

COLD PAK



Monoblock and Split Cold Units

EN

INSTALLATION AND USE MANUAL



WARNING!

CHARACTERISTICS OF THE STAFF, WHO IS IN CHARGE OF THE UNIT'S COMMISSIONING, MAINTENANCE AND REPAIRING

The staff, who manipulates the unit, described in this manual, should have a good acknowledgement of its electrical and refrigeration systems.

Training courses or other type of specific titles should prove this acknowledgement.

SAFETY TOOLS THAT MUST BE USED DURING THE COMMISSIONING, MAINTENANCE AND REPAIRING OPERATIONS.

The electrical system and the refrigeration system are totally different. That is the reason why, it is necessary to use the appropriate tools for each one. In the same way, the safety measures concerning electrical contacts and extremities protections must be strictly followed.

RESIDUAL RISKS

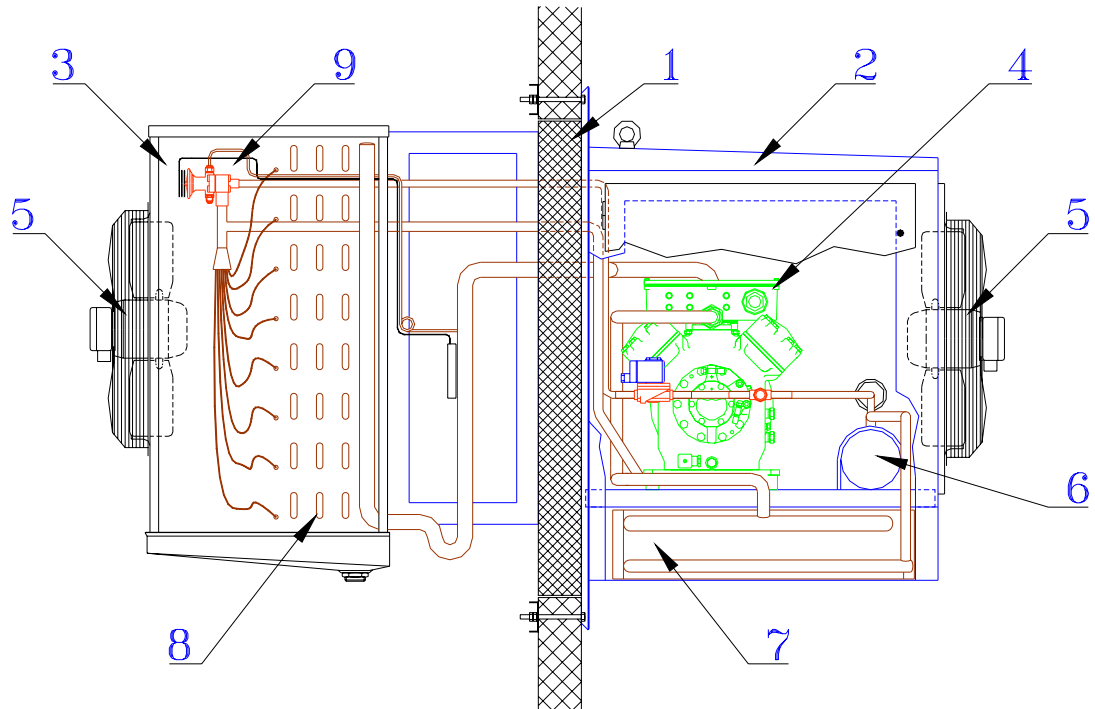
By the unit's configuration and its delivery state, there are zones of no risk. Take also in consideration, that the staff who is in charge of the unit, should know how the unit runs. Please, take note of the following:

1. The fan and the associated transmission are covered by a metal casing, that can be disassembled with the help of proper tools. In this case, it is important to check that there is no voltage and that no extremities or sharp objects are located inside the fan, motor or transmission.
2. Before manipulating the electric panel, it is necessary to check that there is no voltage and no sharp objects inside it.
3. Before manipulating the unit, it is necessary to check that it is in good condition by testing the different leds. In this way, an unintentional start-up can be avoided.
4. Anyway, the main switch, located on the electric panel's door, must be off before starting any manipulation inside the unit.

Each unit is fitted with a characteristics plate with the serial number written on it. This number should be indicated as a reference for any question or advise concerning the unit. This will allow its identification in E.F.C.,S.A.

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1.- DESCRIPTION

The refrigeration units, COLD-PAK are basically fitted with the following elements:

- 1.- Insulation panel
- 2.- Condensing unit (Outdoor)
- 3.- Evaporating unit (indoor)
- 4.- Compressor
- 5.- Fans
- 6.- Receiver
- 7.- Condenser
- 8.- Evaporator
- 9.- Thermostatic valve

2.- GENERAL CHARACTERISTICS

(To have further information concerning the different families, models, services and characteristics, please consult the General Catalogue)



All the units are fitted with refrigerant load (except models box 450), and have been fully factory tested and commissioned.

A Split System version is also available (condensing and evaporating modules are separated) according to the assembly conditions. In this case, the unit is fully factory tested, but after assembling it, the evaporator must be vacuumed and it is necessary to add freon depending on the distance between the condensing unit and the evaporator. (See the assembly details of the split system model.- chapter 5.3).

The condensing unit's casing is made of steel plate with two-components enamel polyurethane painting, dried to the furnace and applied on an epoxy primer base.

The evaporator unit's casing is made of pre-lacquered aluminium plate, except the fan panel which is made of painted and galvanized steel plate.

Hermetic or semi-hermetic compressors are available (depending on models).

The condenser and the evaporator are fitted with copper tube and aluminium fins with different pitch (depending on models).

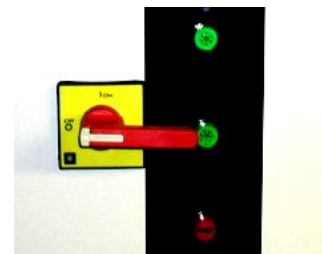
The electric panel is fitted with a general disconnecting switch of protection.

The fans are helicoidal, with outdoor rotor triphasic motor, internal protection by thermistors and located at suction.



Inside the Cold-Pak are installed: **HP pressure switch, LP pressure switch, HP control pressure switch.**

The unit is also fitted with an ambient thermostat, dehydrator filter, liquid sight-glass, liquid electric valve and thermostatic expansion valve.



Units, fitted with defrosting, include also a **timetable programmer** and an end defrosting thermostat (defrosting by hot gas) or a defrosting and safety klixon (electrical defrosting).

The room temperature must be settled according to the unit's suction/discharge temperature.

The standard Cold-Pak units have been designed to work at outdoor air temperatures up to + 40°C. But, if the installation instructions, that are indicated on the following chapter, have been correctly followed, and the unit's automatisms have been perfectly set, it can be possible to work at higher temperatures (up to +45°C) and no HP pressure switch will be ON. Units for frequent very low temperatures are also available.

