*	90*		
	2 TURNS	900	175*	130*	75*	55*	790	120*	85*	50*	35*		
	3 TURNS	845	125*	85*	30*	20*	740	75*	50*	10*	0*		

(*) STATIC PRESSURE AVAILABLE PA.

(●) WRONG STATUS ON ACCOUNT OF MOTOR POWER LIMIT.

NOTE: The unit leaves factory with pulley two turns opened.

1.- GENERAL CHARACTERISTICS

1.6.- AVAILABLE OPTIONS

FREECOOLING

8.- SELECTION OF THE UNIT AND FREECOOLING SYSTEM

There are different types of freecooling system , different possibilities of dampers installations, and it could be supplied mounted or loose.

In order to provide the customer the needed one, fill in the following table and sent it to the order department:

INSTALLER COMPANY NAME _____ CONTACT PERSON NAME: _____

TEL.: _____ Fax _____ e-mail _____

ATTENTION TO : Lennox Refac S.A. CONTACT PERSON NAME: _____

TEL.: _____ Fax _____ e-mail _____

ORDER NUMBER: _____

A- Select the unit needed, packaged, split or multi-split:

(If the unit needed is packaged, the freecooling will be supplied loose. If the unit selected is split or multi-split the freecooling will be supplied mounted on the indoor unit, except for the freecooling with extra fan on models 76D, which is supplied loose also)

Packaged Split Multi-split

B- Select the air flow drive of the indoor unit required: Horizontal or vertical

Packaged units: As standard vertical air flow drive

Split and multi-split systems: As standard horizontal air flow drive

Vertical Horizontal

C.-Select the type of freecooling thermostatic or enthalpic and the sensor for freecooling management.

Thermostatic freecooling supplied with sensor incorporated inside the thermostat,

Enthalpic freecooling supplied with duct sensor

(If the humidity conditions where the unit is going to be install have relevance, is convenient to install an enthalpic freecooling)

Thermostatic <input type="checkbox"/>	Remote ambient sensor <input type="checkbox"/>	Enthalpic <input type="checkbox"/>	Remote ambient sensor <input type="checkbox"/>
	Remote duct sensor <input type="checkbox"/>		Sensor incorporated at the thermostat <input type="checkbox"/>

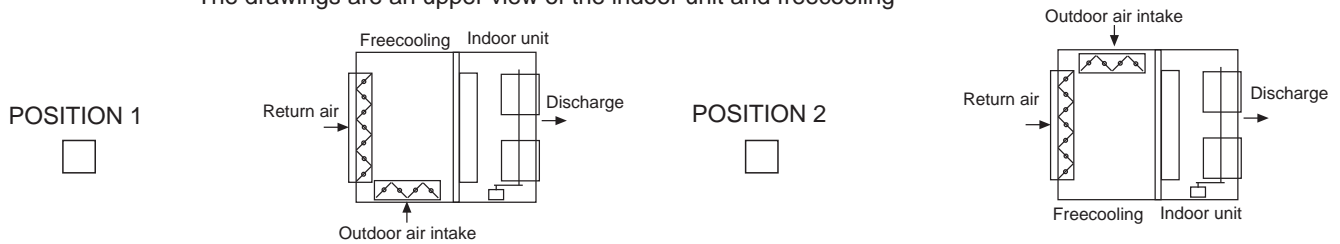
D.- Select if you need extra fan with the freecooling

With extra fan Without extra fan

E.-Select the dampers configuration for the freecooling, as following. (In order to be adapted to the ducts of the installation)

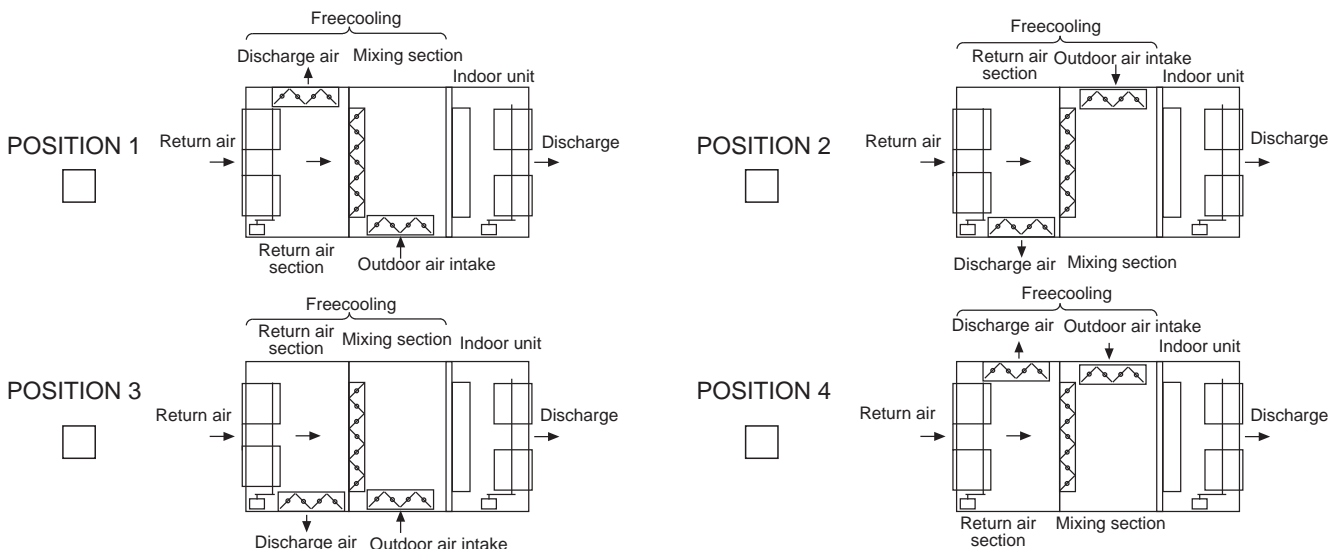
E.1- Dampers position of the dampers on for freecooling WITHOUT extra fan:

The drawings are an upper view of the indoor unit and freecooling



E.2- Dampers position of the dampers on for freecooling WITH extra fan:

The drawings are an upper view of the indoor unit and freecooling

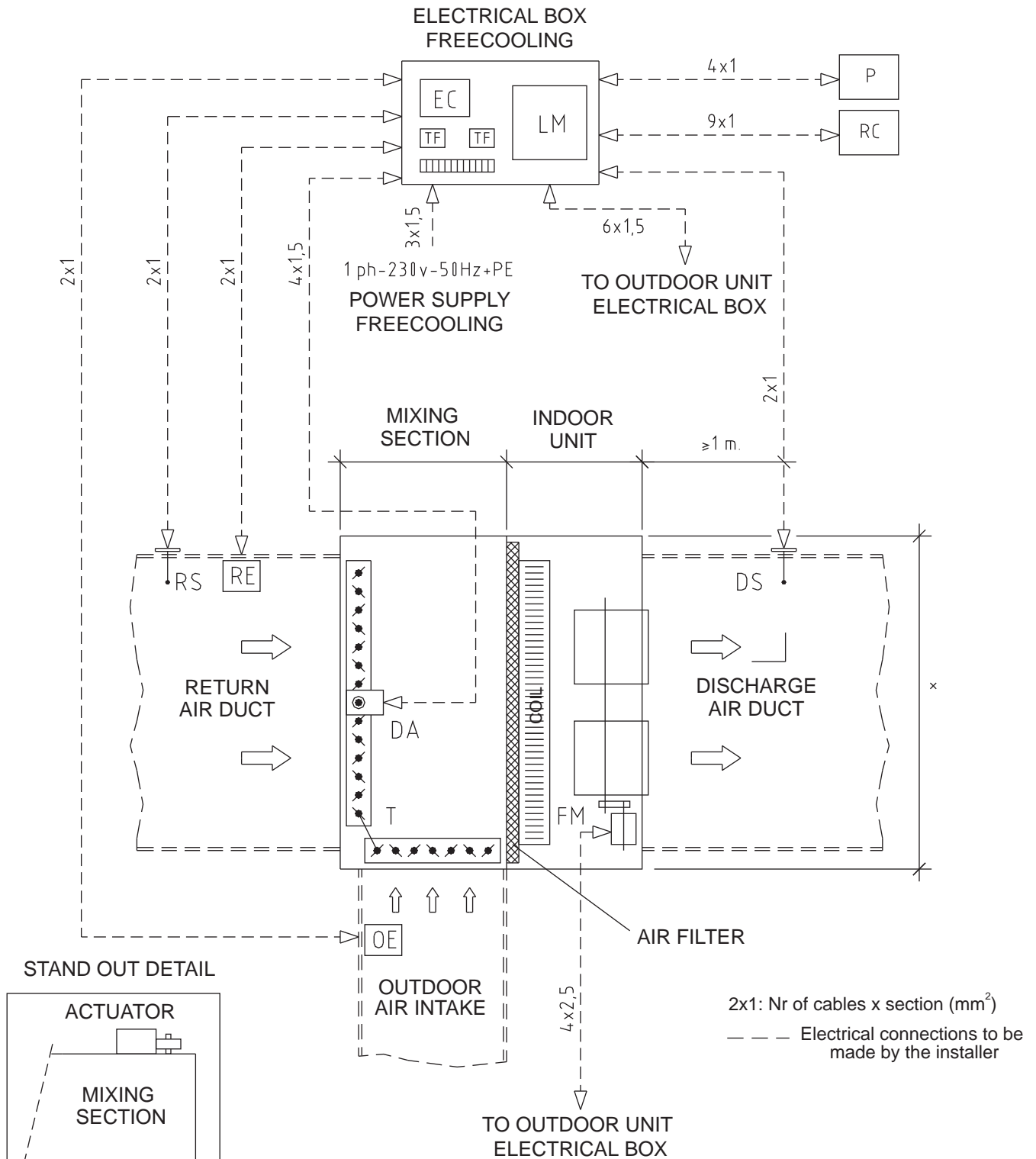


1.- GENERAL CHARACTERISTICS

1.6.- AVAILABLE OPTIONS

FREECOOLING

OUTLINE FOR ENTHALPIC FREECOOLING WITHOUT EXTRA FAN



FREECOOLING OUTLINE FOR DOUBLE CIRCUIT UNITS

P - Potentiometer
 EC - Enthalpy measure
 LM - Logic module
 TF - Transformer

RC - Remote controller
 RE - Return Enthalpy sensor
 RS - Return Temperature sensor
 DS - Discharge Temperature sensor

