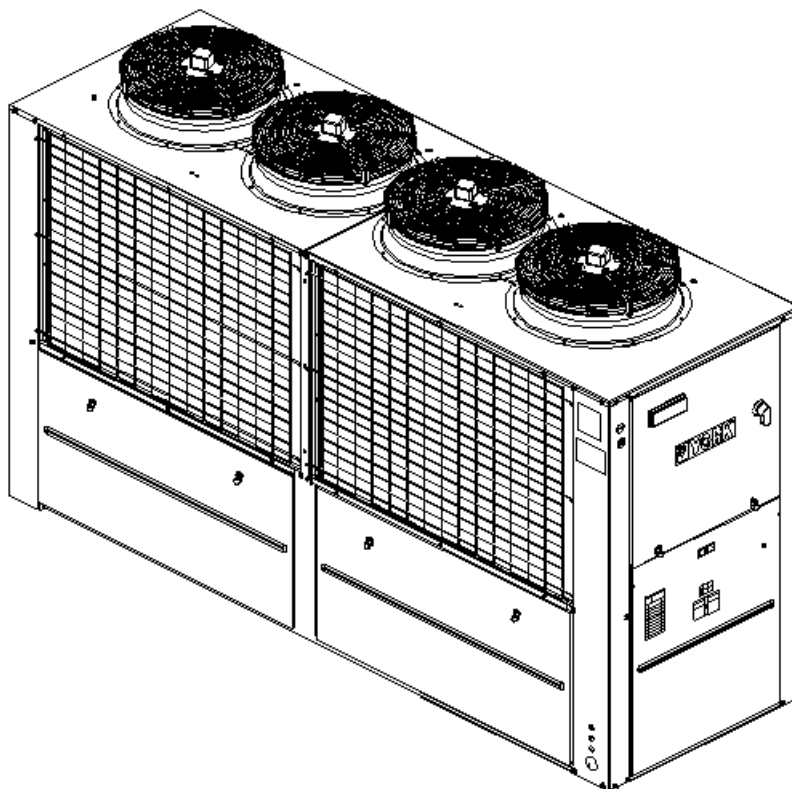




BY JOHNSON CONTROLS

Air-condensed water chillers and heat pumps YLCA / YLHA



Technical Information

Ref.: N-27697_EN 1110



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1

Technical Information

1.1 General Information

1.1.1 Nomenclature

Air-water chiller with axial fans / Air-water heat pump with axial fans			
	Nominal cooling capacity in kW	Voltage	
		M: Single-phase voltage (230.1.50)	
		T: Three-phase (400.3.50)	
			-: Without hydro kit (pack)
			P: With hydro kit (pack)
		M	-
YLCA / YLHA	60	T	P

1.1.2 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).

1.1.3 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.

1.1.4 Features and advantages

Features

- R-410A refrigerant
- Compact size
- Low height and weight
- Factory-tested equipment.
- Accessibility
- Main switch
- Microprocessor for control and alarms
- Manufactured to ISO 9001
- Variable speed fan
- Hydro kit
- Connection for communications

Advantages

- Does not harm the ozone layer
- Minimum footprint
- Space for installing on terraces
- Operating quality control
- Easy maintenance
- Operator safety
- Easy and safe operation
- High quality level
- Low noise level and condensation control
- For installations with low water volume
- Ideal for building management

1.1.5 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.

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).

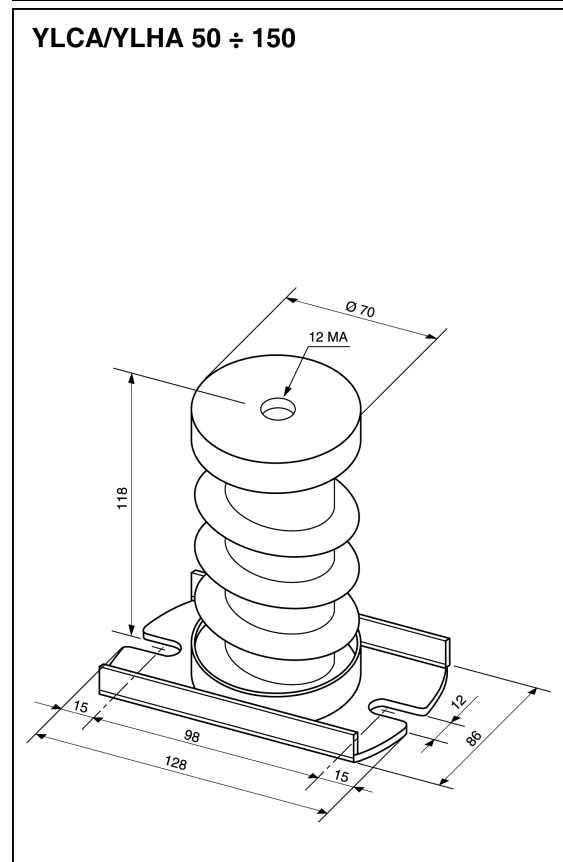
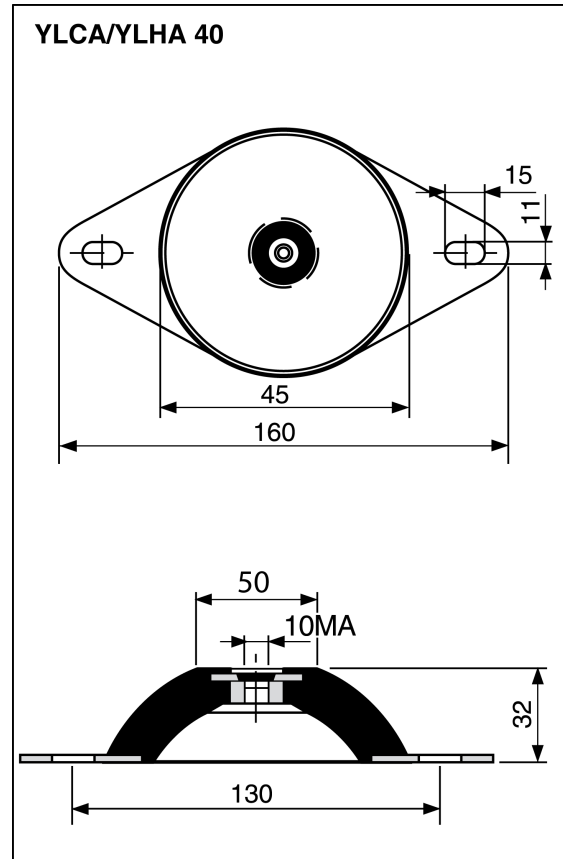
Antivibratory supports

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 Safety instructions

This document contains the necessary information for the safe and efficient transportation, assembly and installation of the air conditioning unit. This guarantees the condition of the unit and its operating safety.

Only an authorised company may assemble the air conditioning unit.