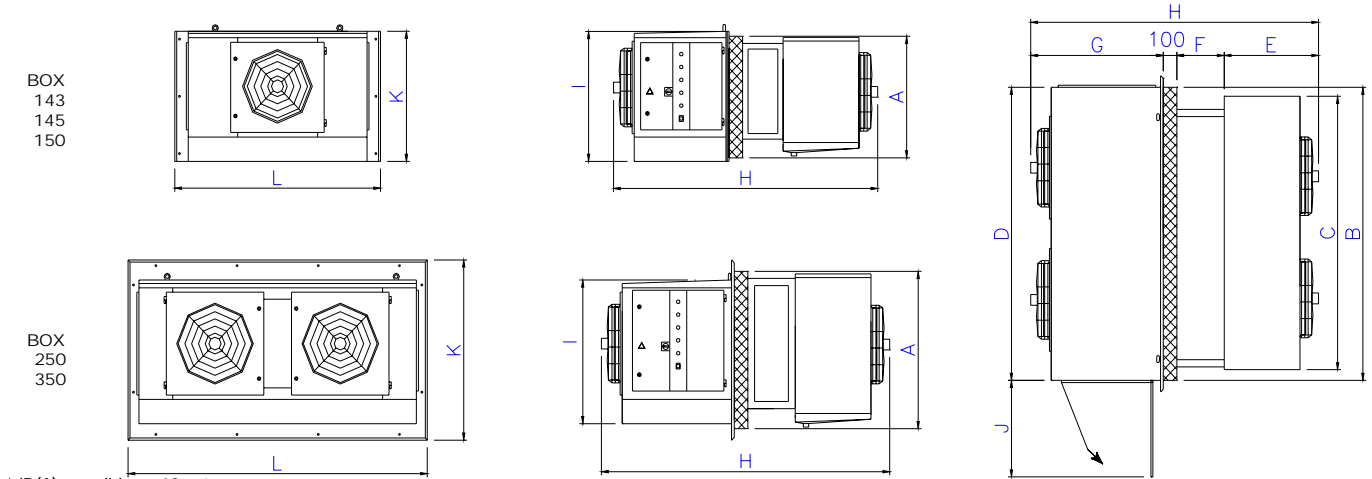


Depending on the characteristics of the supplied models, the unit can be fitted with the following elements:

- Oil pressure switch
- Compressor safety klixon
- Defrosting (several systems)
- Fans cyclic relay

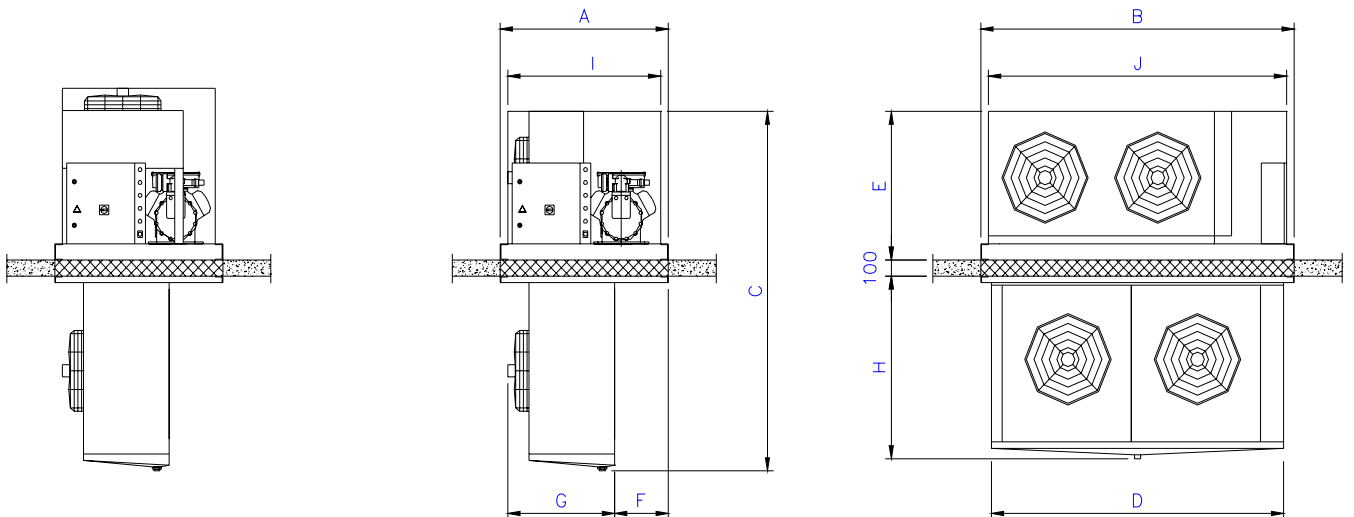
2.1- DIMENSIONS AND WEIGHTS

Compact version

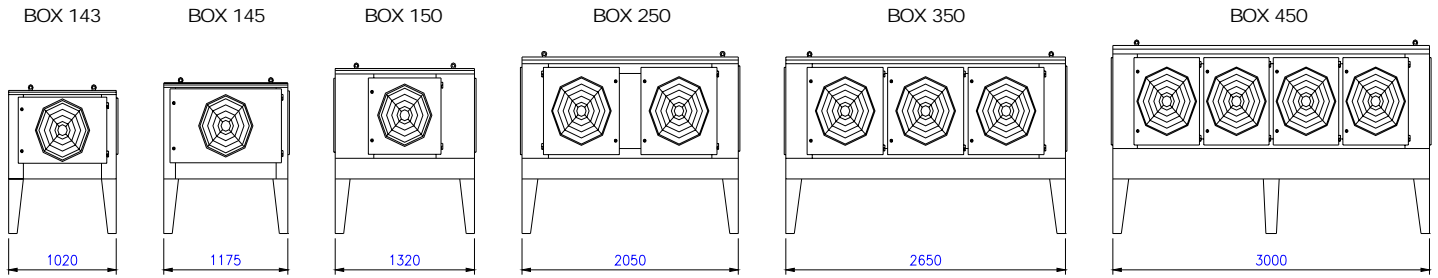


BOX	DIMENSIONES / DIMENSIONS / DIMENSOES												VENT. FAN	NOISE LEVEL dB(A)	PESO (Kg) WEIGHT POIDS
	A	B	C	D	E	F	G	H	I	J	K	L			
143	670	1000	970	1020	580	250	715	1645	730	490	730	1220	1 x ø 450	52	200 / 290
145	730	1190	1140	1175	580	300	775	1755	790	550	790	1375	1 x ø 450	52	240 / 330
150	850	1350	1330	1320	700	300	865	1965	910	610	910	1520	1 x ø 500	54	320 / 510
250	1100	2050	1912	2050	700	350	990	2140	1005	685	1260	2210	2 x ø 500	58	550 / 820
350	1220	2650	2560	2650	700	400	990	2190	1005	685	1380	2810	3 x ø 500	59	940 / 1100