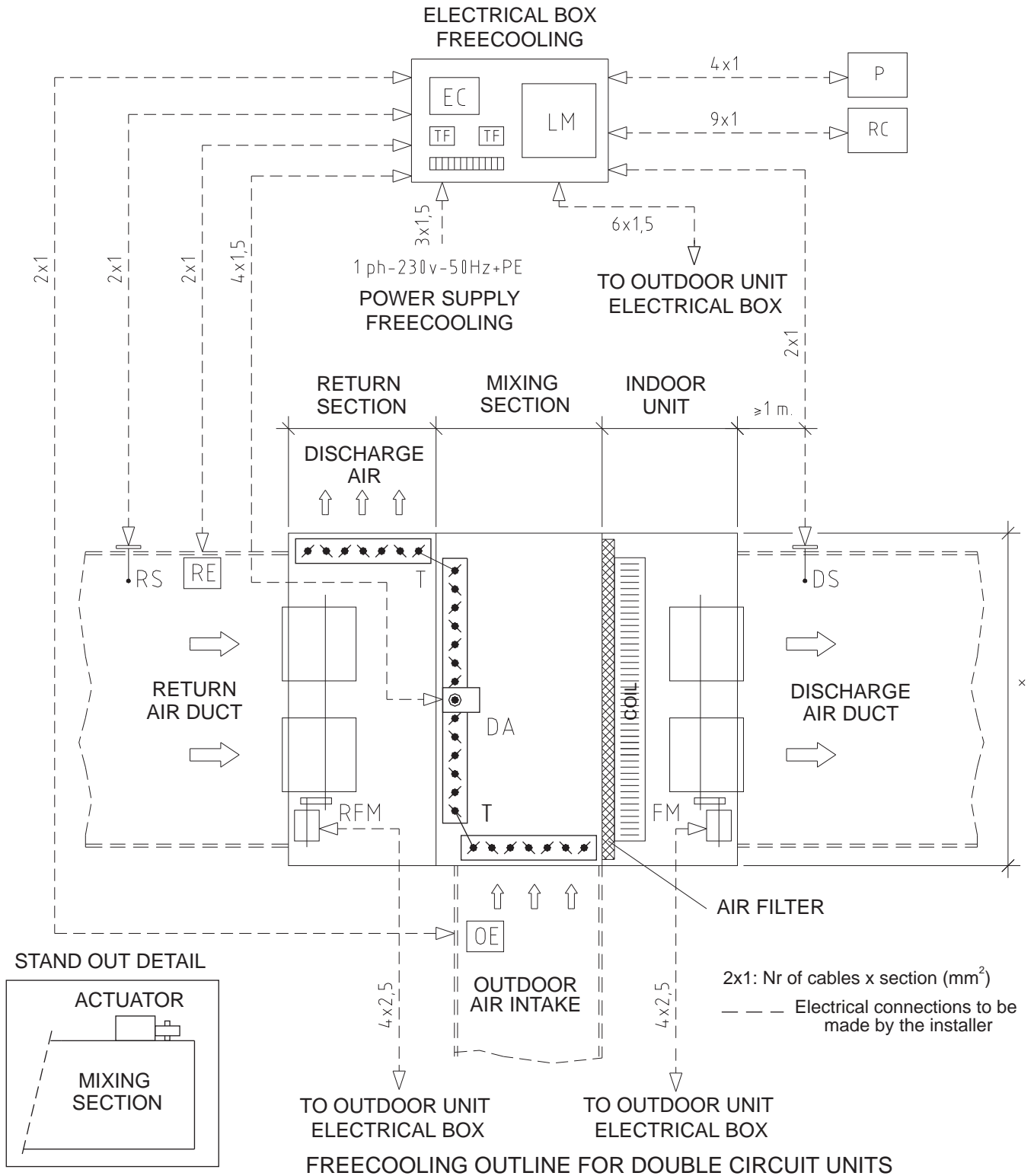
DA - Damper Actuator
 FM - Discharge fan motor
 OE - Outside enthalpy sensor
 T - Transmission

1.- GENERAL CHARACTERISTICS

1.6.- AVAILABLE OPTIONS

FREECOOLING

OUTLINE FOR ENTHALPIC FREECOOLING WITH EXTRA FAN



P - Potentiometer
EC - Enthalpy measure
LM - Logic module
TF - Transformer

RC - Remote controller
RE - Return Enthalpy sensor
RS - Return Temperature sensor
DS - Discharge Temperature sensor

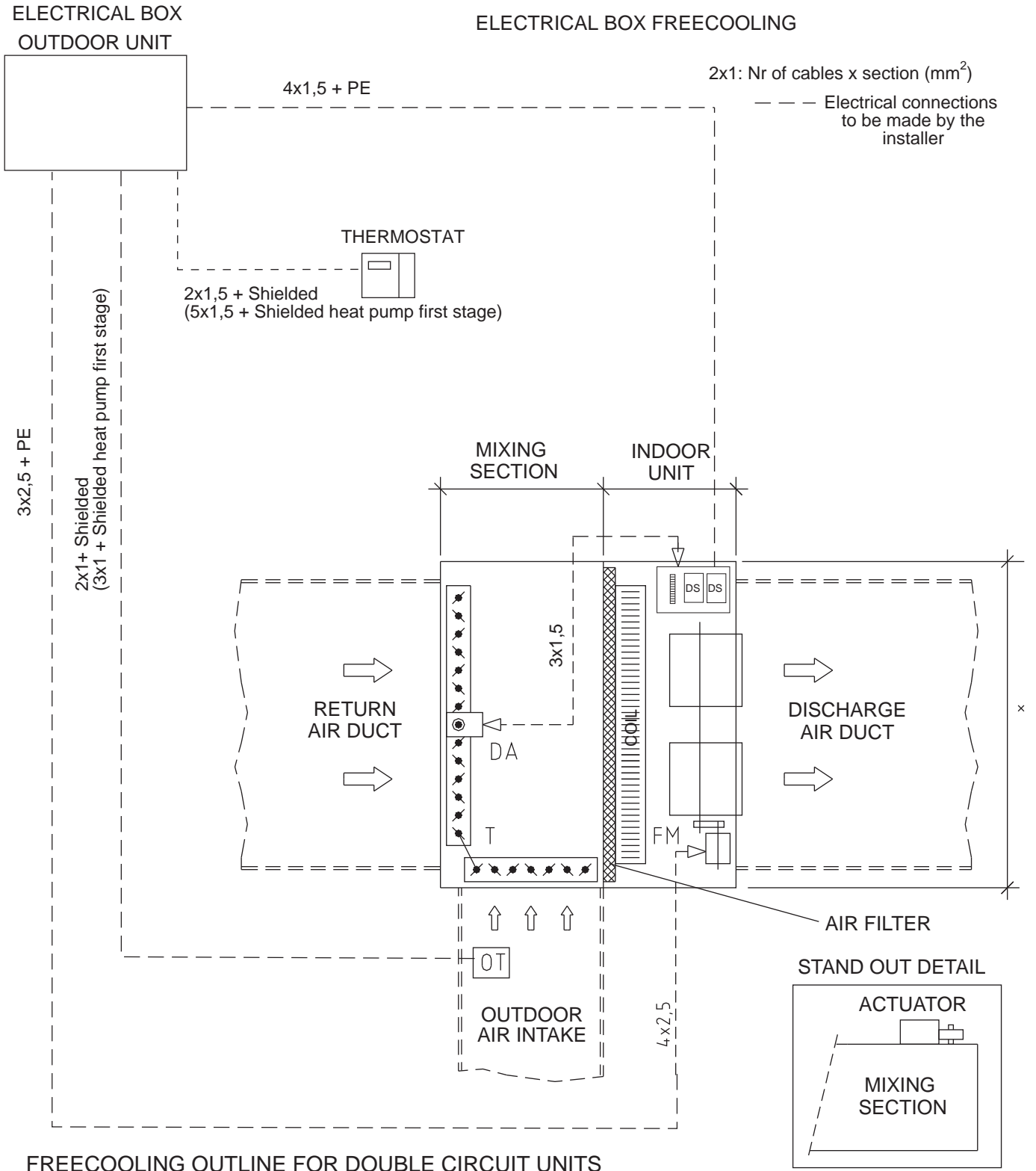
DA - Damper Actuator
RFM - Return fan motor
FM - Discharge fan motor
OE - Outside enthalpy sensor
T - Transmission

1.- GENERAL CHARACTERISTICS

1.6.- AVAILABLE OPTIONS

FREECOOLING

OUTLINE FOR THERMOSTATIC FREECOOLING WITHOUT EXTRA FAN



FREECOOLING OUTLINE FOR DOUBLE CIRCUIT UNITS

- DS - Discharge Temperature sensor
- DA - Damper Actuator
- FM - Discharge fan motor
- OT - Outside temperature sensor
- T - Transmission

1.- GENERAL CHARACTERISTICS

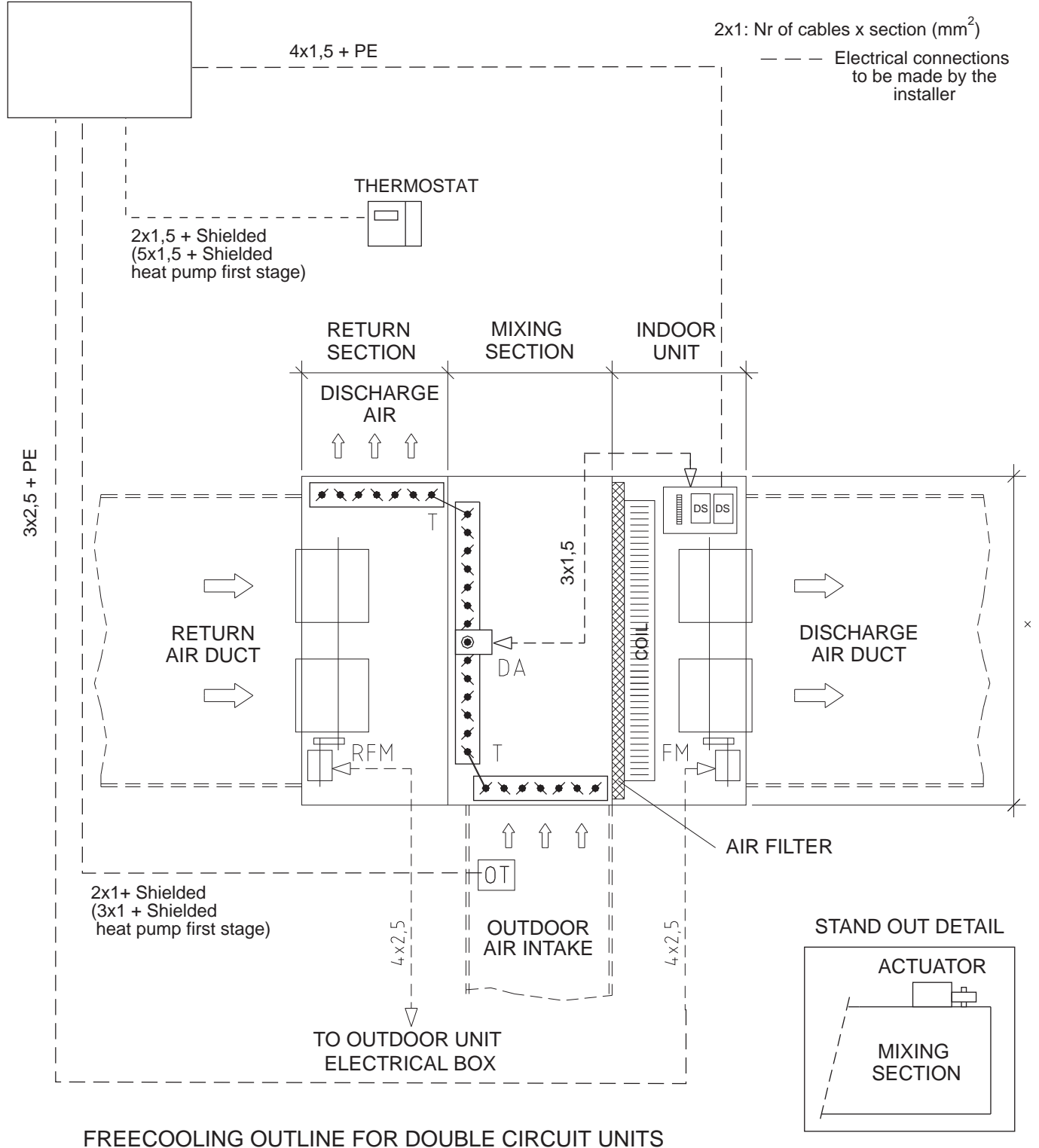
1.6.- AVAILABLE OPTIONS

FREECOOLING

OUTLINE FOR THERMOSTATIC FREECOOLING WITH EXTRA FAN

ELECTRICAL BOX
OUTDOOR UNIT

ELECTRICAL BOX FREECOOLING



FREECOOLING OUTLINE FOR DOUBLE CIRCUIT UNITS

DS - Discharge Temperature sensor
DA - Damper Actuator
RFM - Return fan motor
FM - Discharge fan motor

