INDEX

GENERAL DESCRIPTION

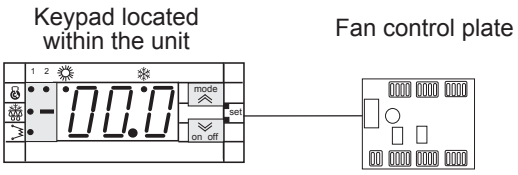
This equipment is an electronic device that controls packaged water cooling systems via air and reversible air/water heat pumps.
The thermostat allows the following operations::
- Unit ON/OFF
- Select system operating mode
- Set point adjustment
- Alarm signal relay
- Display temperature
- Status of the unit alarms
- Possibility of remote ON/OFF.
- A remote controller as an option

REGULATION:
The control makes the system regulation as follow:
- The signals of analague inputs through the inlet and outlet probe temperature and from the refrigerant piping probe temperature (two for model E 420).
- Receives digital inputs through the status of low, high and end defrost pressostat, flow switch (water flow) status and from electrical protection of fan and compressor.
According to the valves and status of analogue and digital inputs manages; The out put signals; compressor, fan and status of and water pump operating, obtaining the regulation of the inlet water temperature to the unit, regulating the speed of the air fan volume, activating the defrost cycle (heat pump units only); output signals water exchange heater, water tank heater, and hot gas valve (all these elements are an option) used to protect the unit, and also activated the alarm codes about, setting pressostat, flow switch, water flow, and the electrical protection of fan and compressor (see alarm section).
- A group of parameters let the control be programmed for each application.

The control supplied incorporated on the unit contains the following devices:

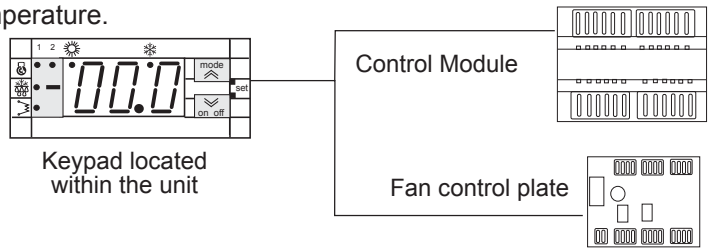
MODEL E210

- Keypad
Located within the unit.
The keypad provides control of the system
- Fan Control Plate
Located at the electrical box
Allows the fan voltage to be varied in respect of the condensing temperature.



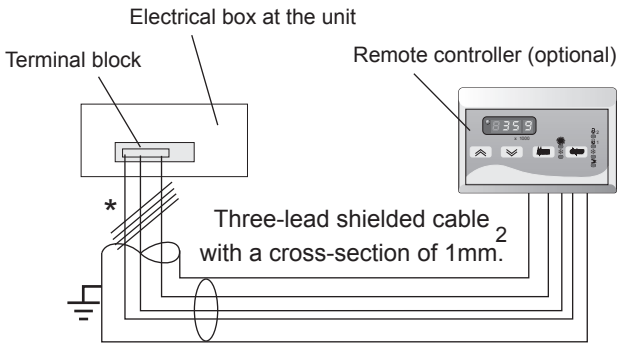
MODEL E420

- Keypad
Located within the unit.
- Control Module
Located at the electrical box
This device controls the operation of the unit, allowing the regulation of the system.
- Fan Control Plate
Located at the electrical box
Allows the fan voltage to be varied in respect of the condensing temperature.



A remote controller is offered as an option.
To install this optional remote controller proceeded as follow:
- Connect exactly as indicated in electrical diagram
- The wire should not exceed 50 m.

The three cables for connection from the keypad to the power board must be kept separate from other cables, using an individual cable channel; and use shielded cables, with a cross-section of 1 mm^2.



*Connection to be made by user
MAXIMUM LENGTH 50m

THE KEYPAD INCORPORATED AT THE UNIT, MODEL E210

READING DISPLAY

This is the 3-digit display, The inlet water temperature is shown in degrees (default), ºC (when shows decimal point), o ºF (do not show the decimal point) . The following can also be displayed:

- Values of all parameters controlled by the equipment:
  - Cooling set point, cooling differential temperature
  - Heating set point (heat pump units) and heating differential temperature
  - Outlet water temperature (as security)
  - Inlet water temperature (regulation)
  - Defrost temperature
- Alarm codes.
- The status of all machine functions (operating hours, delay time etc.)

COMPRESSORS LED

When this LED is continually lit it indicates that the compressor is operating (in heating or cooling mode, depending on the operating mode selected); however, when it flashes this indicates that pausing is taking place which is delaying the compressor start.

MODE / UP BUTTON

Selects the operating mode between the following: Stand-by / Cool / Heat

In menu mode, this button acts as a scroll up or up key (increasing value).

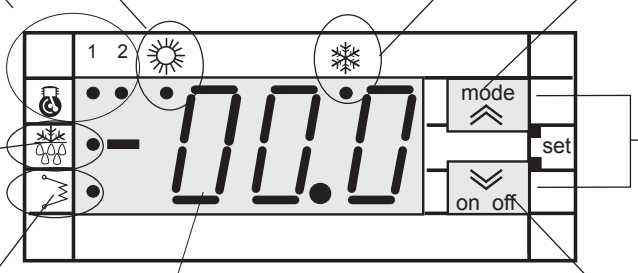
HEATING MODE LED When this LED is continually lit it indicates that the unit is operating in heating mode.

COOLING MODE LED

When this LED is continually lit it indicates that the unit is operating in cooling mode.

COOLING MODE LED / HEATING MODE LED

When none of this two leds COOLING/HEATING are lit, it indicates that the operating mode selected is STAND-BY



DEFROST LED

LED ON: The defrosting is in progress

LED OFF: If defrosting is disabled or has been completed

LED BLINK: If timing is in progress (defrost interval)

MODE - ON / OFF BUTTON

Pressing both buttons at he same time, gets to the menu level

They also lets move one level up or down in the menu.

READING DISPLAY

ELECTRICAL HEATER LED

When this LED is continually lit it indicates that the internal anti-freeze electrical heater is on, if the led is off, the internal anti-freeze is off.

ON - OFF / DOWN BUTTON

Turn the unit ON and OFF, Press once to reset all manually reset alarms not currently active; all the alarm events per hour will also be reset even if the alarms are not active.

In menu mode this key acts as a scroll down or down key (decreasing value)

THE KEYPAD INCORPORATED AT THE UNIT, MODEL E420

READING DISPLAY

This is the 3-digit display, The inlet water temperature is shown in degrees (default), ºC (when shows decimal point), o ºF (do not show the decimal point) . The following can also be displayed:

- Values of all parameters controlled by the equipment:
  - Cooling set point, cooling differential temperature
  - Heating set point (heat pump units) and heating differential temperature
  - Outlet water temperature (as security)
  - Inlet water temperature (regulation)
  - Defrost temperature
- Alarm codes.
- The status of all machine functions (operating hours, delay time etc.)

COMPRESSOR LED

When this LED is continually lit it indicates that the compressor is operating (in heating or cooling mode, depending on the operating mode selected); however, when it flashes this indicates that pausing is taking place which is delaying the compressor start.