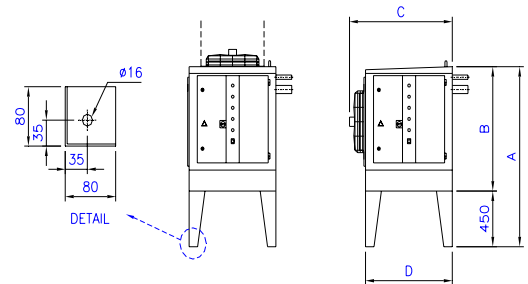
Ceiling version



Split version and condensing unit

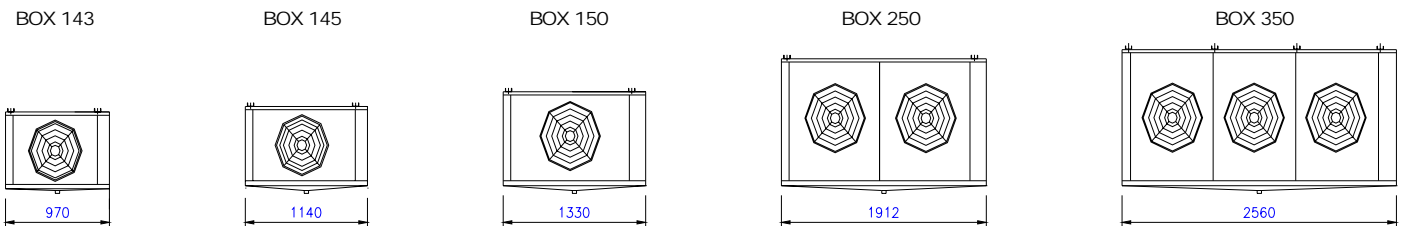


BOX	DIMENSIONES / DIMENSIONS / DIMENSÕES				NOISE LEVEL dB(A)	PESO (Kg) WEIGHT POIDS
	A	B	C	D		
143	1180	730	715	550	52	160 / 230
145	1240	790	775	610	52	180 / 250
150	1360	910	865	700	54	290 / 460
250	1455	1005	990	825	58	380 / 600
350	1455	1005	990	825	59	580 / 830
450	1550	1100	1265	1100	60	1000 / 1200

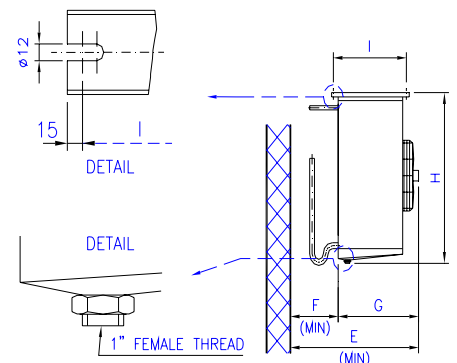


BOX	DIMENSIONES / DIMENSIONS / DIMENSÕES										PESO (Kg) WEIGHT POIDS
	A	B	C	D	E	F	G	H	I	J	
143 T	850	1050	1755	970	950	250	580	705	750	950	170 / 240
145 T	900	1250	1790	1140	950	300	580	740	800	1150	190 / 260
150 T	1100	1500	1910	1330	950	350	700	860	1000	1400	290 / 480
250 T	1100	2050	2150	1912	950	350	700	1100	1000	1950	420 / 740

Evaporators



BOX	DIMENSIONES / DIMENSIONS / DIMENSÕES					PESO (Kg) WEIGHT POIDS
	E	F	G	H	I	
143	880	300	580	705	525	60 / 80
145	880	300	580	740	525	70 / 90
150	1050	350	700	860	635	90 / 120
250	1050	350	700	1100	635	180 / 240
350	1100	400	700	1205	635	290 / 370



3.- LOCATION

Before placing the Cold-Pak, please bear in mind the following points:

- Outdoor part of the room: the external area has to be well ventilated and the condenser air inlet should not find any obstacle. You should consider that there are two options: vertical air outlet (under-roof installation) and horizontal air outlet (i.e. the standard one). There should not have any obstacle in front of the fans. Please, bear in mind that if the outlet air is suctioned again by the condenser, your Cold-Pak's electric current consumption will be higher. It could even happen that the Cold-Pak 's HP pressure switch can be activated at not very high ambient temperatures. That would not happen, if the unit is placed at the right location. The unit must be placed avoiding a direct exhibition to the sun. If it is impossible and the factory is located in a warm zone, it is necessary to protect the unit and to install it under a roof.

- Inside part of the room: the air suction should not find any obstacle (see pictures representing different assembly solutions). The air should enter inside the coil very easy, even when there are goods inside the room. Let a free passage to allow the air to reach easy the evaporator entrance and to obtain a right unit's running. The fans discharge should not find any obstacle, to reach the end of the room.

To avoid any problem with frost (or having to carry out frequent defrostings), place the unit where the direct outdoor air inlets through the door have no direct effect (the space between the unit's panel and wall frame should be perfectly sealed to avoid outside air inside the room), and do not open very often the doors.

It is necessary to insist that it is very important to install the unit at the right place. If you have any doubt, do not hesitate to contact your installer or EFC.

- Wall where the unit will be installed: it must be able to support the unit's weight (see Cold-Pak's characteristics plate). The wall's thickness should include the insulation. (see ASSEMBLY SOLUTIONS). If your wall has got thickness or characteristics that do not admit any of the suggested solutions, please consult E.F.C. You can also use the SS system, with separate modules. .

