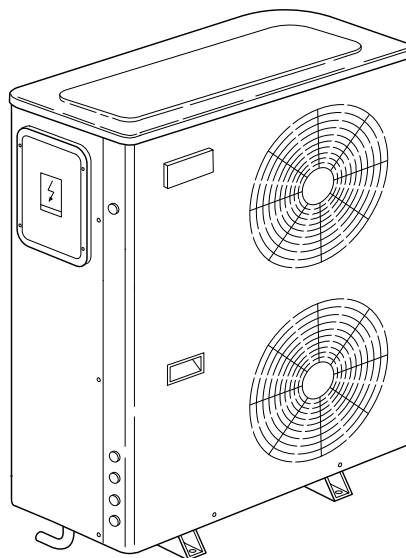




BY JOHNSON CONTROLS

# Air-condensed water cooling units and heat pumps YLCA / YLHA PLUS 5 to 27



User manual

Ref.: N-40315\_EN 1110



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# User manual

## 1.1 General description of the unit

## 1.1 General description of the unit

The YLCA/YLHA PLUS 5 to 27 units are high-performance air-water cooling units and heat pumps using R-410A ecological coolant.

These units are designed for air conditioning or industrial applications that require cold or hot water.

They are silent and compact units, equipped with axial fans, that can be installed directly outdoors.

Inertia tanks are available as an optional extra for those installations requiring a greater volume of water.

The control system of these units is a specially programmed electronic controller for use with air-water cooling units and heat pumps.

Easy to use and safe, these units precision-control the water return temperature of the installation, carry out defrost cycles, modulate fan speeds and control compressor, pump and auxiliary electric heater start-up. By reading the control probes and safety elements, the controller protects the entire equipment against malfunctions. The system allows connecting the unit to a standard RS485 monitoring network.

For further information, please see [Operating instructions µC2](#), see on page 7.

The YLCA/YLHA PLUS 5 to 27 units are made of proven quality components and manufactured in compliance with standards in force (ISO 9001 certification).

### 1.1.1 Models available and capacities

Cool-only model	YLCA 5 M	YLCA 7 M and T	YLCA 9 M and T	YLCA 12 M and T
Cooling capacity	5,38	7,13	9,05	12,40

Cool-only model	YLCA 15 T	YLCA 20 T	YLCA 27 T
Cooling capacity	14,5	19,52	25,60

Heat pump model	YLHA PLUS 5 M	YLHA PLUS 7 M and T	YLHA PLUS 9 M and T
Cooling capacity	5,4	7,10	8,72
Heating capacity	6,3	7,16	10,1

Heat pump model	YLHA PLUS 12 M and T	YLHA PLUS 15 T	YLHA PLUS 20 T	YLHA PLUS 27 T
Cooling capacity	11,75	13,8	19,4	25,8
	12			
Heating capacity	12,25	16,1	20,9	27,5
	12,4			

Cooling capacities in kW for 12/7 °C water inlet/outlet temperature and 35 °C ambient temperature.

Heating capacities in kW for 40/45 °C water inlet/outlet temperature and 7 °C ambient temperature.

## 1.1.2 Technical specifications

These units are supplied completely factory-assembled and with all coolant tubing and wiring ready for installation on site. After mounting, these units must go through an operational test with water. Coolant leaks will also be checked during this process.

### Sheeting casing

The units are made of galvanized steel sheeting and anticorrosion nuts and bolts. Panels can be removed for access to internal components. The casing parts are painted with white RAL9001 oven-baked polymerized enamel.

### Compressors

Hermetic Scroll compressors are used, mounted on anti-vibration supports. These compressors are equipped with internal devices that protect them against high operating temperatures. The sump heaters operate only when the compressor is inoperative.

### Indoor heat exchanger

Comprises a stainless steel plate exchanger, adequately insulated by a layer of closed-cell elastomer foam. The coolant side of said exchanger accepts an operating pressure of 52 bar, whereas the water side accepts 10 bar. When the unit includes a hydro kit, maximum admissible pressure on the water side is 6 bar (adjustment of the tank safety valve).

### Outdoor heat exchanger

Made up of two notched aluminium blue fin coils and grooved copper tubing mechanically expanded within the fin assembly.

### Fans

Of the axial and low sound level type. Equipped with single-phase motors with IP54 protection. These motors allow speed control by means of a phase cut-out shifter controlled by the unit controller. This allows unit operation at low ambient temperatures (-10°C). On cool only units with an optional low ambient temperature kit can reach -18°C. On heat pumps, the fan will remain inoperative during defrosting.

### Electrical and control panel

Located inside the machine, and with IP44 protection. The operating and control components are factory mounted, wired and tested. This control panel is equipped with an external locking isolator that turns the power supply off. Inside are the contactors for the compressor and the pump, the transformer, thermal magnetic protectors, the speed control, connecting strip and the keyboard-display with the unit controls.

### Control keyboard-display

This device is accessible through an external leak-tight plastic cover. This is an easy-to-use control with three access levels: direct, user (password) and factory (password). For further information, please see [Operating instructions µC2](#), see on page 7.

### Cooling circuit

The cool only unit cooling circuit includes: Schrader valves on the high, low and liquid sides, expansion valve, filter dryer, sight glass (YLCA 20 to 27), high and low pressure switches, service valves to isolate the condenser (YLCA 27) and an expansion restrictor (YLCA 5 to 15).

The heat pump model includes: Schrader valves on the high, low and liquid sides, two expansion restrictors (YLHA PLUS 5 to 15), two expansion valves, high and low pressure switches, dryer filter, sight glass (YLHA PLUS 20 to 27), four-way valve (energised during the summer cycle and during defrost cycles), check valves (YLHA PLUS 20 to 27), service valves for isolating the condenser (YLHA PLUS 27), an expansion valve for the heat cycle and a liquid vessel. The suction tubing is coated with closed-cell elastomer.

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## 1.1 General description of the unit

### **Hydro kit (pack)**

These units include a pack assembled with the components of a hydro kit. This assembly is located within the unit frame and does not increase the footprint of same. It includes the following components: centrifugal pump, expansion tank loaded with nitrogen at 1,5 bar, safety valve set to 6 bar, flow switch, air bleed valve and drain valve. Also includes a mesh filter for the water circuit. This filter is supplied loose for installation at the most convenient point.

### **Protecting grids**

To protect the coils from possible impacts. Made of steel rods and painted with oven baked polymerized white enamel (RAL9001).

### **Soft Start**

The models YLHA PLUS 5, 7, 9 and 12 MCS have an electronic starter specially designed to limit the starter intensity point in the single-phase Scroll compressors.

## Options and accessories

### Remote control

Wall-mounted remote control unit with keyboard for cool/heat and ON/OFF functions. Includes power supply, alarm and cool/heat LEDs. Maximum cable length: 50 m.

### Remote terminal

For total access and control of the system by means of the display and buttons. It allows for selection of cool, heat and off functions. Operating parameters can also be modified and the system can also be supervised. Can be installed at a maximum distance of 1040 m.

### BMS connections

By means of a serial board, it is possible to connect the system to a standard RS485 monitoring network.

### low ambient temperature kit (YLCA 5 to 15)

Includes a pressure transducer to control condensation pressure at low ambient temperatures (-18 °C).

This component is standard in models YLCA 20 to 27 and YLHA PLUS 5 to 27.

### High pressure fans

### Inertia tank

With or without built-in auxiliary heater.

