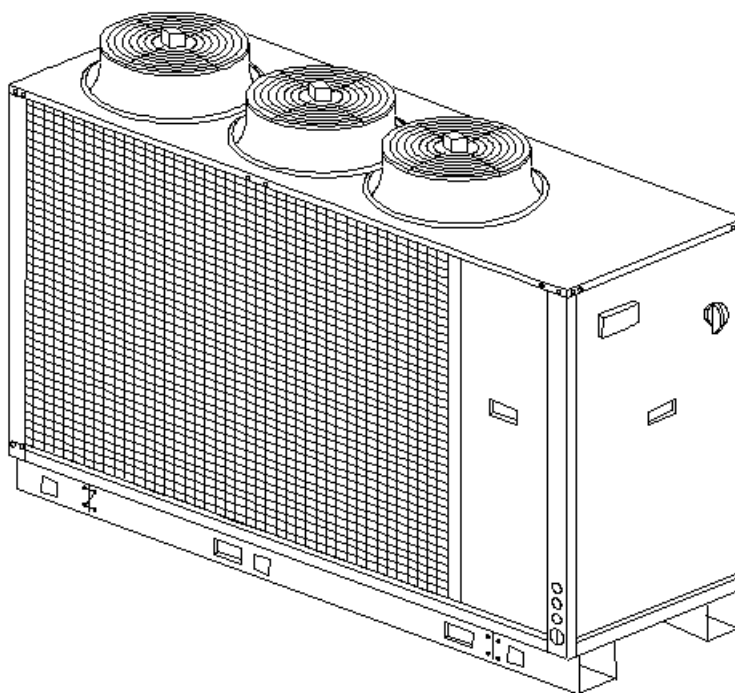




BY JOHNSON CONTROLS

Air-condensed water chillers and heat pumps YLHA 50, 60 and 80



User manual

Ref.: N-40290_EN 1110



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1

User manual

1.1 General description of the unit

The YLCA/YLHA units are high-performance air-water chillers and heat pumps using R-410A ecological refrigerant.

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

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

They are available in two versions: with and without a hydro kit, which includes a buffer tank and a high head pressure pump.

The control system of these units is a specially programmed electronic controller to be used on air-water chillers and heat pumps equipped with tandem compressors. 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 electric heater start-up. By reading the control sensors 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.

The YLCA/YLHA 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 40	YLCA 50	YLCA 60	YLCA 80	YLCA 100	YLCA 120	YLCA 150
Cooling capacity	39,6	52,1	60,5	77,6	99	119	151

Heat pump model	YLHA 40	YLHA 50	YLHA 60	YLHA 80	YLHA 100	YLHA 120	YLHA 150
Cooling capacity	37,8	52	60,5	72,2	96	114	145
Heating capacity	38,6	52,5	59,6	74,7	104	119,6	150

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

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

1.1.2 Technical specifications

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

Sheet 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

One, two or four hermetic Scroll compressors mounted in tandem on rails and antivibratory supports are used. Compressors are connected for operation with one single cooling circuit. Start-up is carried out by two independent starters. These compressors are equipped with mechanical elements that protect them against high operating temperatures. The crankcase heaters operate only when the compressor is inoperative.

Water side heat exchanger

Comprises a stainless steel plate exchanger, adequately insulated by a layer of closed-cell elastomer foam. Includes an antifreeze heater monitored by the controller. The refrigerant side of said exchanger accepts an operating pressure of 45 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).

Air side 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 at the front of the unit, and with IP44 protection. The operating and control components are factory mounted, wired and tested. The door of this control panel is equipped with a locking isolator that turns power supply off. Inside we find the contactors for compressors and the pump, the transformer, magneto-thermal protectors, controller electronic plates, 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.

Cooling circuit

The cool only unit cooling circuit includes: expansion valve, filter-dryer, liquid sight glass, high and low pressure switches, service valves for isolating the condensing unit, and Schrader valves on the high and low sides. The heat pump model also includes, in addition, a four-way valve (energized in summer cycle and during defrosts), retaining valves, a heat cycle expansion valve and a liquid tank. The suction tubing is coated with closed-cell elastomer.

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: Lined buffer tank and with an antifreeze heater, centrifugal pump, expansion vessel charged with nitrogen at 1.5 bar, safety valve set to 6 bar, water circuit, pressure gauge, two air bleed valves, filling 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.

Flow switch

Assures sufficient water flow when the unit is in operation.

Options and accessories

Units without hydro kit

This includes the elements described in the previously mentioned specifications, less the hydro kit (pack). The water circuit includes an air bleed valve. Connections are ready for on-site installation.