ATTENTION

Only authorised companies with the appropriate technical resources and suitably trained personnel may install the air conditioning unit.



CAUTION

The specialists responsible for installing the air conditioning unit must make sure they have all of the information and knowledge required to correctly install, test and deliver the unit. Johnson Controls Inc. shall not be considered responsible for any damage caused by installation of the unit that is not consistent with that described in this document or others specifically provided with the unit.

During regular equipment installation, the fitter must pay special attention to certain situations in order to prevent injuries or damage to the unit.

Situations that could jeopardise the safety of the fitter or that of others nearby or that could put the unit itself at risk are clearly indicated in this manual.

A series of special symbols are used to clearly identify these situations.

Pay careful attention to these symbols and to the messages following them, as your safety and the safety of others depends on it.

1.3 Icons used in this document



DANGER

- *The text following this symbol contains information and instructions relating directly to your safety and physical wellbeing.*
- *Not taking these instructions into account could lead to serious, very serious or even fatal injuries to you and others in the proximities of the unit.*

Information can also be found on safe procedures during unit handling. This will help reduce the risk of accidents.



CAUTION

- *The text following this symbol contains information and instructions relating directly to your safety and physical wellbeing.*
- *Not taking these instructions into account could lead to minor injuries to you and others in the proximities of the unit.*
- *Not taking these instructions into account could lead to unit damage.*

Information can also be found on safe procedures during unit handling. This will help reduce the risk of accidents.



NOTE

- *The text following this symbol contains information or instructions that may be of use or that is worthy of a more thorough explanation.*
- *Instructions regarding inspections to be made on unit parts or systems may also be included.*

1.4 Instructions for storage, transport, loading and unloading of the unit



CAUTION

Outdoor units must be moved and stored vertically to prevent oil from leaking from the compressor.

Delivery inspection

The unit should be carefully inspected for visible damage or abnormalities as soon as it is received.

Any abnormalities or damage to the unit should be communicated to both the transportation and insurance company in writing.

Storage instructions

The unit should be stored in a place suitable to the purpose (warehouse or similar), protected from the weather, water, humidity and dust.

Cover the unit with a canvas of a suitable size.

The unit should be appropriately protected from knocks and dust, ensuring the protective parts it was supplied with remain in place. Where these are not in place, establish the necessary protection and barriers to keep vehicles or fork-lift trucks away.

Transport, loading and unloading of the unit

The units should only be handled by personnel from the company responsible for their installation.

Transport of the unit should be in such a manner that no damage is caused by faulty or inadequate mooring to the bed or body of the vehicle.

Where necessary, protect all of the edges of the unit against knocks and scratches and moor it to the bed or body of the vehicle using suitable textile belts or slings to keep it perfectly still.

Loading and unloading the unit from a truck or trailer should be on flat, solid ground using an appropriate crane with sufficient capacity.

1.4.1 Inspection

Upon reception, inspect the goods and notify the carrier and the insurance company, in writing, of any possible damage during transportation.

1.4.2 Disposal of packaging

The packaging is recyclable. Dispose of it in the appropriate place or take it to an appropriate collection centre. Respect the regulations in force for this type of waste in the country where the unit is being installed.

Packaging remains must be correctly disposed of. Improper disposal of packaging generates environmental problems that affect human life.

1.4.3 Disposal of the unit

When removing the unit, the components must be ecologically recovered. The refrigeration circuit is full of refrigerant that must be extracted and delivered to the gas manufacturer for recycling.



ATTENTION

The refrigerant gas contains greenhouse-effect fluorinated gas covered by the Kyoto protocol.

Please see the specifications plate for type of gas and quantity per system.

GWP (Global Warning Potential): 2088

There will be oil left in the hermetic compressor, therefore it must be delivered with the circuit sealed.

The air conditioner shall be deposited in the area established by local authorities, to facilitate its selective recovery.

1.4.4 Handling

The unit must be moved using the metal rails provided for its installation and transport

1.5 Selection guide (YLCA/YLHA)

Necessary information

The following information is needed to select a YLCA/YLHA water chiller:

- 1 Cooling capacity needed
- 2 Design cold water input and output temperatures.
- 3 Design water flow, if one of the temperatures of Point 2 above is unknown.
- 4 Design input temperature of air to condensing unit. Normally, this will be the design ambient temperature of summer air, unless influenced by the situation or other factors.
- 5 Altitude above sea level.
- 6 Design fouling factor of the evaporating unit.



NOTE

Points 1, 2 and 3 should be related by means of the following formulae:

$$\text{Cooling capacity kW} = \frac{\text{l/h cold water} \times \text{differential } ^\circ\text{C}}{860}$$

SELECTION EXAMPLE

A chiller is required to chill water from 13°C to 7°C, with a cooling capacity of 119 kW.

There are also other design conditions:

- Ambient air entering the condensing unit 35°C
- Fouling factor: 0.044 m² °C/kW
- Altitude: Sea level

Taking a quick look at the table, we can see that a YLCA 120 unit gives an approximate required capacity of 119 kW.

As the factors appearing in Tables and *Altitude factors, see on page 18* are not applicable, the conditions will be as follows:

- Cooling capacity: 119 kW
- Power consumed: 40 kW
- Water temperature: 13°C to 7°C (Temp. difference of 6)

$$\text{Water flow} = \frac{119 \times 860}{6} = 17\,056 \text{ l/h}$$

Available pressure in hydraulic circuit of a unit with pack:

- From the table we infer that the YLCA 120 TP, with a 17 056 l/h flow, has an available pressure of 279 kPa.

Pressure drop in hydraulic circuit of a unit without pack:

- From the table we infer that the YLCA 120 T, with a 17 056 l/h flow, has an available pressure drop of 23 kPa.

Pressure drop in filter:

- From Table *Pressure drop in filters, see on page 22*, 2 ½" filter, we infer that with a 17 056 l/h flow, said filter has a pressure drop of 2.4 kPa.

YLHA selection method

- 1 Determine the correct size of the YLHA unit by selecting a model from Tables 3, 4 and 5 that is closest to the cooling and heating capacities required in the design conditions of the water outlet and air inlet temperatures.
- 2 Apply fouling (Table 11) and altitude (Table 12) correcting factors to the capacity and power values that appear in the corresponding capacity tables in cool and heat. Make sure the corrected capacity is still sufficient for your needs.
- 3 Using the corrected capacities of the unit, select the design temperature differential, or the flow.
- 4 Check to make sure that these selections are within the YLCA/YLHA operating limits.

YLHA SELECTION EXAMPLE

A YLHA heat pump operating at a 35°C ambient temperature should chill water from 13°C to 7°C, with a 112 kW cooling capacity.

A 110 kW heating capacity is required in 5°C design ambient temperature and a hot water output temperature of 40°C.