1.1 General description of the unit

**Antivibration supports**

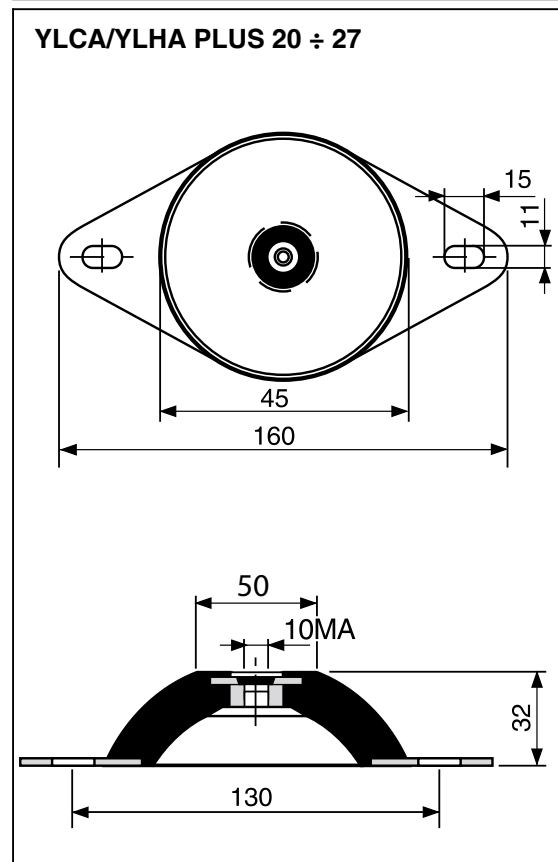
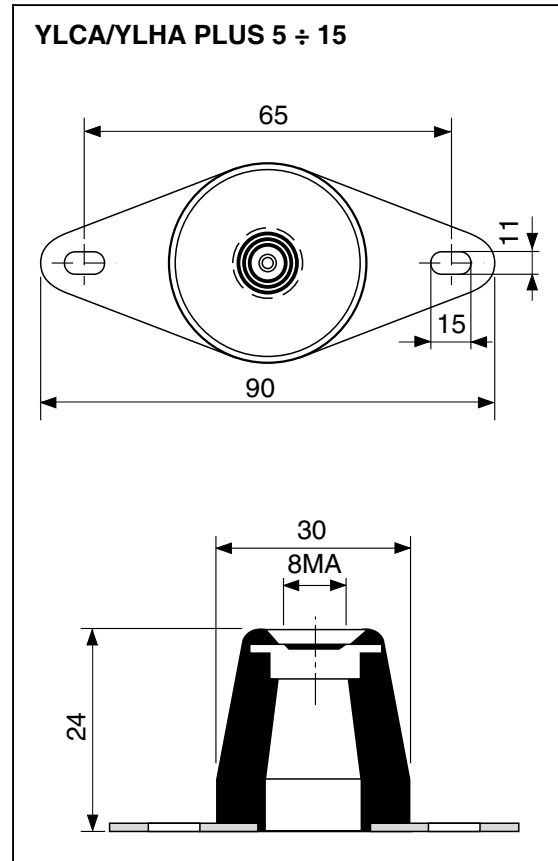
Whenever necessary to reduce vibrations and noise produced by the unit to the maximum, a set of rubber antivibration supports can be used. These should be installed between the chassis support of the unit and the base or floor on which it is to sit.

This base must be solid and dimensioned in accordance with the load to be supported.

Use 8/10MA bolts to fasten the supports to the base of the chassis.

The antivibration support accessory includes 4 parts.

These spring supports should be distributed and fastened in the drilled holes at the base of the cooling unit, the location of which is detailed in the section **Dimensions, clearance and accesses** of the documents *Installation* and *Technical Information* for the unit.





## 1.2 Operating instructions µC2

### DESCRIPTION OF THE CONTROL UNIT

This is a multipurpose controller specially programmed for use with air-water cooling units and heat pumps equipped with a compressor with one single power stage.

#### Main functions

- Water temperature control (at inlet or outlet, As per parameter **r6**).
- Defrost cycle management.
- System operating and safety management.
- Fan speed control.
- Alarm management.
- Connection for supervision and remote assistance (serial connection accessory RS485).

#### Devices controlled

- Compressor
- Fans
- Four-way valve
- Water pump
- Alarm device
- Auxiliary heater

### STANDARD COMPONENTS

#### Control module

This is the central nucleus that processes the signals coming from the probes and protection elements of the entire system to control its active elements: compressor and fans, four-way valve, water circulating pump, alarm relay and auxiliary heater. Power supply 24 Vac.

It can also be used for access and control of the system by means of the display, buttons and LEDs available. It allows for selection of cool, heat and off functions. Operating parameters can also be modified, and the system can also be supervised.

#### Fan speed control module

Operates by phase cut-off. Includes fuse

#### NTC and ratiometric (pressure) probes

##### YLCA / YLHA PLUS 5 to 15 standard

4 NTC probes are used to read the temperatures of the system:

- B1. Controls the set point. Reads water temperature at exchanger inlet.
- B2. Antifreeze control. Reads water temperature at exchanger outlet.
- B3. Controls the dynamic set point. Reads outdoor air temperature.
- B4. Fan speed and defrost cycle control. Reads coolant pressure inside the battery.

##### YLHA PLUS, YLCA 20, 27 and YLCA 5 to 15 LAK (Low ambient Kit accessory)

3 NTC probes are used to read system temperatures and a ratiometric pressure transducer (B4) to read coolant pressure inside the coil:

- B1. Controls the set point. Reads water temperature at exchanger inlet.
- B2. Antifreeze control. Reads water temperature at exchanger outlet.
- B3. Controls the dynamic set point. Reads outdoor air temperature.
- B4. Fan speed and defrost cycle control. Reads coolant pressure inside the coil.

#### Parameters

The set of parameters that configure the operating program of the unit is divided into four levels (Factory, Super User, User and Direct), depending on the function of each parameter and the user's access level. The parameters of each level can be modified from that same level, as well as lower level parameters.

### **Factory Level**

Accessible with the Factory password. Allows configuration of all unit parameters.

### **Super User Level**

Accessible with the Super User password. Allows setting of Super User, User and Direct parameters.

### **User Level**

Accessible with password 22. Allows access to all parameters the user normally sets.