Two pumps

Accessory available with models 50 to 150 with hydro kit. The second pump becomes operative when the magnetothermal protector of the first pump is activated (models 50, 60 and 80), or through the controller program (models 100, 120 and 150).

Water filter

Supplied as a standard element on units including the hydro kit. Stainless steel mesh with 1 mm. diameter perforations. Optional on units not including the hydro kit. The warranty of the unit will not be valid if a water filter has not been installed.

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 noise level units (LN)

Include anti-noise covers mounted on the compressors and sound isolating plates, covering the compressor chamber.

Soft starter

For the soft motor start. Specially designed for Scroll compressors. (Maximum outdoor temperature: 50°C).

Protecting grids

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

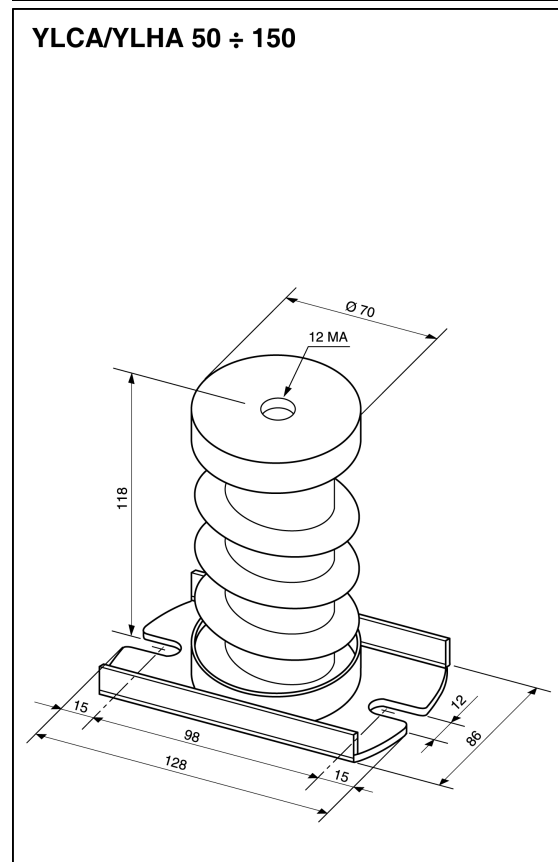
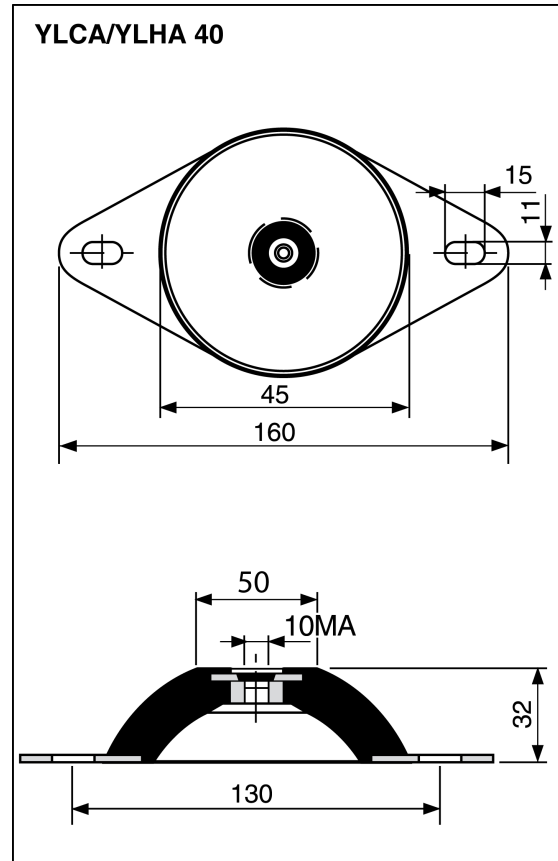
Antivibratory supports

Whenever necessary to reduce vibrations and noise produced by the unit to a maximum, a set of steel spring antivibratory 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.

The antivibratory support accessory for models YLCA/YLHA 40, 50 and 60 includes 4 units, whereas for models YLCA/YLHA 80, 100, 120 and 150 includes 6.

These spring supports should be distributed and fastened in the drilled holes at the base of the chiller, the location of which is detailed in the General Dimensions section.



1.2 Operating instructions µC2 (YLHA 50, 60 and 80)

DESCRIPTION OF THE CONTROL UNIT

This is a multipurpose controller specially programmed for use with air-water chillers and heat pumps equipped with a tandem compressor, two power stages and a single cooling circuit.