The fouling factor is 0.044 m² °C/kW, with the unit operating at sea level (no corrections). With a quick glance of capacity Tables 3 and 5, we see that a YLHA 120 heat pump gives the approximate required capacities of:

- Cooling capacity = 114 kW
- Total unit absorbed power = 43.2 kW
- Cold water temperature = 13 °C to 7 °C (Temp. diff. of 6 °C)
- Hot and cold water flow = 16 340/h
- Heating capacity = 110.1 kW
- Total unit absorbed power in heat mode = 35.8 kW
- Hot water output temperature = 40°C

$$\text{Hot water temp. dif-ferential} = \frac{110.1 \times 860}{16\,340} = 5.8 \text{ °C}$$

Thus, hot water return temperature is = 34.2°C

All values are within operating limits:

- Available pressure in hydraulic circuit of a unit with pack:
- From Table 6 we infer that the YLCA 120, with a 16 340 l/h flow, has an available pressure of 289 kPa.
- Pressure drop in hydraulic circuit of a unit without pack:
 - From the table we infer that the YLCA 120, with a 16 340 l/h flow, has an available pressure of 21 kPa.
- Pressure drop in filter.
 - From Table [Pressure drop in filters](#), see on page 22, 2 ½" filter, we infer that with a 16 340 l/h flow, said filter has a pressure drop of 2.2 kPa.

1.5.1 Selection guide with glycol (cooling only units)

Necessary information

The following information is needed to select a YLCA water chiller:

- 1 Cooling capacity needed
- 2 Design cold water/glycol input and output temperatures.
- 3 Design water/glycol flow.
- 4 Design input temperature of air to condensing unit. Normally, this will be the design ambient temperature of summer air, unless influenced by the situation or other factors.
- 5 Altitude above sea level.
- 6 Design fouling factor of the evaporating unit.



NOTE

Points 1, 2 and 3 should be related by means of the following formulae:

$$\text{Capacity (kW)} = \frac{\text{Temp. diff. (}^\circ\text{C)} \times \text{Flow (litres/sec.)}}{\text{Glycol factor}}$$

$$\text{Temp. diff. (}^\circ\text{C)} = \text{Liquid inlet Temp.} - \text{Liquid output Temp.}$$

To determine the glycol factor, please see [Glycol concentration and correcting tables](#), see on page 16 (Recommended ethylene glycol concentrations) for ethylene glycol or (Recommended propylene glycol concentrations) for propylene glycol. For design output temperature, please see the recommended glycol concentration and the glycol factor in this concentration. This is the minimum concentration to be used for design output temperature. If a greater concentration is required, the glycol factor can be determined by means of [Glycol concentration and correcting tables](#), see on page 16 (Ethylene glycol in other concentrations) or (Propylene glycol in other concentrations).

Selection method

- 1 Determine the correct chiller model by selecting the one that is closest to the capacities required by the design conditions of the glycol outlet and air inlet temperatures.
- 2 Apply the fouling correcting factors that correspond to the fouling, altitude and glycol concentration factor, to the capacity and power values in the capacity tables. Make sure the corrected capacity is still sufficient for your needs.
- 3 Using the corrected capacities of the chiller, set the design temperature range, or the flow, to balance the formulae appearing in [Selection guide \(YLCA/YLHA\)](#), see on page 10.
- 4 Always recheck to make sure these selections are within the specified design limits.

Selection example

A chiller is required to chill ethylene glycol from 1 a to -4°, with a capacity of 75 kW.

The following design conditions are applicable:

- Fouling factor: 0.088m °C/kW
- Altitude: 1,200m
- Ambient air: 25°C
- Glycol concentration: 30% w/w

For a -4°C ethylene glycol output, the concentration recommended in Figure 1 is 30%. Therefore, the specified concentration is appropriate.

From Table [Cooling capacities YLCA 40 ÷ 150 \(35% ethylene glycol\)](#), see on page 37, we infer that a YLCA-120 unit, at the established design conditions, gives a capacity of 76.8 kW and a consumption of 28.8 kW.

With the design fouling factor, use the capacity correcting factors x 0.987 and power x 0.995 (see [Fouling factors](#), see on page 15).

On design altitude, apply the capacity correcting factors x 9.973 and power x 1.020 (see [Altitude factors](#), see on page 18).

On design glycol concentration, apply the capacity correcting factors x 1.015 and power x 1.005 (see [Correcting factors for other glycol concentrations, see on page 18](#)).

Applying these factors to the selection: YLCA -120

$$\text{Capacity} = 76.8 \times 0.987 \times 0.973 \times 1.015 = 74.9 \text{ kW}$$

$$\text{Comp. power} = 28.8 \times 0.995 \times 1.020 \times 1.005 = 29.4 \text{ kW}$$

For the specified glycol concentration and a -4C output temperature, Figure 3 shows a 0.248 glycol factor. Thus, the flow can be determined with the formula appearing in [Selection guide \(YLCA/YLHA\), see on page 10](#).

$$74.9 \text{ [kW]} = \frac{(1 - (-4)) \times \text{Flow [l / s]}}{0,248}$$

$$\text{Flow} = \frac{74.9 \times 0.248}{5} = 3.71 \text{ [l / s]} \text{ or } 13374 \text{ [l / h]}$$

This covers the Limits of Use.

The evaporating unit pressure drop can be determined by taking the water pressure drop value for a YLCA 120 unit and multiplying it by the correcting factor (see [Glycol concentration and correcting tables, see on page 16](#)) for a 30% concentration and an average temperature of -1.5°C, that is to say:

$$-1.5 \text{ °C} = \frac{1 + (-4)}{2}$$

$$16 \text{ kPa} \times 1.22 = 19.5 \text{ kPa.}$$

1.6 Technical data

1.6.1 Limits of use

Model	Voltage limits		Input air temperature to the coil DB				Water output temperature				Temperature diff. between water output and inlet	
	Nominal at 400		Operating cycle				Operating cycle				Mini- mum °C	Maxi- mum °C
	Mini- mum	Maxi- mum	Minimum °C		Maximum °C		Minimum °C		Maximum °C			
			Cold	Heat	Cold	Heat	Cold	Heat	Cold	Heat		
YLCA	342	436	-18	-	46	-	5(1)	-	15	-	3	7
YLHA				-10		20		30		50(2)		

- (1) At lower water temperatures, it is advisable to use glycol-type antifreeze mixtures. Minimum temp. with glycol -5°C
- (2) 50°C if the inlet air is 0°C.

Prior to final approval of the installation

Check:

- Voltage remains between 342 - 436 V.
- Power supply cable cross-section is at least as indicated in the corresponding wiring diagrams. The cable used for the unit power supply must be H05 RN - F.
- Operating instructions have been given to the user.
- The warranty card has been filled out.
- Maintenance instructions have been given, or a regular maintenance contract has been signed.