### **Direct Level**

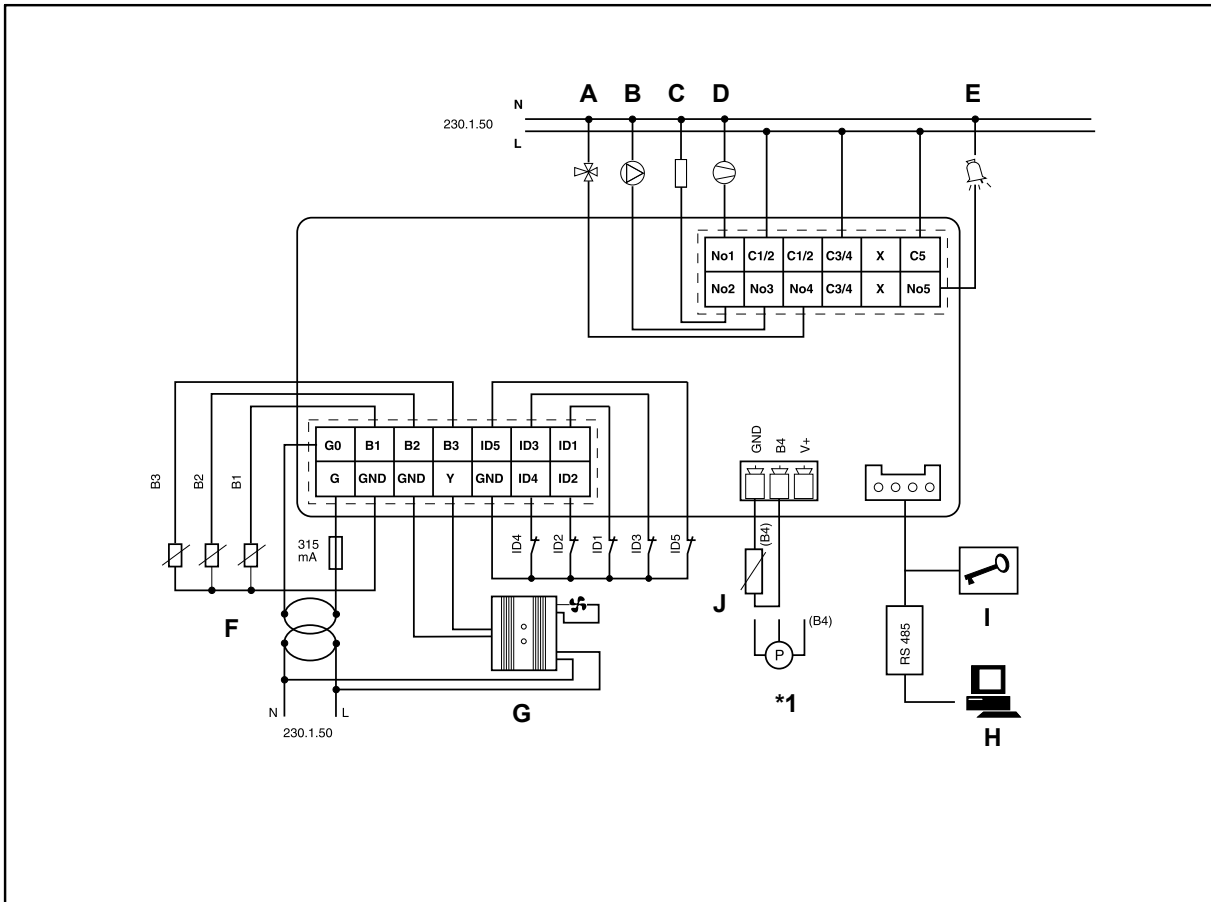
Accessible without a password. Allows for reading of the values detected by the probes, as well as other system values. Can be used by the user without affecting unit operation.

### **General**

Modification of the parameters that affect basic unit configuration should be made with the controller in Standby position.

## 1.2.1 General diagram

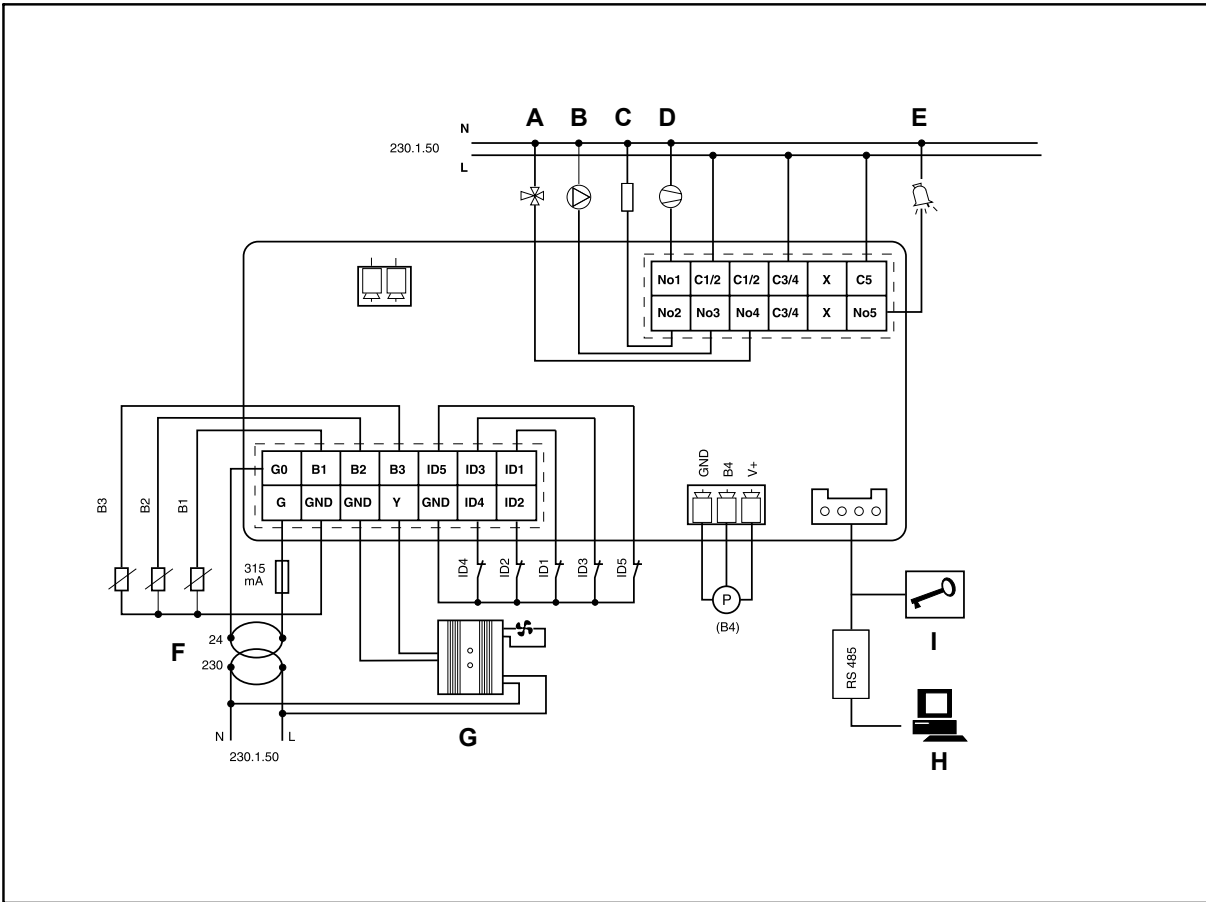
### General diagram YLCA 5 ÷ 15



A	Four-way valve	B2	Water outlet temperature probe (Antifreeze protection)
B	Pump	B3	Outdoor temperature probe in units with LAK
		B3	Battery probe in standard units (fan and defrost control)
C	Heater	B4	Outdoor probe standard units (Dynamic Set point)
D	Compressor 1	ID1	Water flow switch
E	Alarm	ID2	Remote COOL / HEAT
F	230 / 24 transformer	ID3	High pressure switch
G	Fan speed control	ID4	Low pressure switch
H	Communication	ID5	Remote ON / OFF
I	Programmable key	N	Neutral
J	Outdoor probe standard units	L	Phase
B1	Water inlet temperature probe (Control set point)		

(\*1): When the low ambient kit (LAK) is fitted, set the B4 probe as a pressure transducer and the B3 probe as an outdoor temperature NTC probe.

