User & Installation Manual

intarblock R290

MCV-LD

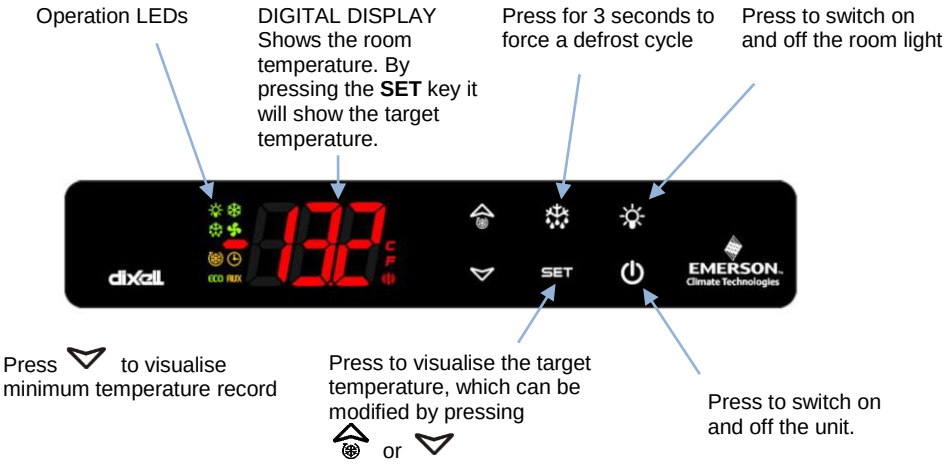
BCV-LD

Doc. MCV / BCV - LD 1.0
June 2018

I. Quick Start Guide

Congratulations! You have acquired a high quality cooling unit. Your INTARBLOCK unit is specially designed to equip positive temperature cold rooms in a range from -5ºC (23ºF) to +10ºC (50ºF), and from -15ºC (5ºF) to -25ºC (13ºF), depending on the model.

Once installed, your INTARCON unit can be fully operated from the remote keyboard. The remote keyboard has the following functions and characteristics:



The unit has four operation modes:

Refrigeration mode. - This is the normal operation mode. The display shows the room temperature, and by pressing the **SET** key the target temperature is shown. During this operation the electronic control keeps a record of the maximum and minimum room temperature ever measured, which can be consulted at any time.

Defrost mode. – Periodically, your unit will switch to the defrost mode to eliminate the frost that has formed on the evaporator. You can also force a defrost cycle by pressing the corresponding key.

Fast cooling mode. - If you like, you can activate this operation mode during the start-up of the cold room. The unit will run continuously for the preset time in parameter "**CCt**", even beyond the target temperature.

Energy saving mode.- If you like, you can activate or deactivate this operation mode to save energy during the night or when the room will stay closed for a long time. By activating this function the target temperature is increased according to preset value in parameter "**HES**". This mode can only be activated with a set digital input. Depending on the unit, it is possible that digital inputs are used and cannot be set as energy saving mode.

Basic keyboard functions.-

	To switch ON and OFF the instrument.
	To switch ON and OFF the room light.
	To visualise the maximum room temperature record In programming mode it increases the displayed value or explores the parameter list. By pressing the key for 3 seconds the fast cooling cycle starts.
	To visualise minimum room temperature record In programming mode it decreases the displayed value or explores the parameter list.
SET	To display and modify target set point; in programming mode it selects a parameter or confirm an operation. By holding it pressed for 3s when max or min temperature is displayed it will be erased.
	By holding it pressed for 3s a manual defrost cycle starts.

II. CONTENTS

1. DESCRIPTION

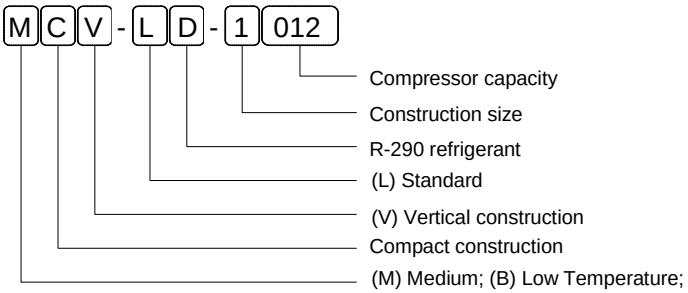
INTARBLOCK units are monoblocks refrigeration units in vertical and roof construction, fully tested and adjusted in Factory. They are assembled on a prelacquered galvanised steel shell and have been designed for indoor installation, with easily removable panels to give access to fans, refrigerant circuit and circuit board.

MCV Series is designed for positive temperature refrigeration applications from -5ºC (23ºF) to +10ºC (50ºF) and consist of 3 models to cover a cooling capacity range from 700 W to 1300 W.

BCV Series are designed for positive temperature refrigeration applications from -15ºC (5ºF) to -25ºC (-13ºF) and consist of 3 models to cover a cooling capacity range from 400 W to 800 W.

2. IDENTIFICATION

INTARBLOCK series are identified according to the following nomenclature on the product data plate.



3. OPERATION

INTARBLOCK are refrigeration machines operating under a vapour compression cycle.

Refrigeration cycle

The refrigeration cycle uses a phase change refrigerant fluid in a closed circuit, with the following four steps:

Expansion: Refrigerant expansion takes place in the capillary tube between high and low pressure sections. During the expansion, liquid refrigerant cools down to the evaporating temperature.

Evaporation: In the evaporator the refrigerant evaporates under constant temperature and pressure absorbing heat from the cold room. Once the refrigerant vapour has been fully evaporated, it is slightly overheated beyond the evaporation temperature.

Compression: The resultant refrigerant vapour is suctioned from the evaporator by the compressor through the suction line. The compressor compresses the refrigerant vapour up to high pressure and temperature.

Condensation: The hot high pressure gas is condensed in the condenser at a constant temperature and pressure, rejecting the latent evaporation heat to the ambient exterior. Once the refrigerant has been fully condensed, the liquid refrigerant is slightly cooled (subcooling) with respect to the condensation temperature.

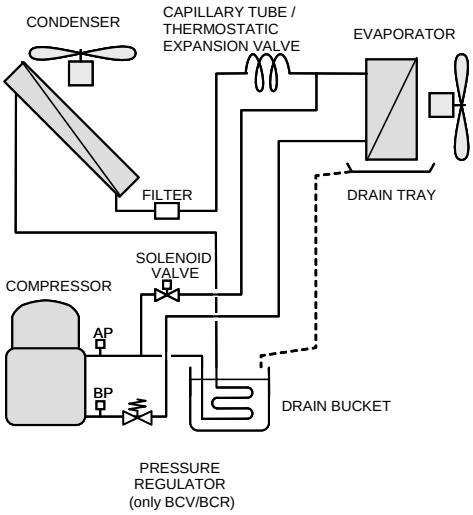
High pressure liquid refrigerant is then directed to the capillary tube or thermostatic expansion valve, depending on the model, and therefore closing the circuit.