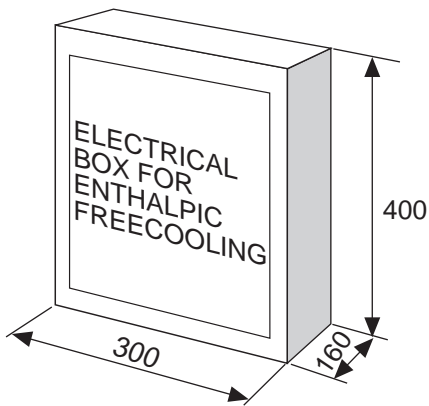
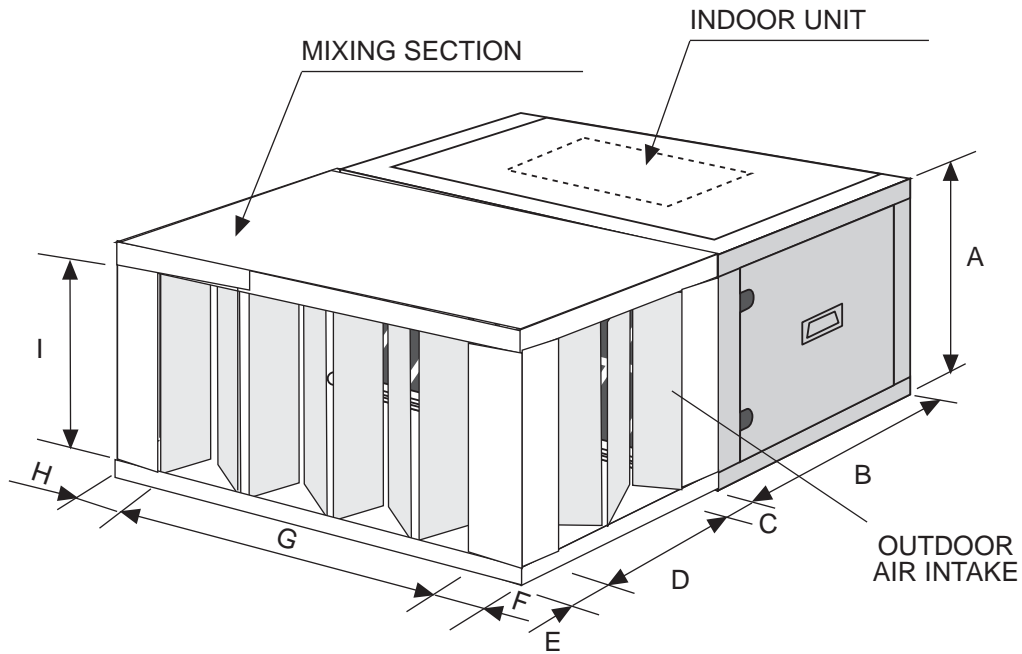
OT - Outside temperature sensor
T - Transmission

1.- GENERAL CHARACTERISTICS

1.6.- AVAILABLE OPTIONS

FREECOOLING

DIMENSIONS FREECOOLING WITHOUT EXTRA FAN



Electrical box for freecooling is supplied loose inside the mixing section.
Fix by the installer.

The damper position, can be different than the picture shows. See drawings.

	MODELS 22-24-28-32	MODEL 38
A	640	640
B	749	749
C	98	73,5
D	750	750
E	52	76,5
F	222	222
G	750	876
H	222	222
I	499	500
WEIGHTS Kg (*)	100	100

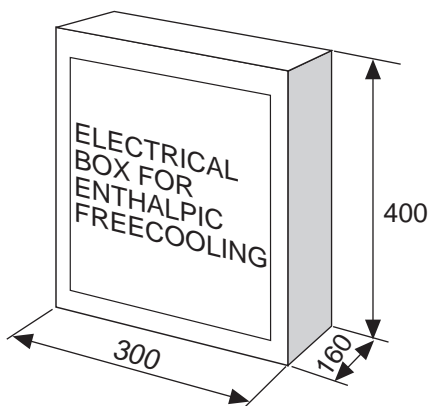
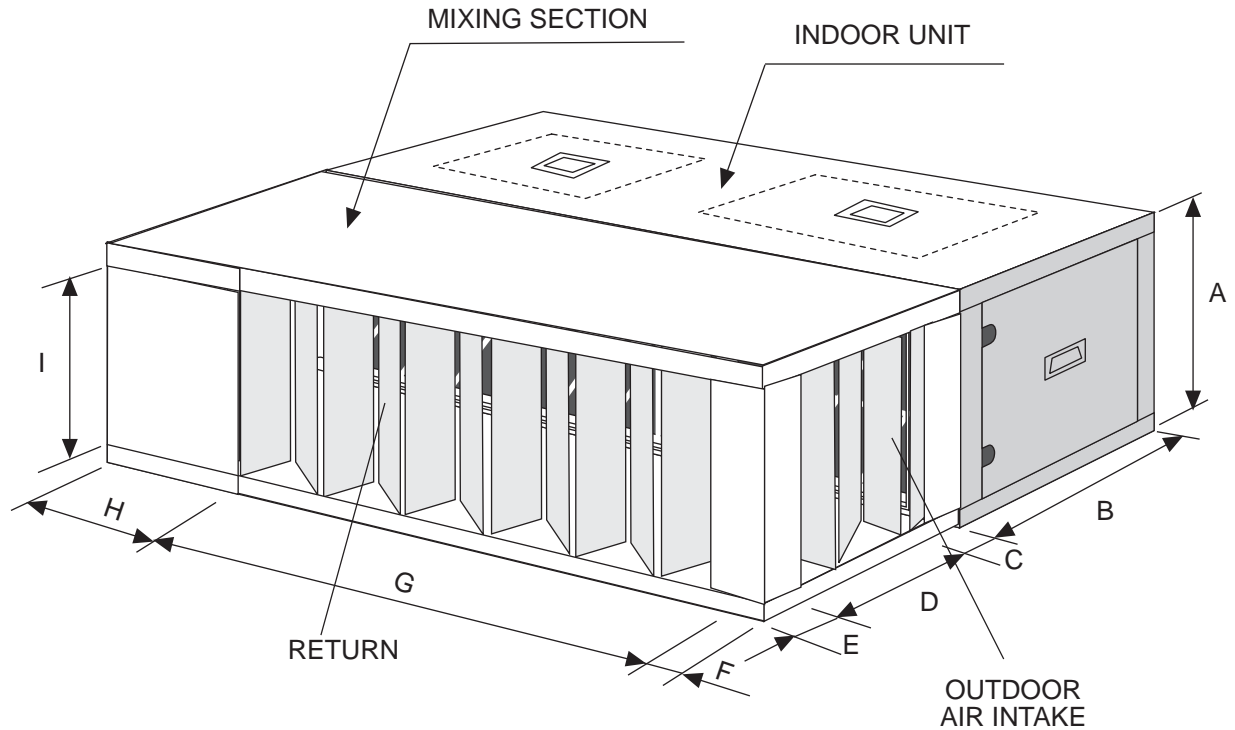
(*) Add to the unit's weight.

1.- GENERAL CHARACTERISTICS

1.6.- AVAILABLE OPTIONS

FREECOOLING

DIMENSIONS FREECOOLING WITHOUT EXTRA FAN



Electrical box for freecooling is supplied loose inside the mixing section.
Fix by the installer.

The damper position, can be different than the picture shows. See drawings.

	MODELS 44-48-56-64	MODEL 76
A	640	640
B	749	749
C	100,5	100,5
D	749	749
E	50,5	50,5
F	250	312,5
G	1750	1875
H	250	312,5
I	499	499
WEIGHTS Kg (*)	130	135

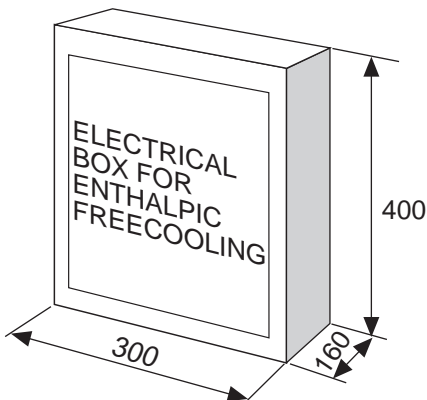
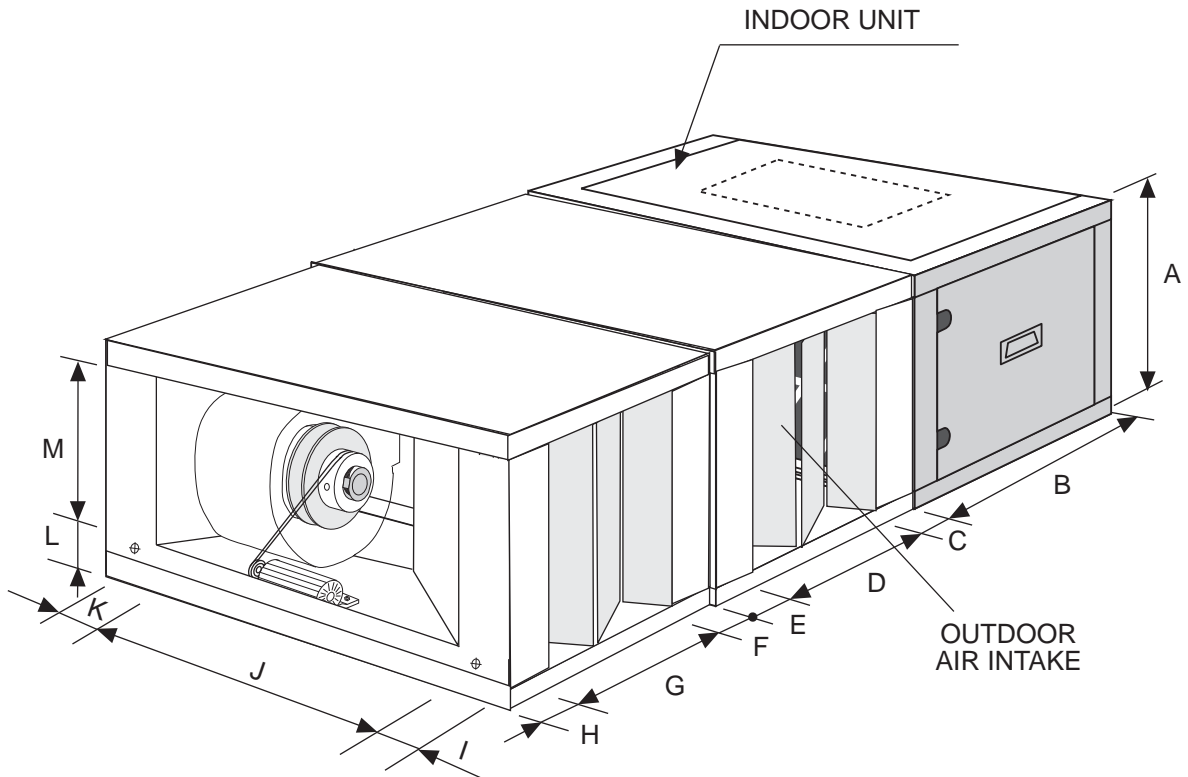
(*) Add to the unit's weight.