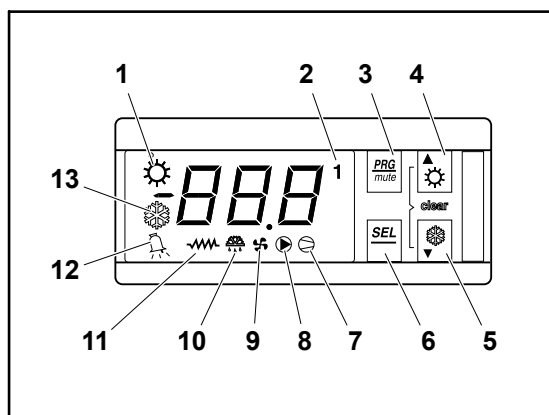
### General diagram YLCA 20 ÷ 27 and YLHA 5 ÷ 27



A	Four-way valve	B2	Water outlet temperature probe (Antifreeze protection)
B	Pump	B3	Outdoor temperature probe (Dynamic set point)
C	Heater	B4	Ratiometric pressure probe (fan speed and defrost control)
D	Compressor 1	ID1	Water flow switch
E	Alarm	ID2	Remote COOL / HEAT
F	230 / 24 transformer	ID3	High pressure switch
G	Fan speed control	ID4	Low pressure switch
H	Communication	ID5	Remote ON / OFF
I	Programmable key	N	Neutral
B1	Water inlet temperature probe (Control set point)	L	Phase

## 1.2.2 Symbols on the display

The display has three figures in green, plus the sign and one decimal. It also shows the symbols of the functions selected in orange (the alarm symbol is red).



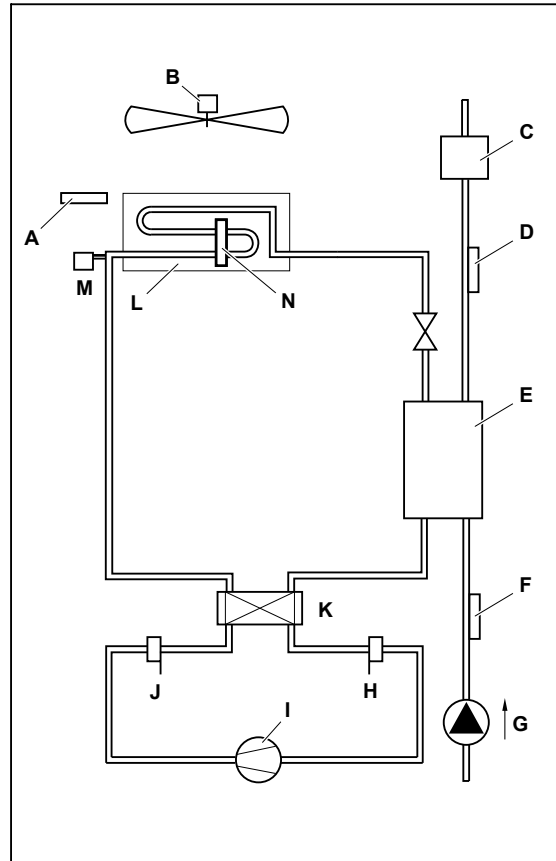
Button	Colour	Meaning	
		LED permanently lit	LED flashing
-2-	Orange	Compressor operating *	Timing start-up
-7-		Compressor on call	-
-8-		Water pump operating	-
-9-		Fans operating	-
-10-		Defrost active	-
-12-	Red	Alarm activated	-
-13-	Orange	Cool cycle	-
-1-		Heat cycle	-

(\*) Operational compressor number

Button	Unit status	Pressing
-3-	Loads default values	Applies voltage when pressed
	Returns to superior sub-group within the programming area until exiting it (saving changes in E2PROM)	Press once
-6-	Access to Direct parameters	Press for 5 seconds
	Selects a Direct parameter and shows its value / Confirms parameter changes	Press once
-3 + -6-	Parameter programming with password	Press for 5 seconds
-4-	Selection of higher parameter within the programming area	Press once or keep pressed down
	Increase value	Press once or keep pressed down
	Selection of heat function from standby position and vice versa (P6=1)	Press for 5 seconds
-5-	Selection of lower parameter within the programming area	Press once or keep pressed down
	Reduce value	Press once or keep pressed down
	Selection of cool function from standby position and vice versa (P6=1)	Press for 5 seconds
-4 + -5-	Manual alarm reset	Press for 5 seconds
	Clears hour counters (within programming area)	Press for 5 seconds
-6 + -4-	Forced manual defrost	Press for 5 seconds

### 1.2.3 Control layout

- |   |   |   |   |
|---|---|---|---|
| A | Outdoor temperature probe:<br>YLCA / YLHA PLUS 5 to 15 with LAK (B3)<br>YLCA / YLHA PLUS 5 to 15 standard (B4)<br>YLCA / YLHA PLUS 20 to 27 standard (B3) | H | Low pressure switch (LP)  |
| B | Fan   | I | Compressor  |
| C | Flow switch (FS)  | J | High pressure switch (HP)   |
| D | NTC water outlet probe (B2)   | K | Four-way valve  |
| E | Indoor heat exchanger   | L | Outdoor heat exchanger  |
| F | NTC water inlet probe (B1)  | M | Pressure sensor (BA)<br>(YLCA / YLHA PLUS 5 to 20 LAK)<br>(YLCA / YLHA PLUS 20 to 27) |
| G | Pump  | N | Outdoor exchanger NTC probe (B3)<br>(YLCA / YLHA PLUS 5 to 15)                        |



#### Parameter tables

The following tables show the parameters and their values, divided into groups:

Parameter level codes		Supervision variables	
<b>D</b>	Direct	<b>R/W</b>	Read/write parameter
<b>U</b>	User	<b>R</b>	Read-only parameter
<b>S</b>	Super user		
<b>F</b>	Factory		

## 1.2.4 Parameters relating to probes

Parameters relating to probes							
Display	Description	Level	VS	Unit	Max.	Min.	Value
/01	NTC B1 probe (water inlet): 0=Always ON (function not available) 1= Present	F	1 (R/W)	-	1	0	1
/02	NTC B2 probe (water outlet): 0=Always ON (function not available) 1= Present	F	2 (R/W)	-	1	0	1
/03	NTC B3 probe: 1= Condensation probe 2= Outdoor probe	F	14 (R/W)	-	1	0	(a)
/04	B4 probe: 0= Absent 1= ON/OFF 2= Outdoor NTC probe 3= Ratiometric 5 Vdc	F	15 (R/W)	-	3	0	(b)
/09	Minimum input voltage	F	18 (R/W)	0,01 Vdc	/10	0	50
/10	Maximum input voltage	F	19 (R/W)	0,01 Vdc	500	/09	450
/11	Minimum pressure	F	1 (R/W)	bar	/12	0	0
/12	Maximum pressure	F	2 (R/W)	bar	99,9	/11	45
/13	B1 probe calibration	F	3 (R/W)	°C	12	-12	0
/14	B2 probe calibration	F	4 (R/W)	°C	12	-12	0
/15	B3 probe calibration	F	5 (R/W)	°C	12	-12	0
/16	B4 probe calibration	F	6 (R/W)	bar	12	-12	0
/21	Digital filter	U	20 (R/W)	-	15	1	4
/22	Inlet limitation	U	21 (R/W)	-	15	1	8
/23	Measuring unit: 0=C 1=1F	U	5 (R/W)	-	1	0	0
b00	Probe viewed on display	U	24 (R/W)	-	7	0	0
b01	Value read by probe B1	D	70 (R)	°C	-	-	-
b02	Value read by probe B2	D	71 (R)	°C	-	-	-
b03	Value read by probe B3	D	72 (R)	°C	-	-	-
b04	Value read by probe B4	D	73 (R)	°C/bar	-	-	-