Defrost cycle

Because of the evaporator temperature can be below 0ºC (32ºF), frost will inevitably deposit on the evaporator surface through the condensation and freezing of the water vapour contained in the interior ambient air. To prevent the air flow from being obstructed and the consequently loss of performance, the instrument switches automatically to the defrost operation mode every given period of time.

During the defrost cycle, by opening the solenoid valve, part of the hot gas from the compressor discharge is injected into the evaporator. The evaporator temperature is rapidly increased in order to melt the frost on it while the interior fan is off.

The defrost water is collected in the condensate drain tray and directed to the drain bucket. This drain bucket contains a hot gas coil to progressively evaporate the drain water to the outer ambient.



4. OPERATION LIMITS

INTARBLOCK units are designed for continuous operation within the following temperature limits:

	Cold Room Temperature		Ambient Temperature	
	Max	**Min**	**Max**	**Min**
MCV	+10 ºC (50ºF)	-5 ºC (23ºF)	+45 ºC (113ºF)	+15 ºC (59ºF)
BCV	-15 ºC (5ºF)	-25 ºC (-13ºF)	+45 ºC (113ºF)	+15 ºC (59ºF)

The units should work beyond these limits only for short periods of time or during the start-up.

5. COMPOSITION

MCV / BCV units are built with a self-contained construction. The components are assembled on a steel structure and covered with a prelacquered galvanised steel shell. It consists of:

Refrigerant circuit

- Hermetic reciprocating compressor with internal protection, assembled on silent blocks.
- R290 refrigerant load below 150 g.
- HP pressure switches.
- HP and LP load nipples.
- Thermostatic expansion valve.
- Anti-acid dehydrating filter.
- Evaporation coil in copper tubes and aluminium fins with stainless steel drain tray.
- Condensation coil in copper tubes and aluminium fins.
- Solenoid valve for the hot gas by-pass.
- Water drain bucket including hot gas coil for the automatic evaporation of drain water.

Air circuits

- Electronic axial fans with single phase motor, with internal protection. Free from sparks. Dynamically equilibrated blades with protection grille.

Electric board

- Electric control XW60LH with the following elements and features:
  - microprocessor,
  - compressor relay,
  - defrost relay,
  - evaporator fan relay,
  - cold room light relay,
  - door switch digital input,
  - HP pressure switch input,

- interior return air temperature NTC probe,
- defrost NTC probe,
- condenser NTC probe,
- 'HotKey' connection for XJ485 (optional) required for the communication ModBus RS485.

- Compressor permanent condenser in MCV-LD-1012/1017 units.
- Compressor start relay and condenser.
- Ground connection for compressor and motor fans.
- Cold room LED light.
- Door microswitch connection.
- Door heating cable (only for BCV models).
- Draining pipe heating cable (only for BCV models).

6. TESTS

Every INTARBLOCK units have been previously checked and tested in Factory according to the following test protocol:

- Helium leak-proof test. A leak-proof certificate is supplied upon request.
- Refrigeration load.
- Operation test for refrigeration and defrost modes under nominal operating conditions.
- Safety devices checking – verification of their correct installation, and conformity with regulations and function of pressure limitors.

7. SAFETY DEVICES

INTARBLOCK units feature the following safety devices:

- Protection against excessive refrigerant pressure in the high pressure section of the refrigeration circuit.
- Thermal protection with automatic restart for compressor and fans to protect motor wirings from overloads.
- Common ground connections.

8. MCV SERIES TECHNICAL FEATURES

MCV series		0009	1012	1017
Cooling capacity	Cooling capacity (1) (W)	695	1060	1320
	Absorbed power (2) (W)	390	510	710
	COP performance	1,78	2,07	1,86
Installed power (3) (W)		468	638	806
Dimensions LxWxH (mm)		420x525x803	420x656x803	420x656x803
Weight (kg)		38	56	62
Condenser fan	Type	Axial		
	Power (W) @ r.p.m	23W @ 1300	23W @ 1300	23W @ 1300
Evaporator fan	Nominal air flow rate (m3/h)	300	500	500
	Type	Axial		
	Power (W) @ r.p.m	15 @1300	23W @ 1300	23W @ 1300
Compressor	Type	Hermetic reciprocating		
	Swept volume (m3/h)	1,52	2,10	2,92
	Nominal discharge pressure (bar rel.)	14,36		
	Nominal suction pressure (bar rel.)	2,44		
	Power (CV)	1/3	1/2	3/4
High pressure switch	Brand	Emerson	Emerson	Emerson
	Model	PS4-W1 - 808300	PS4-W1 - 808300	PS4-W1 - 808300
	Cut out (bar rel.)	26	26	26
Max. absorbed intensity (4) (A)	230 V / I ph / 50 Hz	3,11	4,24	4,44
Start-up intensity (A)	230 V / I ph / 50 Hz	20,21	21,24	22,24
Refrigerant	Typo	R-290 / Group A3 / GWP-100:3		
Sound pressure level db(A)		29	29	29

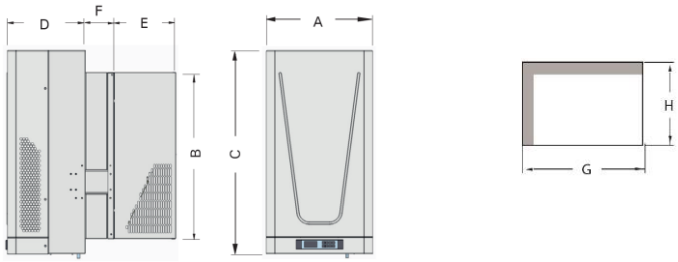
(1) Cooling capacity under cold room temperature of 0 ºC (32 ºF) and ambient temperature of 35 ºC (95 ºF).
(2) Total absorbed power by compressor and fans under nominal condition (axial version).
(3) As defined by RD138/2011 "Reglamento de seguridad para instalaciones frigoríficas y sus I.T. complementarias". IF-01.
(4) Maximum absorbed current even beyond compressor operation limits (axial version).