1.- GENERAL CHARACTERISTICS

1.6.- AVAILABLE OPTIONS

FREECOOLING

DIMENSIONS FREECOOLING WITH EXTRA FAN



Electrical box for freecooling is supplied loose inside the mixing section.
Fix by the installer.

The damper position, can be different than the picture shows. See drawings.

	MODELS 22-24-28-32	MODEL 38
A	640	640
B	749	749
C	98	73,5
D	750	750
E	52	76,5
F	48	48
G	750	750
H	102	102
I	186	186
J	822	948
K	186	186
L	96,5	96,5
M	500	500
WEIGHTS Kg (*)	120	125

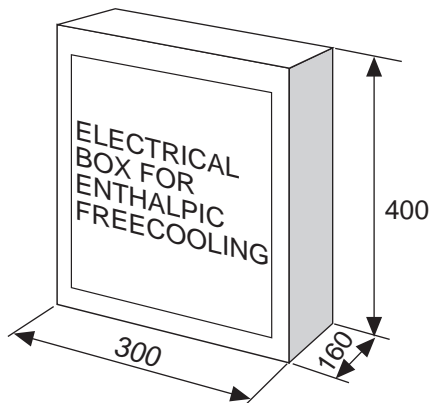
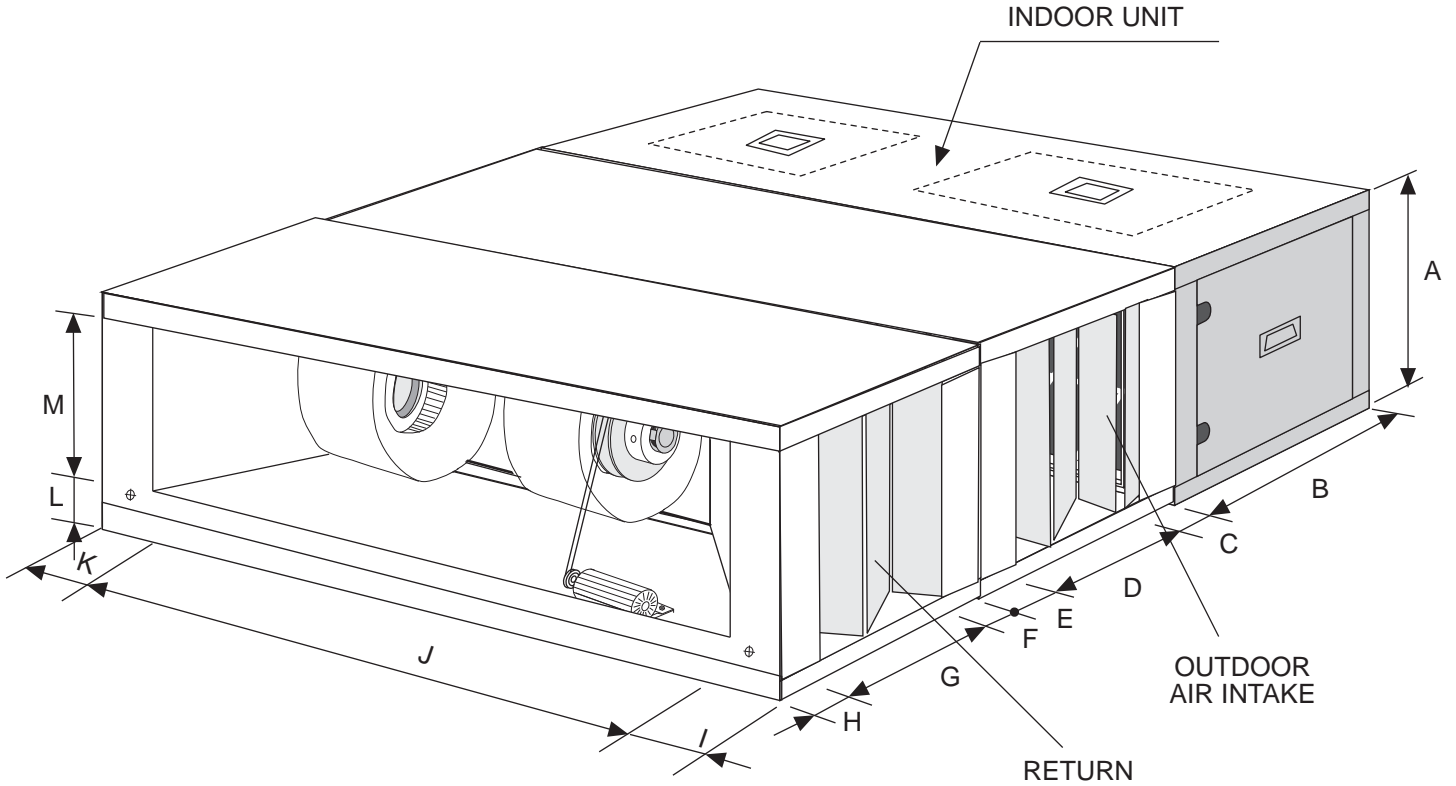
(*) Add to the unit's weight.

1.- GENERAL CHARACTERISTICS

1.6.- AVAILABLE OPTIONS

FREECOOLING

DIMENSIONS FREECOOLING WITH EXTRA FAN



Electrical box for freecooling is supplied loose inside the mixing section.
Fix by the installer.

The damper position, can be different than the picture shows. See drawings.

	MODELS 44-48-56-64	MODEL 76
A	640	640
B	749	749
C	100,5	100,5
D	749	749
E	50,5	50,5
F	48	48
G	750	750
H	102	102
I	186	311
J	1878	1878
K	186	311
L	96,5	96,5
M	500	500
WEIGHTS Kg (*)	195	200

(*) Add to the unit's weight.

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.

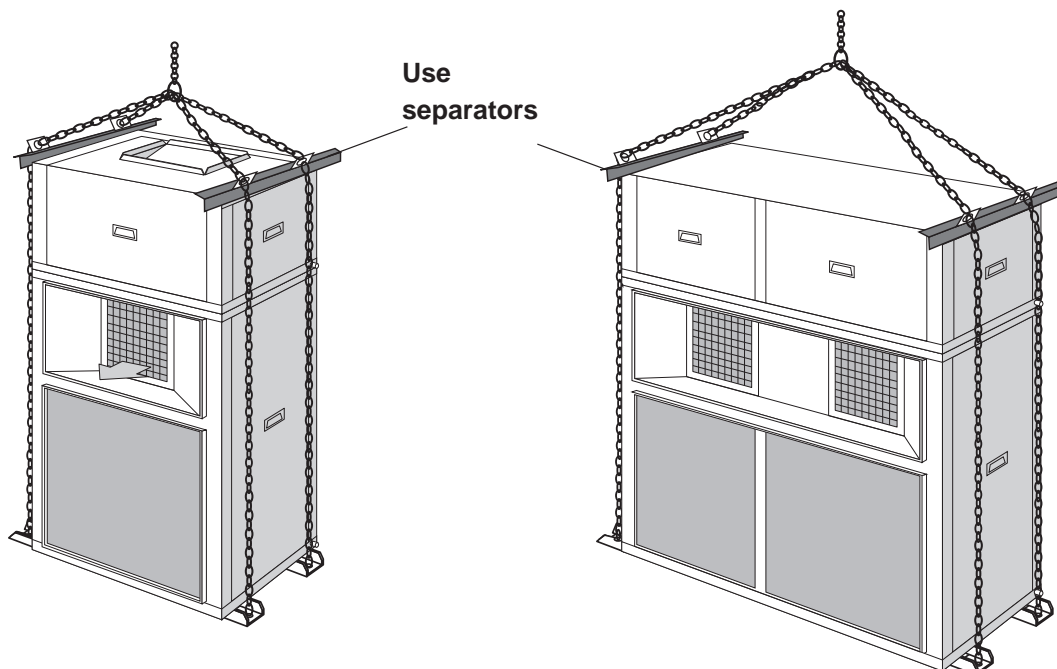
The units are designed to be installed with ducts, calculated by qualified technical staff. The joints to be used between ducts and the openings to the unit should be Elastic Joints. Avoid the use of BYPASS joints between the extraction air and input air in both the outdoor and indoor sections. The structure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