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 (accessory serial connection RS485).

Devices controlled

- Compressor
- Fans
- Four-way valve
- Water pump
- Alarm device
- Heaters

STANDARD COMPONENTS

Base control module for the system and the first compressor.

This is the central nucleus that processes the signals coming from the sensors and protection elements of the entire system to control its active elements: compressors and fans, four-way valve, water circulating pump, alarm relay and antifreeze 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.

Expansion and control module for the second compressor

This is an expansion of the base module to which it should be connected by means of two cables. It controls the operation of the second compressor.

Fan speed control module

Operates by phase cut-off. Includes fuse

NTC and ratiometric (pressure) sensors

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

- B1. Controls the set point. Reads water temperature at exchanger inlet.
- B2. Antifreeze control. Reads water temperature at exchanger discharge.
- B3. Controls the dynamic set point. Reads outdoor air temperature.
- B4. Fan speed and defrost cycle control. Reads refrigerant 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 upon 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 Super User, User and Direct parameters.

User Level

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

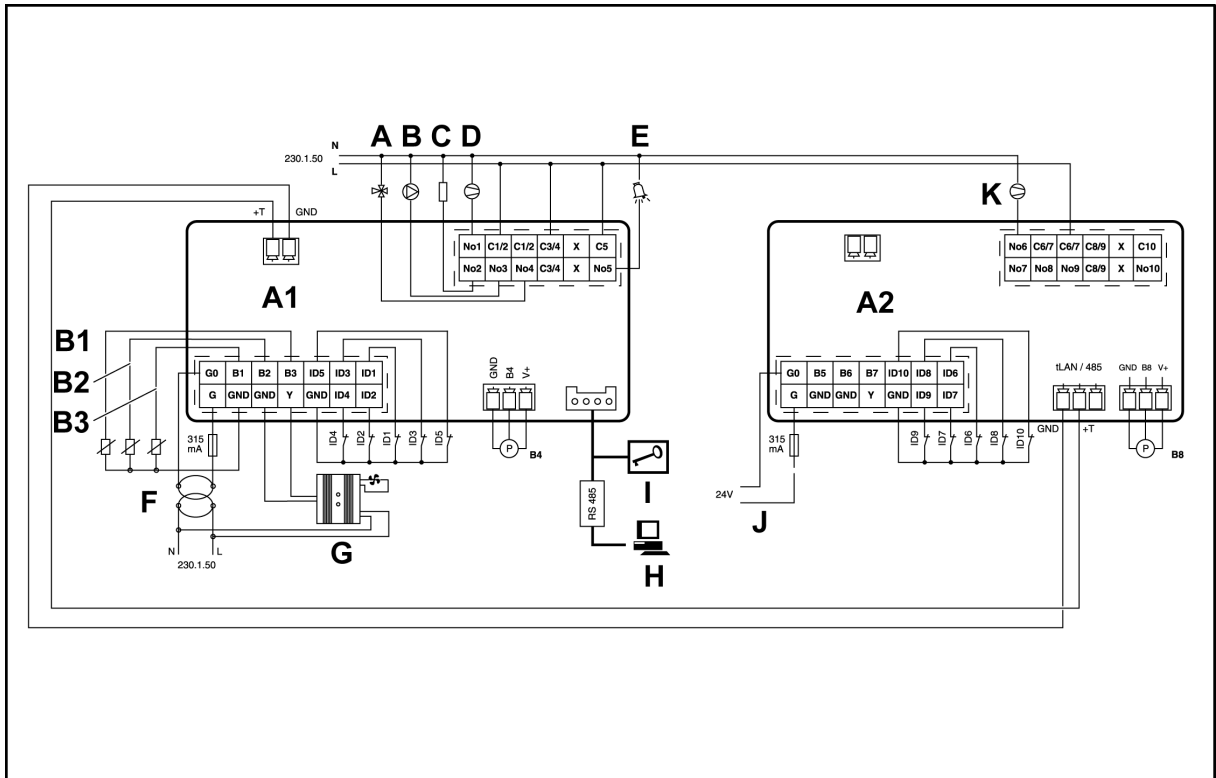
Direct Level

Accessible without a password. Allows for reading of the values detected by the sensors, 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.