3.1- ASSEMBLY SEQUENCE



Step: 1



Step: 2



Step: 3



Step: 4



Step: 5

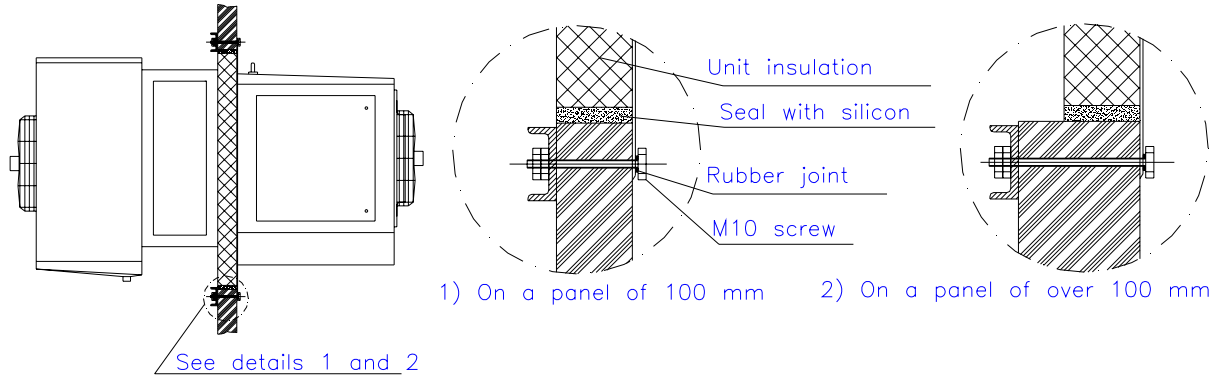


Step: 6

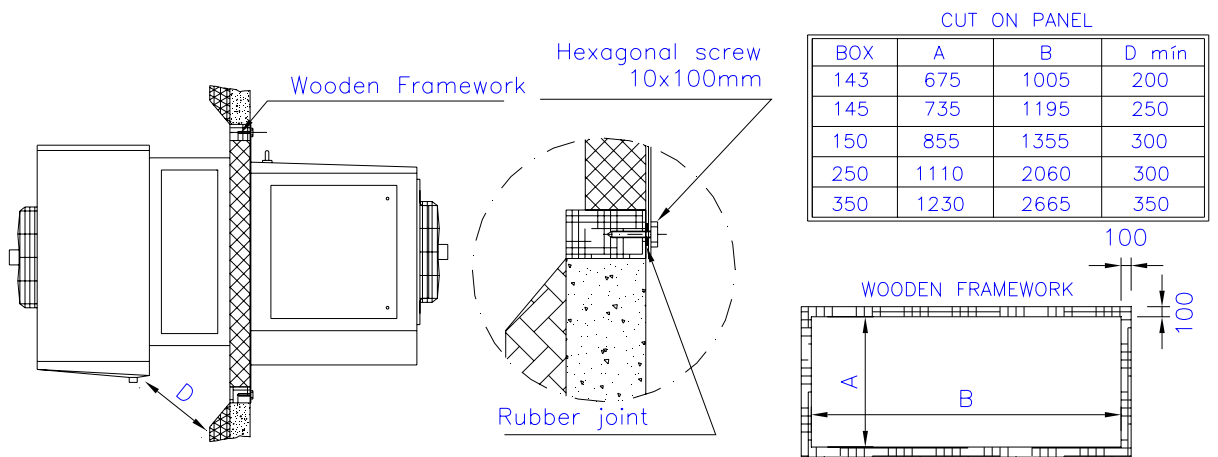


3.2- ASSEMBLY DETAILS

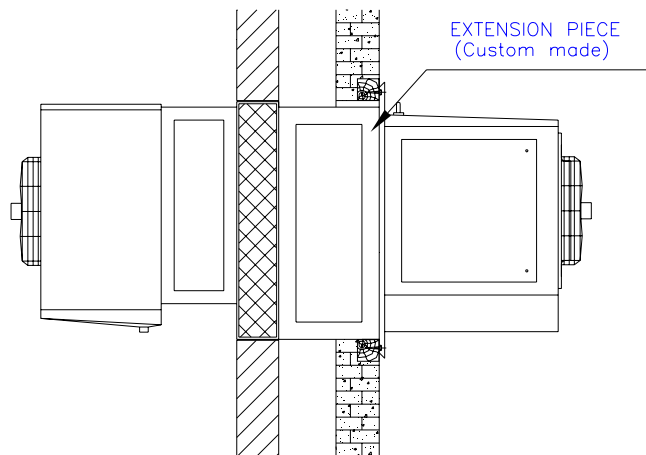
Assembly on panel



Assembly on wall



Assembly on wall (Special)



4.- UNIT'S LABELS LIST


Fans turn senseCaution Label**CAUTION!!**

BEFORE STARTING UP THE UNIT:

- 1) CHECK THAT THE NETWORK VOLTAGE IS ACCORDING WITH THE ONE INDICATED ON THE CHARACTERISTICS PLATE.
- 2) TAKE OUT THE TRANSPORT PROTECTIONS FROM THE COMPRESSOR SPRINGS (IF IT IS NECESSARY)
- 3) CHECK THE LEVEL, FASTEN, STABILITY AND OTHER ASPECTS THAT ARE INDICATED ON THE INSTRUCTIONS BOOK.

Identified LabelCaution Labels

Characteristics Plate

		CE
EQUIPOS FRIGORIFICOS COMPACTOS, S. A.		0062
C/Zuaznabar, 36 Pol. Ind. Ugaldetxo Apdo. 51- 20180 Oyarzun (Guipúzcoa) – ESPAÑA Tel: (34) 943 49 26 42 Fax: (34) 943 49 03 05 e- mail: efc@adegi.es - www.efcsa.com		
Cold Pak	Serial Num	Date
<input type="text"/>	<input type="text"/>	<input type="text"/>
Max. Pressure. (bar)	Refrigerant	Charge (kg)
<input type="text"/>	<input type="text"/>	<input type="text"/>
Voltage/Phase/Hz	Weight (kg)	Nom. Max. P. (kW)
<input type="text"/>	<input type="text"/>	<input type="text"/>

COLD PAK: Name of the Cold-Pak EFC model

SERIAL NUM: Unit's reference number. It's necessary to indicate this number for any advise or claim concerning the unit.

DATE: Date of the unit's final test.

MAXIMUM PRESSURE (bar): Unit's running maximum pressure (Safety valve pressure).

REFRIGERANT: Refrigerant fluid that is included in the unit.

LOAD (kg): Refrigerant load that is included in the unit.

VOLTAGE / PHASE / Hz: Unit's power supply.

WEIGHT (kg): Unit's weight with refrigerant load.

NOMINAL MAX. P. (kW): Nominal maximum power of the unit's running.

CE CE marked according to the 98/37/CEE Machines Norm and the 97/23/CE Pressure Units

0062 Number of Certified Body

5.- RECEPTION AND ERECTION

5.1. UNPACKING

The unit should be examined before and after the unpacking, to check that it has not been damaged during the transport..

Any damage during the transport will be notify to the Forwarder Agency in order to send an agent to carry out an inspection. It is also recommended to communicate it to E.F.C.

5.2. HOW TO PLACE COMPACT MODELS

Units are fitted with lifting eyes to place it by using cranes or similar machines.

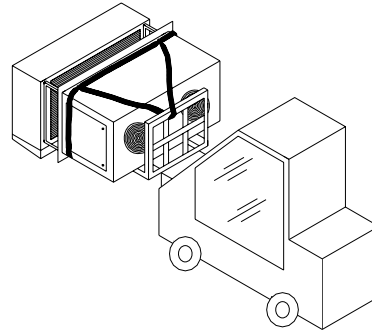
In this case, it is recommended to use a forklift, place some wooden pieces in the bottom part, resting on sides and protecting the condensation coil at the same time.