9. BCV SERIES TECHNICAL FEATURES

BCV series		0014	1017	1028
Cooling capacity	Cooling capacity (1) (W)	460	685	880
	Absorbed power (2) (W)	350	440	630
	COP performance	1,31	1,55	1,39
Installed power (3) (W)		539	687	1151
Dimensions LxWxH (mm)		420x525x803	420x656x803	420x656x803
Weight (kg)		38	57	64
Condenser fan	Type	Axial		
	Power (W) @ r.p.m	23W @ 1300	23W @ 1300	23W @ 1300
Evaporator fan	Nominal air flow (m3/h)	300	500	500
	Type	Axial		
	Power (W) @ r.p.m	15 @1300	23W @ 1300	23W @ 1300
Compressor	Type	Hermetic reciprocating		
	Swept volume (m3/h)	2,35	2,92	4,83
	Nominal discharge pressure (bar rel.)	14,36		
	Nominal suction discharge (bar rel.)	1,02		
	Power (CV)	3/4	3/4	1 1/4
High pressure switch	Brand	Emerson	Emerson	Emerson
	Model	PS4-W1 - 808300	PS4-W1 - 808300	PS4-W1 - 808300
	Cut out (bar rel.)	26	26	26
Max. absorbed intensity. (4) (A)	230 V / I ph / 50 Hz	2,93	3,62	4,97
Starting-up intensity (A)	230 V / I ph / 50 Hz	17,84	21,37	33,37
Refrigerant	Type	R-290 / Group A3 / GWP-100:3		
Sound pressure level db(A)		29	29	31

(1) Cooling capacity under cold room temperature -20 ºC (-4 ºF) and ambient temperature of 35 ºC (95 ºF).
(2) Total absorbed power by compressor and fans under nominal condition (axial version).
(3) As defined by RD138/2011 “Reglamento de seguridad para instalaciones frigoríficas y sus I.T. complementarias”. IF-01.
(4) Maximum absorbed current even beyond compressor operation limits (axial version).

10. DIMENSIONS



Dimensions (mm)	A	B	C	D	E	F	G	H
0 series	420	595	803	238	207	80	400	600
1 series	420	657	803	307	269	80	400	660

11. ELECTRICAL CONNECTIONS

Before connecting the unit to the electrical supply, make sure that the circuit board is in good condition and please follow the following recommendations:

- Consult the electrical diagram supplied by manufacturer.
- Single phase units (230V/I/50Hz) have a three-wire supply, and, three phase units have a 5 wire supply, the ground wire always being green-yellow colour.
- Always install the appropriate protection device, magnetothermal and differential, on the power supply line. In case that more than one unit is installed, always provide separate protection devices for each of the installed units.
- Electrical wires section in power supply wiring is to be calculated according to the electrical data provided by manufacturer data plate, power supply wires length, wires type, etc.; always according to electrical regulation.
- Install the door microswitch supplied cable.

12. EMERGENCY SYSTEM

The electronic control of the units incorporates systems for emergency control and alarm for the following causes:

- Probe failure.
- High and low room temperature.
- High refrigerant pressure.
- Electronic control failure.
- Opened door.

Once an error is detected, the unit switches to emergency operation mode.

13. SOUND PRESSURE LEVEL

The correct installation of the unit should respect adecuate acoustic levels. To determine these adequate levels, the ambient exterior environment should be considered for the acoustic radiation; the type of building for the noise transmitted and the rest of the solid elements should be considered for the transmission of vibrations. If necessary, contract an acoustic study by a specialized technician.

INTARBLOCK units include low noise components. The technical features chart indicates sound pressure levels calculated at 10 m from the source in open field distribution (directivity = 1).

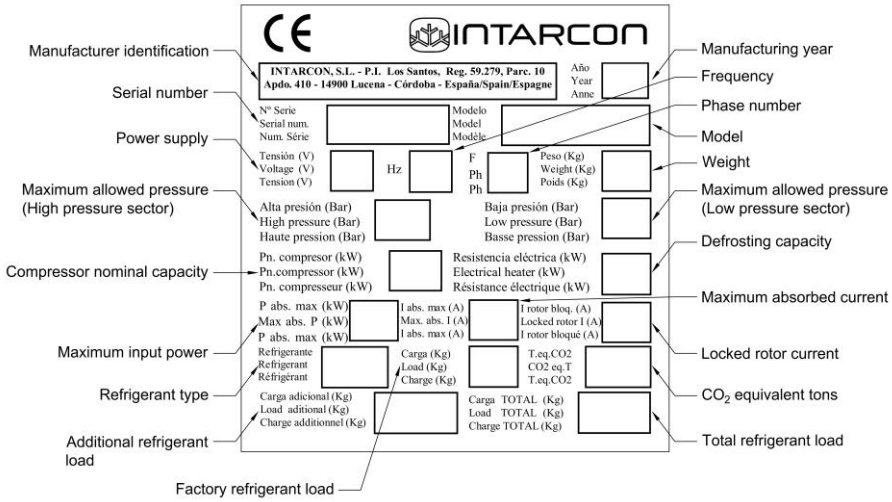
14. TRANSPORT

Handle the unit with care to prevent damages during its transport. Please follow the following instructions:

- Always handle the unit in vertical position.
- Never pile the units during transport.
- Never pile units during storage.
- Use a forklift or a pallet jack to handle the unit.
- Keep the unit on its pallet until its final destination.

15. DATA PLATE

All units are identified with the following data plate.



Note: In all communications with the manufacturer please indicate the serial number.

16. SAFETY RECOMMENDATIONS

The start-up of the unit and its repair must be carried out by qualified personnel.
To minimise the risk of accidents during the installation, start up or maintenance tasks, the following instructions must be followed.

It is mandatory to observe the recommendations and instructions as shown in manufacturer manuals, plates and specific instructions. It is also mandatory to observe laws and regulations.

Before operating on the unit, verify that the general supply is disconnected to avoid electrical shocks.

Refrigerant leaks may cause:

- Suffocation due to oxygen displacement in the atmosphere, narcotic effect or heart arrhythmia.

Ensure that the working area is properly ventilated.

- Eye irritations or burns may be caused if refrigerant comes into contact with the skin.

Use a safety mask and a pair of gloves. Avoid any contact between the refrigerant and the skin and take care with sharp corners and edges of the unit.

In case of accident due to refrigerant inhalation follow the following instructions:

- Move the victim where they can breathe fresh air. The victim should lay on their back or their shoulder.
- Call emergency services if needed.

In case of eye injures due to refrigerant splatters:

- Never rub your eyes. In case contact lenses are used, you must take them out.
- Eyes should be kept open and washed with plenty of water.
- The victim should be taken to an emergency medical service

In case of burns due to refrigerant contact with the skin

- Wash the affected part with plenty of running water and take clothes off the area while water is applied.
- Never cover the affected parts with cloth, bandages or oil.

Safety recommendations for flammable refrigerants

The units are in conformity with the requirements for refrigeration units with commercial use according to EN 60335-2-89:2010. Specifically, the R290 units have a flammable charge below 150 g; therefore, it is highly unlikely to form an explosive atmosphere.

When you work with flammable refrigerants you must follow the following preventive measures:

- Ensure that the working area is properly ventilated and have no source of ignition within 3 m.
- You should also have a fire extinguisher to hand. This should either be a dry powder type with a capacity of at least 2 kg, or an equivalent type.
- Before manipulating the electrical connections verify that the power supply is disconnected.
- Refrigerant recovery machines should not be used unless they are authorised for flammable refrigerants.
- Use in place of a recovery machine a standard vacuum pumps can be safely used ensuring the on / off switch is the only source of ignition. If this is the case, move the switch to the on position and plug the pump into a socket outside the 3 m zone and control it from this socket, also locate the vacuum pump in a well-ventilated area or outside.
- HC loads below 150 g can be unloaded to the ambient air.