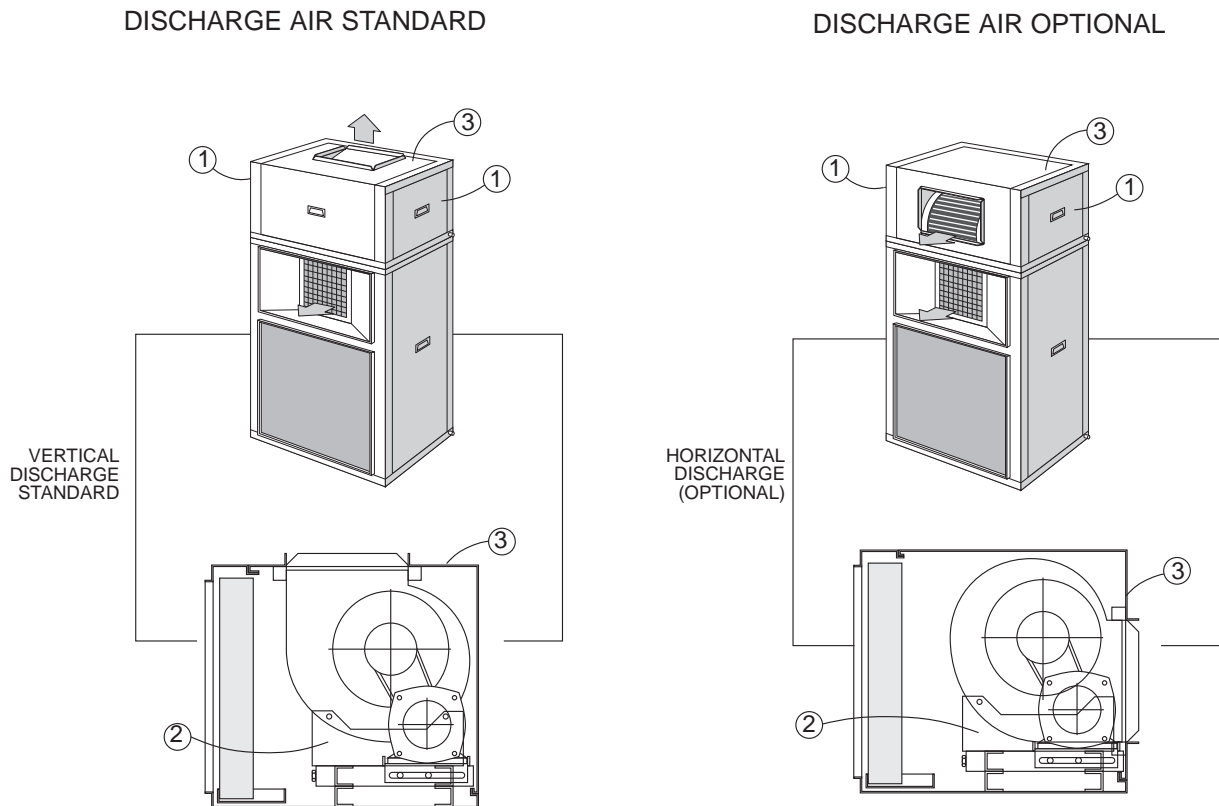
How to hoist the unit

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



2.- INSTALLATION

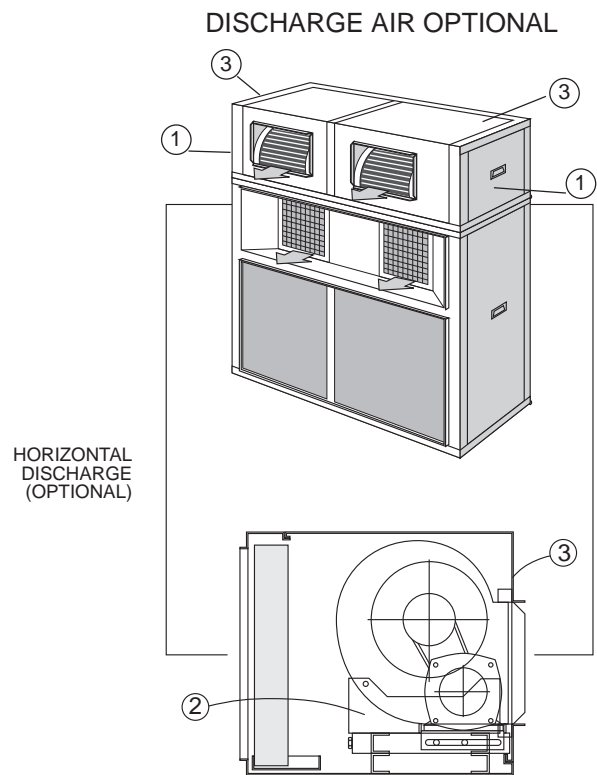
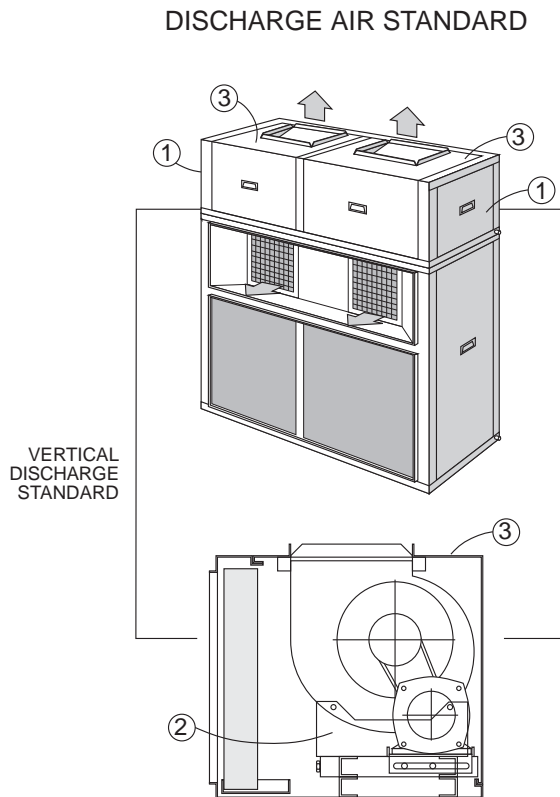
2.3.- OPTIONAL OPERATIONS PRIOR TO UNIT INSTALLATION: CHANGE IN THE POSITION OF THE INDOOR FAN FOR UNIT MODELS 22E-24E-28E-32E-38E



- 1 Check that unit is electrically disconnected.
- 2 Unscrew and remove side covers (1) and (3).
- 3 Loosen the transmission belts and disassemble them.
- 4 Remove the pulley from the fan axle.
- 5 Remove the fan and their supports (2).
- 6 Turn the fan until horizontal discharge position is reached.
- 7 Replace the fan on the supports (2) which should not moved.
- 8 Place the pulley on the fan axle on the side which coincides with the motor: assemble the belts and align them.
- 9 Tense the belts correctly.
- 10 Replace the upper and lateral covers and screw them down (1) and (3).

2.- INSTALLATION

2.3.- OPTIONAL OPERATIONS PRIOR TO UNIT INSTALLATION: CHANGE IN THE POSITION OF THE INDOOR FAN FOR UNIT MODELS 44D-48D-56D-64D-76D



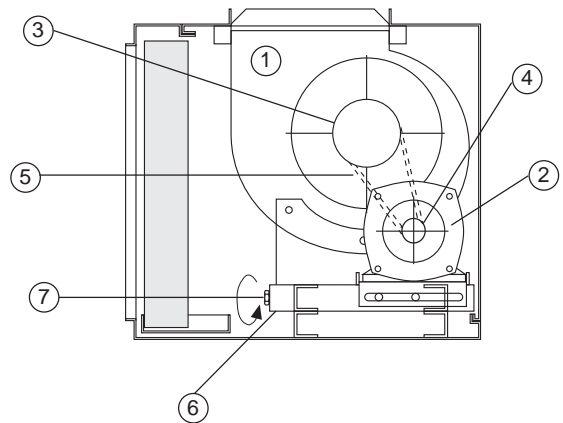
- 1 Check that unit is electrically disconnected.
- 2 Unscrew and remove side covers (1) and (3).
- 3 Loosen the transmission belts and disassemble them.
- 4 Remove the pulley from the fan axle.
- 5 Remove the fan and their supports (2).
- 6 Turn the fan until horizontal discharge position is reached.
- 7 Replace the fan on the supports (2) which should not moved.
- 8 Place the pulley on the fan axle on the side which coincides with the motor: assemble the belts and align them.
- 9 Tense the belts correctly.
- 10 Replace the upper and lateral covers and screw them down (1) and (3).

2.- INSTALLATION

2.4.-OPTIONAL OPERATIONS PRIOR TO UNIT INSTALLATION:

THE VENTILATION FOR LVCK- LVHA- LVHK UNITS IS FORMED BY:

- 1.- Centrifugal fan (single or double).
- 2.- Activating motor.
- 3.- Fixed pulley at the fan.
- 4.- Variable pulley at the motor fan.
- 5.- transmission pulley or pulleys.
- 6.- Base of the motor with displacement system for tensioning of belts.
- 7.- Tensing screw.



FLOW REGULATION IN THE FANS

The fan for all indoor units and for outdoor units models KVCK/ KVHK/ KVHA 32E- 38E- 64D- 76D, have a variable pulley incorporated into the activating motor, by which it is possible to vary, when the fan is off its diameter to modify the air flow of the unit, as required.

1. Fixer part
2. Mobil part
3. Fixing screw

CLOSED PULLEY:

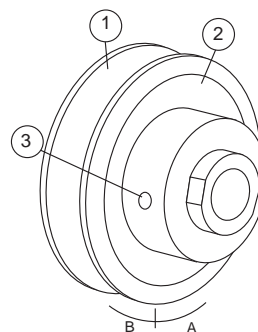
To increase the fan flow, turn the mobil part in direction "B" (Clock wise).

OPEN PULLEY:

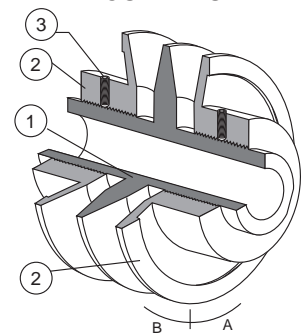
To reduce the flow, turn in direction "A" (Unlock wise).

VARIABLES PULLEY

SIMPLE PULLEY



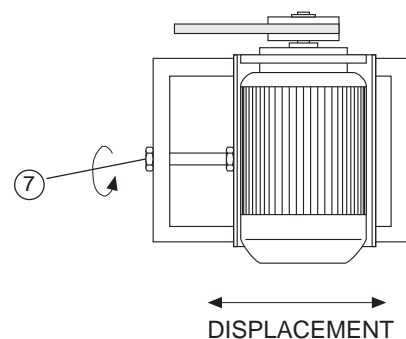
DOUBLE PULLEY



TENSION OF BELTS

The belts can be easily tensioned through the tensing screw incorporated into the bases of the motor of the transmitting units which also enables a good servicing to be carried out.

When the tensing screw is moved, the motor fan is moved to the sides in order to tension the pulley.

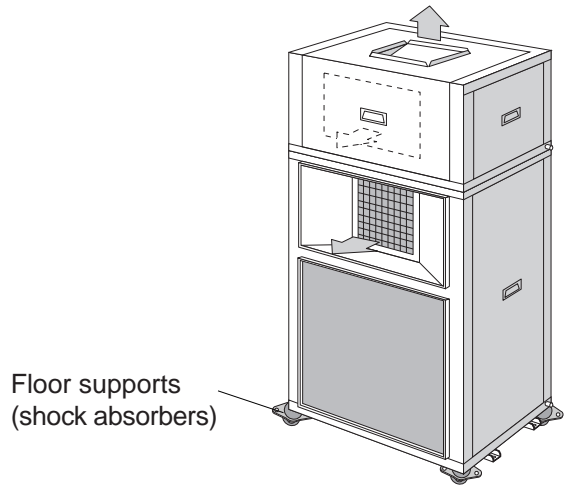


2.- INSTALLATION

2.5.- UNIT LOCATION

- The bedplate is made up of two metal channels, capable of with standing the weight of the units.
 - If the unit is floor mounted, then the profiles should be isolated with shock absorbing material such as anti-vibration or pads. Keep in mind that fans rotate at approximately 850 rpm.
- For the ones with variable pulley belts, see performances tables.

UNIT INSTALLED ON SHOCK ABSORBERS



- The unit is able to work in normal radioelectronics conditions for commercials and residential installations. For any other conditions please consult.
- If the outside temperature in the area where the heat pump unit is to be installed is low or the cycle functioning are too long, it may necessary to install a electrical heater, bellow the likely coils on the drip tray, which avoid the causing of ice in the coil during defrost cycle.
- If the outdoor unit is going to be installed outside. It may be recommended to install isolation around the panel of electrical box, to make sure it became hermetic.