- (a) YLCA/YLHA PLUS 5 to 15 /03=1; YLCA/YLHA PLUS 5 to 15 LAK /03=2; YLCA/YLHA PLUS 20 to 27 /03=2  
 (b) YLCA/YLHA PLUS 5 to 15 /04=2; YLCA/YLHA PLUS 5 to 15 LAK /04=3; YLCA/YLHA PLUS 20 to 27 /04=3

## 1.2.5 Parameters relating to the compressor

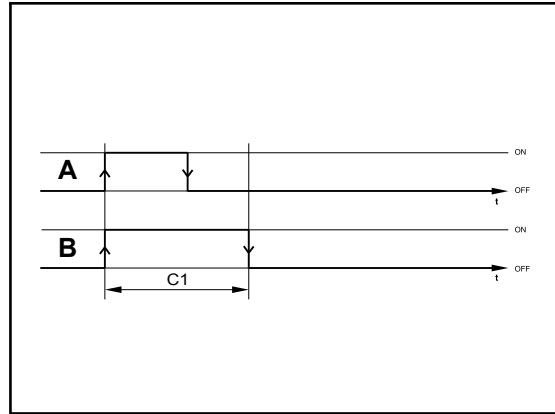
Parameters relating to the compressor							
Display	Description	Level	VS	Unit	Max.	Min.	Value
c01	Minimum operating time	U	25 (R/W)	Seconds	999	0	60
c02	Minimum stoppage time	U	26 (R/W)	Seconds	999	0	60
c03	Time between start-ups of one compressor	U	27 (R/W)	Seconds	999	0	300 (a)
							240 (b)
c06	Start-up timing	U	30 (R/W)	Seconds	999	0	10
c07	Compressor start-up delay with regard to the pump	U	31 (R/W)	Seconds	150	0	20
c08	Pump stoppage delay with regard to the compressor	U	32 (R/W)	Minutes	150	0	1
c10	Operating hour counter for compressor	D	90 (R)	Hours	800	0	-
c14	Operating hour counter for compressor maintenance	U	34 (R/W)	Hours	100	0	0
c15	Operating hour counter for pump	D	94 (R/W)	Hours	800	0	-
c17	Minimum time between pump start-ups	U	35 (R/W)	Minutes	150	0	5
c18	Minimum operating time for pump	U	36 (R/W)	Minutes	15	0	1

- (a) Units without Soft - Start  
 (b) Units with Soft - Start

### 1.2.6 Operating graphics

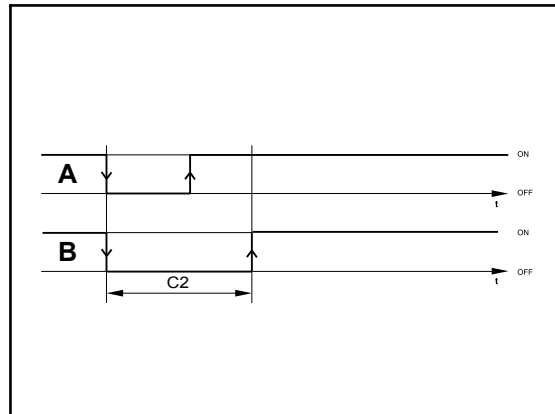
#### Min. operating time of a compressor