It is also recommended to fasten the unit to the forklift by slings with the help of the lifting eyes. (see picture)

For this type of works, a little crane can also be used.

Unit has to remain hanging like that until it is fixed to the frame or panel.

Finally, it is necessary to fill the gap between the assembling frame and the insulation panel, by wooden strips, expanded polyurethane and/or silicon.

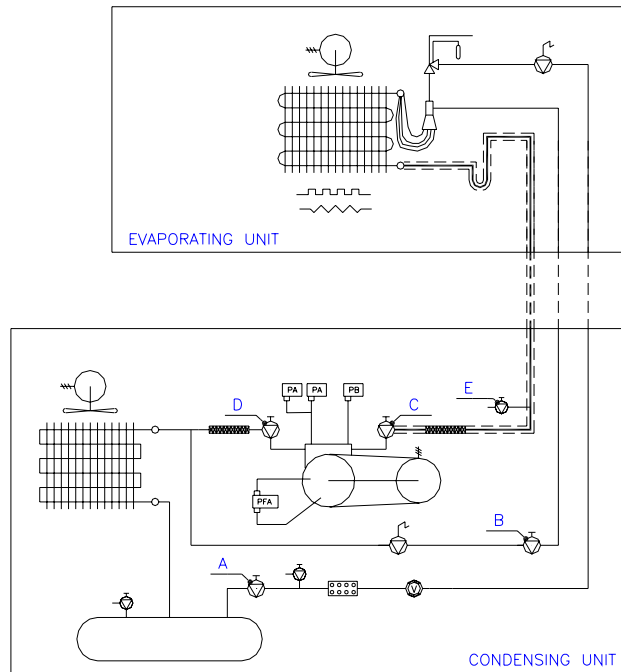


It is very important that the unit keeps always an horizontal position.

5.3. ASSEMBLY OF SPLIT SYSTEM MODELS

Instructions for the unit's installation and assembly:

Please, take the following precautions to mount the evaporator.:



- Check the maximum length between the condenser and the evaporator. The diameters have been considered for a maximum length (between condenser and evaporator) of 15 linear metres. If the distance exceeds 15 metres, please consult E.F.C., to consider the possibility of increasing the diameters.
- Check that valves A (liquid outlet), B (hot gas to evaporator, if fitted) and C (compressor suction valve) are closed.
- Take maximum precautions, during the assembly, to avoid humidity or dirt inside the system.
- Carry out a circuit pressure test with dried nitrogen through E, that is mounted in the suction line, inside the casing, by using a pressure reducer.
- Empty circuit and make a triple vacuum (0,5 mm. Hg.) through the same E valve, that has already been mentioned for the pressure test.
- Break vacuum with the condensing unit pressure and then depending on the distance between the condensing and evaporating units, decide if it is necessary to add refrigerant.
- Then, open valves A, B and C.
- Connect the electric panel elements to the distribution box, that is located inside the evaporator.
- Make a good insulation of the piping that join the evaporating unit to the condensing unit. (Suction, hot gas and liquid; this latest one is up to the installer's criteria).
- The unit is fitted with refrigerant load for a maximum length of 15 metres between the condensing unit to the evaporator (except for units with box 450). If the distance exceeds this length, it could be necessary to add refrigerant.
- The automatism is factory set, therefore they cannot be manipulated.

The non-fulfilment of these rules can badly imply the running of the unit and, even, its damage. Therefore, the manufacturer can cancel the unit's guarantee.

REMARK: The pipes laying between outdoor and indoor modules has to be carried out according to the good refrigeration technique.


5.4. ELECTRIC CONNECTIONS

The compact Cold-Pak is fully wired. It is only necessary to supply it with electric current, which has to be the same as the one indicated on the characteristics plate. It should be grounded as well.

Connect the remote control (if there is any) according to the numbers that are indicated on the electric drawing, that is supplied together with the unit.

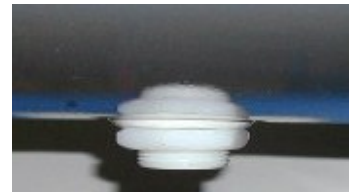
Before installing the unit, it is necessary to place an automatic general switch, according to the local rules and requirements.

With reference to the split system units, the inter-connection between modules will be made according to the electric drawing that is also supplied. (the evaporating unit fans power supply and klixon, heaters, control signals, etc)

REMARK: All our units are manufacturing according to the European Electric Norm and the  marked.

5.5. DRAINAGE CONNECTIONS

The unit is fitted with a 1" (female thread), that is located at the bottom part of the tray. A pipe will be connected and will be taken to the outside by the shortest way. It is necessary to insert a trap to avoid the outdoor air intake.



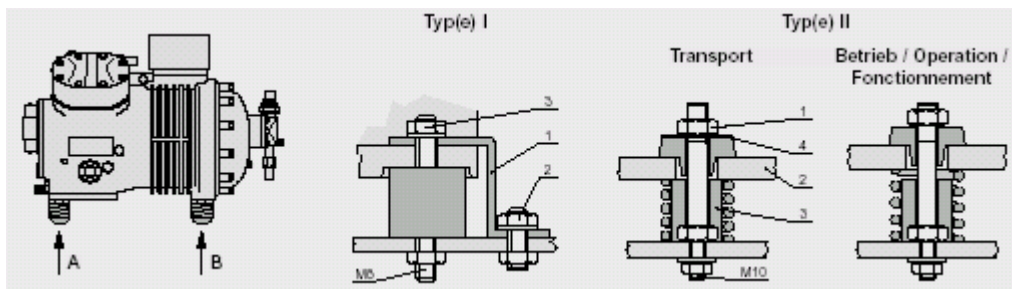
For low temperature rooms, it is necessary to add a suitable continuous running heater to the drain pipe. This pipe must be insulated.

6.- COMMISSIONING

6.1. PRIOR TO START UP

Semi-hermetic compressor units are supplied with compressors rigidly fixed to the bedplate to avoid damages during the transport.

Once the compressors are installed and before starting up, it is necessary to loosen nuts and to leave a 2mm clearance between them and special rubber washers. Use the corresponding drawing, depending on the models. (See picture).