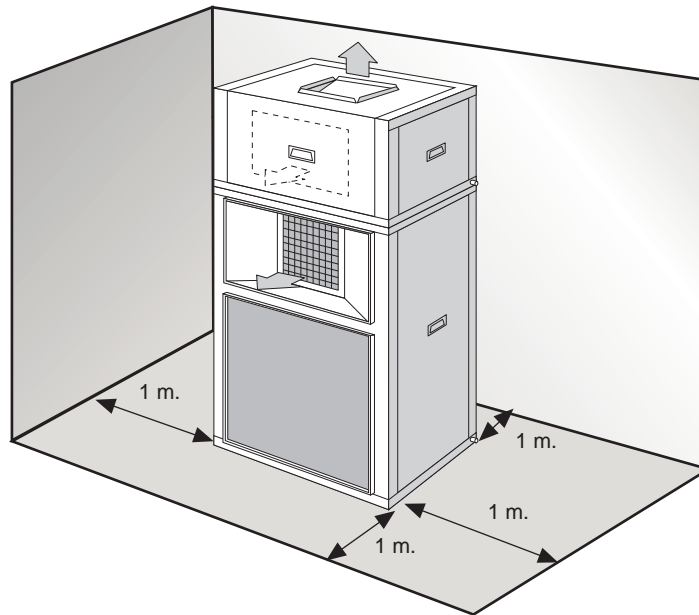
2.- INSTALLATION

2.6.- INSTALLATION CLEARANCES

Clearance around the unit for service and maintenance.

SERVICE SPACE

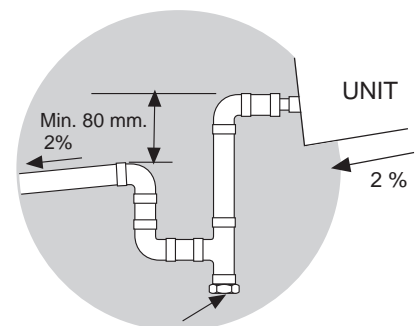
Space should be left free for access or servicing, to ease the installation of cables, drainage connections, electric installation and cleaning filters, as well as easy access to the unit.



2.7.- DRAINS

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

Drainage pipes will be fitted for each tray through a siphon with a height difference of 80 mm. to avoid drainage problems from the depression formed by the fans. The pipes should have an inclination of 2% to ease drainage of condensation. The connections the units are pipes with exterior screw thread of $\frac{3}{4}$ (Tap).



Inspection and cleaning stopper.

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.

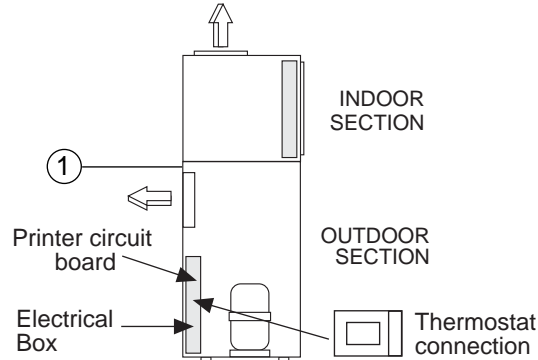
2.- INSTALLATION

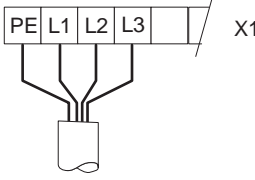
2.8.- ELECTRICAL CONNECTION

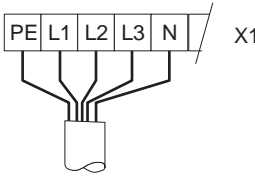


- BEFORE MAKING ANY ELECTRICAL CONNECTIONS, BE SURE THAT ALL CIRCUIT BREAKERS ARE OPEN.
- IN ORDER TO CARRY OUT THE ELECTRICAL CONNECTIONS, FOLLOW THE ELECTRICAL DIAGRAM SUPPLIED WITH THE UNIT.

① Power supply to the unit.



POWER SUPPLY 230V THREE-PHASE UNITS	UNIT MODEL	Nr. OF CABLES x SECTION (mm ²)	
		① Power supply without electric heater	① Power supply with electric heater
			
3 ~ 230V - 50 Hz + PE			
	22E	4 x 10	4 x 25
	24E	4 x 10	4 x 25
	28E	4 x 10	4 x 25
	32E	4 x 16	4 x 35
	38E	4 x 16	4 x 35
	44D	4 x 25	4 x 70
	48D	4 x 25	4 x 70
	56D	4 x 35	4 x 70
	64D	4 x 50	4 x 95
	76D	4 x 50	4 x 95

POWER SUPPLY 400V THREE-PHASE UNITS	UNIT MODEL	Nr. OF CABLES x SECTION (mm ²)	
		① Power supply without electric heater	① Power supply with electric heater
			
3N ~ 400V - 50 Hz + PE			
	22E	5 x 4	5 x 10
	24E	5 x 4	5 x 10
	28E	5 x 6	5 x 10
	32E	5 x 6	5 x 16
	38E	5 x 10	5 x 16
	44D	5 x 10	5 x 25
	48D	5 x 10	5 x 25
	56D	5 x 16	5 x 35
	64D	5 x 25	5 x 35
	76D	5 x 25	5 x 50

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

VOLTAGE OPERATING LIMITS

MODELS	VOLTAGE	LIMIT
22E/44D	230 V-1Ph-50Hz	198-264 V -1Ph- 50Hz
24E/48D	230 V-3Ph-50Hz	180-242 V -3Ph- 50Hz
28E/56D	400 V-3Ph-50Hz	342-462 V -3Ph- 50Hz
32E/64D	230 V-3Ph-50Hz	198-264 V -3Ph- 50Hz
38E/76D	400 V-3Ph-50Hz	342-462 V -3Ph- 50Hz

2.- INSTALLATION

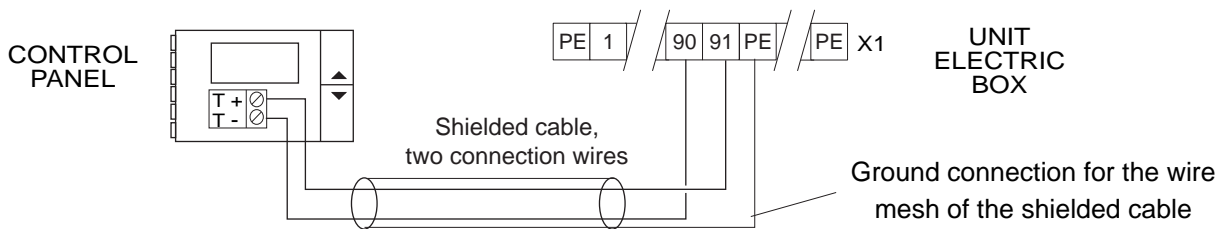
2.9.- ELECTRICAL CONNECTION

CONTROL PANEL

ELECTRICAL CONNECTION DIGITAL THERMOSTAT, FOR STANDARD UNIT VERSION.



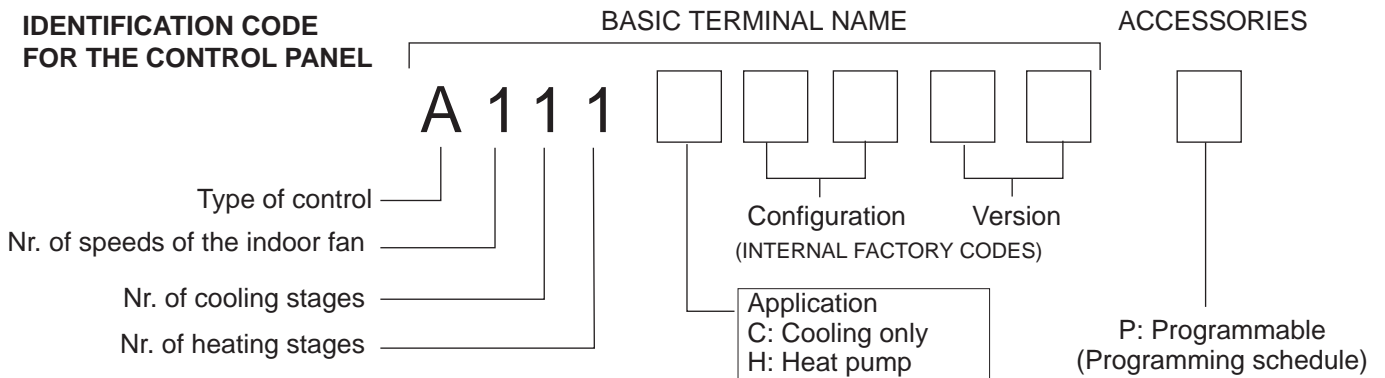
IMPORTANT
THE SHIELDED CONNECTION CABLE BETWEEN THE CONTROL PANEL AND THE UNIT MUST BE SEPARATE FROM ANY OTHER TYPE OF ELECTRICAL WIRING. CONNECT IT TO THE ELECTRIC BOX LOCATED IN THE OUTDOOR UNIT.



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



Since this type of control panel is factory-configured for each application, an identification code located on the control 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.



2.- INSTALLATION

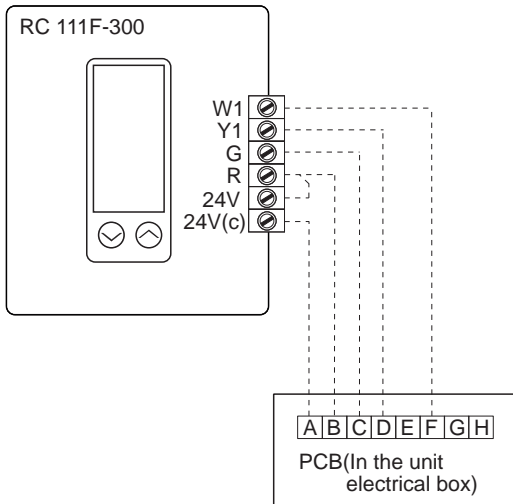
2.10.- ELECTRICAL CONNECTION

CONTROL PANEL

ELECTRICAL CONNECTION DIGITAL THERMOSTAT, FOR VFC UNIT VERSION.