- A Signal
- B Compressor



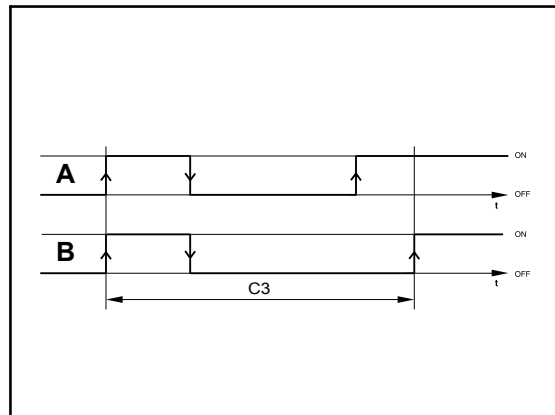
#### Min. stoppage time of a compressor

- A Signal
- B Compressor



#### Min. time between compressor start-ups

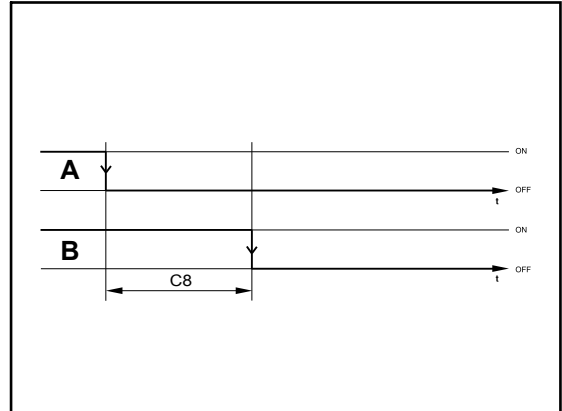
- A Signal
- B Compressor





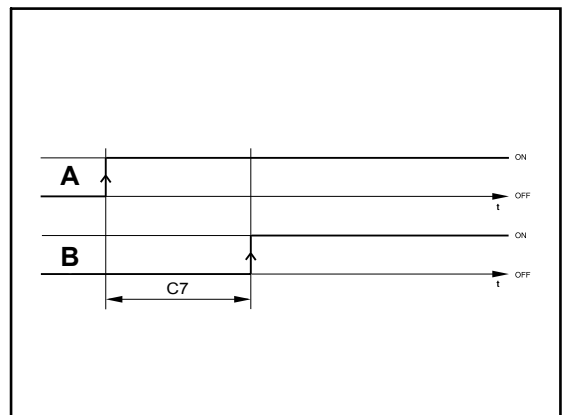
**Compressor / pump stoppage delays**

- A Compressor
- B Pump



**Pump / compressor start-up delays**

- A Pump
- B Compressor

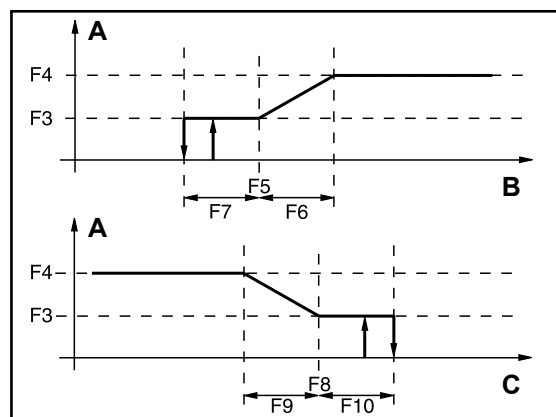


### 1.2.7 Parameters relating to fans

Parameters relating to fans							
Display	Description	Level	VS	Unit	Max.	Min.	Value
F01	Fan outlet: 0= Absent (function not available) 1= Present	F	10 (R/W)		1	0	1
F02	Operating mode: 0=Always ON (function not available) 1= parallel to the compressor (function not available) 2=ON/OFF operation (function not available) 3= parallel to the compressor and speed adjustment	U	48 (R/W)		3	0	3
F03	Minimum Triac voltage	F	49 (R/W)	step	F04	0	35
F04	Maximum Triac voltage	F	50 (R/W)	step	100	F03	85
F05	Minimum speed temp, cool cycle	F	24 (R/W)	°C	80	-40	30
	Minimum speed pressure, cool cycle (1)			bar			22,2
F06	Maximum speed temp differential, cool cycle	F	26 (R/W)	°C	50	0	15
	Maximum speed pressure differential, cool cycle (1)			bar			3,7
F07	Fan stoppage temp differential, cool cycle	F	28 (R/W)	°C	50	0	10
	Fan stoppage pressure differential, cool cycle (1)			bar			6,5
F08	Minimum speed temp, heat cycle	F	30 (R/W)	°C	80	-40	6
F09	Maximum speed differential, heat cycle	F	32 (R/W)	°C	50	0	3
F10	Fan stoppage temp differential, heat cycle	F	34 (R/W)	°C	F08	0	6
F11	Fan start-up time	F	51 (R/W)	Seconds	120	0	10
F12	Triac impulse duration	F	52 (R/W)	Seconds	10	0	2
F13	Fan management in defrost mode: 0= fan disabled 1= fan enabled in cool cycle mode (function not available). 2= fan disabled until the defrost end temperature is reached and with top-speed start-up during d16	F	53 (R/W)		2	0	2
F14	Fan operating when starting with high ambient temperature	U	91 (R/W)	Seconds	999	0	30

(1) Parameters to be checked when pressure probes are to be used (low ambient accessory) YLCA 5 to 15.

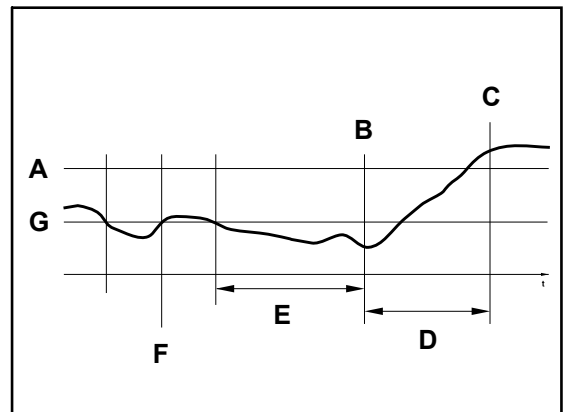
- A Fan speed
- B Condensing temperature
- C Evaporation temperature



## 1.2.8 Parameters relating to defrost

Parameters relating to defrost							
Parameters	Description	Level	VS	Unit	Max.	Min.	Value
d01	Defrost operation: 0= Absent (function not available) 1= Present	U	7 (R/W)	-	1	0	1
d02	Defrost at time or temperature: 0= Time (function not available) 1= Temperature / Pressure	U	8 (R/W)	-	1	0	1
d03	Defrost start temp	U	19 (R/W)	°C	d04	-40/	-3
	Defrost start pressure			bar		11	
d04	Defrost end temp	U	21 (R/W)	°C	80/	d03	20
	Defrost end pressure			bar	12		14,4
d05	Minimum defrost start time	U	37 (R/W)	Seconds	150	10	10
d06	Minimum defrost duration	U	38 (R/W)	Seconds	150	0	0
d07	Maximum defrost duration	U	39 (R/W)	Minutes	15	1	6
d08	Time between two defrost cycles	U	40 (R/W)	Minutes	150	10	30
d11	Activation of heaters during defrost: 0= No 1= Yes	U	9 (R/W)	-	0	1	1
d12	Compressor stoppage before defrost	F	43 (R/W)	Minutes	3	0	1
d13	Compressor stoppage after defrost	F	44 (R/W)	Minutes	3	0	1
d16	Forced ventilation time at defrost end (if F13=2 only)	F	47 (R/W)	Seconds	360	0	60

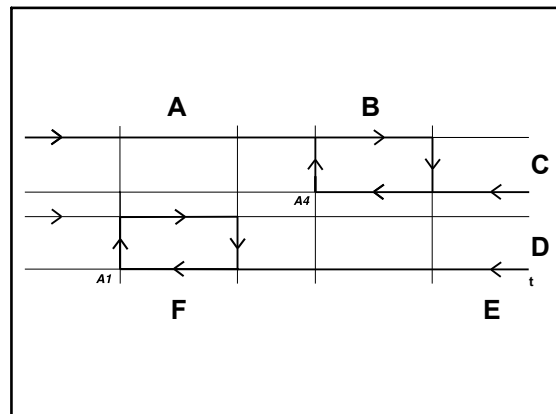
- |   |                                |   |                                  |
|---|--------------------------------|---|----------------------------------|
| A | Defrost end temperature (d04)  | E | Minimum defrost start time (d05) |
| B | Defrost start                  | F | Timer start                      |
| C | Defrost end                    | G | Defrost start temperature (d03)  |
| D | Maximum defrost duration (d06) |   |                                  |



### 1.2.9 Antifreeze control configuration parameters

Antifreeze control configuration parameters							
Parameters	Description	Level	VS	Unit	Max.	Min.	Value
A01	Antifreeze control set point temperature	U	11 (R/W)	°C	-	A07	3
A02	Antifreeze reset differential	U	12 (R/W)	°K	50	0,3	5
A03	Antifreeze alarm by-pass time	U	22 (R/W)	Seconds	150	0	0
A04	Antifreeze heater activation temperature	U	13 (R/W)	°C	r16	A01	3
A05	Antifreeze heater activation differential	U	14 (R/W)	°K	50	0,3	2
A06	Backup heater control probe: 0= Control probe 1= Antifreeze probe	F	6 (R/W)	-	1	0	0
A07	Minimum level antifreeze control set point temperature	U	15 (R/W)	°C	79	-40	3
A08	Heating heater activation set point temperature	U	16 (R/W)	°C	r15	A01	3
A09	Heating heater deactivation set point temperature differential	U	17 (R/W)	°C	50	0,3	3
A10	Automatic start-up by antifreeze alarm (unit in standby): 0= Function disabled 1= Water pump + heater 2= Water pump + heater + compressor (heat pumps only) 3= Heater	U	23 (R/W)		3	0	2

- A Antifreeze reset differential (A2)
- B Antifreeze heater activation differential (A5)
- C Heaters
- D Antifreeze alarm
- E Antifreeze heater activation temperature (A4)
- F Antifreeze set point temperature (A1)



## 1.2.10 Unit configuration parameters

Unit configuration parameters							
Display	Description	Level	VS	Unit	Max.	Min.	Value
H01	Unit model: 2= Water cooling unit 3= Air-water heat pump	F	54 (R/W)				2 (YLCA) 3 (YLHA PLUS)
H02	Number of ventilation circuits (do not modify this parameter)	F	12 (R/W)				0
H03	No. of evaporating units present (do not modify this parameter)	F	13 (R/W)				0
H04	No. of compressors per circuit (do not modify this parameter)	F	55 (R/W)				0
H05	Pump operation: 0= Absent 1= Always ON 2= ON upon controller call 3= ON upon controller and time call	F	56 (R/W)		3	0	1
H06	COOL/HEAT digital input: 0= Absent 1= Present	U	14 (R/W)		1	0	0
H07	ON/OFF digital input: 0= Absent 1= Present	U	15 (R/W)		1	0	0
H08	Network configuration (do not modify this parameter).	F	57 (R/W)		3	0	0
H09	Keyboard locked: 0= Disabled 1= Enabled	U	16 (R/W)		1	0	1
H10	Serial direction for monitoring: 0= Future use as terminal	U	58 (R/W)		200	1	1
H11	Output configuration (not selectable)	F	59 (R/W)		3	0	0
H12	4-way valve logic operation. Activated in cold cycle (do not modify this parameter)	F	60 (R/W)		3	0	0
H21	Second pump function (do not modify this parameter)	F	62 (R/W)		4	0	0
H22	Default parameter loading disabled: 0= Disabled 1= Enabled	F	18 (R/W)		1	0	1
H23	Modbus protocol setting: 0= Disabled 1= Enabled	F	11		1	0	0