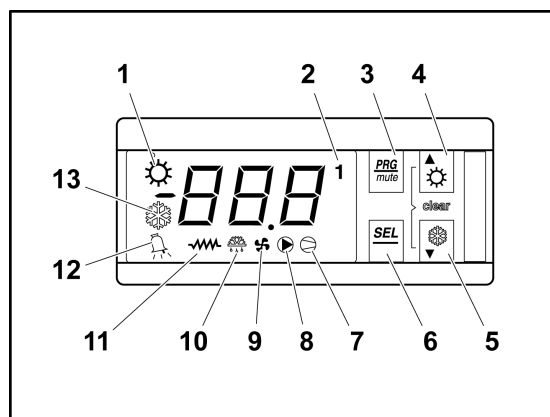
1.2.1 General diagram



A1	μ chiller ²	N	Neutral
A2	μ chiller ² (expansion)	L	Phase
A	Four-way valve	B1	Water inlet temperature sensor (Control set point)
B	Pump	B2	Water outlet temperature sensor (Antifreeze protection)
C	Heater	B3	Outdoor temperature sensor (Dynamic set point)
D / K	Compressor 1 / Compressor 2	B4, B8	Radiometric pressure sensor (Fan speed and defrost control)
E	Alarm	ID1	Remote COOL / HEAT Water flow control
F	230 / 24 transformer	ID2	Fan heat switches
G	Fan speed control	ID3, ID8	High-pressure switch
H	Communication	ID4, ID9	Low-pressure switch
I	Programmable key	ID5	Remote ON / OFF
J	Transformer connection	ID7	Flow switch
		ID10	General protection

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).



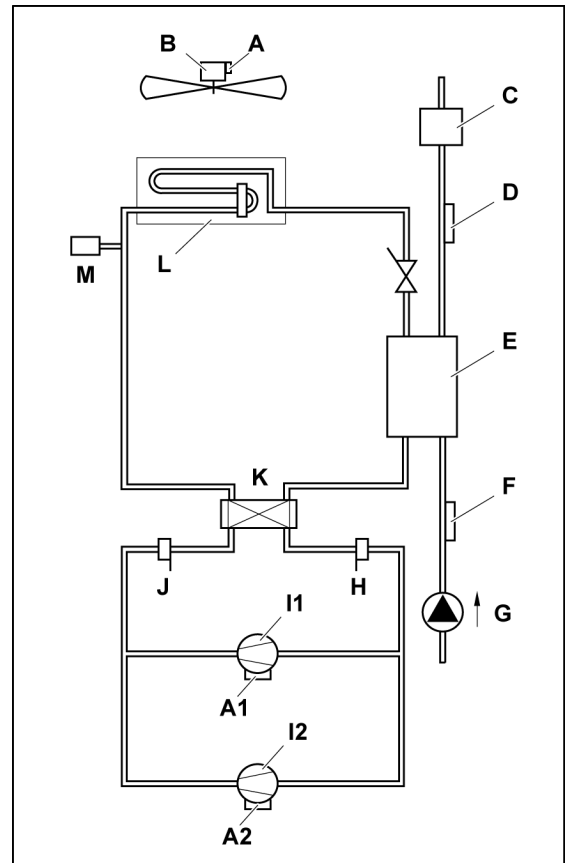
Button	Colour	Meaning	
		LED permanently lit	LED flashing
-2-	Orange	Compressor operating *	Timing start-up
-7-		Compressor on call	-
-8-		Water pump operating	-
-9-		Fans operating	-
-10-		Defrost active	-
-12-	Red	Alarm activated	-
-13-	Orange	Cool cycle	-
-1-		Heat cycle	-

(*) Operational compressor number

Button	Unit status	Pressing
-3-	Loads default values	Applies voltage when pressed
	Returns to superior sub-group within programming area until output of same (except 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- + -1-	Forced manual defrost	Press for 5 seconds

1.2.3 Location of controls (YLHA 50, 60 and 80)

- | | | | |
|----|---------------------------------|----|---------------------------|
| A | Fan heat switch (TK1, TK2, TK3) | G | Pump |
| A1 | Compressor 1 heat switch (A3) | H | Low-pressure switch (LP) |
| A2 | Compressor 2 heat switch (A4) | I1 | Compressor 1 (M1) |
| B | Fan -1 (M3, M4, M5) | I2 | Compressor 2 (M2) |
| C | Flow switch (FS) | J | high-pressure switch (HP) |
| D | NTC water outlet sensor (B2) | K | Four-way valve |
| E | Indoor heat exchanger | L | Outdoor heat exchanger |
| F | NTC water inlet sensor (B1) | M | Pressure sensor (B4) |