In the case of refrigerant recovery:

- Always use a recovery unit authorised for HC.
- Vacuum must be made in the cylinder to evacuate the air.
- Do not mix flammable refrigerants with other types of refrigerants.
- When recovering hydrocarbon refrigerants, do not fill the recovery cylinders with more than 45% of the HFC safe fill weight.
- Label the recovery cylinder to show it contains a flammable refrigerant.

Before brazing or un-brazing the refrigerant circuit:

- Continuously monitor the area with a flammable refrigerant detector.
- Recover or evacuate the flammable refrigerant from the system, making sure you are recovering all the refrigerant from the entire system and connecting the pump the corresponding time in order to drain the system.
- Before brazing, fill the system with dry nitrogen free of oxygen to a pressure of 0.1 bar g.
- Before brazing, cmake sure that there is at least one point of access to the system for exterior air and purge with dry nitrogen

When charging the system with refrigerant:

- If charging lines are not unloaded, purge them carefully (by opening then closing the cylinder valve before purging).
- Do not over charge the system, always use the proper charge indicated by the manufacturer, using a scale to help.

17. INSTALLATION AND MOUNTING

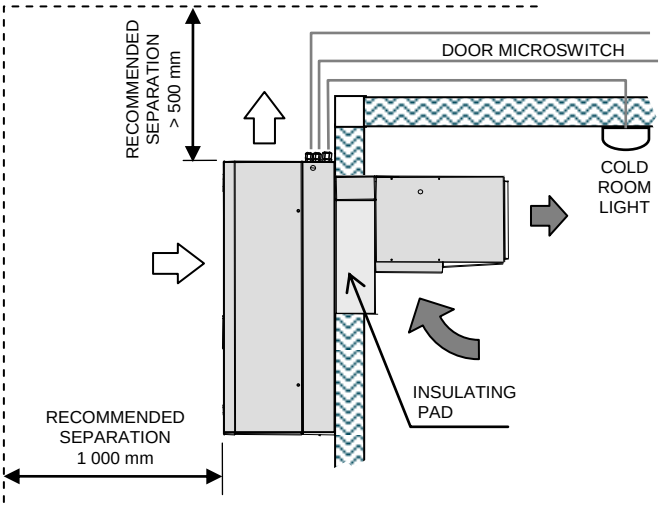
The final placement of the unit will affect the good performance of the unit. For an optimal performance, please follow the following recommendations:

- Upon reception of you unit, please verify that it is free from any transport damage. Otherwise indicate the perceived damages on the receipt.

- Install the unit in a room with good ventilation and away from heat sources.
- Keep the surroundings of the unit clean to facilitate the air intake and exhaust, and make sure the air does not recirculate.

INTARBLOCK units are designed for wall mounting directly onto the cold room panel. To do so, cut out the indicated frame on the wall panel, depending on the type of mounting:

- Plug in mounting.- on an existing cold room or a new one:
  1. Cut out the indicated frame on the wall panel.
  2. Place the unit into the wall frame with the supplied insulated pad.



  3. Fix the unit to the wall with through bolts.

18. START-UP

Before starting up the unit, please check that the unit is properly fixed on its supports and the electrical connections are properly installed. If you have worked on the unit, take care not to forget tools or any objects inside, that there is no gas leak and that assembly connections are done properly.

Before starting-up or after a stand-by periods, activating the crankcase heater (when included) twelve hours in advance is recommended. Otherwise, the compressor must be warmed up in a different way to ensure the refrigerant-oil separation. This operation is important, especially when starting-up in low ambient temperatures.

Connect the electrical supply and switch on the unit with the cold room door closed. The display will show the room temperature and after the time as specified for **OdS** parameter the compressor will start.

Set the cold room temperature set point and wait until the cold room temperature reaches the set point. The high temperature alarm will not be activated until the time of **dAO** parameter is elapsed.

Once the target temperature is reached, initialise the record of maximum temperature as indicated in indicated in the instructions for the electronic control. You may check that auxiliary devices work properly:

- Room light. - turn on and off the room light.
- Door switch. - check that the compressor and fans stop when opening the door.

Force a manual defrost cycle to check this operation mode. Make sure that the evaporation coil gets clean and that the unit stays within the normal operating parameters without activating any safety device.

Depending on the application, you may need to modify defrost parameters, such as time period between two consecutive defrost cycles, defrost cycle duration or final temperature. To do so, pay attention to the defrost cycles during normal operation.

Finally you can easily test the proper operation of some of the safety device such as:

- Open door alarm. - By leaving the door open beyond indicated in **doA** parameter.
- High pressure switch or high temperature alarm. - By intentionally obstructing the air intake of condenser.

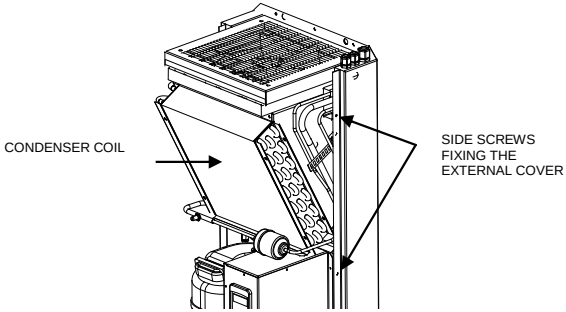
19. MAINTENANCE

INTARBLOCK units are self-contained units not requiring specialised maintenance. Nevertheless, to keep your unit in an optimal working state, we recommend to periodically carrying out the following preventive maintenance tasks.

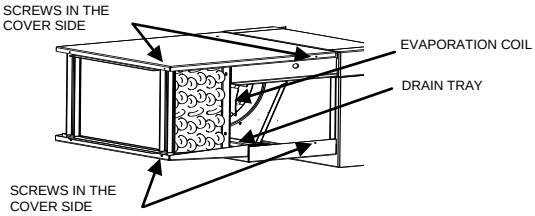
During the maintenance tasks, switch off the power supply and use gloves and glasses to avoid any possible cut and splashes.

On the whole you should do a corrosion check of metallic parts (frame, bodywork, heat exchangers, circuit board, etc.). Also check the connections, as well as a leak test of the circuits.

- External cleaning. - To keep your unit free from dust and dirtiness, simply pass a wet cloth over the cover. Do not use solvents or detergents.



- Condenser cleaning. - During normal operation, dust and dirtiness will deposit on the coil surface and will obstruct air flow. Periodically, and depending on the surroundings, the condenser should be cleaned. To do so, remove the external cover of the unit by removing the side screws. Use compressed air, blowing from inside or a vacuum cleaner to remove dirtiness on the coil. Alternatively use a brush from the outer face of the coil. Do not force the fins to avoid deformation.
- Cleaning the evaporator. - Remove any of the side covers of the evaporator block by removing front and side screws. Blow air from outside or brush on the inner side to remove the dirtiness on the coil.