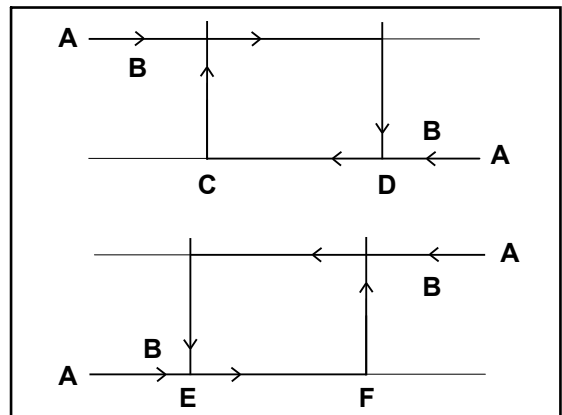
### 1.2.11 Alarm configuration parameters

Alarm configuration parameters							
Parameters	Description	Level	VS	Unit	Max.	Min.	Value
P01	Alarm delay by flow switch at start-up.	U	63 (R/W)	Seconds	150	0	20
P02	Alarm delay by flow switch with unit in operation.	U	64 (R/W)	Seconds	120	0	5
P03	Alarm delay by low pressure switch at start-up.	U	65 (R/W)	Seconds	200	0	60
P05	Alarm reset 6= High and low pressure switch manual reset at third activation in one hour. Antifreeze control is manually reset	F	67 (R/W)				6
P06	Cool and heat cycle symbols: 1= "Sun" heat cycle, "Snowflake" cool cycle 0= "Sun" cool cycle, "Snowflake" heat cycle	F	19 (R/W)		1	0	1
P08	Digital input 1 for flow switch. Do not modify this parameter	F	69 (R/W)				1
P09	Digital input 2 for the remote COOL/HEAT function. Do not modify this parameter	F	70 (R/W)				9
P15	Low pressure alarm selection: 0= Inoperative with the compressor OFF 1= Operative with the compressor OFF	F	76 (R/W)		1	0	1
P16	High-temperature alarm for return water	U	38 (R/W)	°C	80	-40	30
P17	High-temperature delay at start-up	U	77 (R/W)	Minutes	250	0	30
P18	High pressure alarm by transducer: 0= Function disabled	F	39 (R/W)	bar	99,9	0,1	41
P19	Low-temperature alarm for return water	U	40 (R/W)	°C	80	-40	10
P20	Alarm activation for high and low water temperature at start-up: 1= function enabled 0= function not enabled	U	20 (R/W)		1	0	0

## 1.2.12 Controller configuration parameters

Controller configuration parameters							
Display	Description	Level	VS	Unit	Max.	Min.	Value
r01	Cool cycle set point temperature	U	41 (R/W)	°C	r14	r13	12
r02	Cool set point temperature differential	U	42 (R/W)	°C	50	0,3	1
r03	Heat cycle set point temperature	U	43 (R/W)	°C	r16	r15	40
r04	Heat cycle set point temperature differential	U	44 (R/W)	°C	50	0,3	2
r06	Type of regulation: 0= Proportional. Temperature inlet. 1= Proportional + neutral zone. Inlet temp. 2= Proportional. Outlet temperature 3= Proportional + neutral zone. Outlet temp. 4= By time + dead zone. Outlet temperature (cooling units only)	F	79 (R/W)		4	0	0
r07	Neutral zone differential	F	45 (R/W)	°C	50	0	1
r08	(Only if r06=4) Maximum activation time. Outlet temperature.	F	80 (R/W)	Seconds	999	r09	120
r09	(Only if r06=4) Minimum activation time. Outlet temperature.	F	81 (R/W)	Seconds	999	c04	100
r10	(Only if r06=4) Maximum deactivation time. Outlet temperature.	F	82 (R/W)	Seconds	999	r11	120
r11	(Only if r06=4) Minimum deactivation time. Outlet temperature.	F	83 (R/W)	Seconds	999	c05	100
r12	(Only if r06=4) Compressor deactivation differential.	F	46 (R/W)	°C	50	0	1
r13	Cool cycle minimum set point temperature	U	47 (R/W)	°C	r14	-40	6
r14	Cool cycle maximum set point temperature	U	48 (R/W)	°C	80	r13	20
r15	Heat cycle minimum set point temperature	U	49 (R/W)	°C	r16	-40	25
r16	Heat cycle maximum set point temperature	U	50 (R/W)	°C	80	r15	45
r17	Summer offset constant	U	51 (R/W)	-	5	-5	-0,4
r18	Maximum set point distance	U	52 (R/W)	°K	20	0,3	3,2
r19	Summer offset start temperature	U	53 (R/W)	°C	176	-40	32
r20	Winter offset start temperature	U	54 (R/W)	°C	176	-40	5
r27	Inertia tank suppression. 0= No suppression. 1=Suppression in cold cycle 2=Suppression in heat cycle. 3= Always suppressed.	F	88 (R/W)		3	0	3
r28	Minimum low pressure determining time	F	89 (R/W)	Seconds	999	0	210
r29	Cool cycle low pressure differential	F	58 (R/W)	°C	50	0,3	3
r30	Heat cycle low pressure differential	F	58 (R/W)	°C	50	0,3	4
r31	Winter offset constant	U	60 (R/W)	-	5	-5	-0,4

- |   |                      |   |   |
|---|----------------------|---|---|
| A | Temperature          | D | HEAT set point (r03) + Differential (r04) |
| B | Compressor           | E | COOL set point (r01)                      |
| C | HEAT set point (r03) | F | COOL set point (r01) + Differential (r02) |



### 1.2.13 Alarm table

Alarm table		
Display	Alarm type	Reset
A1	Antifreeze alarm	Manual
Aht	High temperature at start-up (if activated, P20=1)	Automatic
ALt	Low temperature at start-up (if activated, P20=1)	Automatic
d1-2	Defrost operating	-
dF1-2	Problem in defrost	Automatic
E1	B1 probe	Automatic
E2	B2 probe	Automatic
E3	B3 probe	Automatic
E4	B4 probe	Automatic
ELS	Low voltage power supply	Automatic
EHS	High voltage power supply	Automatic
EPr	Eprom Error. Unit running.	Automatic
EPb	Eprom Error. On start-up	Automatic
ESP	Communication failure with expansion module	Automatic
EL	Problem at fan voltage control	Automatic
FL	Flow switch / pump protector	Manual
Hc	Compressor maintenance alarm	Automatic
HP	High pressure / Fan heat switch	Manual
Ht	High water temperature alarm	Automatic
L	Low charge alarm	Automatic
LP	Low pressure	Manual



## 1.2.14 Functions

### Alarm reset

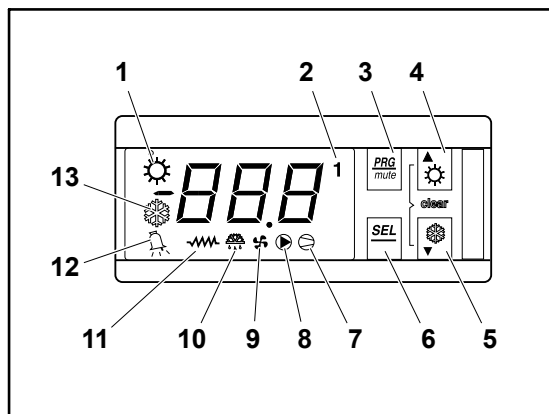
Pressing the **UP -4-** and **DOWN -5-** keys for 5 seconds cancels the alarms present in the memory. At the same time, the alarm message disappears from the display and the alarm relay is deactivated.