Parameter tables

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

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

1.2 Operating instructions µC2 (YLHA 50, 60 and 80)

1.2.4 Parameters relating to sensors

Parameters relating to sensors							
Display	Description	Level	VS	Unit	Max.	Min.	Value
/01	NTC B1 sensor (water inlet): 0= Absent (function not available) 1= Present	F	1 (R/W)	-	1	0	1
/02	NTC B2 sensor (water outlet): 0= Absent (function not available) 1= Present	F	2 (R/W)	-	1	0	1
/03	NTC B3 sensor (Outdoor temperature): 0= Absent	F	14 (R/W)	-	1	0	2
/04	B4 sensor: 0= Absent 1= ON/OFF 2= NTC 3= Ratiometric 5 Vdc	F	15 (R/W)	-	3	0	3
/08	B8-type sensor: 0= Absent 1= ON/OFF 2= NTC 3= Ratiometric 5 Vdc	F		-	3	0	3
/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 sensor calibration	F	3 (R/W)	°C	12	-12	0
/14	B2 sensor calibration	F	4 (R/W)	°C	12	-12	0
/15	B3 sensor calibration	F	5 (R/W)	°C	12	-12	0
/16	B4 sensor calibration (accessory)	F	6 (R/W)	bar	12	-12	0
/19	B7 sensor calibration	F		°C	12	-12	0
/20	B8 sensor calibration (accessory)	F		bar	12	-12	0
/21	Digital filter	U	20 (R/W)	-	15	1	4
/22	Input limitation	U	21 (R/W)	-	15	1	8
/23	Measuring unit 0=C 1=1F	U	5 (R/W)	-	1	0	0
b00	Sensor viewed on display	U	24 (R/W)	-	7	0	0
b01	Value read by sensor B1	D	70 (R)	°C	-	-	-
b02	Value read by sensor B2	D	71 (R)	°C	-	-	-
b03	Value read by sensor B3	D	72 (R)	°C	-	-	-
b04	Value read by sensor B4	D	73 (R)	bar	-	-	-
b07	Value read by sensor B7	D	76 (R)	°C	-	-	-
b08	Value read by sensor B8	D	77 (R)	bar	-	-	-

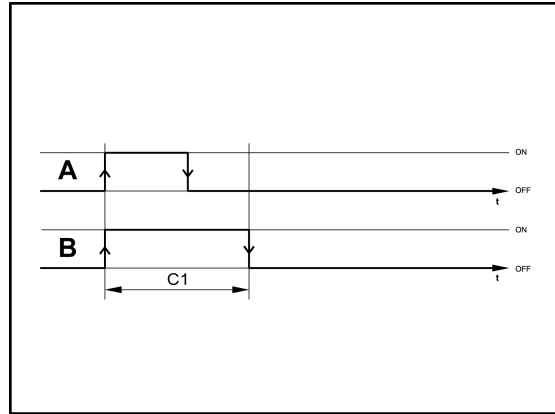
1.2.5 Parameters relating to the compressor

Parameters relating to the compressor							
Display	Description	Level	VS	Unit	Max.	Min.	Value
c01	Minimum operating time	U	25 (R/W)	Seconds	999	0	120
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
c04	Time between start-ups of two compressors	U	28 (R/W)	Seconds	999	0	3
c05	Time between stoppage of two compressors	U	29 (R/W)	Seconds	999	0	3
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 1	D	90 (R)	Hours	800	0	-
c11	Operating hour counter for compressor 2	D	91 (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	2