1.6.2 Correction Factors

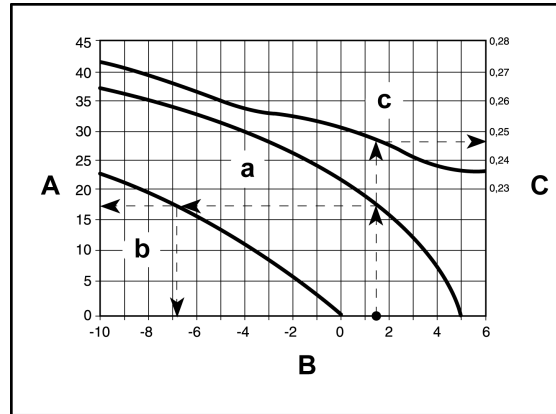
Fouling factors

Evaporator		
Fouling Factor m ² °C/kW	Capacity factor	compressor absorbed power factor
0,044	1	1
0,088	0,987	0,995
0,176	0,964	0,985
0,352	0,926	0,962

Glycol concentration and correcting tables

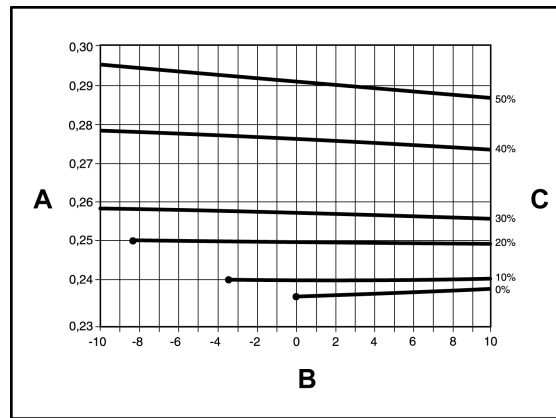
Recommended ethylene glycol concentrations

- | | | | |
|---|---|---|---|
| A | % in weight | a | Recommended concentration % in weight |
| B | Outlet liquid temperature °C | b | Freeze point |
| C | Glycol factor L/S °C/kW in recommended concentrations | c | Glycol factor in recommended concentrations |



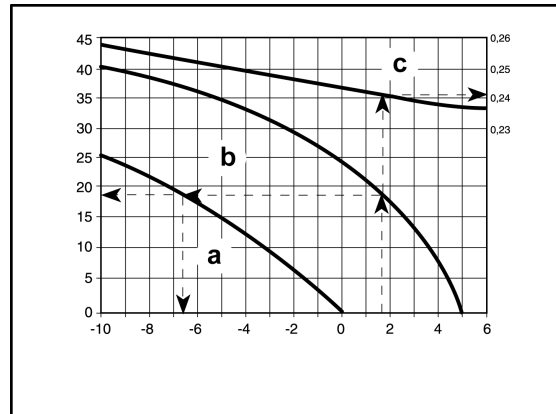
Ethylene glycol in other concentrations.

- | | |
|---|------------------------------|
| A | Glycol factor |
| B | Outlet liquid temperature °C |
| C | Glycol factor |



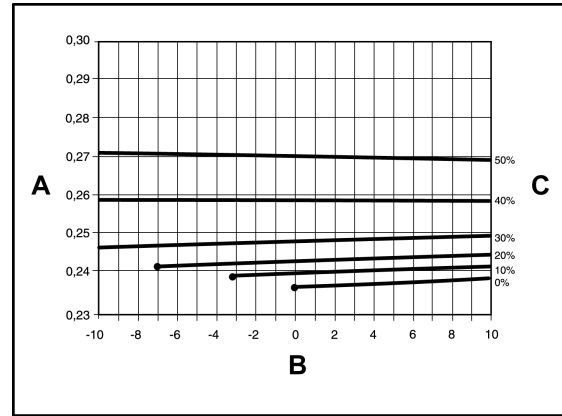
Recommended propylene glycol concentrations

- | | | | |
|---|---|---|---|
| A | % in weight | a | Recommended concentration % in weight |
| B | Outlet liquid temperature °C | b | Freeze point |
| C | Glycol factor L/S °C/kW in recommended concentrations | c | Glycol factor in recommended concentrations |



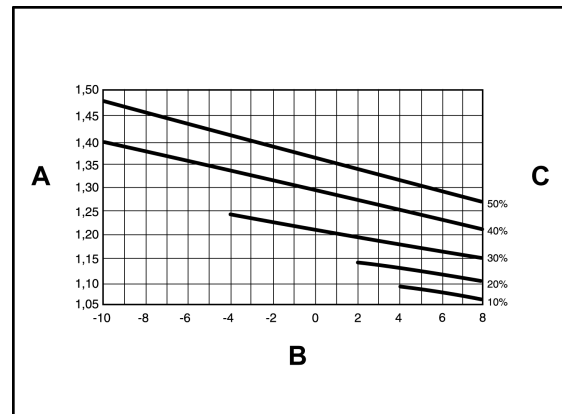
Propylene glycol in other concentrations

- A Glycol factor
- B Outlet liquid temperature °C
- C Glycol factor



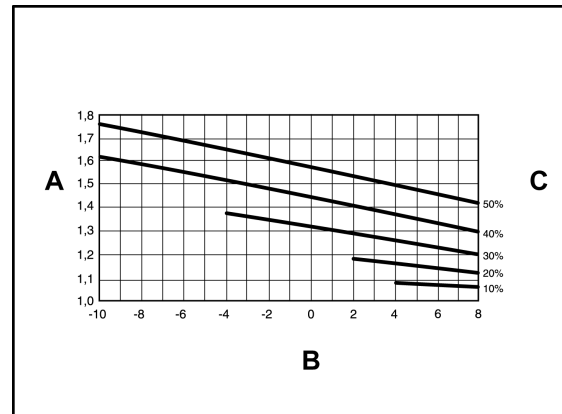
Ethylene glycol pressure drop correcting factor

- A Correcting Factor
- B Average liquid temperature °C
- C Glycol concentration P/P



Propylene glycol pressure drop correcting factor

- A Correcting Factor
- B Average liquid temperature °C
- C Glycol concentration P/P



Correcting factors for other glycol concentrations

% in weight	Ethylene glycol		Propylene glycol	
	Capacity	Absorbed power	Capacity	Absorbed power
10	1,061	1,025	1,097	1,033
20	1,036	1,015	1,067	1,023
30	1,015	1,005	1,026	1,008
35	1	1	1	1
40	0,985	0,995	0,974	0,992
50	0,954	0,985	0,923	0,977

If it is necessary to select different glycol percentages, correct the capacity and absorbed power capacities of tables 2 and 4 (35% ethylene glycol), multiplying them by the coefficients indicated in the table.