The following repair tasks should only be carried out by qualified personnel.

- Replacement of any electrical part in the unit.
- Any modification of mechanical parts.
- Any operation on the refrigerant circuit.
- Any modification on the protection devices, control panel, control switches.

In addition to the maintenance tasks shown previously in this manual, the unit is affected by the norms applied to this material.

20. REFRIGERANT LOAD

INTARBLOCK units are specifically designed for the refrigerant indicated in the data plate. The use of any other refrigerant in the unit invalidates its warranty.

Any operation related to the load, removal or replacement of refrigerant must always be carried out by qualified personnel and never by the user, being mandatory the recovery of refrigerant for its reuse and/or removal, the refrigerant should be provided to an authorised waste management service.

Units must always be loaded with refrigerant in liquid phase through the liquid line nipple, in the exact quantity indicated on the data plate.

21. DISPOSAL MANAGEMENT

After the installation, dispose of the packaging and pallet in an environmentally friendly manner and according to applicable laws.

When disposing your unit or any of its parts, do so through an authorized waste management company according to laws and regulations.

22. CONTROL

The unit is managed by an circuit board and a control keyboard with the following operating modes:

Refrigeration mode

The refrigeration operation mode is driven by a thermostatic control according to the cold room temperature and the set point temperature established by the user. Thus, when the room temperature is greater than the temperature target, plus a pre-set differential, the compressor starts, and stops when the room temperature reaches the target temperature.

During this operation mode the display shows the room temperature. Target temperature can be shown by pressing the SET key and can be modified by pressing and .

To protect the compressor from successive starts, an anti-short cycle timing is built in.

Fast cooling mode

The fast freezing operation mode can be activated or deactivated by pressing key during 3 seconds. During this operation mode the compressor works continuously for a pre-set period as configured through the “CCt” parameter.

Defrost mode

After every pre-set period (fixed by parameter “**Idf**”) the unit executes a defrost cycle. The unit is pre-set on a defrost mode controlled through the inner coil temperature. In this mode, when the evaporator coil reaches a certain temperature (as predefined value through the parameter “**dtE**”), or after certain time (as predefined value through the parameter “**MdF**”). After a defrost cycle the unit stays idle for the drain time (pre-set time through the parameter “**Fdt**”) to allow the evacuation of all defrosted water.

The unit is configured to stop fans during the defrost cycle (parameter “**FnC**”).

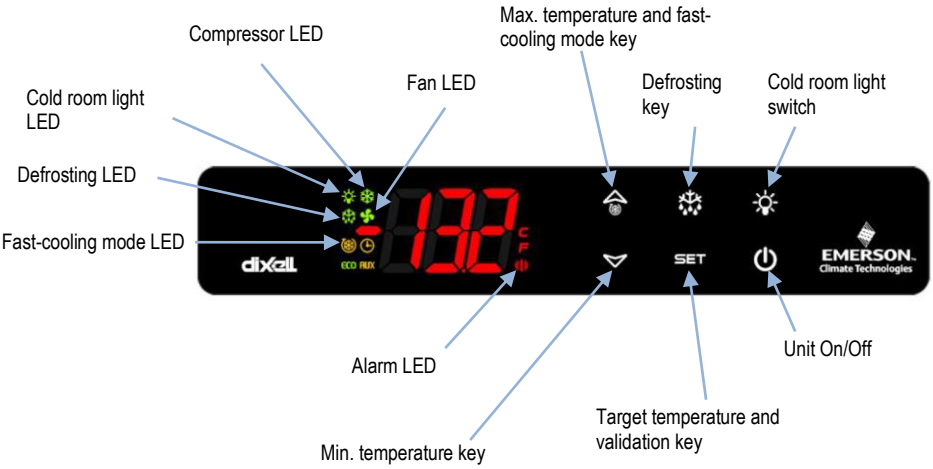
After the defrost cycle and during the beginning of the normal refrigeration mode, the evaporator fan remains stopped for the time defined by parameter “**Fnd**”.

Room light

Room light can be switched on and off through the key .

Control Keyboard

Composed of a display of 3 digits and a 6 key keyboard with LEDs to indicate operation mode and alarms.



SET	To display and modify target set point; in programming mode it selects a parameter or confirm an operation. By holding it pressed for 3 seconds, when max. or min. temperature is displayed it will be erased.
	To see max. stored temperature; in programming mode it browses the parameter codes or increases the displayed value. By holding it pressed for 3 seconds the fast freezing cycle starts.
	To see min. stored temperature; in programming mode it browses the parameter codes or decreases the displayed value.
	By holding it pressed for 3 seconds the defrosting is started.
	Switch ON and OFF the cold room light.
	Switch ON and OFF the unit.

Operation LEDs

LED		STATUS	DESCRIPTION
❄	Compressor LED	On	The compressor is running
		Flashing	Anti-short cycle safety device on. Pressure switch/es opened (pressure switch)
	Fan LED	On	The fan is running
		Flashing	Fan delay start-up after defrosting running
	Defrosting LED	On	The defrost is enabled
		Flashing	Defrost is finished. Drip time in progress
	Fast-cooling LED	On	The Fast Freezing cycle is enabled
ECO	Energy saving mode	On	Energy saving mode is enabled. Digital input set as active energy saving mode (depending on the model).
	Cold room light	On	Cold room light on

Keyboard functions

- To switch on or off the unit.-
  1. hold press key ⏻.
- To show maximum temperature record.-
  1. press ,
  2. the display will show the value together with "**Hi**",
  3. press or wait 5 seconds to restore the normal display.
- To show minimum temperature record.-
  1. press ,
  2. the display will show the value together with "**Lo**",
  3. press or wait 5 seconds to restore the normal display.
- To restart the minimum and maximum temperature record.-
  1. while maximum or minimum temperature record is shown,
  2. press the key SET until the message "**rST**" is shown.