6.2. START-UP

Steps:

- 1°. Check that the characteristics of the available electric power supply are according to the Cold-Pak's characteristics plate. Before connecting the Cold-Pak, be sure that the origin of the electric current is off.
REMARK: All units should have a ground connection.
- 2°. For negative temperatures rooms, the installer should consider some kind of heating for the unit's drain piping. This heater is supplied by the box distribution, that is located at the evaporator left side, at terminals 0 and 2 (the same as the ones of the inferior tray silicone heater).
- 3°. Activate the Cold-Pak supply external general switch, taking care that the unit's (or the remote control) switch is in OFF position.
The unit will remain like that for 6 hours, so that the crankcase heater can be heating and the liquid refrigerant (if any) of the compressor crankcase can be evaporating.
- 4°. After 6 hours with the unit fed and the switch at the OFF position, change the switch at position ON. At that moment, check that the fans turn sense is correct. If not, switch off the general switch and revert the positions of the supply wires.
- 5°. Once the Cold-Pak unit is running, set the room ambient thermostat to the requested temperature, and check it with the thermometer that is placed at the evaporator air inlet. Take in consideration the units discharge/suction temperatures:



MODEL	ROOM TEMPERATURE
CPA	+3°C/+15°C
CPM	-5°C/+10°C
CPMH	-5°C/+5°C
CPB	-15°C/-25°C
CPC	-25°C/-35°C
CPTC	-25°C/-35°C
CPDE	-25°C/-40°C
CPMB	+10°C/-30°C
CPBM	+5°C/-30°C

6°. Automatism are factory set. Therefore, they cannot be manipulated.

The non-fulfilment of these rules can badly imply the running of the unit and, even, its damage. Therefore, the manufacturer can cancel the unit's guarantee.

6.3. NORMAL OPERATING

- After a long shutdown, it is possible to find liquid inside the compressor crankcase, which can result in failures at starting-up. To avoid this, switch on external general switch and wait for, at least, one hour before actuating on the unit 's starting up switch.
- Before starting up, check that the failure led is not lighting. Otherwise, check the cause (HP pressure switch, oil pressure switch, compressor internal klixon or compressor thermal relay). Once the cause has been located, it is necessary to repair it and to start up the unit.
- Once the switch is at ON position, the READY Led should be lighted. If the room ambient temperature thermostat requires refrigeration, the liquid solenoid valve will open, the evaporator fans will start working and the corresponding LED will indicate REFRIGERATION. The Compressor's ON/OFF will be made by LP pressure switch.
- To avoid excessive low discharge pressures during the cold seasons, a control by pressostat, that acts on the condenser fans, is available.

6.4 DEFROSTING

The defrosting type of each evaporator depends on each unit model. There are 3 defrosting systems, depending on the model.

Defrosting by hot gas: The end defrosting thermostatic valve is fixed to the suction piping and is covered by the insulation. This thermostat is supplied at +20°C with the differential at its minimum level.

This thermostat should not be deregulated in the compact units. The non-fulfilment of this rule can cause the cancellation of the guarantee.

For *split system units* with long distances between the evaporating and condensing units, it can be necessary to adjust again the end defrosting thermostat, in order to avoid a too long defrosting process and to obtain a right running.

There is also an additional security device, that stops the defrosting process after 30 minutes.

Electric defrosting: It usually stops after 30 working minutes. However, there is a defrosting klixon at the evaporator's lower part, that regulates the defrosting end (+12°C) and the start of the evaporator fan (+3°C). There is also a security klixon, that is located at the evaporator upper part, that would stop the defrosting process if the temperature reached 60°C.

Defrosting by air: The same time programmer, that starts the defrosting process, stops it after 20 working minutes.

There are high temperature models that are not fitted with defrosting. Most part of the units is fitted with heater on the tray.

The DEFROSTING Led is lighting as long as the defrosting process lasts.

REMARK: It is possible, that when the unit starts for the first time, the DEFROSTING led remains lighting during several minutes.

The system is controlled by a timer and a thermostat. The timer is factory set and its periods of time are valid in most cases.

It is very important to settle the time between consecutive defrostings. This is done by a clock that is located at the unit electric panel.

The unit has been factory set with a compressor accumulated running time of 6 hours. It is possible that the installer has reduced the time during the start up.

If there is humidity inside the room, because:

- the evaporators are close to the doors,
- the opening doors takes too much time,
- the product inlet is made with superficial water,
- or any other reason,

it will be necessary, without any doubt, to reduce the time between consecutive defrostings, in order to avoid any frost inside the evaporator when the defrosting process ends.

This last point is very important, taking into account that if there is some frost when the defrosting process ends, the following defrosting will finish with a little bit more ice,... And finally, the evaporator will be obstructed by ice. The consequence of this situation, will be that not only the evaporator will not refrigerate, but also the compressor's breaking.

If the evaporator is obstructed by ice, proceed as follows:

- Make the defrosting process, as often as necessary, in order to eliminate all frost inside the evaporator.
- Then, reduce the time between defrostings.
- Start up the unit.

Do not worry, if it is necessary to make frequent defrostings. Usually, this process is economic, because the unit performance is better (more production and less consumption) when there is no frost inside the coil. The performance is getting worse as there is more frost.

6.5. SETTINGS AND INTERESTING DATA

- It is essential to know the refrigerant type used in your unit. This information is indicated on the unit's characteristics plate.
- The high pressure switch is factory set and is fitted with manual reset. If the pressure switch is ON, before resetting it, it is necessary to analyze the causes and solve them, Consult your installer.
- The safety valve is set depending on models. It will not operate unless the high pressure switch fails or if very unusual circumstances or a very serious false operation have taken place.
- The low pressure switch is factory set depending on models, and its automatic reset takes place when the pressure has reached the differential range.
- Working pressure switch is factory set depending on models and it is fitted with an automatic reset.
- The end defrosting thermostat is factory set at +20°C, with the minimum differential value.
- The oil pressure switch is factory set at 0,7 bar and is fitted with manual reset.

Special models destined for fruit (or any other goods that require high humidity) are fitted with a factory set cyclic relay to start up fans every 30 minutes during 20 seconds, when the thermostat stops the unit.

REMARK: All the above mentioned figures can change depending on the models and/or the running special conditions of each unit.

7.- SERVICE AND MAINTENANCE

7.1. PERIODICAL OPERATIONS

- Check the electric panel state, clean it and check also the contactors state, replacing them if necessary.
- Check visually that there is not too much ice inside the evaporator. If not, increase the frequency of the defrostings, if you consider that the set defrosting numbers are not correct.
- Check the compressor oil level. Verify in operation whether it recovers oil circulating through the installation, in order to avoid adding more oil than necessary.
- Check the refrigerant charge and the system humidity, looking at sight glass (do not open the Cold-Pak doors). The sight glass should not show any bubbles when the unit is in continuous running, once the running temperature has been reached. The sight glass colour indicator will also show the suitable colour, that indicates the lack of humidity.
- Check the tray and drain heaters consumption.
- Check that there is not any obstacle or dust inside the condenser.