LED 1: Compressor circuit 1

LED 3: Compressor circuit 2

MODE / UP BUTTON

Selects the operating mode between the following: Stand-by / Cool / Heat

In menu mode, this button acts as a scroll up or up key (increasing value).

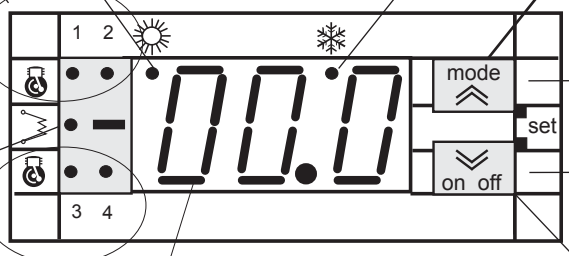
HEATING MODE LED When this LED is continually lit it indicates that the unit is operating in heating mode.

COOLING MODE LED

When this LED is continually lit it indicates that the unit is operating in cooling mode.

COOLING MODE LED / HEATING MODE LED

When none of this two leds COOLING/HEATING are lit, it indicates that the operating mode selected is STAND-BY



MODE - ON / OFF BUTTON

Pressing both buttons at he same time, gets to the menu level

They also lets move one level up or down in the menu.

ELECTRICAL HEATER LED

When this LED is continually lit it indicates that the internal anti-freeze electrical heater is on, if the led is off, the internal anti-freeze is off.

READING DISPLAY

ON - OFF / DOWN BUTTON

Turn the unit ON and OFF, Press once to reset all manually reset alarms not currently active; all the alarm events per hour will also be reset even if the alarms are not active.

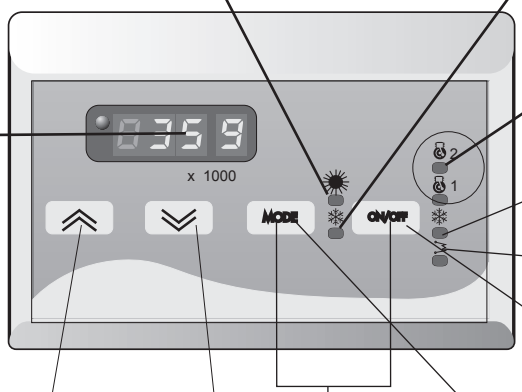
In menu mode this key acts as a scroll down or down key (decreasing value)

THE KEYPAD REMOTE CONTROLLER (OPTION), MODEL E210

READING DISPLAY

This is the 3-digit display, The inlet water temperature is shown in degrees (default), ºC (when shows decimal point), o ºF (do not show the decimal point) . The following can also be displayed:

- Values of all parameters controlled by the equipment:
  - Cooling set point, cooling differential temperature
  - Heating set point (heat pump units) and heating differential temperature
  - Outlet water temperature (as security)
  - Inlet water temperature (regulation)
  - Defrost temperature
- Alarm codes.
- The status of all machine functions (operating hours, delay time etc.)



HEATING MODE LED
When this LED is continually lit it indicates that the unit is operating in heating mode.

When none of this two leds COOLING/HEATING are lit, it indicates that the operating mode selected is STAND-BY

COOLING MODE LED
When this LED is continually lit it indicates that the unit is operating in cooling mode.

COMPRESSOR LED
When this LED is continually lit it indicates that the compressor is operating (in heating or cooling mode, depending on the operating mode selected); however, when it flashes this indicates that pausing is taking place which is delaying the compressor start.
LED 1: Compressor circuit 1
LED 2: Compressor circuit 2

DEFROST LED
LED ON: The defrosting is in progress
LED OFF: If defrosting is disabled or has been completed
LED BLINK: If timing is in progress (defrost interval)

ELECTRICAL HEATER LED
When this LED is continually lit it indicates that the internal anti-freeze electrical heater is on, if the led is off, the internal anti-freeze is off.

UP BUTTON
In menu mode, this button acts as a scroll up or up key (increasing value).

DOWN BUTTON
In menu mode this key acts as a scroll down or down key (decreasing value)

MODE - ON / OFF BUTTON
Pressing both buttons at he same time, gets to the menu level
They also lets move one level up or down in the menu.

ON - OFF BUTTON
Turn the unit ON and OFF, Press once to reset all manually reset alarms not currently active; all the alarm events per hour will also be reset even if the alarms are not active.

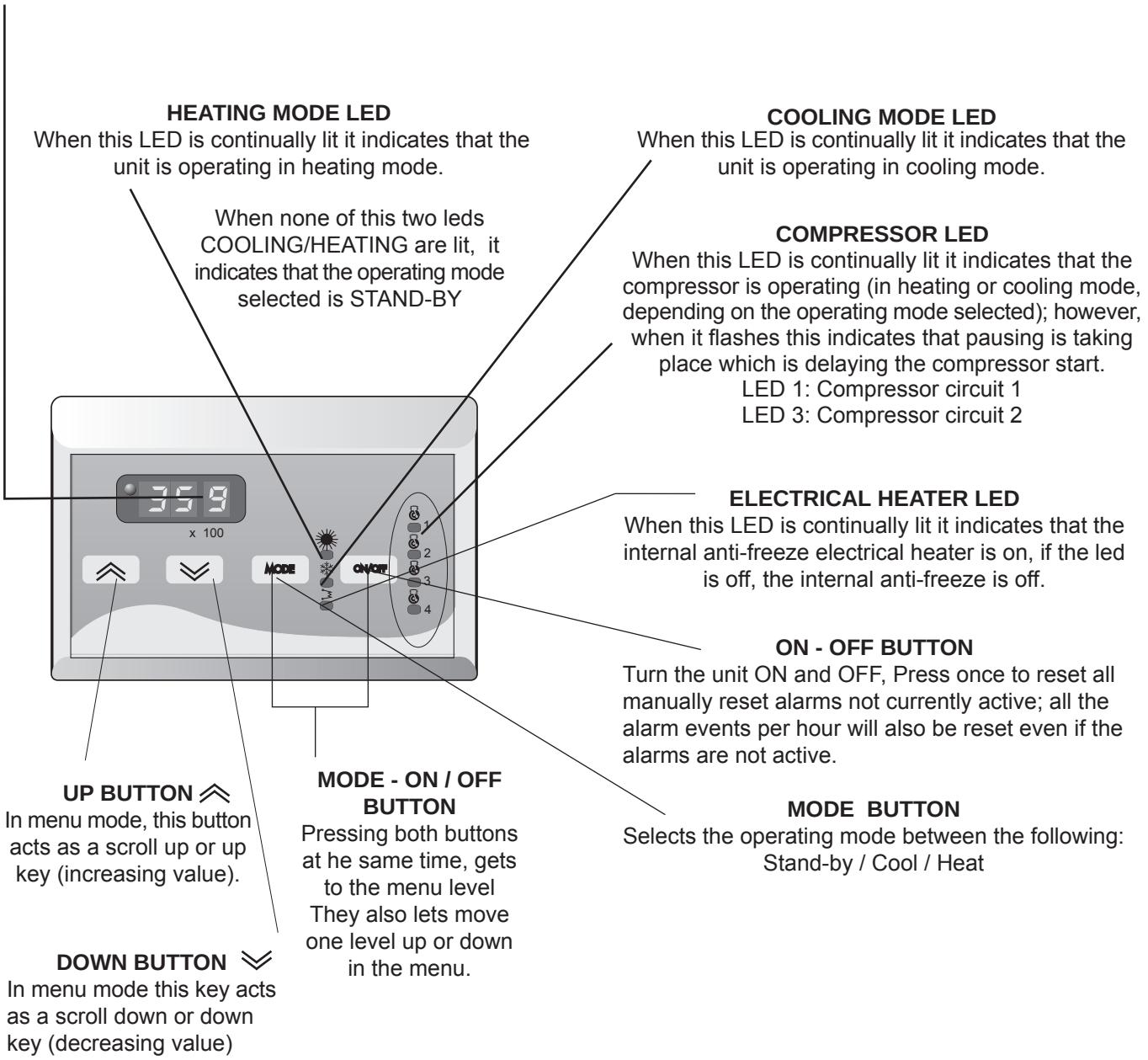
MODE BUTTON
Selects the operating mode between the following:
Stand-by / Cool / Heat