1.2.6 Operating graphics

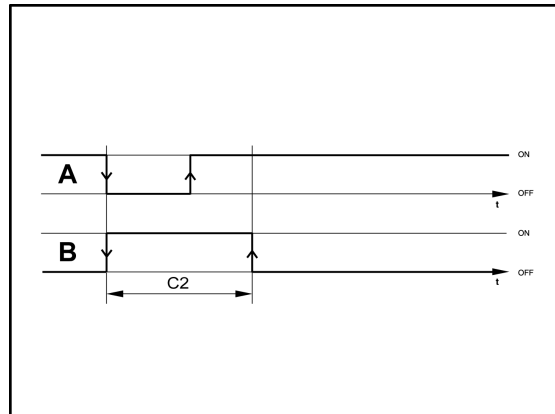
Min. operating time of a compressor

- A Signal
- B Compressor



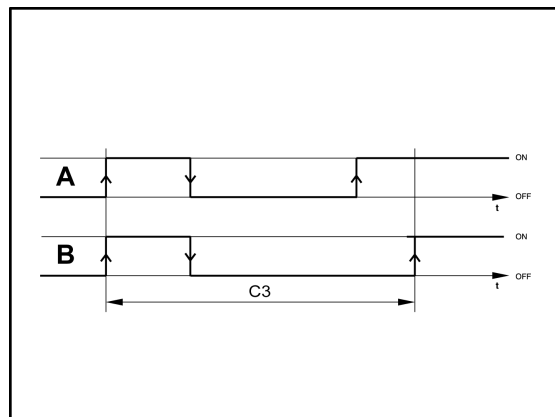
Min. stoppage time of a compressor

- A Signal
- B Compressor



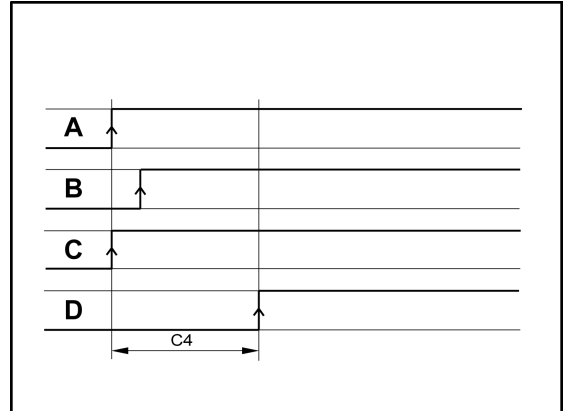
Min. time between compressor start-ups

- A Signal
- B Compressor



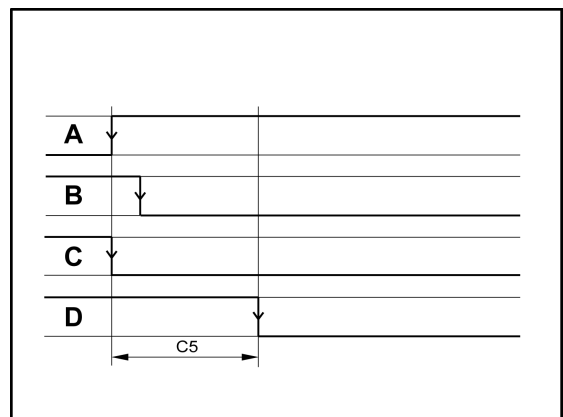
Min. time between start-up of two compressors

- A Signal 1 C Compressor 1
- B Signal 2 D Compressor 2



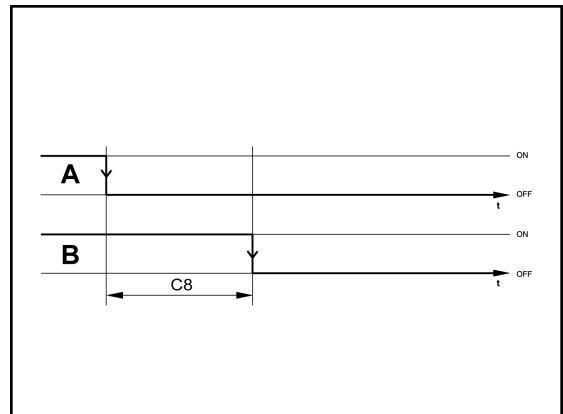
Time between stoppage of two compressors