Altitude factors

Altitude	Capacity factor	compressor absorbed power factor
0	1	1
600	0,987	1,01
1200	0,973	1,02
1800	0,958	1,029
2400	0,943	1,038

Pressure drop in the YLCA/YLHA 40 ÷ 150 hydraulic circuit without pack (no filter fitted)

YLCA-YLHA model	Flow l/h	kPa	YLCA-YLHA model	Flow l/h	kPa
40	4750	13	80	9500	40
	5500	19		10000	43
	6250	26		11000	48
	7000	33		12000	53
	7750	42		13000	59
	8500	50		14000	65
	9250	61		15000	72
	10000	71		16000	79
	10750	84		17000	87
50	6500	25		18000	96
	7000	28		19000	107
	7500	31		20000	119
	8000	34	21000	132	
	8500	37	22000	145	
	9000	40	100	12000	45
	9500	44		13000	46
	10000	48		14000	47,5
	10500	52		15000	49,5
	11000	57		16000	52
	11500	62		17000	55
	12000	67		18000	60
	12500	72		19000	65
	13000	77		20000	70
13500	83	21000		75	
14000	89	22000		80	
14500	95	23000		85	
60	7500	36	24000	92	
	8000	38	-	-	
	8500	40,5	-	-	
	9000	43	-	-	
	9500	45,5	-	-	
	10000	48	120	15000	18
	10500	51		16000	20
	11000	54		17000	23
	11500	57		18000	25,5
	12000	60		19000	28
	12500	64		20000	31
	13000	68		21000	34
	13500	72		22000	37
	14000	76		23000	40
	14500	81		24000	43
	15000	86		25000	46
	15500	90,5		26000	49
	16000	95	27000	52,5	
	16500	100	28000	56,5	
	17000	105	29000	60	
		30000	63		
		31000	67		
		32000	70,5		
		33000	74,5		
		34000	78		

1 Technical Information

1.6 Technical data

YLCA-YLHA model	Flow l/h	kPa
150	18000	12,5
	19000	14
	20000	15,5
	21000	17,5
	22000	19,5
	23000	21,5
	24000	23,5
	25000	25,5
	26000	27,5
	27000	30
	28000	32,5
	29000	35
	30000	37,5
	31000	40
	32000	43
	33000	46
	34000	49
	35000	52
	36000	55
	37000	58
38000	61	
39000	64	
40000	67	
41000	70	
42000	73	

Available pressure for the YLCA/YLHA 40 ÷ 150 hydraulic circuit with pack (no filter fitted)

YLCA-YLHA TP model	Flow l/h	kPa	YLCA-YLHA TP model	Flow l/h	kPa
40	4750	261	100	12000	245
	5500	218		13000	236
	6250	166		14000	226
	7000	105		15000	215
	7500	60		16000	201
	8000	13		17000	187
50	6500	149		18000	171
	7000	142		19000	153
	7500	135		20000	131
	8000	127		21000	110
	8500	119		22000	87
	9000	110		23000	57
	9500	100		24000	32
	10000	90		120	15000
	10500	79	16000		295
	11000	68	17000		279
11500	56	18000	261		
12000	44	19000	241		
60	7500	233	20000		217
	8000	222	21000		187
	8500	210	22000		157
	9000	198	23000		123
	9500	185	24000		90
	10000	172	25000	55	
	10500	156	150	18000	249
	11000	140		19000	243
	11500	122		20000	237
	12000	105		21000	230
12500	86	22000		223	
13000	67	23000		215	
13500	47	24000		207	
80	9500	169		25000	199
	10000	164		26000	192
	10500	159		27000	183
	11000	154	28000	175	
	11500	148	29000	165	
	12000	143	30000	155	
	12500	137	31000	145	
	13000	131	32000	132	
	13500	124	33000	120	
	14000	118	34000	109	
	14500	111	35000	95	
	15000	103	36000	84	
	15500	96	37000	70	
	16000	87	38000	57	
	16500	79			
	17000	71			
17500	62				
18000	53				
18500	43				
19000	33				

Data with water at 10°C.

If using glycol, apply the correction factors indicated in section (Ethylene glycol pressure drop correcting factor and propylene glycol pressure drop correcting factors).

Pressure drop in filters

1 1/2" filter

Water flow (l/h)	3500	4000	4500	5000	5500	6000	6500	7000	7500
kPa	1,3	2,6	4	5,4	6,9	8,4	10	11,6	13,3
Water flow (l/h)	8000	8500	9000	9500	10000	10500	11000	11500	11800
kPa	15	16,8	18,7	20,7	22,8	25	27,3	29,7	32

2" filter

Water flow (l/h)	6000	7000	8000	9000	10000	11000	12000	13000
kPa	0,5	0,8	1,1	1,4	1,7	2	2,3	2,6
Water flow (l/h)	14000	15000	16000	17000	18000	19000	20000	
kPa	2,9	3,3	3,7	4,1	4,6	5,1	6	

2 1/2" filter

Water flow (l/h)	15000	16000	17000	18000	19000	20000	21000	22000	23000	24000
kPa	2	2,2	2,4	2,7	3	3,3	3,6	4	4,4	4,8
Water flow (l/h)	25000	26000	27000	28000	29000	30000	31000	32000	33000	34000
kPa	5,2	5,6	6	6,5	7	7,5	8	8,5	9	9,7
Water flow (l/h)	35000	36000	37000	38000	39000	40000	41000	42000		
kPa	10,5	11,3	12,1	13	14	15	16	17		

Data with water at 10°C.

If using glycol, apply the correction factors indicated in section (Ethylene glycol pressure drop correcting factor and propylene glycol pressure drop correcting factors).

1.6.3 Physical data

Physical data, YLCA units

Physical data

		YLCA (T and TP)							
Characteristics		40	50	60	80	100	120	150	
Cooling capacity	kW	39,6	52,1	60,5	72,6	101	119	151	
Capacity control	%	100	50-100			25-50-75-100			
Power supply	V/ph	400.3.50							
EER/OOP		3	2,9	3,1	2,9	2,9	2,9	2,8	
Compressor	Compressor consumption	kW	12,46	2 x 8.5	2 x 9.2	2 x 12.4	4 x 7.8	4 x 9.4	4 x 12.5
	Compressor amperage	A	23,5	2 x 15.5	2 x 16.7	2 x 24.6	4 x 16	4 x 17.7	4 x 23.5
	No. of compressors		1	2 (1 Tandem)			4 (2 tandem)		
	Compressor type		SCROLL						
	Oil charge	l	3,25	2 x 3.25			4 x 3.25		
Oil type		POLYOL ESTER OIL							
Evaporating unit type		PLATES							
Fan	No. of fans		2		3	4			
	Fan diameter	mm	560	630				710	
	Fan consumption	W	2 x 400	2 x 600		3 x 600	4 x 600		4 x 860
	Fan amperage	A	2 x 1.9	2 x 2.8		3 x 2.8	4 x 2.8		4 x 3.9
	Total air flow	m³/h	12300	18600		27500	36000		48000
	Sound power (standard / Low noise)	dB(A)	81 / 76	83 / 78	85 / 80	86 / 82	86 / 82	86 / 82	87 / 83
	Sound pressure at 5 m (standard / Low noise)	dB(A)	60 / 54	62 / 56	63 / 57	66 / 60	63 / 60	64 / 60	65 / 61
Sound pressure at 10 m (standard / Low noise)	dB(A)	54 / 48	56 / 50	57 / 51	60 / 54	57 / 54	58 / 54	59 / 55	
Refrigerant	Refrigerant type		R-410A						
	Refrigerant charge	kg	11	13	16	25	2 x 16.5	2 x 16.2	2 x 21
	No. of refrigerant circuits		1			2			
Water circuit	Nominal water flow	l/h	6820	8960	10400	13350	17600	20470	25970
	Water connection, female		1 1/4"		2"		2 1/2"		
	water filter, female		1 1/2"		2"		2 1/2"		
Dimensions	Length	mm	1500	2104		2944	3416		3770
	Width	mm	822	1011		1118	1101		
	Height	mm	1573	1600			2190		2263