THE KEYPAD REMOTE CONTROLLER (OPTION), MODEL E420

READING DISPLAY

This is the 3-digit display, The inlet water temperature is shown in degrees (default), ºC (when shows decimal point), o ºF (do not show the decimal point) . The following can also be displayed:

- Values of all parameters controlled by the equipment:
  - Cooling set point, cooling differential temperature
  - Heating set point (heat pump units) and heating differential temperature
  - Outlet water temperature (as security)
  - Inlet water temperature (regulation)
  - Defrost temperature
- Alarm codes.
- The status of all machine functions (operating hours, delay time etc.)



FUNCTION

UNIT COMMISSIONING

When all the instructions in the Operating, Service and Installation Manual have been carried out, the unit can be commissioned as follows:

POWER SUPPLY TO THE UNIT

- Set the general cut-off switch to ON (if included), when the unit gets under power supply the display will lights up.

TURN ON/OFF THE UNIT.

- Pressing [on off] button during more than two seconds , lets you turn on or OFF the unit.

The display will show the inlet water temperature or an alarm indication, if E 00 shows, indicates that the init has been turn off by the [on off] remote, located between 93 and 94 terminal at the electrical box, If the unit does not incorporate this switch, verify that exits an overpass between these terminals, and the leds on the display will lit (see alarm section). To turn off the unit press [on off] button during more than 2 seconds, before disconnect power supply, wait until water pump stops.

SELECTING THE UNIT'S OPERATING MODE

The operating mode is always indicated on the display by leds.
Pressing the [mode] button repeatedly you can change the unit operating mode, and select the required one:

COOL → HEAT → STAND BY

COOL: The unit is working on cooling mode, the led ❄ will lights up on the display
HEAT: The unit is working on heating mode, the led ☼ will lights up on the display
STAND BY: The unit is working on stand-by, none led will lights up.

Once cool or heat have been selected water pump will turn on. If cool is the unit's operating mode selected and the inlet water temperature exceeds the cooling the get point, or if heating mode have been selected and the inlet water temperature drops below the heating get point, there will be a demand for the compressor to start, then the compressor led start blinking, witch indicates that is on start compressor temporize, delaying the compressor start, because of anticycle protection (see page 18), after of this, compressor start and led gets set.
NOTE: When unit is not going to be operating during long periods of time do not turn off power supply.

SELECTING THE WATER TEMPERATURE OF THE SYSTEM (SET POINT)

To modify the set point of the unit follow the steps:
Press the buttons [on off] and [mode] simultaneously and release within two seconds, the display will show up [SEt]
Press the buttons [on off] and [mode] again, the display will show up [Coo] (cooling set point)
Pressing the buttons [≫] and [≪],the display will show up [HEA] (heating set point)
Once positioned on the set point which should be changed [Coo] or [HEA]
Press the buttons [on off] and [mode] simultaneously and release within two seconds, and the display shows up the actual set point, and with buttons [≫] or [≪] may change the set point, among a maximum and a minimum.
Once the set point have been changed press [on off] and [mode] simultaneously.
To get to the display value, press [on off] and [mode] simultaneously during more than two seconds, the display will show up [SEt] press again [on off] and [mode] during more than two seconds, and you will be on the display value.

HOW TO GET TO PARAMETERS AND DEVICES

A parameter is an internal program reference containing important values which can be set to allow the user or installer to ensure proper operation of the unit.
A device is, the status list of the elements that comprises the system
Getting to the menu mode enable the user to obtain a status list for the unit's devices, this can be used to read the probe temperatures or the operating hours for example.
All parameters and devices are structure on levels of visualization as shown bellow:

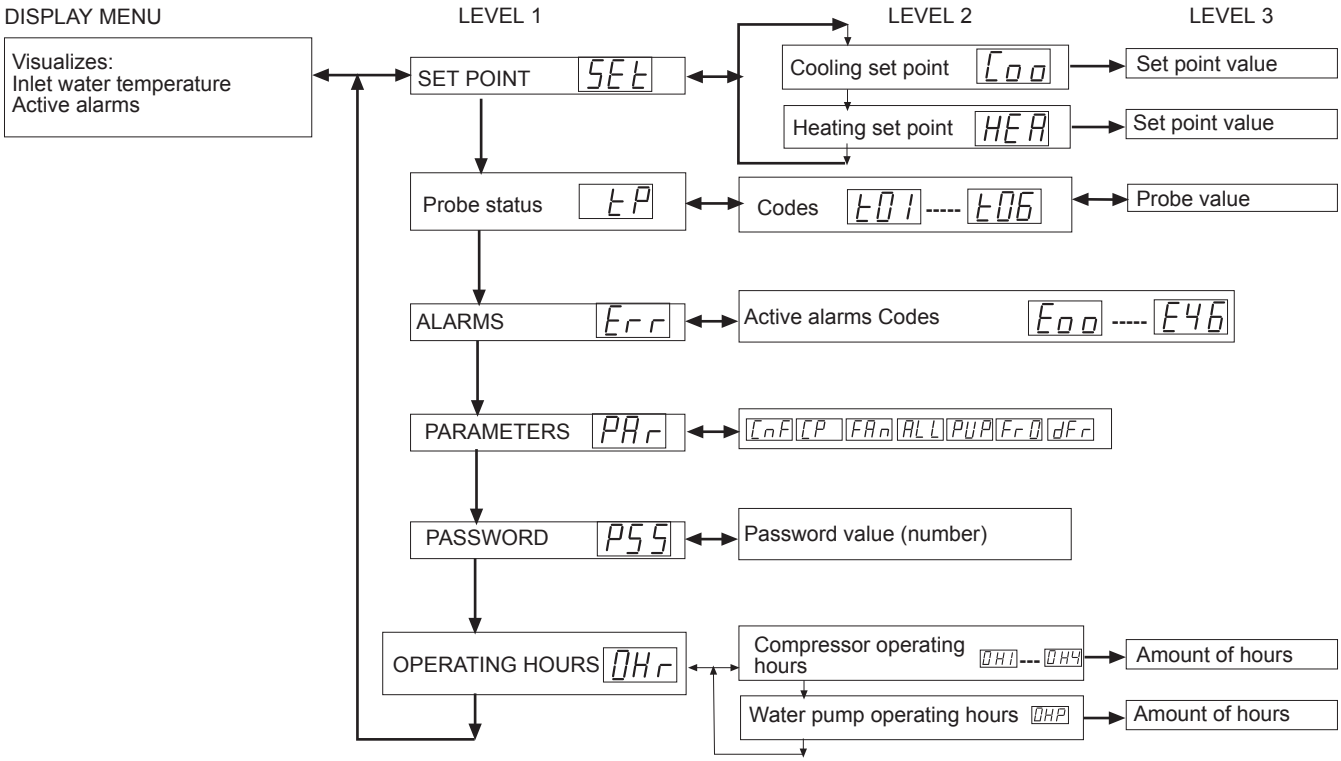
HOW TO GET TO MENU MODE
Press mode and on off buttons and release *within two seconds*, to enable the user to get to the menu mode