- A Signal 1 C Compressor 1
- B Signal 2 D Compressor 2



Compressor / pump stoppage delays

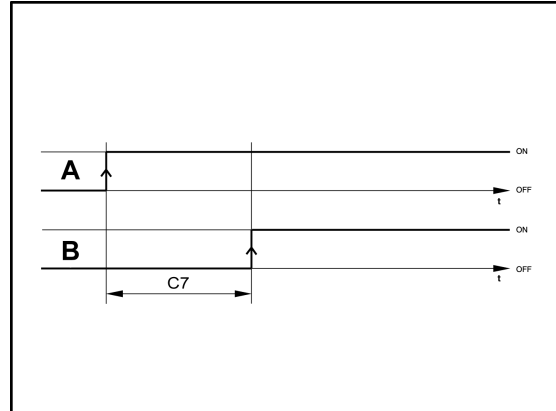
- A Compressor
- B Pump



Pump / compressor start-up delays

A Pump

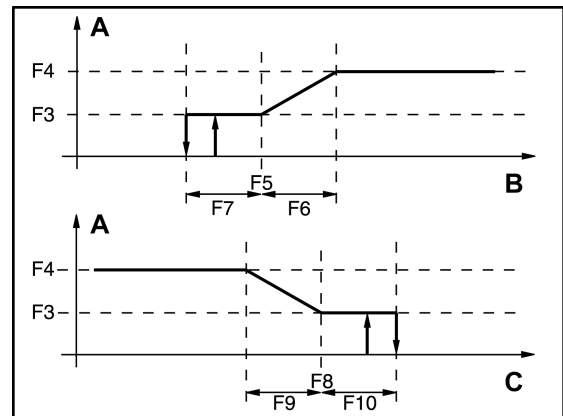
B Compressor



1.2.7 Parameters relating to fans

Parameters relating to fans							
Parameters	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 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	92
F05	Cool cycle minimum speed pressure	F	24 (R/W)	bar	80	-40	22,2
F06	Cool cycle maximum speed pressure differential	F	26 (R/W)	bar	50	0	3,7
F07	Cool cycle fan stoppage pressure differential	F	28 (R/W)	bar	50	0	6,5
F08	Heat cycle minimum speed pressure	F	30 (R/W)	bar	80	-40	8,7
F09	Heat cycle maximum speed differential	F	32 (R/W)	bar	50	0	0,9
F10	Heat cycle fan differential	F	34 (R/W)	bar	F08	0	1,9
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 defrost end temperature is reached and with start-up at maximum speed during d16	F	53 (R/W)		2	0	2

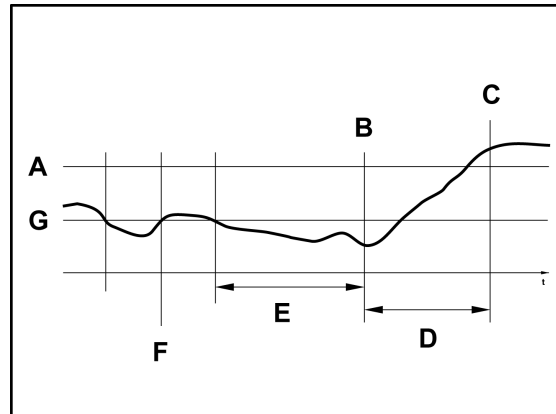
- A Fan speed
- B Condensing temperature
- C Evaporating temperature



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 pressure	U	19 (R/W)	bar	d04	/11	5,8
d04	Defrost end pressure	U	21 (R/W)	bar	/12	d03	18
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)	Minutes	360	0	60

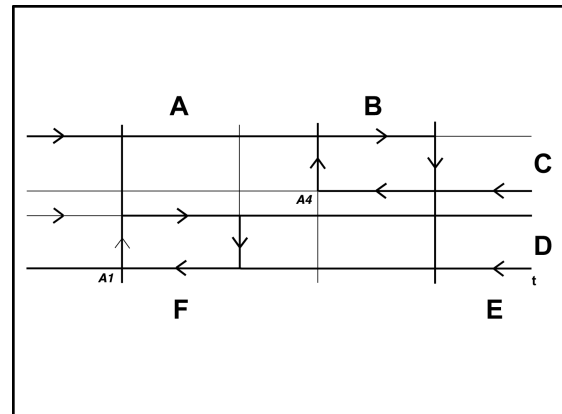
- A Defrost end temperature (d04)
- B Defrost start
- C Defrost end
- D Maximum defrost duration (d06)
- E Minimum defrost start time (d05)
- F Timer start
- G Defrost start temperature (d03)



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 bypass 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 sensor: 0= Control sensor 1= Antifreeze sensor	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= Start-up of water pump 2= Start-up of water pump and compressor in heat cycle (heat pumps only) 3= Heater operative	U	23 (R/W)		3	0	1

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



1.2 Operating instructions µC2 (YLHA 50, 60 and 80)

1.2.10 Unit configuration parameters

Unit configuration parameters							
Display	Description	Level	VS	Unit	Max.	Min.	Value
H01	Unit model: 2= Water chiller 3= Air-water heat pump	F	54 (R/W)				3
H02	Number of vent 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)				2
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	2
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