Units with hydro kit (version P)

		YLCA (Version P)						
Characteristics		40	50	60	80	100	120	150
No. of pumps		1						
Available static pressure at nominal flow (without filter)(2)	kPa	115	110	160	126	190	205	192
Available static pressure at nominal flow (without filter)(3)	kPa	105	108	158	123	187	202	186
Pump consumption	W	1035	990	1515	1620	2395	3180	3400
Pump amperage	A	1,9	1,8	2,9	3,3	4,4	5,5	6,1
Unit water content	l	131	188	194	285	193	195	214
Expansion vessel volume	l	12		18		25		35
Tank capacity	l	115	170		260	152		
Safety valve setting	MPa (bar)	0,6 (6)						
Max. unit power supply consumption	kW	18,23	24,6	26,3	35,2	52,4	56,2	70,7
Max. unit current amperage	A	33	46,2	49,2	70,5	95,4	108	124
Start-up current (compressor)	A	174	118	118	174	118	118	174
Weight (1)	kg	380	580	611	785	1220	1286	1503

1.6 Technical data

- (1) Weights for the empty unit
- (2) Static pressure available, Eurovent certified
- (3) Pressure with clean filter

Units without pack

		YLCA						
Characteristics		40	50	60	80	100	120	150
Start-up current (compressor)	A	174	118	118	174	118	118	174
Water circuit pressure drop	kPa	75	40	51	61	54	32	27,5
Unit water content		4	6	6	7	12	12	14
Max. unit power supply consumption	kW	17,2	23,6	24,8	33,6	50	53	67,3
Max. current amperage	A	31	44,4	46,3	67,2	91	103	118
Weight (1)	kg	340	524	555	715	1124	1190	1415

- (1) Weights for the empty unit

Physical data, YLHA units

Physical data

		YLHA (T and TP)							
Characteristics		40	50	60	80	100	120	150	
Cooling capacity	kW	37,8	52	60,5	72,2	96	114	145	
Heating capacity	kW	38,6	52,5	59,6	74,7	104	119,6	150	
Capacity control	%	100	50-100			25-50-75-100			
Power supply	V/ph	400.3.50							
EER/OOP		2,8/3	3/2,9	3,1/3	2,7/2,8	2,7/2,8	2,6/3	2,8/2,8	
Compressor	Compressor consumption in cooling	kW	12,4	2 x 8	2 x 9.2	2 x 12.1	4 x 8.3	4 x 10.2	4 x 11.8
	Compressor consumption in heating	kW	11,7	2 x 8.3	2 x 9.2	2 x 12.2	4 x 8.7	4 x 9.2	4 x 12.5
	Compressor amperage in cooling	A	23,5	2 x 15	2 x 16.7	2 x 24.9	4 x 16	4 x 18.2	4 x 23.5
	Compressor amperage in heating	A	24,5	2 x 15.3	2 x 16.7	2 x 24.6	4 x 15.5	4 x 16.9	4 x 24.5
	No. of compressors		1	2 (1 Tandem)			4 (2 tandem)		
	Compressor type		SCROLL						
	Oil charge	l	3,25	2 x 3.25			4 x 3.25		
Oil type		POLYOL ESTER OIL							
Evaporating unit type		PLATES							
Fan	No. of fans		2		3	4			
	Fan diameter	mm	560	630				710	
	Fan consumption	W	2 x 400	2 x 600		3 x 600	4 x 600		4 x 860
	Fan amperage	A	2 x 1.9	2 x 2.8		3 x 2.8	4 x 2.8		4 x 3.9
	Total air flow	m ³ /h	12300	18600		27500	36000		48000
	Sound power (standard / Low noise)	dB(A)	81 / 76	83 / 78	85 / 80	88 / 85	85 / 81	86 / 82	87 / 83
	Sound pressure at 5 m (standard / Low noise)	dB(A)	60 / 54	62 / 56	63 / 57	66 / 61	63 / 59	64 / 60	65 / 61
	Sound pressure at 10 m (standard / Low noise)	dB(A)	54 / 48	56 / 50	57 / 51	60 / 55	57 / 53	58 / 54	59 / 55
Refrigerant	Refrigerant type		R-410A						
	Refrigerant charge	kg	12,5	15,5	18	29	2 x 18	2 x 20	2 x 29
	No. of refrigerant circuits		1			2			
Water circuit	Nominal water flow	l/h	6500	8940	10400	12420	17600	19610	24940
	Water connection, female		1 1/4"	2"			2 1/2"		
	water filter, female		1 1/2"	2"			2 1/2"		
Dimensions	Length	mm	1500	2104		2944	3416		3770
	Width	mm	822	1011		1118	1101		
	Height	mm	1573	1600			2190		2263

Units with hydro kit

		YLHA (Version P)						
Characteristics		40	50	60	80	100	120	150
No. of pumps		1						
Available static pressure at nominal flow (without filter)(2)	kPa	147	118	160	137	195	231	205
Available static pressure at nominal flow (without filter)(3)	kPa	137	117	158	134	192	228	200
Pump consumption	W	1035	990	1515	1580	2380	3180	3400
Pump amperage	A	1,9	1,8	2,9	3,2	4,4	5,5	6,1
Unit water content	l	131	188	194	285	193	195	214
Expansion vessel volume	l	12		18		25		35
Tank capacity	l	115	170		260	152		
Safety valve setting	MPa (bar)	0,6 (6)						
Max. unit power supply consumption	kW	17,38	23,9	26,3	34,2	52,4	56,2	74,5
Max. unit current amperage	A	36,2	45,1	49,2	69,8	95,4	108	120
Start-up current (compressor)	A	174	118	118	174	118	118	174
Weight (1)	kg	397	593	624	805	1250	1316	1535

1.6 Technical data

- (1) Weights for the empty unit
- (2) Static pressure available, Eurovent certified
- (3) Pressure with clean filter