### Forced defrost (heat pumps)

Pressing the **SEL -6-** and **UP -4-** keys simultaneously for 5 seconds activates forced defrost of the unit.

### Clearing hour counters

While reading compressor or pump (c10 and c15) operating hours, said counters can be cleared by pressing the **UP -4-** and **DOWN -5-** keys simultaneously.



### Pump operation

4 operating modes can be selected in accordance with the value given to parameter H5.

- H5=0 (pump disabled).
- H5= 1 (pump always on),
- H5= 2 (pump running under control of regulator or in parallel with the compressor),
- H5= 3 (pump stops and starts at regular intervals irrespective of the compressor operation (parameters c17 and c18)).

### Calibration of probes

If necessary, probes can be calibrated by using parameters /13, /14, /15 y /16. See Table [Parameters relating to probes](#), see on page 13.

### Remote ON/OFF

A remote ON/OFF inlet can be connected between terminals D5 and B on the connecting strip. To activate said inlet, a value of 1 should be given to parameter H07 (H07= 1). With this inlet open the unit is OFF; when closed, the unit is ON. This option does not disable the ON/OFF function of the keyboard.

### Remote COOL/HEAT

A remote COOL/HEAT inlet can be connected between terminals D2 and B on the connecting strip. To activate said inlet, a value of 1 should be given to parameter H06 (H06= 1). With this inlet open the unit is in HEAT; when closed, the unit is in COOL. This function disables the COOL/HEAT function of the keyboard.

## 1.3 Regular maintenance activities for which the user is responsible

### 1.2.15 Temperature / resistance characteristics of NTC control probes (10 kOhms)

Temperature [°C]	Resistance [kOhms]	Temperature [°C]	Resistance [kOhms]	Temperature [°C]	Resistance [kOhms]	Temperature [°C]	Resistance [kOhms]	Temperature [°C]	Resistance [kOhms]
-50	329,2	-16	55,95	18	13,08	52	3,8	86	1,41
-49	310,7	-15	53,99	19	12,58	53	3,77	87	1,37
-48	293,3	-14	50,9	20	12,09	54	3,65	88	1,33
-47	277	-13	48,66	21	11,83	55	3,53	89	1,3
-46	261,8	-12	46,48	22	11,2	56	3,42	90	1,26
-45	247,5	-11	44,41	23	10,78	57	3,31	91	1,23
-44	234,1	-10	42,45	24	10,38	58	3,21	92	1,2
-43	221,8	-9	40,56	25	10	59	3,11	93	1,16
-42	209,8	-8	38,76	26	9,63	60	3,02	94	1,13
-41	198,7	-7	37,05	27	9,28	61	2,92	95	1,1
-40	188,4	-6	35,48	28	8,94	62	2,83	96	1,06
-39	178,3	-5	33,89	29	8,82	63	2,75	97	1,05
-38	168,9	-4	32,43	30	8,31	64	2,66	98	1,02
-37	160,1	-3	31,04	31	6,01	65	2,58	99	0,99
-36	151,8	-2	29,72	32	7,72	66	2,51	100	0,97
-35	144	-1	28,47	33	7,45	67	2,43	101	0,94
-34	136,6	0	27,28	34	7,19	68	2,36	102	0,92
-33	129,7	1	26,13	35	6,94	69	2,29	103	0,9
-32	123,2	2	25,03	36	6,69	70	2,22	104	0,87
-31	117,1	3	23,09	37	6,46	71	2,16	105	0,85
-30	111,3	4	22,09	38	6,24	72	2,1	106	0,83
-29	106,7	5	22,05	39	6,03	73	2,04	107	0,81
-28	100,4	6	21,15	40	5,82	74	1,98	108	0,79
-27	95,47	7	20,2	41	5,63	75	1,92	109	0,77
-26	90,8	8	19,48	42	5,43	76	1,87		
-25	86,39	9	18,7	43	5,24	77	1,81		
-24	82,22	10	17,98	44	5,08	78	1,76		
-23	78,29	11	17,24	45	4,91	79	1,71		
-22	74,58	12	16,55	46	4,74	80	1,66		
-21	71,07	13	15,9	47	4,59	81	1,62		
-20	67,74	14	15,28	48	4,44	82	1,57		
-19	64,54	15	14,68	49	4,3	83	1,53		
-18	61,62	16	14,12	50	4,16	84	1,49		
-17	58,66	17	13,57	51	4,02	85	1,45		

## 1.3 Regular maintenance activities for which the user is responsible

### 1.3.1 Maintenance Schedule

The HVAC unit is designed to require as little maintenance as possible. Nevertheless, to ensure the correct operation of the unit with a minimal use of electricity, a long working life and compliance with the regulations of each country, regular maintenance inspections must be made.

Johnson Controls Inc. shall not be considered responsible for any damage caused by improper maintenance of the HVAC unit, which includes anything inconsistent with that described in this document or others specifically provided with the unit.

### 1.3.2 Maintenance responsibilities of the user

Like any other machine, the HVAC unit requires regular maintenance, as the wear to which some of its parts are subjected can effect its mechanical reliability and the safety of those responsible for its maintenance.

In compliance with current regulations, the unit must be regularly inspected and the results recorded on the forms provided by the Labour and Health Authorities of the country where the HVAC unit is installed.

Users cannot access this form to perform maintenance and upkeep tasks on the unit.

There is no intent for the user to perform any maintenance tasks on the HVAC unit.



***It is strictly prohibited for the user to carry out any maintenance or upkeep tasks on the HVAC unit.***

***This appliance is not destined for use by people (including children) with limited physical, sensorial or mental capacities, or without adequate experience or knowledge, unless they have received instructions or been supervised in the use of the appliance by an individual responsible for their safety.***

***Children must be supervised at all times to ensure that they do not play with the appliance.***

***Only trained Johnson Controls Inc. personnel with the necessary means and tools may carry out maintenance and upkeep work on the unit.***

***Trained personnel must be aware of the health and safety regulations and procedures applicable to HVAC units. They should also be aware of general procedures and those applying specifically to this unit.***

***Contact a Johnson Controls Inc. Authorised Technical Assistance Service for scheduled maintenance on this unit.***

#### PRODUCT DISPOSAL

According to Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003, the presence of the symbol on the product or in the documents included with the product indicates that this product is classified, according to current law, as an electrical and electronic device and, therefore, this product cannot be dealt with at the end of its working life as domestic or urban waste.

The product must be taken to collection points for the recycling of waste electrical and electronic equipment.

The appropriate management, reuse, assessment and recycling of these products protect human health and the environment.