⚠ Do not forget to restart temperature records at the first start-up of the unit

- To show and modify target temperature.-
  1. press SET and the temperature target will be shown,
  2. to modify the target temperature hold pressed SET for 2 seconds, the corresponding LED will beging to flash,
  3. press ▲ or ▼ to modify its value,
  4. to store the new value press SET or wait 10 seconds.
- To force a manual defrost cycle.-
  1. press ❄ for 2 seconds.
- To Access **Pr1** parameter list, user parameters.-
  1. press SET + ▼ simultaneously for 3 seconds,
  2. **ºC** and **ºF** LEDs will flash,
  3. the display will show the first parameter.
- To Access **Pr2** parameter list, installer parameters.-
  1. access Pr1 list pressing SET + ▼ for 3 seconds,
  2. release the keys and then push again SET + ▼ more than 7 seconds,
  3. the parameter **"Pr2"** will be displayed followed by the "**HY"** parameter.
  4. now all the parameters will be available.
- To modify a parameter.-
  1. enter the parameter list,
  2. select the parameter by pressing ▲ or ▼ and press SET to visualize its value.
  3. press ▲ or ▼ to modify its value.
  4. press SET to confirm the new value and jump to the next parameter.
  5. to exit the programming mode press SET + ▲ or wait for 15 seconds.
- To lock the keyboard.-
  1. press ▲ + ▼ for 3 seconds.
  2. the message "**POF**" will be shown and only the set point and temperature records can be consulted and to switch on and off the light,
  3. to unblock the keyboard press ▲ and ▼ for 3 seconds.

23. PARAMETER LIST

Code	Description	Range	Default		List
			MT	BT	
Hy	Set point differential.	0,1 ÷ 25,5 °C	2,0 °C		Pr1
LS	Minimum set point.	-50,0 °C ÷ SET	-5 °C	-25 °C	Pr2
US	Maximum set point.	SET ÷ 110,0 °C	10 °C	-15 °C	Pr2
PROBES					
Ot	Thermostat probe calibration.	-12,0 ÷ 12,0 °C	0	0	Pr1
P2P	Evaporator probe presence: n=no (defrosting by time) ; y=yes (defrosting by time and temperature)	n - y	y	y	Pr2
oE	Evaporator probe calibration.	-12,0 ÷ 12,0 °C	0	0	Pr2
P3P	Third probe presence: n=no; y=yes.	n - y	n	n	Pr2
O3	Third probe calibration.	-12,0 ÷ 12,0 °C	0	0	Pr2
P4P	Fourth probe presence: n=no ; y=yes	n - y	y	y	Pr2
O4	Fourth probe calibration.	-12,0 ÷ 12,0 °C	0	0	Pr2
REGULATION					
OdS	Time in which functions excluding light are not allowed to start-up.	0 ÷ 255 min	1 min		Pr2
AC	Anti-short cycle delay.	0 ÷ 30 min	4 min		Pr1
Ac1	Delay start-up of second compressor	0 ÷ 255 sec	120		
rtr	Percentage of the second and first probe for regulation.	0 ÷ 100	100		
CCt	Fast freezing mode time (minutes).	0 ÷ 23 h 50 min	0h 30 min		Pr2
CCS	Set point for continuous cycle. (fast cooling/freezing)		-2	-22	
Con	Time interval during which the compressor is working after probe default.	0 ÷ 255 min	15 min		Pr2
COF	Time interval during which the compressor is stopped due to probe default.	0 ÷ 255 min	15 min		Pr2
DISPLAY					
CF	Temperature measurement unit.	°C - °F	°C		Pr2
rES	Resolution integer/decimal point (only if CF = °C): in (integer) = 1 °C; de (decimal) = 0,1 °C.	in - de	de		Pr1
Lod	Probe shown by display.	P1, P2, P3, 1r2	P1		Pr2
rEd	Remote display: P1=Thermostat probe; P2=Evaporator probe; P3=Condenser probe; 1r2=P1-P2.	P1, P2, P3, 1r2	P1		Pr2
dLy	Display delay.		0		Pr2
dtr	Percentage of P1-P2 for visualization by display.	1 ÷ 99	50		Pr2
DEFROSTING					
tdF	Defrost type. (DO NOT MODIFY). rE=electrical heater ; rT=off time ; in=hot gas injection	rE, rT, in	in		Pr1
dFP	Probe selection for defrost.	P1, P2, P3, 1r2	P2		

Code	Description	Range	Default		List
			MT	BT	
dtE	Defrosting end temperature.	-50,0 ÷ 110,0 °C	20,0 °C		Pr1
IdF	Interval between defrosting cycles.	1 ÷ 120 h	3 h		Pr1
MdF	Maximum defrosting length.	0 ÷ 255 min	20 min	30 min	Pr1
dSd	Defrosting start delay.	0 ÷ 99 min	0 min		Pr2
dFd	Display during defrost: rt=real temperature ; it=last recorded temperature ; Set=set point ; dEF="dEF" message ; dEG="dEG" message.	rt, it,Set, dEF, dEG	it		Pr2
dAd	Delay after defrosting to display cold room temperature.	0 ÷ 255 min	15 min		Pr2
Fdt	Time from defrosting end to compressor starting-up (draining time).	0 ÷ 60 min	2 min		Pr2
SdF	Set point for Smart Defrost "IdF".	-30,0 ÷ 30,0 °C	0,0 °C		Pr2
dPO	Displayed if defrosting after starting-up.	n - y	n		Pr2
dAF	Defrost delay after fast freezing.	0 ÷ 23 h 50 min	2,0 h		Pr2
FANS					
FnC	Fans operating mode: With compressor (C) / always on (O) / during defrosting (y=yes / n=no).	C-n, C-y, O-n, O-y	C-n		Pr2
Fnd	Fans operation delay after defrosting.	0 ÷ 255 min	3 min	4 min	Pr2
FCt	Temperature differential to avoid fan short cycles.	0 ÷ 50 °C	0		
FSt	Fans stop temperature.	-50,0 ÷ 110,0 °C	10°C	0 °C	Pr2
Fon	Fans ON time with compressor OFF.	0 ÷ 15 min	0		Pr2
FoF	Fans OFF with compressor OFF.	0 ÷ 15 min	0		Pr2
FAP	Probe selection for fan management.	nP-P1-P2-P3-P4	P2		Pr2
AUXILIARY					
ACH	Kind of regulation for auxiliary relay.	CL ÷ Ht	CL		Pr2
SAA	Set point for auxiliary key.	-55,0°C ÷ 15,0°C	0		Pr2
SHy	Differential for auxiliary output.	0,1 ÷ 25,5°C	2		Pr2
ArP	Probe selection for auxiliary.	nP-P1-P2-P3-P4	nP		Pr2
Sdd	Auxiliary relay off during defrost.	yes ÷ no	no		Pr2
ALARMS					
ALP	Probe selection for temperature alarms.	nP-P1-P2-P3-P4	P1		Pr2
ALC	Temperature alarm configuration (ALU and ALL): rE=relative ; Ab= absolute.	rE - Ab	rE		Pr2
ALU	Differential related to setpoint for maximum temperature alarm.	rE: -50,0 ÷ 110,0 °C Ab: 0,0 ÷ 50,0 °C	5,0 °C		Pr1
ALL	Differential related to setpoint for minimum temperature alarm.	rE: -50,0 ÷ 110,0 °C Ab: 0,0 ÷ 50,0 °C	5,0 °C		Pr1
AFH	Temperature alarm and fan differential.	0,1 ÷ 25,5 °C	2,0 °C		Pr2
ALd	Temperature alarm delay.	0 ÷ 255 min	0 min		Pr2
dAO	Delay of temperature alarm after start-up.	0 ÷ 23 h 50 min	1 h		Pr2
AP2	Probe selection for temperature alarm of condenser.	nP-P1-P2-P3-P4	P4		
AL2	Condenser low temperature alarm.	-55,0 ÷ 150 °C	-40 °C		Pr2
Au2	Condenser high temperature alarm.	-55,0 ÷ 150 °C	65 °C		Pr2