To move through the menu on this way →
Press mode and on off buttons simultaneously and release *within two seconds.*
To move through the menu on this way ←
Press mode and on off buttons simultaneously during *more than two seconds*.

NOTE: When leds on the display lit alternative from one to the other.
You are on menu mode.

To move through the menu on this way ↓ , press: ⌄⌄
To move through the menu on this way ↑ , press: ⌃⌃

MENU STRUCTURE



SEt Water temperature adjustment menu

tP Status temperature probes menu
ST1: Inlet water temperature
ST2: Outlet water temperature
ST3 and ST6: Piping temperature

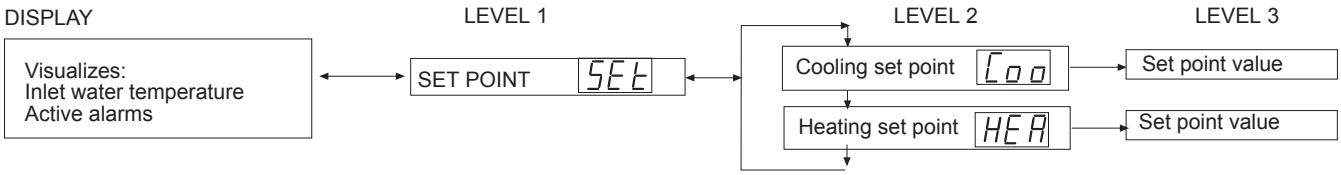
Err Active alarms Menu

PAr Configuration parameters menu

PSS Password to access to parameters configuration (number), the password is 38.

OHr Operating hours resources management (compressor, water pump)

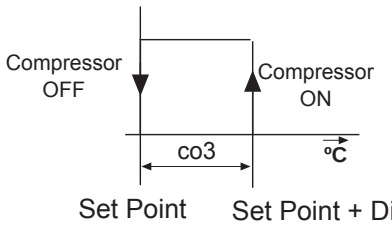
SET POINT THERMOSTAT FUNCTION DESCRIPTION



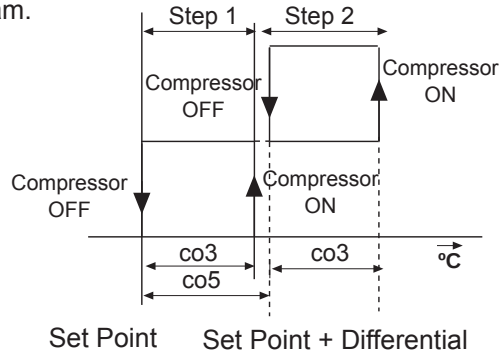
See page 7, for adjustment of set point of the system

The water temperature is thermostatically controlled via a set point and a tolerance range (differential)
The operation of these parameters is shown in the following diagram.

COOLING OPERATING MODE



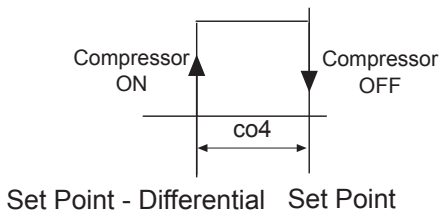
UNITS with 1 Compressor



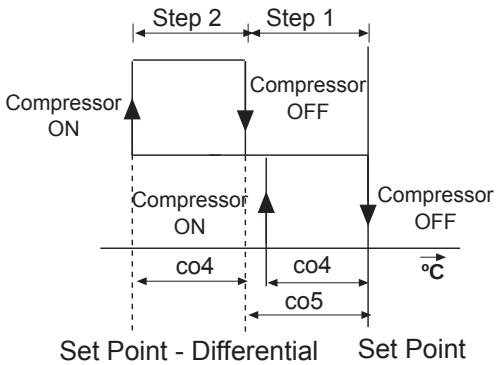
UNITS with 2 Compressors

Operation with one compressor is as shown in the diagram taking into account that the temperature above which the controller takes over is the inlet water temperature. When this temperature exceeds the set point + tolerance range (differential) the compressor starts to produce cool water. When inlet water temperature gets bellow the set point the compressor stops. For example: if set point = 10°C and tolerance range (differential)= 2°C, the compressor will operate when the return water temperature exceeds 10°C and switch off when it returns at 10ºC, and turn on again when the temperature reaches 12ºC.

HEATING OPERATING MODE



UNITS with 1 Compressor



UNITS with 2 Compressors

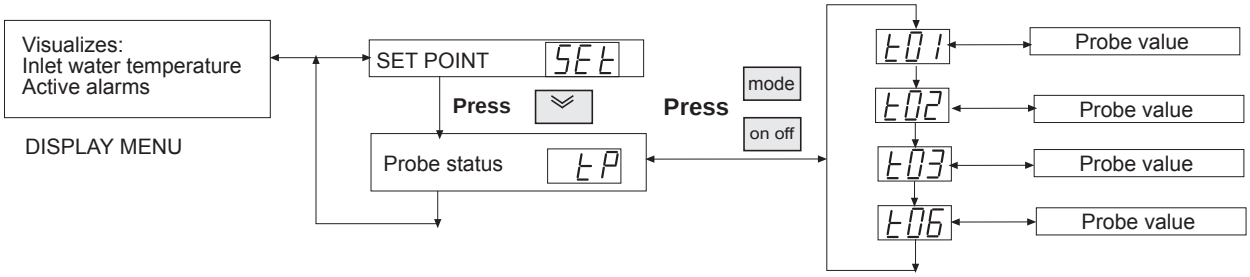
Operation with one compressor is as shown in the diagram taking into account that the temperature above which the controller takes over is also the inlet water temperature. When this temperature drops below the set point - tolerance range (differential) the compressor starts to produce warm water. When the inlet water temperature increases beyond the set point + tolerance range (differential) the compressor switches off. For example, if set point = 41°C and tolerance range = 2°C, the compressor will operate when the return water temperature drops below 39°C and switch off when it returns at 41ºC.