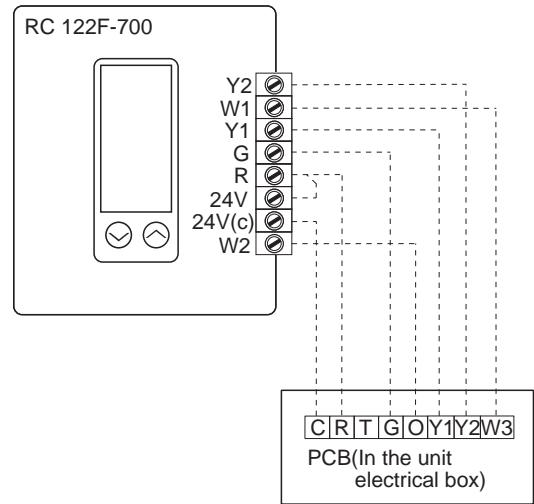
MODELS: COOLING ONLY UNITS

22E-24E-28E-32E-38E



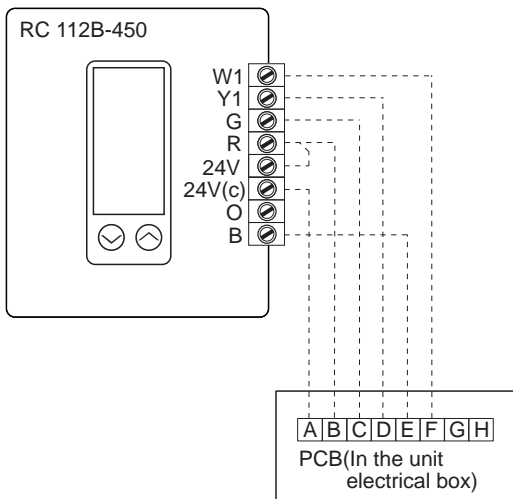
MODELS: COOLING ONLY UNITS

44D-48D-56D-64D-76D



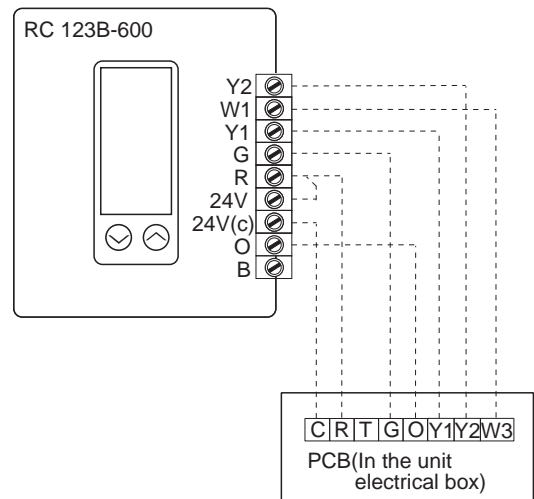
MODELS: HEAT PUMP UNITS

22E-24E-28E-32E-38E



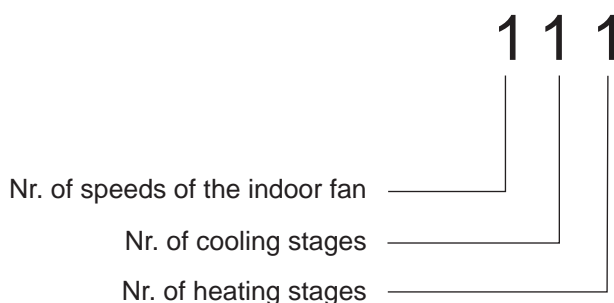
MODELS: HEAT PUMP UNITS

44D-48D-56D-64D-76D

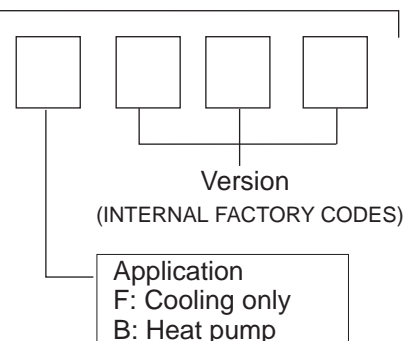


- For securing and connecting the Control Panel, consult the control Panel Manual supplied with the unit.

IDENTIFICATION CODE FOR THE CONTROL PANEL



BASIC TERMINAL NAME



2.- INSTALLATION

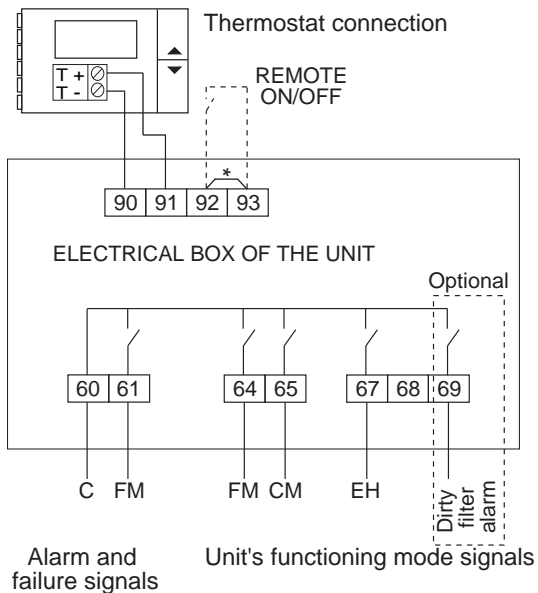
2.10.- ELECTRICAL CONNECTION

ELECTRICAL CONNECTION " REMOTE SIGNALS"

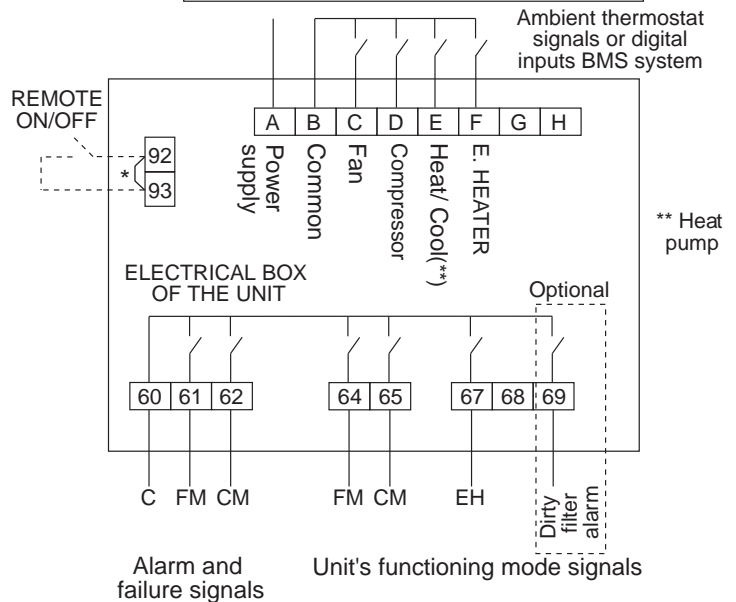
The electrical box of all the range, lets you obtain the following functions:

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

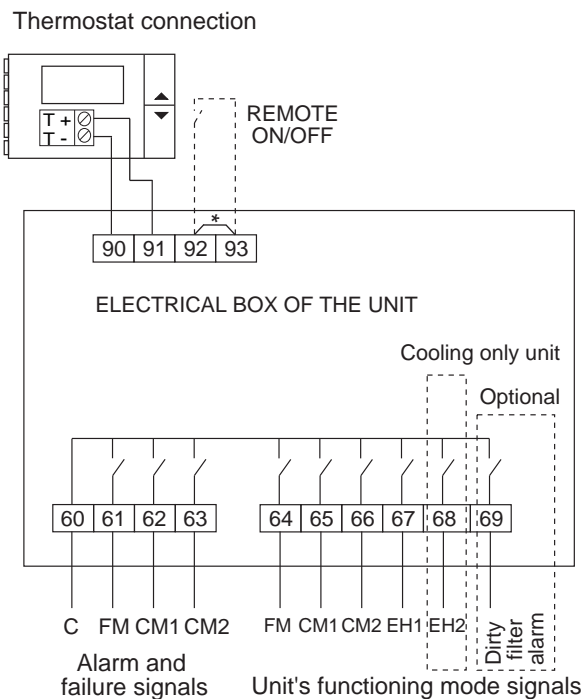
SINGLE CIRCUIT UNIT, STANDARD VERSION



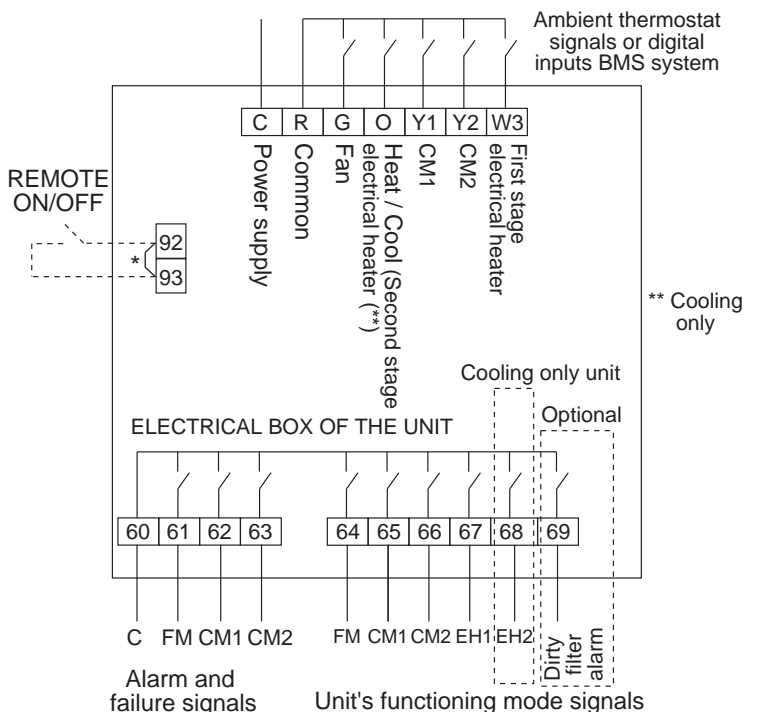
SINGLE CIRCUIT UNIT, VFC VERSION



DOUBLE CIRCUIT UNIT, STANDARD VERSION



DOUBLE CIRCUIT UNIT, VFC VERSION



- C: Common
- FM: Indoor fan
- CM: Compressor
- CM1: Compressor 1
- CM2: Compressor 2
- EH1: Electrical heater 1
- EH2: Electrical heater 2