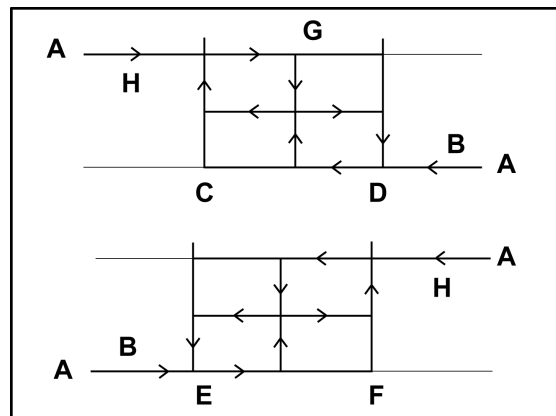
1.2.11 Alarm configuration parameters

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
P04	Partialisation in HP Preventive HP 0= Inactive 1= Active	U	66 (R/W)		1	0	1
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 remote Cool/Heat selection. Do not modify this parameter	F	69 (R/W)				9
P09	Digital input 2 for Fan heat protector function	F	70 (R/W)				6
P10	Digital input 6 for function. Not used.						0
P11	Digital input 7 for Flow switch function	F					1
P12	Digital input 10 for phase control function Do not modify this parameter	F					3
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	2
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	3
r05	Compressor rotation 0= Disabled 1= FIFO type 2= Per operating hours	F	78 (R/W)		2	0	2
r06	Type of regulation 0= Proportional. Inlet temperature. 1= Proportional+neutral zone. Input temp. 2= Proportional. Output temperature 3= Proportional+neutral zone. Output temp. 4= By time+dead zone. Output temperature (chillers only)	F	79 (R/W)		4	0	0
r07	Neutral zone differential	F	45 (R/W)	°C	50	0	1
r08	(If r06=4 only) Maximum activation time. Output temperature.	F	80 (R/W)	Seconds	999	r09	120
r09	(If r06=4 only) Minimum activation time. Output temperature.	F	81 (R/W)	Seconds	999	c04	100
r10	(If r06=4 only) Maximum deactivation time. Output temperature.	F	82 (R/W)	Seconds	999	r11	120
r11	(If r06=4 only) Minimum deactivation time. Output temperature.	F	83 (R/W)	Seconds	999	c05	100
r12	(If r06=4 only) 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

- A Temperature
- B First compressor
- C HEAT set point (r03)
- D HEAT set point (r03) + Differential (r04)
- E COOL set point (r01)
- F COOL set point (r01) + Differential (r02)
- G Differential /2 (r02 / 2)
- H Second compressor



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 sensor	Automatic
E2	B2 sensor	Automatic
E3	B3 sensor	Automatic
E4	B4 sensor	Automatic
E8	B8 sensor	Automatic
ELS	Low supply voltage	Automatic
EHS	High supply voltage	Automatic
EPr	Eprom. error. Unit operating.	Automatic
EPb	Eprom. error. At start-up	Automatic
ESP	Communication failure with expansion module	Automatic
EL 1-2	Problem at fan voltage control	Automatic
FL	Flow switch	Manual
Hc1/Hc2	Compressor maintenance alarm	Automatic
HP1/HP2	High pressure	Manual
Ht	High water temperature alarm	Automatic
LP1/LP2	Low pressure	Manual
PC1	Compressor partialisation (high pressure)	Automatic
tC1	Fan heat switches	Automatic
TP	Phase order fault/phase fault	Manual

1.2.14 Functions

Alarm reset

Pressing the UP and DOWN keys for 5 seconds cancels 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 and UP keys simultaneously for 5 seconds activates forced defrost of the unit.

Clearing hour counters

While reading compressor or pump (c10, c11 and c15) operating hours, said counters can be cleared by pressing the UP and DOWN 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 permanently on), H5=2 (pump ON controlled by the regulator or in parallel with the compressor), H5=3 (pump goes on and off at regular intervals, independent of compressor operation) (parameters c17 and c18).

Calibration of sensors

If necessary, sensors can be calibrated by using parameters /13, /14, /15, /16, /19 and /20. See Table [Parameters relating to sensors](#), see on page 12.

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.

Partialisation of compressors in (HP Prevent) high pressure

This function is activated if P04 = 1. If for any reason the high pressure is near the disconnecting point (P18-0.5 bar), this control deactivates one of the compressors and waits 10 seconds. After this interval, if the alarm persists, the unit will stop. If, on the other hand, the alarm disappears, the unit will continue to operate with one single compressor. In this situation, the message PC1 appears on screen. This condition will remain activated until the pressure drops below the F5 + F6 value. In this case, the unit recovers the previously deactivated compressor.

1.3 Regular maintenance activities for which the user is responsible

1.3.1 Maintenance Schedule

The air conditioning unit is designed to require as little maintenance as possible. Nevertheless, to ensure smooth operations 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 unit, which includes anything inconsistent with that described in this document or others specifically provided with the unit.

To make them easier, maintenance tasks have been grouped by time intervals in a series of tables. *Maintenance responsibilities of the user*, see on page 25.

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.

1.3 Regular maintenance activities for which the user is responsible

**DANGER**

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.