AFFECTED PARAMETERS

MAX: Maximum value for the parameter
MIN: Minimum value for the parameter
DEF: The default value, factory set.
UNIT: The units of measure used.
VAR.: Minimum variation allowed

Code which appears on the display		DESCRIPTION	1 COMPRESSOR UNITS VALUES			2 COMPRESSOR UNITS VALUES				
			MIN	MAX	DEF	MIN	MAX	DEF	UNIT.	VAR.
SEt	Coo	Cooling set point	10	15	11	9	14	10	ºC	0,1
	HEA	Heating set point	30	43	41	35	43	42	ºC	0,1
PAr — CP	C03	Cooling differential temperature	0	25,5	2	0	25,5	1.5	ºC	0,1
	C04	Heating differential temperature	0	25,5	2	0	25,5	1.5	ºC	0,1
	C05	Differential for second compressor	---	---	---	0	25,5	1.5	ºC	0,1

ANALOGUE INPUTS



HOW TO GET TO PROBE STATUS MENU

Press mode and on off buttons and release *within two seconds*, the display will show up SEt

To move through the menu on this way →

Press mode and on off buttons simultaneously and release *within two seconds*.

To move through the menu on this way ←

Press mode and on off buttons simultaneously during *more than two seconds*.

To move through the menu on this way ↓ , press:

To move through the menu on this way ↑ , press:

Probe St1 t01 Inlet water temperature

Probe St2 t02 Outlet water temperature

Probe St3 t03 Piping temperature at circuit 1

Probe St4 t06 Piping temperature at circuit 2 (ONLY MODEL E420)

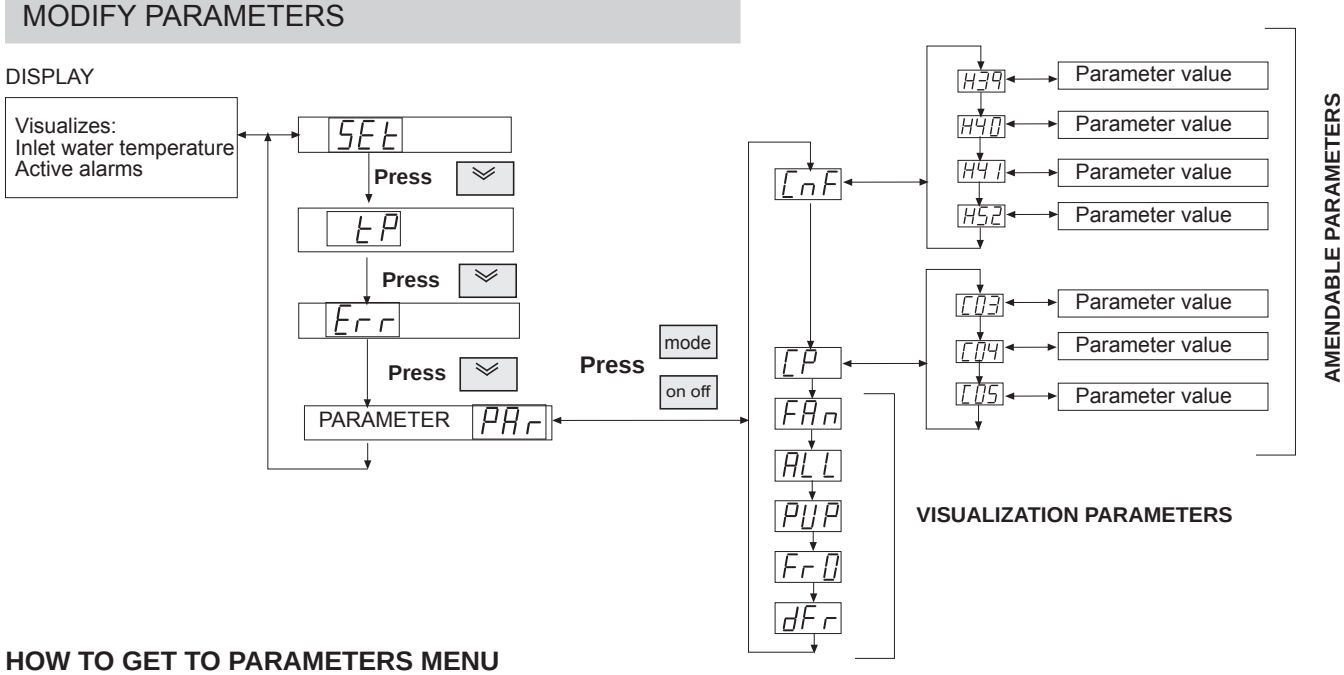
For every unit without anti-freeze the minimum outlet water temperature should be 5ºC
For applications where the outlet water temperature is lower than 5ºC is necessary to use anti-freeze.

AFFECTED PARAMETERS

MAX: Maximum value for the parameter
MIN: Minimum value for the parameter
DEF: The default value, factory set.
UNIT: The units of measure used.
VAR.: Minimum variation allowed

Code which appears on the display		DESCRIPTION	MIN	MAX	DEF	UNIT.	VAR.
1 CIRCUIT UNIT MODEL E210							
PAr → CnF	H52	Unit for measure temperature H52=0 the temperature is visualized on ºC H52=1 the temperature is visualized ºF	0	1	0	---	---
2 CIRCUITS UNIT MODEL E210							
PAr → CnF	H64	Unit for measure temperature H64=0 the temperature is visualized on ºC H64=1 the temperature is visualized ºF	0	1	0	---	---

MODIFY PARAMETERS



HOW TO GET TO PARAMETERS MENU

Press mode and on off buttons and release *within two seconds*, the display will show up SEt

To move through the menu on this way →

Press mode and on off buttons simultaneously and release *within two seconds.*

To move through the menu on this way ←

Press mode and on off buttons simultaneously during *more than two seconds*.

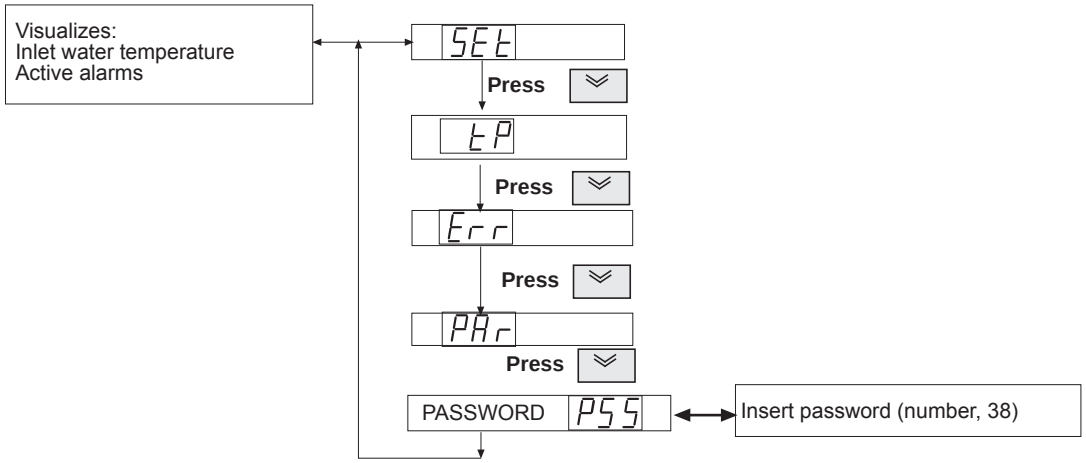
To move through the menu on this way ↓ , press:

To move through the menu on this way ↑ , press:

PAr Menu of configuration parameters of the unit

- CnF General configuration parameters of the unit (Values (F))
- CP Parameters configuration concerning to compressor (Values (C))
- FAn Parameters configuration concerning to fan and defrost control (Values (F))
- ALL Parameters configuration concerning to active alarms (Values (A))
- PUP Parameters configuration concerning to water pump (Values (P))
- Fr0 Parameters configuration concerning to anti-freeze (Values (r))
- dFr Parameters configuration concerning to defrost cycle (Values (d))

To access to parameters modification, a password should be includes to the system, this is not necessary if you want to visualize the parameters



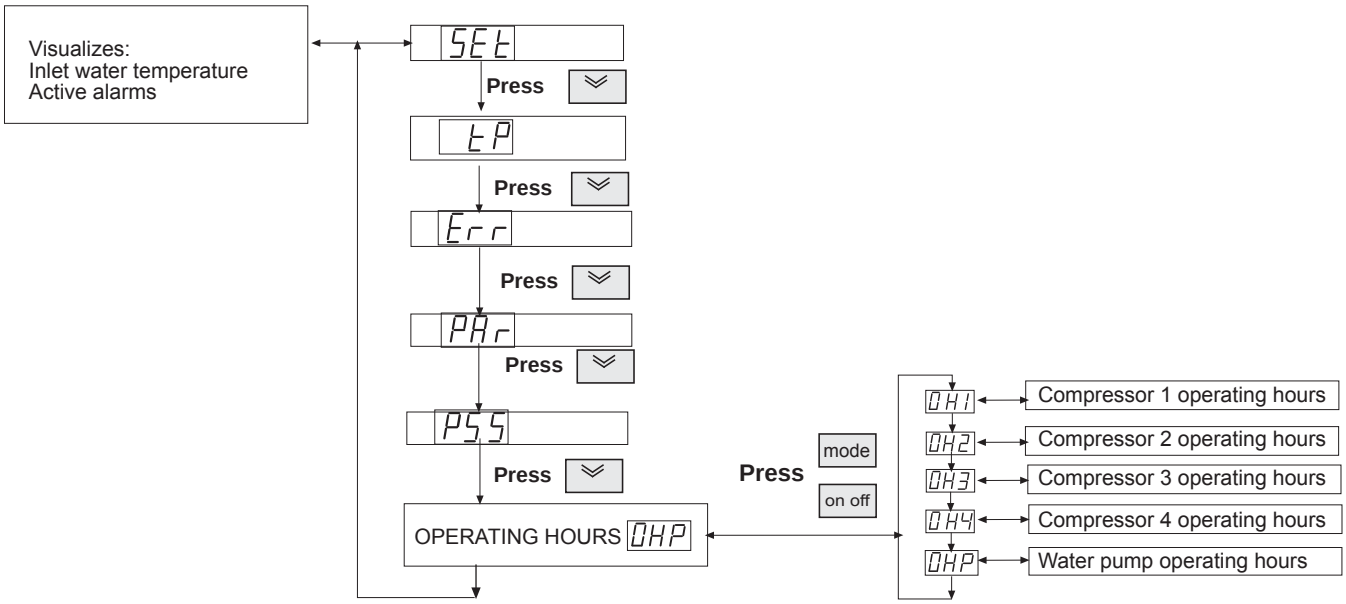
MODIFY UNIT PARAMETERS

MAX: Maximum value for the parameter
MIN: Minimum value for the parameter
DEF: The default value, factory set.
UNIT: The units of measure used.
VAR.: Minimum variation allowed

DESCRIPTION	MIN	MAX	DEF	UNID.	VAR.
1 CIRCUIT UNIT MODEL E210					
H45 Alarm switch polarity □ H45=0 switch opens if out is activated□ H45=1 switch closed if out is activated	0	1	0	---	1
H52 Unit for measure temperature H52=0 the temperature is visualized on ºC H52=1 the temperature is visualized ºF	0	1	0	ºC	0,1
C03 Cooling differential temperature	0	25,5	1.5	ºC	0,1
C04 Heating differential temperature	0	25,5	1.5	ºC	0,1
C05 Differential for second compressor	0	25,5	1.5	ºC	0,1

DESCRIPTION	MIN	MAX	DEF	UNID.	VAR.
2 CIRCUITS UNIT MODEL E420					
H56 Alarm switch polarity □ H56=0 switch opens if out is activated□ H56=1 switch closed if out is activated	0	1	0	---	1
H64 Unit for measure temperature H64=0 the temperature is visualized on ºC H64=1 the temperature is visualized ºF	0	1	0	---	---
C03 Cooling differential temperature	0	25,5	1.5	ºC	0,1
C04 Heating differential temperature	0	25,5	1.5	ºC	0,1
C05 Differential for second compressor	0	25,5	1.5	ºC	0,1

OPERATING HOURS.



HOW TO GET TO OPERATING HOURS MENU

Press mode and on off buttons and release *within two seconds*, the display will show up

To move through the menu on this way →

Press mode and on off buttons simultaneously and release *within two seconds.*

To move through the menu on this way ←

Press mode and on off buttons simultaneously during *more than two seconds.*

To move through the menu on this way ↓ , press:

To move through the menu on this way ↑ , press:

Reset of operating hours counters.

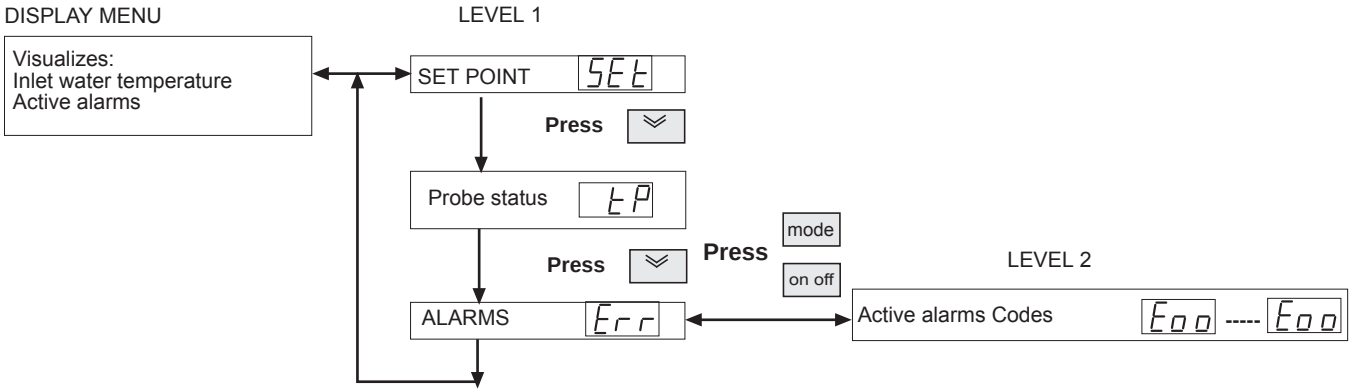
When display shows the compressor or water pump operating hours, the counters may setting zero, pressing ON/OFF button and release *within two seconds.*

CODE	PARAMETERS	MIN	MÁX	UNIT
OH1	Operating hours compressor 1	0	9.99	hrs/khrs
OH2	Operating hours compressor 2 (if available) model E210	0	9.99	hrs/khrs
OH3	Operating hours compressor 2 (if available) model E420	0	9.99	hrs/khrs
OH4	No available	0	9.99	hrs/khrs
OHP	Water pump operating hours	0	9.99	hrs/khrs

The display shows without decimal point until 999 operating hours, If counter have exceed 999, appears a decimal point and value have to be multiplied by 1.000 (Example: 1.00 hours x 1000).