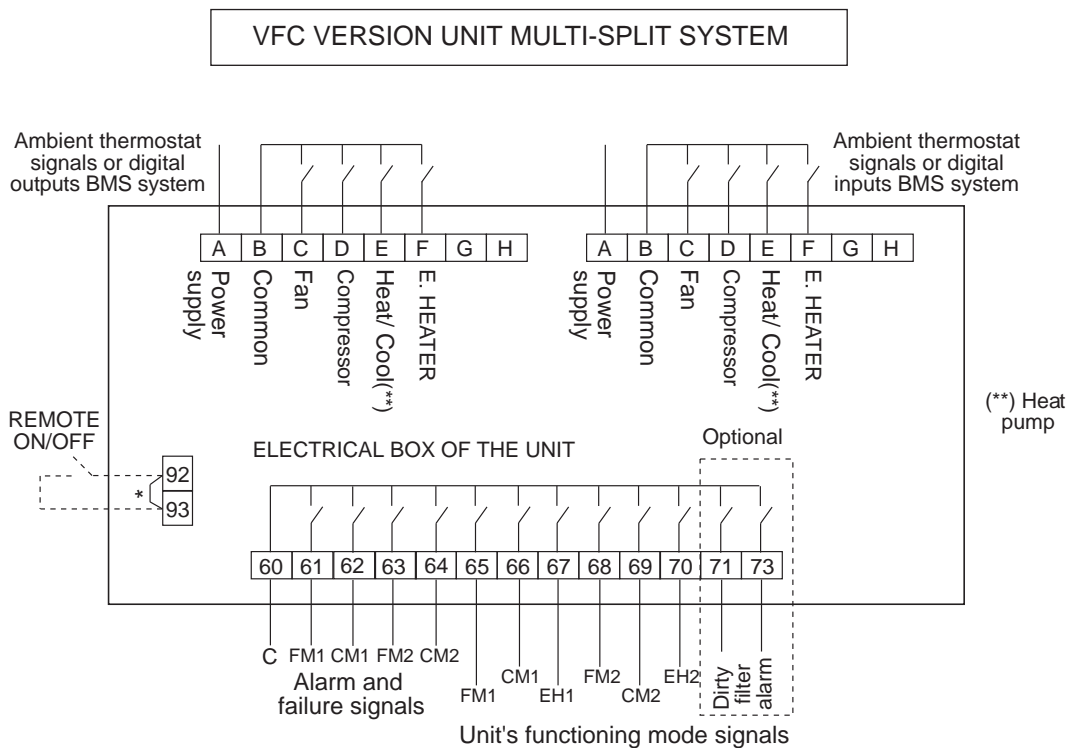
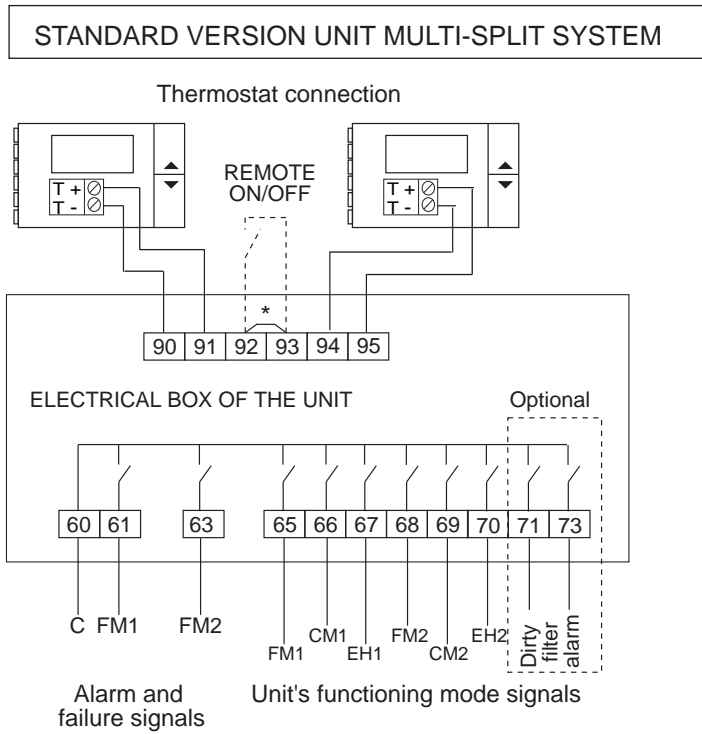
When unit switch off, the system will show CM, CM1 Y CM2 failure signal.

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

2.- INSTALLATION

2.10.- ELECTRICAL CONNECTION

ELECTRICAL CONNECTION " REMOTE SIGNALS" MULTI-SPLIT SYSTEMS



- C: Common
- FM: Indoor fan
- CM1: Compressor 1
- CM2: Compressor 2
- EH1: Electrical heater 1
- EH2: Electrical heater 2

When unit switch off, the system will show, CM1 Y CM2 failure signal.

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

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.

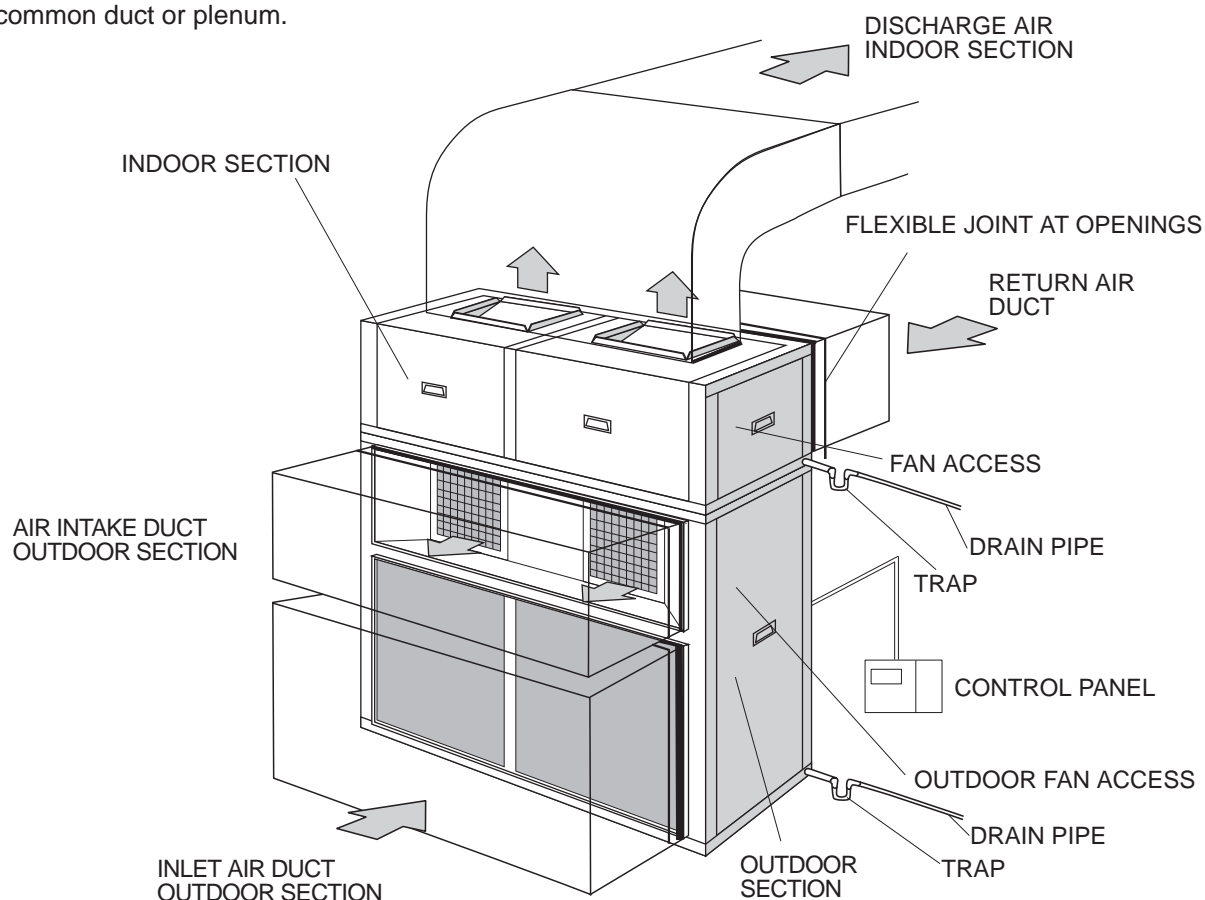
FIGURE FOR THE STANDARD UNIT CONFIGURATION FOR MODELS
44D-48D-56D-64D-76D

LOCATION

The unit can be installed outside. If it is installed, air entry and exit ducts should be fitted. Both indoor and outdoor units should be assembled on bases previously made and stood on absorbent and antivibrating material to avoid the vibrations being transmitted to the structure of the building.

DISCHARGE IN THE DOUBLE CIRCUIT UNITS

Always to be done through a common duct or plenum.



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 high 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 for standard unit version, press "OFF" for VCF version units and wait for the anti-cycle time (5 minutes), afterwards, the unit will start-up again.

Stop the indoor fan by disconnecting it. The low pressure should drop and the unit should stop when the pressure gauge reaches 1 kg/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.

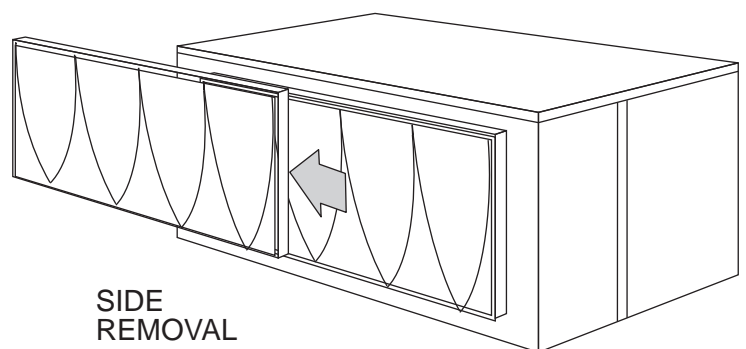
- CONTROL :

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

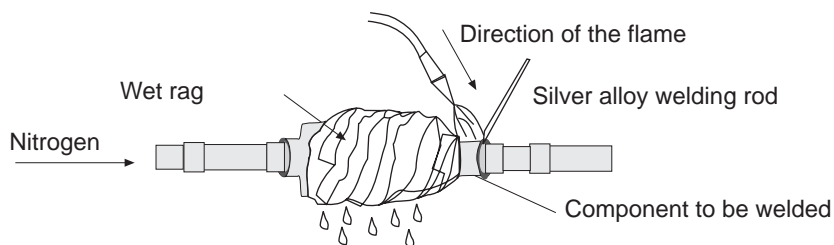


IMPORTANT

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 pipe work, use pipe cutters. Do not use saws or any other tools that produce filings.
- All brazing must be carried out in a nitrogen atmosphere to prevent corrosion from forming.
- Use silver alloy brazing rod.
- Take special care that the flame from the torch is aimed in the opposite direction from the component to be welded and is covered with a wet rag in order to avoid overheating.



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

Once this level of vacuum has been reached, keep the pump in operation for at least one hour. **DO NOT USE THE COMPRESSOR AS A VACUUM PUMP.**

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



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

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 wrapped before using them and be very thorough about any possible dirt (dust, filings, burrs, etc.).
- When there is a leak, gather what is left of the charge, create a vacuum in the unit and completely recharge with new R-407C Refrigerant.
- Brazing should always be carried out in a nitrogen atmosphere.
- Reamers should always be well sharpened.

4.- MAINTENANCE

4.3.- FAILURE DIAGNOSIS

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

FAILURE	POSSIBLE CAUSES	POSSIBLE SOLUTIONS
UNIT DOES NOT START	Failure in the power supply, or insufficient voltage.	Connect the power supply or check the voltage.
	Circuit breakers have opened.	Reset.
	Power cable or Control Panel cable is defective.	Inspect and Correct.
UNIT STOPS DUE TO HIGH PRESSURE DURING THE COOLING CYCLE	High Pressure switch is defective.	Check Cut-off Pressure or change Pressure Switch if necessary.
	Outdoor fan is not working.	Check for voltage, inspect the motor and turbine or replace if necessary.
	Outdoor Fan turns in the wrong direction.	Switch the power phases.
	Outdoor Coil is dirty or clogged for passing air	Inspect and Clean.
	Excess charge of the Refrigerant.	Remove the charge and charge according to the data on the Rating Plate.
UNIT STOPS DUE TO HIGH PRESSURE DURING THE HEATING CYCLE	The same causes and solutions as the Cold Cycle but with reference to the 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.

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