There are two possibilities to clean the condenser:

1. If there is adherent dust on the fins, clean them with a dried brush through the condenser suction part (underneath the unit), with the unit in operation (Condenser fans ON), in order to allow the dust to go out through the fans.
In order to obtain a perfect cleaning of the fins, blow away by a compressed-air flow (if available) through the interior part of the condensing module, with the fans OFF. The air flow is pointed to the fins from the interior part of the condensing model, in order to allow the dust to go out through the bottom part.
2. If the dust is fixed to the fins, and the instructions of point 1 are not enough, do the cleaning of the fins from top to bottom, with the help of compressed air-water or even, with some kind of cleaning product which should not damage the copper (of the tubes) or the aluminium (of the fins).

7.2. GAS AND OIL CHARGE AND REPLACEMENT OF ELEMENTS

Pressure test

Required elements:

- Refrigerant bottle
- Dry nitrogen bottle
- Tubes and fittings
- Nitrogen pressure reducer
- Leak detector

Since the units have been factory tested, it is not necessary to submit them to pressure test.

If circuits have to be manipulated, it is necessary to carry out watertight tests, with HP and LP connected. Then, the pressure is increased up to 1 bar with dry nitrogen. This pressure is lower than the tared pressure of the safety valve.

Once the test pressure has been obtained, close the pressure reducer valve and the unit's valve and do the watertight test.

In case of leak, it is necessary to indicate it, in order to repair it. After repairing it, test it again. Repeat this process until no leak is detected. If it is possible, keep the test pressure during the night. If there are no great variations of temperature, a tight system will not show practically any pressure difference, when it is controlled the following day. In case of notifying a pressure difference between the beginning and the end of the pressure test, please check that this difference has not been caused by an ambient temperature variation, before considering a pressure leak.

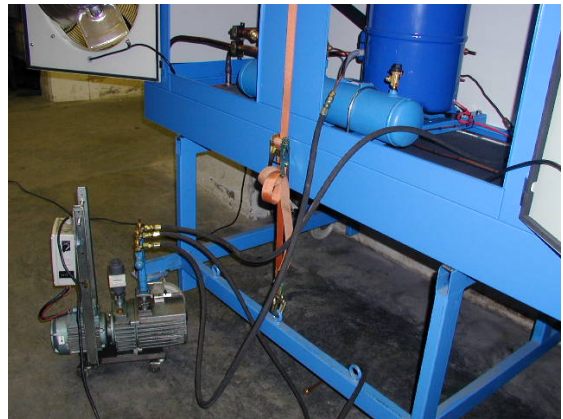
Dehydration

1) General remarks:

Humidity is, without any doubt, the greatest problem that can arise in the system. This can result in freezing inside the thermostatic expansion valve, sludge and oil decomposition, "coppering", and so on. The most practical method of dehydration is to make vacuum that has to be made whenever the system is opened to the atmosphere.

2) Required elements

- A vacuum pump that allows to reduce the pressure, at least, to 0,5mm mercury. If the compressor works as vacuum pump, the requested performance will not be achieved and in addition, the compressor can be seriously damaged.
- A vacuum pressure gauge with the correct readings should be used.
- Dry nitrogen with pressure reducer.



3) Preparation

Let free the dried nitrogen that has been used for the tight test.

4) Execution

- A triple vacuum is recommended.
- Check that in the area where the vacuum is going to take place, all valves are closed. Then start up the pump.
- Keep the pressure gauge valve closed, except when a reading is being taken; in this case, keep the valve open for at least 3 minutes before taking readings, so that these will be more accurate.
- Close the valve immediately after reading the pressure. Make the first vacuum up to a pressure of 1,5 mm mercury, that means, 1.500 micron and stop the pump.
- Then, in the farthest point or points from vacuum pump connection, introduce gradually dried nitrogen into the system thus breaking vacuum. This operation has to be carried out gradually, because otherwise pump can be damaged if pressure is suddenly modified. "Spit" or cause a soft "pop", by releasing pump connection to compressor or unit and allowing dry nitrogen or refrigerant to drain system. This drain with nitrogen will remove remaining humidity.
- Close the valve of the nitrogen pressure reducer or refrigerant bottle. Release the bottle and make the vacuum again at 1,5mm mercury.
- Let the system stopped for one tour. Then, check again with the pressure gauge. If the reading is higher than 2, make vacuum again at 1,5 and verify it again one hour later. If after two additional tests, the reading in the vacuum pressure gauge is too high, repair leaks as necessary.
- Make again vacuum in the system up to 0,5mm mercury and if the system works correctly it will be ready to be charged with refrigerant. Take out the pump and the vacuum pressure gauge.

Gas charge

Check the sight glass with the room at the usual running temperature (unit's doors must be closed). If it is necessary to add refrigerant, proceed as follows:

- Weigh the refrigerant bottle and connect it to the charging valve.
- Drain air from the piping and put the bottle upside down (if it is not fitted with a probe) so that the liquid can enter when opening charging valve.
- Close the receiver liquid outlet valve and make the refrigerant charge.
- Check from time to time the refrigerant charge: close the charging valve and open fully the liquid valve, then start up the compressor. Check the liquid sight glass once the system has reached its balance and with the room at its usual running temperature.

We consider that the refrigeration unit is charged, when no bubbles appear in sight glass with the unit's doors closed. Then do not add more refrigerant, because a too high refrigerant quantity can cause a greater condensation pressure, a greater power consumption and the possibility of flooding the compressor with refrigerant.

- Weigh the refrigerant bottle after loading the system, to obtain the exact quantity of used freon.

How to add oil into compressor

The compressor is correctly charged with oil when it is seen through the crankcase sight glass; otherwise, charge it until it appears in sight glass.

To charge oil:

- With the compressor in operation, put the switch in STOP position and wait until the unit stops by low pressure. Then disconnect the general switch.
- Close the refrigerant liquid outlet valve and the compressor suction and discharge valve.
- Connect the compressor oil charge pump to the compressor oil supply to reach the suitable oil level.
- Close the compressor oil charge valve, take out the charge valve and tighten the cap with the gasket.
- Open the refrigerant liquid outlet valve, the compressor suction and discharge valve and switch on again the switches.

REMARK: The oil charge pump is usually manual.

Replacement of the refrigeration circuit elements

Replacement of the thermostatic expansion valve, liquid solenoid, sight glass and dehydrater filter.

- Close the liquid outlet valve.
- Switch off the panel switch.
- Close the compressor suction and discharge valve.
- Replace the exact element.
- Connect the general switch.
- Check leaks.
- Make vacuum.
- Add refrigerant, if it is necessary.