ALARM CODES

MENU STRUCTURE



The unit self-protect through safety devices, when any of these safety devices detect an anomaly, shown in the display in order to advice the installer.
The activation of an alarm brings about:
- The display of the alarm code beginning with the letter E and follows a number, if more than one alarm will be activated, the alarm visualized would be the one with the lowest numerical value.- The blocking of some or all the outputs, depending on the type of alarm.

E00□ This señalization en not an alarm, indicates that unit is turn off from ON /OFF remote.

VIS (Visualization) :Indicates the type of alarm shows on the display.
RE (Reset) : Type of reset: To enable the alarms:
AUT: AUTOMATIC RESET: Some alarms are automatically reset, when the cause is no longer present, they disappear from the display.
MAN: MANUAL RESET: Pressing ON/OFF button, for *more than 2 seconds.*
If the alarm conditions have been removed, the instrument returns to the normal operation and the alarm relay is de-energized. If on the other hand, the alarm conditions persist, then call for technical service.

VIS.	DESCRIPTION	EFFECT	RE	ACTION
E01	High pressostat alarm This alarm may indicate the following problems: - High pressostat protection - Compressor electrical protection (only EAC 047 o 081) - Indoor fan electrical protection - Fuses of the fan burn out	Unit stops	MAN	Press the ON/OFF button, until the alarm disappeared, if the alarm shows up again check: •Coil clean and no blocked. • Water flow on the cooling cycle •Check fuses of the fan
E02	Low presostat alarm This alarm may indicate the following problems: - Low amount of refrigerant - Low water flow in cooling cycle - Blocked coil in heating cycle - Fuses of the fan burn out After two automatic resets in one hour, it comes to be a manual reset	Compressor 1 stops	MAN	When this alarm shows up repeteally, and the alarm keeps on, make a electrical reset and check: •Coil clean and no blocked. • Water flow on the cooling cycle •Check fuses of the fan •Check refrigerant charge.
E03	Compressor and fan thermal protection alarm: - Compressor and fan thermal protection open - Faulty power supply	Compressor 1 stops	MAN	Press the ON/OFF button until the alarm disappeared, if alarm shows up again check continuity and change the faulty component •Check refrigerant charge •Check the refrigerant circuit is not blocked •Check connections and fusses •Check power supply

ALARM CODES

VIS.	DESCRIPTION	EFFECT	RE	ACTION
E05	Anti-freeze alarm Indicates the outlet water temperature is lower than +3ºC.	Unit stops	MAN	Press the ON/OFF button until the alarm disappeared, if alarm shows up again •Check the water filter •Check water flow •Check that the water pump is connected to power supply of the unit.
E06	Outlet water probe alarm Outlet water probe open or without connecting.	Unit stops	AUTO	These protection are automatic reset, if alarm shows up again check: •Connection of outlet water temperature probe (ST2), (see electrical diagram), Check continuity and change the faulty component.
E07	Alarm of the refrigerant piping probe: Refrigerant piping probe open or without connecting	Unit stops	AUTO	These protection are automatic reset, if alarm shows up again check: •Connection of refrigerant piping probe (ST2), (see electrical diagram), Check continuity and change the faulty component.
E11	High pressure/High temperature alarm. Is activated when refrigerant piping probe (St3) detect a temperature higher than 65ºC and the high pressostat has not activated. This alarm may activated the following problems: -Faulty high pressostat.	Unit stops	AUTO	Press the ON/OFF" button , until the alarm disappeared, if alarm shows up again, check: • Working of high pressostat. • Coil clean and no blocked. • Water flow on the cooling cycle • Check fuses of the fan
E12	Low pressure/Low temperature alarm. Is activated when refrigerant piping probe (St3) detect a temperature lower than -30ºC and the low pressostat has not activated. This alarm may activated the following problems: -Faulty low pressostat.	Unit stops	AUTO	• Check low pressostat working. • Coil clean and no blocked. • Check water flow on the cooling cycle • Check fuses of the fan • Check refrigerant charge.
E13	Second compressor and fan thermal protection alarm: - Compressor and fan thermal protection open - Faulty power supply	Compressor 2 stops	MAN	Press the ON/OFF button until the alarm disappeared, of alarm shows up again check continuity and change the faulty component •Check refrigerant charge •Check the refrigerant circuit is not blocked •Check connections and fusses •Check power supply
E21	High presostat alarm, circuit 2 This alarm may indicate the following problems: - High presostat protection - Compressor electrical protection opens - Indoor fan electrical protection opens - Fuses of the fan burn out	Compressor 2 stops	MAN	Press the ON/OFF button, until the alarm disappear, if the alarm shows up again check: •Coil clean and no blocked. • Water flow on the cooling cycle •Check fuses of the fan
E22	Low presostat alarm, circuit 2 This alarm may indicate the following problems: - Low amount of refrigerant - Low water flow in cooling cycle - Blocked coil in heating cycle - Fuses of the fan burn out After two automatic resets in one hour, it comes to be a manual reset	Compressor 2 stops	MAN	When this alarm shows up repeteally, and the alarm keeps on, make a electrical reset and check: •Coil clean and no blocked. • Water flow on the cooling cycle •Check fuses of the fan •Check refrigerant charge.

ALARM CODES

VIS.	DESCRIPTION	EFFECT	RE	ACTION
E23	Compressor and fan thermal protection alarm circuit 2: - Compressor or fan thermal protection open - Faulty power supply	Compressor 2 stops	MAN	Press the ON/OFF button until the alarm disappeared, if alarm shows up again check continuity and change the faulty component •Check refrigerant charge •Check the refrigerant circuit is not blocked •Check connections and fusses •Check power supply
E27	High pressure/High temperature alarm. Is activated when refrigerant piping probe (St3) detect a temperature higher than 65ºC and the high pressostat has not activated. This alarm may activated the following problems: -Faulty high pressostat.	Unit stops	AUTO	Press the ON/OFF" button , until the alarm disappeared, if alarm shows up again, check: • Working of high pressostat. • Coil clean and no blocked. • Water flow on the cooling cycle • Check fuses of the fan
E31	Low pressure/Low temperature alarm. Is activated when refrigerant piping probe (St3) detect a temperature lower than -30ºC and the low pressostat has not activated. This alarm may activated the following problems: -Faulty low pressostat.	Compressor 2 stops	AUTO	• Check low pressostat working. • Coil clean and no blocked. • Check water flow on the cooling cycle • Check fuses of the fan • Check refrigerant charge.
E32	Alarm of the refrigerant piping probe, for circuit 2 It may indicates: Refrigerant piping probe open or without connecting	Compressor 2 stops	AUTO	These protection are automatic reset, if alarm shows up again check: •Connection of refrigerant piping probe (ST2), (see electrical diagram), Check continuity and change the faulty component.
E40	Inlet water probe alarm: It may indicates: - Inlet water probe opens or without connecting.	Unit stops	AUTO	Check connection of refrigerant piping probe (ST1), (see electrical diagram), Check continuity and change the faulty component.
E41	Water flow switch alarm Indicates low water flow in the unit.	Unit stops	AUTO	•Check water circuit is not blocked. •Check water filter
E45	Alarm of error configuration. It may indicates that the terminal is broken	Unit stops	AUTO	This protections are automatic reset, if the alarm shows up again, check the continuity and change the faulty component.
E46	High inlet water temperature. Indicates: Inlet water temperatures detects temperatures higher than 90ºC, during more than one second	Unit stops	AUTO	This protections are automatic reset, if the alarm shows up again, Check connection of inlet water probe (ST1), (see electrical diagram) check the continuity and change the faulty component