Units without pack

		YLHA						
Characteristics		40	50	60	80	100	120	150
Start-up current (compressor)	A	174	118	118	174	118	118	174
Pressure drop, cooling mode	kPa	70	37	51	56	53	29,5	25,5
Unit water content		4	6	6	7	12	12	14
Max. unit power supply consumption	kW	16,3	23	24,8	32,6	50	53	71,1
Max. current amperage	A	34,3	43,3	46,3	66,6	91	103	114
Weight (1)	kg	337	537	568	735	1154	1220	1445

- (1) Weights for the empty unit

1.6.4 Electrical specifications

Model	Power supply [V / ph (Hz)]	Compressor					Fans		Pump	
		Rated current [A]		Start-up current [A]	Standard Rating [kW]		Rated current [A]	Standard Rating [kW]	Rated current [A]	Standard Rating [kW]
		Cold	Heat		Cold	Heat				
YLCA 40	400/3 (50)	21,7	-	174	12,46	-	2 x 1.9	2 x 400	1,9	1035
YLHA 40		25,8	24,5		12,49	11,7				
YLCA 50		2 x 15.5	-	118	2 x 8.5	-	2 x 2.8	2 x 600	1,8	990
YLHA 50		2 x 15	2 x 15.3		2 x 8	2 x 8.3				
YLCA 60		2 x 16.7	-		2 x 9.20	-				
YLHA 60		2 x 16.7	2 x 16.7		2 x 9.20	2 x 9.20				
YLCA 80		2 x 24.6	-	174	2 x 12.4	-	3 x 2.8	3 x 600	3,3	1620
YLHA 80		2 x 24.9	2 x 24.6		2 x 12.1	2 x 12.2			3,2	1580
YLCA 100		4 x 16	-	118	4 x 7.8	-	4 x 2.8	4 x 600	4,4	2395
YLHA 100		4 x 16	4 x 15.5		4 x 8.3	4 x 8.4				
YLCA 120		4 x 17.7	-		4 x 9.4	-			5,5	3180
YLHA 120		4 x 18.2	4 x 16.9		4 x 10.2	4 x 9.2				
YLCA 150		4 x 23.5	-	174	4 x 12.53	-	4 x 3.9	4 x 860	6,1	3400
YLHA 150		4 x 23.5	4 x 24.5		4 x 11.8	4 x 12.5				

1.7 Measurements, clearances and accesses

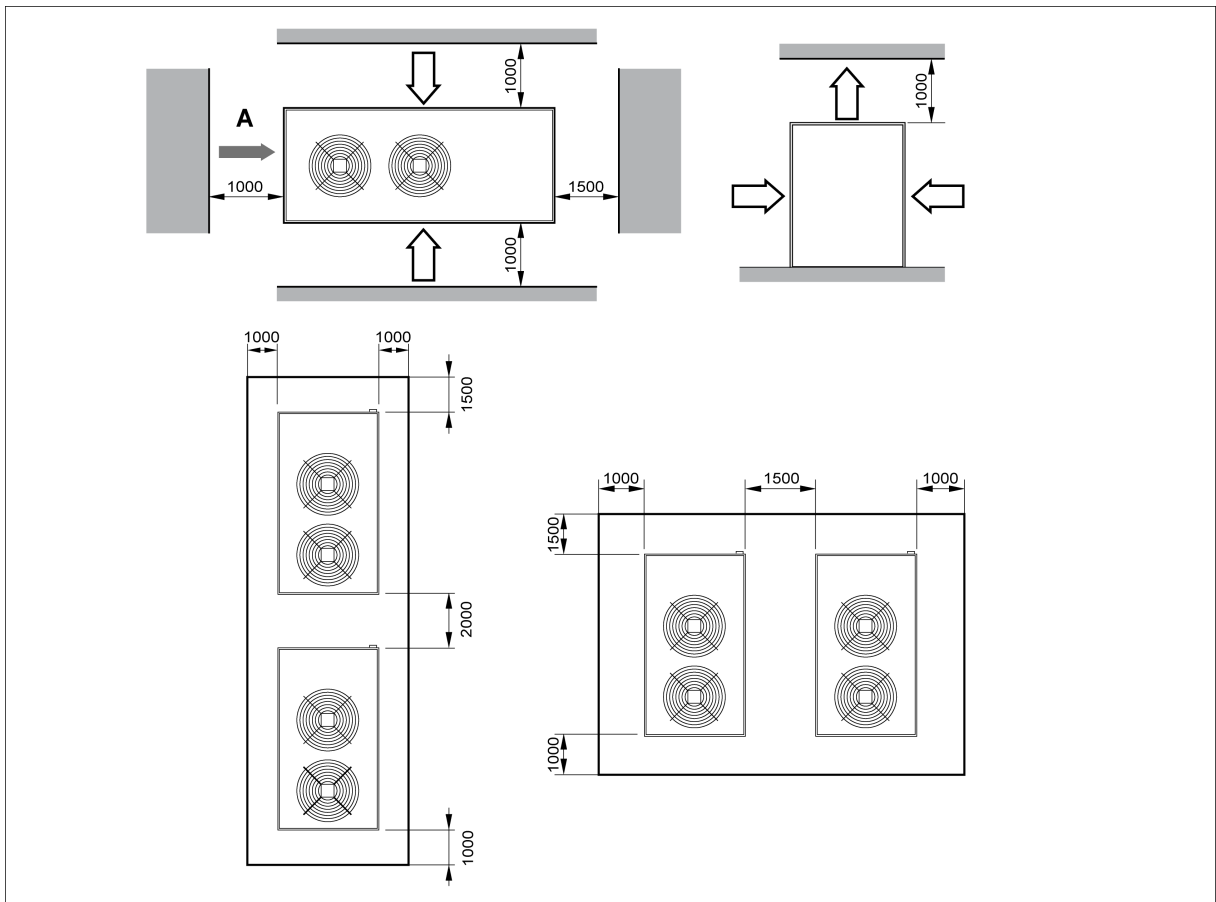
1.7.1 Clearances

When installing each unit, clearances should be left for:

- 1 Air inlet and discharge.
- 2 Maintenance servicing.
- 3 Power supply connections.