Code	Description	Range	Default		List
			MT	BT	
Ah2	Differential for temperature condenser alarm recovery.	0,1 ÷ 25,50 °C	5 °C		Pr2
Ad2	Condenser temperature alarm exclusion at start-up.	0 ÷ 255 min	1 min		Pr2
dA2	Condenser temperature alarm exclusion at start-up.	0 ÷ 23h 50 min	1h, 30 min		Pr2
bLL	Compressor off with low temperature alarm of condenser.	yes ÷ no	no		Pr2
AC2	Compressor off with high temperature alarm of condenser.	yes ÷ no	yes		Pr2
tbA	Alarm signal silencing by pressing a key.	n - y	n		Pr2
oA3	Third relay configuration (auxiliary relay): deF=do not select; FAN=do not select; Alr=alarm; Lig=room light; AUS=Aux; onF=always on; dB= neutral zone; cP2=second compressor; dF2=do not select;	dEF-FAN-Alr-Lig-AUS-onF-dB-CP2-dF2-HES	Lig		Pr2
AOP	Alarm relay polarity.	CL - OP	OP		Pr2
DIGITAL INPUTS					
i1P	Door microswitch polarity: CL=Closed (the digital input is activated by closing the contact). OP=Opened (the digital input is activated by opening the contact).	CL - OP	OP		Pr2
i1F	Digital input configuration: PAL=pressure switch alarm.	EAL, bAL, PAL, dFr, AUS, Es, onF	PAL		Pr2
did	Time interval to calculate the number of the pressure switch activation.	0 ÷ 255 min	60		Pr2
iP2	Second digital input polarity: CL=Closed (the digital input is activated by closing the contact). OP=Opened (the digital input is activated by opening the contact).	CL - OP	OP		Pr2
i2F	Digital input 2 configuration: EAL=external alarm; bAL=serious alarm.	EAL, bAL, PAL, dor, dEF, AUS, htr, FAN, ES, onF,HdF	dor		Pr2
d2d	Second digital input alarm delay.	0 ÷ 255 min	15		Pr2
nPS	Number of activation of the pressure switch, during the “did” interval, before signalling the alarm event “PAL”.	0 ÷ 15	8		Pr2
odC	Compressor status when open door: CPr=Compressor off; Fan=Fan off; F_C=Compressor and fan off.	no, Fan, CPr, F_C	F_C		Pr2
rrd	Outputs restart after door open alarm.	n - y	y		Pr2
HES	Delta temperature during Energy Saving cycle.	-30,0 ÷ 30,0 °C	2 °C		Pr2
OTHERS					
Adr	Serial address: identifies the instrument address when connected to a ModBUS compatible monitoring system.	1 ÷ 247	1		Pr1
pbC	Type of probe.	PTC - NTC	NTC		Pr1
onF	ON/OFF key enabling: nu=disables; OFF=enabled; ES=not set	No-OFF-ES	OFF		Pr1

Configurable digital input

The unit has two digital inputs. One of them is always configured as a door switch. The other one is preset as a pressure switch (**PAL** value assigned to parameter **"I2F"**). If during the interval time set by **"did"** parameter, the pressure switch has reached the number of activation of the **"nPS"** parameter, the **"PAL"** pressure alarm message will be displayed. When the digital input is **ON** the compressor is always **OFF**.

The digital inputs polarity depends on **"I1P"** and **"I2P"** parameters: **CL** indicates the digital input is activated by closing the contact; **OP** indicates the digital input is activated by opening the contact.

External communication

By mean of the TTL connector it is possible to connect the unit through a ModBUS-RTU compatible net to a XWEB monitoring system. Same TTL input is used to download or upload parameter data from "Hot key".

Alarm signals

Message	Cause	Output
P1	Thermostat probe failure	Alarm output ON; Compressor according to parameters "Con" y "CoF"
P2	Evaporator probe failure	Alarm output ON; Other outputs unchanged
P3	Ambient probe failure	Alarm output ON; Other outputs unchanged
P4	Fourth probe failure	Alarm output ON; Other outputs unchanged
HA	Maximum temperature alarm	Alarm output ON; Other outputs unchanged
LA	Minimum temperature alarm	Alarm output ON; Other outputs unchanged
HA2	Condenser high temperature	Alarm output. It depends on the **AC2** parameter
LA2	Condenser low temperature	Alarm output. It depends on the **bLL** parameter
dA	Door switch alarm	Alarm output ON; Other outputs unchanged
EA	External alarm	Alarm output ON; Other outputs unchanged
CA	Pressure switch alarm i1F=bAL/PAL	All outputs OFF

Alarm recovery

Depending on the entered option in parameter "**tBA**", alarm signals are turned off by pressing any key or when the alarm cause ceases.

Probe alarms: "**P1**", "**P2**", "**P3**" and "**P4**" automatically stop 10 seconds after the probe restarts normal operation.

Temperature alarms "**HA**" and "**LA**" automatically stop as soon as the thermostat temperature returns to normal values or when the defrost starts.

Door switch alarm "dA" stops as soon as the door is closed.

Alarm "**CA**" recovers only by switching off and on the instrument.

24. FAULT ANALYSIS

Syptom	Cause	Solution
The unit does not turn on	a) Faulty power supply	a) Check protections, fuse, etc.
The compressor does not start up, LED compressor is on	a) Faulty power supply b) Internal klixon is open c) Compressor full of liquid	a) Check protections, fuse, etc. b) Replace c) Plug in the unit to activate crankcase heater (when included) and wait several hours before switching on. Load-unload circuit alternatively
The compressor does not start. Compressor led flashing	a) The contacts for a control instrument are opened. b) Anti-short cycle temporization does not allow the starting-up c) Door switch contact is opened	a) Check pressure value and/or check safety devices (pressure switches) by checking continuity in board connectors. Look for the cause → The HP switch is open due to a high condensation temperature → Faulty pressure switch: identify and replace b) Wait and/or check **AC** parameter. c) Check electrical continuity in board terminals.
The compressor stops some few seconds after having started. The motor produces an intermittent noise and the internal klixon is opened.	a) Low supply voltage b) Faulty starting kit (check the starting relay) c) Blocked compressor d) Seized up compressor	a) Check the power supply and look for the voltage drop. b) Replace compressor and start kit. c) Check oil level and oil return to the compressor through the suction line. If needed install oil traps or remake the suction line. d) Replace compressor.
Repetitive compressor starts and stops	a) If the compressor LED is flashing b) If the compressor LED is on (opened klixon) c) Too small regulation differential or too powerful unit for the room size, or empty room without any thermal inertia.	a) Check pressures and/or safety chain to look for the activated device. → HP pressure switch: condenser is blocked, poor ventilation, too much refrigerant, high room temperature, faulty control of condensing temperature, etc. b) Check oil level and oil return to the compressor through the suction line. If needed install oil traps or remake the suction line. c) Increase regulation differential (parameter **Hy**)