8.- SUGGESTED SPARE PARTS LIST

- Compressor:
 - If it is hermetic: complete compressor.
 - If it is semi-hermetic: breaking up, depending on the failure.
- Liquid solenoid (Coil and interior Kit).
- Dryer filter or dehydraters charges.
- Defrosting solenoid (Coil and interior kit).
- Thermostatic valve (Head and hole).
- Oil pressure switch.
- Defrosting heater
- Condenser fan.
- Evaporator fan.
- Bar heating element.
- Silicone heating element.
- Running high pressure switch.
- Low pressure switch.
- Security high pressure switch
- Ambient thermostat.
- Defrosting thermostat.
- Electric panel:
 - Contactors
 - Relays
 - Defrosting watches
 - Fuses

REMARK: As this list is common for all the Cold-Pak, please do not consider spare parts that have not this application.

9.- REMOTE CONTROL

The standard unit is fitted with 5 leds and the ON/OFF switch are located at the condensing unit door.

- POWER: it indicates that the unit receives voltage.
- FAILURE: it indicates that the unit is stopped because there is a failure.
- REFRIGERATION: it indicates that the unit is running in the refrigeration phase.
- DEFROSTING: it indicates that the unit is running in defrosting phase.
- READY: it indicates that the unit is ON, waiting the thermostat signal.



A remote control fitted with an incorporated electronic thermostat without leds or switch at the door, is also available under requirement. There are several remote control models:



A-61: with incorporated electronic thermostat and leds kit.

A-62: suitable for the sequential starting up of 2 units (there are remote controls that can control up to 6 units: A-66)



- CP-100:

It consists on a control plate, located in the electric panel of each Cold-Pak and a common remote control box. It manages to control up to 4 Cold-Pak units with one single remote control. This electronic controller can control and display.

POSSIBILITIES OF THE CP-100 REMOTE CONTROL

- COLD: the cold action and the VSL o AUX 1 relay are activated at the same time, depending on the configuration parameters.
- EVAPORATOR FAN: it confirms if the fan is running or not.
- DEFROSTING: as long as the defrosting lasts, the led will show a permanent light. When the defrosting is ready to start up, the light blinks, because another control's defrosting process has already started.
- AUXILIAR ACTION: it lights, when there is a cold or humidity control outlet, depending on the setting-up.
- FAILURE: the led has got a fix light, when there is a serious failure that activates the alarm (relay OK is off). When there is a failure that does not activate the alarm, this led will blink, (relay OK is ON).

10.- DESTRUCTION OF PACKAGING

Our units packaging is made of wood and plastic. These mentioned materials should return to the Environment according to the local norms in force.

11.- MACHINE'S DISMANTLING

In case of repairs that require the dismantling of parts of the unit with refrigerant, this one must be introduced in a bottle. If the refrigerant is in a good state, then it will be reused, otherwise it will be neutralized by authorized firms. NEVER THROW REFRIGERANT TO THE ATMOSPHERE.

If the machine must be scrapped (for any reason), each component must be separated in order to eliminate them properly.

Refrigerant and oil must be fully reclaimed and eliminated by authorized staff.

The electric components, that are in a good state, will be dismantled to be used again, or, if it is possible, they must be revised and recycled.

Metallic parts of the machine must be gathered depending on the material type, in order to be melted and recycled.

12.- FAILURES CHART

Failures	Possible causes	Solutions
The compressor does not start up	The electric panel does not have power. supply	Switch on switches. Check general fuses. Check the power supply line.
	The compressor contactor does not have Power supply.	Check compressor fuses.
	Disconnected oil pressure switch.	Reset it. If there is a new disconnection, please check: . Oil level. . Obstruction of the evaporator by ice. . Pressure of the lubrication pump. . Crankcase heater.
	Fans thermistors Damaged (condenser and evaporator).	Check and replace the fan, if it is necessary.
	Disconnected compressor thermal relay.	Check fuses, consumption and relay adjustment.
	Disconnected high pressure switch.	Reset. Then analyze the causes Check that the condenser is in a good state and clean it, if necessary. Repair the fans if they are damaged. Check the fans turn sense.
	Disconnected low pressure switch.	Check the room thermostat, Solenoid coil and sight glass (humidity). Look at the refrigerant charge.
	The compressor is seized up. Burnt motor	Repair it. Repair it. Clean circuits. Change filters.
The compressor starts up And stops each at very short Intervals.	Switch off thermistors.	Check the power supply and the consumption of the the compressor and fans.
	Disconnect the low pressure switch. Lack of refrigerant. Ice inside the evaporator. Obstruction of the liquid filter.	Check the liquid filter state (if the filter is blocked, the outlet refrigerant temperature is lower than inlet refrigerant temperature). Replace it.. Check the refrigerant charge and the sight glass (humidity). Check the operation of the thermostatic expansion valve. It can Seize up or there can be a partial bulb discharge.
	Two phases compressor.	Replace the fuse. Check contactors. Check power supply.
The compressor refrigerates but does not stop.	The thermostat does not disconnect.	Check it.
	Liquid solenoid valve opened.	Dismantle it and clean it.
The compressor stops but does not refrigerate enough or even at all.	Partial obstruction of the liquid filter.	Replace it.
	Partial refrigerant charge.	Look at liquid sight glass. Add liquid and check leaks.
	Partial obstruction of the thermostatic valve.	Clean it and check the sight glass (humidity).
	Obstruction of the suction filter.	Clean it (Semi-hermetic compressor)
	Too much frost inside the evaporator.	Defrosting (inadequate defrosting)
	Low performance of the compressor.	Check valves plate and leaks through the segments .
	The defrosting solenoid valve does not close.	Dismantle it and clean it.
The evaporator does not Defrost.	Damaged timer.	Repair it or replace it.
	The tray heaters does not work.	Check fuses and heaters.
	Obstruction of the drain pipe.	Clean it.
	Defrosting thermostat has been damaged.	Repair it or replace it.

**EQUIPOS
FABRICADOS POR
EFC**

Grupos de frío MONOBLOC
Grupos de frío SPLIT
Secaderos de Jamones
Secaderos de Embutidos
Secaderos de Quesos
Unidades de Condensación
Túneles de Congelación
Unidades de Descongelación
Centrales Frigoríficas
Madurador de Bananas
Generador de hielo en escamas
Grupos de frío gama comercial

**PRODUCTS
MADE BY
EFC**

MONOBLOC cold units
SPLIT cold units
Ham Dryers
Sausage Dryers
Cheese Dryers
Condensing Units
Freezing Tunnels
Thaw Units
Multicompressor Units
Banana Ripening Units
Flake Ice Machines
Comercial Cold Units

**EQUIPEMENTS
PRODUITS PAR
EFC**

Groupes MONOBLOC
Groupes bibloc et SPLIT
Séchoirs Jambon
Séchoirs Salaisons
Séchoirs Fromage
Groupes de Condensation
Tunnels de Congélation
Unités de Descongélation
Centrales Frigorifiques
Unités de Murissage de Bananas
Générateur de glace écaille
Groupes gamme commerciale



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