DESCRIPTION OF THE DEFROST SYSTEM

The defrost process is activated during heating mode in heat pump units, when the outside temperature is low and the outdoor coil could become frozen.
To melt the ice the defrost function will switch the unit to cooling operation for a short period.
During defrost mode the low pressure is at minimum level, consequently the pressostat is disabled in this mode.

The manufacturer uses default control settings which apply to most installations. The set parameters determine the following:

INITIAL DEFROST TEMPERATURE
The defrost cycle begins when outdoor probe temperature is below -3ºC more than 1 minute.

END DEFROST CYCLE
The defrost cycle ends when:
For one circuit unit when outdoor probe temperature of the refrigerating pie reaches 25ºC
For two circuits unit when end defrost pressostat detected 24 bar.

DELAY BETWEEN TWO DEFROST REQUESTS
Time between two defrost cycles is calculated from the end of one to the beginning of next , and it is 30 minutes. This defines the time during which the initial defrost temperature must be maintained. When this time has elapsed the unit starts to defrost. If the initial defrost temperature drops before this time has elapsed, pausing is blocked, and only starts to count when the temperature returns below a set value. This pausing prevents the unit from carrying out continual defrost patterns.

MAXIMUM DEFROST DURATION
This defines the max. defrost period if the temperature has not exceeded a set limit.
This idling avoids excessive defrost modes 5 minutes is the maximum time defrost cycle will be on

DEFROST CYCLE SEQUENCE:
When a probe located in the condenser detects low temperatures (-3°C) during which the operating mode is reversed, the compressor will turn off, then during 30 seconds the reverse of the four-way valve, and 30 seconds later the compressor start. This mode ends when the outside exchanger probe detects the final defrost temperature or exceeds a safety interval. At the end of the defrost mode the compressor stops, 30 seconds later reverse the four-way valve and 30 seconds later, the compressor starts again in heating mode, generating more warm water at a more efficiently due to the absence of frost.

FAN SPEED CONTROL

Fan speed control: Management of the fan speed.

It is management by a fan speed control plate located at the electrical box of the unit
The function of this fan speed control is allowing the unit to operate at very low outside temperatures from -10ºC to 46ºC during cooling mode.
In this case, is a proportional fan speed control, which vary the fan voltage supplied to the fan.

FAN STAGES	AMBIENT TEMPERATURE	FAN RPM
Fan stops	Ambient temperature below +5ºC	0
Minimum fan speed	Ambient temperature between +5ºC and +20ºC	350
Fan regulation	Ambient temperature between +20ºC and +30ºC	350 a 750
Silent fan speed	Ambient temperature between +30ºC and +35ºC	750
Maximum fan speed	Ambient temperature over +35ºC	900

SAFETY DEVICES

These units contains various safety devices, in order to avoid the water reaches low temperatures so it may cause a damage to the system.

1.- Anti-freeze protection:

This protection is activated by the control of the unit.
It comes on when the outlet water temperature probe (ST2), located inside the water interchanger, measures +5ºC and get's off when the outlet water temperature reaches to +6ºC again.
When the protection is activated occurs as follow:
If the unit is on STAND-BY as the operating mode: the water pump goes on, the same happen with electrical heater of water interchanger and electrical heater of water tank (if included)

NO TURN OFF THE UNIT, DURING A LOW PERIOD OF TIME WITHOUT USING THE UNIT, INSTEAD OF THIS SELECT STAND-BY AS THE UNIT'S OPERATING MODE, SO THE UNIT IS PROTECTED BY THE ANTI-FREEZE SAFETY DEVICE.

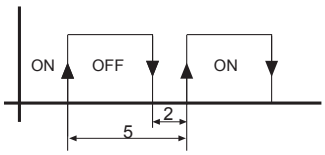
- If the unit is operating on cooling mode: Feed the electrical heater of water tank, the electrical heater of the water interchanger, and activates the hot gas injection valve (if the unit incorporates this optionals)
- If the unit is operating on heating mode:
Feed the electrical heater of water tank and the electrical heater of the water interchanger (if the unit incorporates this optionals)

2.- Anti-freeze alarm.

This alarm activates when the outlet water temperature probe (ST2) measures a value lower than +3ºC, as a consequence the unit goes off. The alarm could be reset when outlet water temperature reaches +8 ºC.

3.- Compressor start temporize

In order to avoid the motor compressor reaches high temperatures, the control stabilizes that should lapse a minimum time of 5 minutes between two start of the compressor, and the compressor have to be off at least 2 minutes (the maximum time of starters in one hour is 12)



4.- Crank case heater compressor.

Located around compressor, this protection is activated during the period, the compressor stops, so keep the compressor oil temperature on adecuatted conditions, protecting from the refrigerant into the compressor oil cabinet.

5.-Water pump start temporize.

When cool or heat have been selected as the unit's operating mode the water pum start, compressor start 4 minutes water, in order to the water circuit stabilizes.

DO NOT TURN OFF THE UNIT OFF, SO THIS PROTECTION CAN OPERATES

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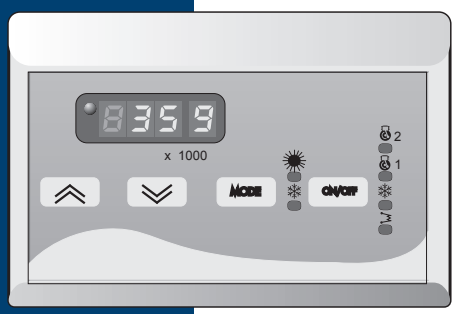
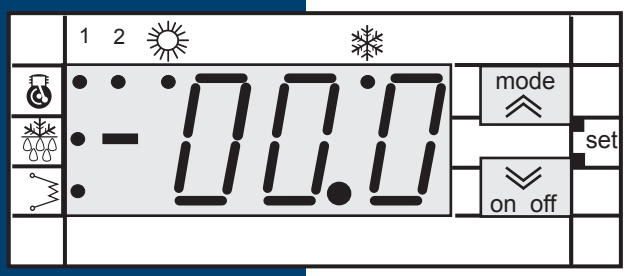
INSTALLATION-OPERATION & MAINTENANCE MANUAL





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