Syptom	Cause	Solution
The unit runs but the room temperature does not goes down	a) Faulty room temperature probe b) Too often defrost cycles c) Too small unit for the room size d) Insufficient air-flow e) The condenser is dirty or obstructed	a) Check the probe value and calibrate through parameters, check probe connections, or replace probe and/or adjust **Ot** parameter. b) Check defrost parameters c) Recalculate the necessary power d) Check air flow (rate, reflow, outlets) e) Clean it
The unit froze the product, even in case of positive temperature set point	a) Faulty room temperature	a) Check wiring and probe value and calibrate through parameters, replace probe and/or adjust **Ot** parameter.
The unit works but loses too much temperature before restarting	a) Regulation differential (parameter **Hy**) too high	a) Decrease regulation differential (parameter **Hy**) by 2 ºC.
The evaporator gets too much frost and the drain tray overflows	a) Too low evaporation pressure b) Blocked drain-pipe c) Cold room leak-proof fault d) The door is opened too often, or there is too much humidity	a) Check pressure and find out the reason b) Check draining pipe heater (for LT models) and replace or connect the heater to continuous supply, set higher slope. Verify the heater is placed along the draining-pipe (for LT models) c) Check continuity of steam barrier and seal the joints. Check door leak-proof. d) Increase defrosting frequency.
Too high condensation pressure (HP pressure switch activates) Condenser alarm **HA2** and/or alarm **CA**	a) Insufficient air flow or air reflow in condenser b) Faulty condenser fan c) Too high room temperature d) Too dirty and obstructed condenser e) Excess of refrigerant load f) Air inside refrigerant circuit	a) Check air flow (rate, reflow, outlets) b) Repair or replace c) Check target temperature d) Clean condenser and air intakes e) Check and replace refrigerant load f) Evacuate and replace refrigerant
Too low evaporation pressure Evaporator blocked by ice	a) Insufficient airflow in evaporator b) Faulty evaporator fan c) Evaporator is always iced d) Frozen drain pipe e) Obstructed refrigerant filter (different inlet and outlet temperatures) f) Lack of refrigerant g) Too low condensation pressure h) Faulty expansion valve	a) Clean air intakes b) Repair or replace c) Check defrost and defrost temperature. Increase defrost frequency d) Check drain heater and replace if necessary (for low temperature units) e) Change refrigerant filter f) Repair leakage, replace refrigerant load g) Too low ambient temperature, too high airflow rate, check and adjust condensation parameters (only for Split units) or replace the unit h) Check possible humidity inside the circuit
Evaporator fan does not work, blocked evaporator (frost)	a) LED ON and power in board connectors → faulty electrical supply connection or faulty motor fan b) LED OFF →wrong Pb2 probe value → faulty probe or wrong probe wiring	a) Check electrical connection or change motor fan b) Check probe wiring or replace probe

Syptom	Cause	Solution
Noisy compressor	a) Loose compressor b) Low oil level c) Faulty compressor	a) Check silentblock screws b) Add oil to the recommended level c) Replace
Defrost unit does not work	a) Faulty evaporator probe b) Wrong defrost parameters c) Faulty solenoid valve (only for hot gas defrosting units)	a) Check value **Pb2**, check connections, replace b) Check and adjust defrost parameters c) Repair
P1 alarm and/or default thermostat reading	a) Room temperature probe faulty or wiring faulty	a) Check probe wiring (electrical connection between units for Split systems). Replace probe
P2 alarm	a) Evaporator probe faulty or wiring faulty	a) Check probe wiring (electrical interconnection for Split units). Replace probe
P3 alarm	a) Condenser probe faulty	a) Check probe wiring. Replace probe
P4 alarm	a) Fourth probe faulty	a) Check probe witing. Replace probe
dA alarm	a) Open door micro-switch	a) Check wiring and door switch or electrical bridge
CA alarm	a) HP switch open	a) Check high pressure.

25. WARRANTY

Validation of warranty. - The user is called to fill out the form through INTARCON's web site: http://www.intarcon.com/en/contacto/registro-garantia/ during the following 20 days after the purchase date. Otherwise, the guarantee period will be in effect from the manufacturing date.

Coverage. - The manufacturer guarantees its products against any manufacturing or functioning defect for 12 months after the validation of the warranty or from the manufacturing date.

During the period of warranty the manufacturer is to assume the repair of the product in its facilities, the replacement of the product or the supply of replacement parts for faulty components, whichever is less costly and technically more viable; guaranteeing the repaired or replaced components during the following 6 months. The coverage the cost and taxes of refrigerant is expressly excluded, in the case it is not supplied by the manufacturer in hermetically sealed products.

The warranty does not include the work on-site to replace the product or components, nor the indirect damages or loss that could be attributed to the faulty operation of the product. In particular, the manufacturer is not to cover any tax on the refrigerant emitted to the environment as a result of a leak in a refrigeration equipment or component suitable to accomplish leak-proof tests according to in-vigour regulation.

Warranty application. - Before claiming a warranty application, the user is to assure they have correctly followed operation instructions and verify that the faulty operation is not due to an improper use of the equipment.

In general terms, the distributor or installer that sold and installed the equipment is called to attend the guarantee claims and to provide the guarantee service. The user is called to contact the distributor or installer in a maximum time of two months from the first fault appearance.

Warranty exclusions. - The following is not covered by the present guarantee:
- Personal injury or material damages for incorrect or negligent use, or the lack of user diligence in preventing these uses; especially the ones related to preservation of refrigerated goods.
- Damages caused by a defective installation or not attributable to the equipment.
- Emerging damages, as far as recognised by the law and regulations, and consequential damages, such as lack of production, loss of revenue or lost profits.
- Damages caused by unforeseeable circumstance or overwhelming force.

Warranty invalidation. - The guarantee will be invalidated in the following cases:
- In case that repairs, modifications or manipulations by unauthorised personnel are perceived.
- In case that wilful damages, fraud or bad faith in the correct use of the equipment are perceived.
- In case that the equipment has been bumped or dropped.
- In case the serial number or the guarantee documentation of the equipment has been modified or made illegible.

Headquarters and factory:
Pol. Ind. Los Santos, Bulevar de Los Santos, 34, Apdo. 410
14900 - Lucena – Córdoba (España)
Tlf. +34 957 50 92 93
www.intarcon.com