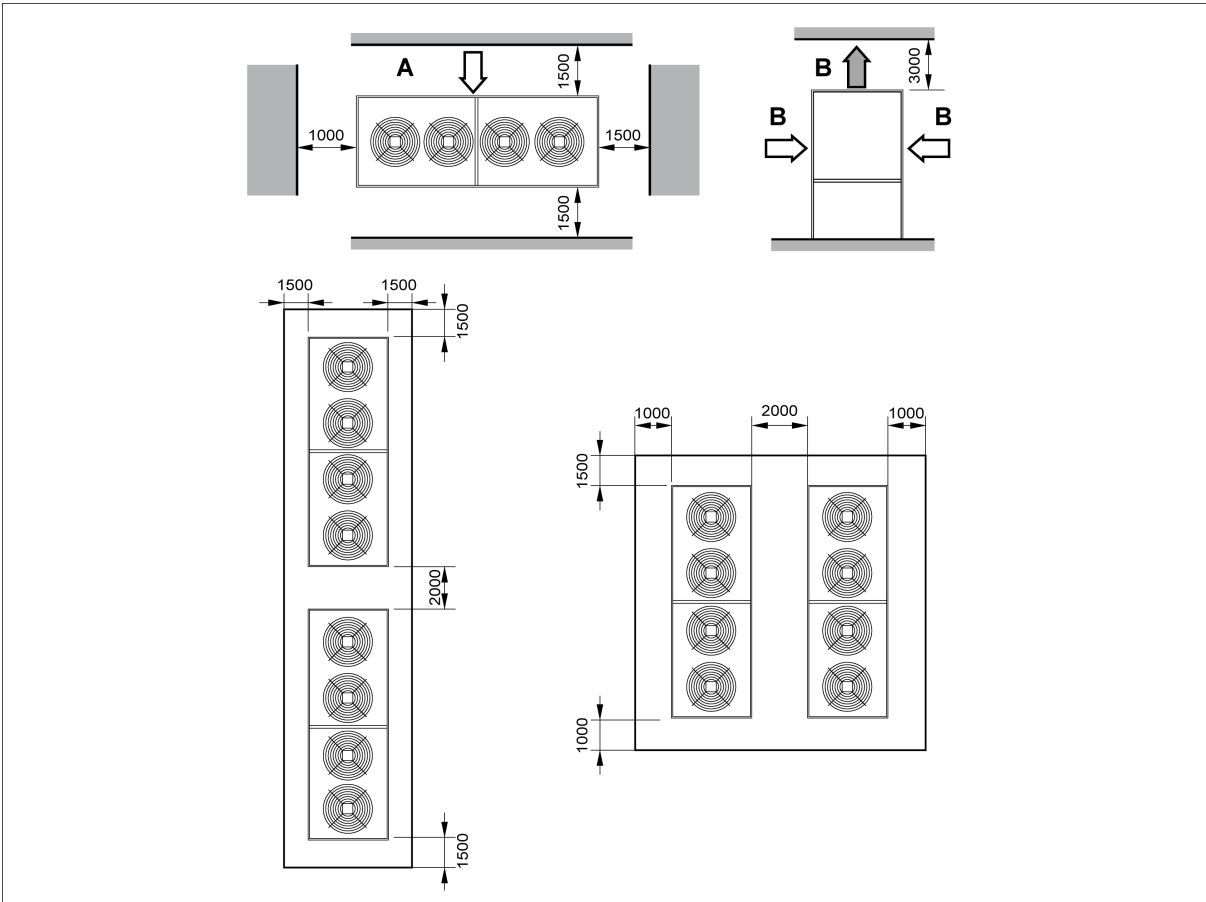
For proper operation, all minimum clearances shown on the general dimension diagrams should be respected always with regard to possible obstruction of air circulation of the work of a user.

Minimum technical clearance YLCA/YLHA 40 80



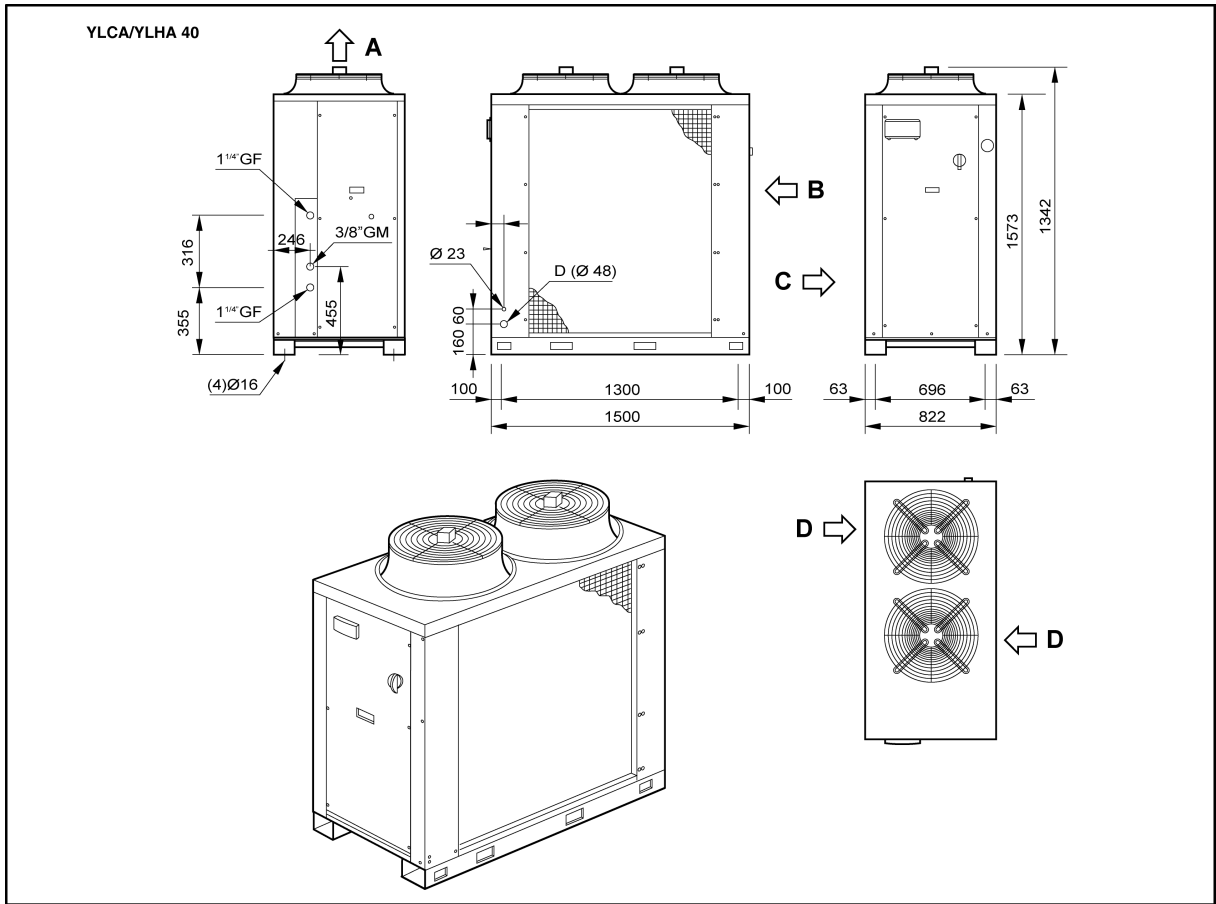
A Water inlet and outlet

Minimum technical clearance YLCA/YLHA 100 ÷ 150



- A Water inlet and outlet
- B Air

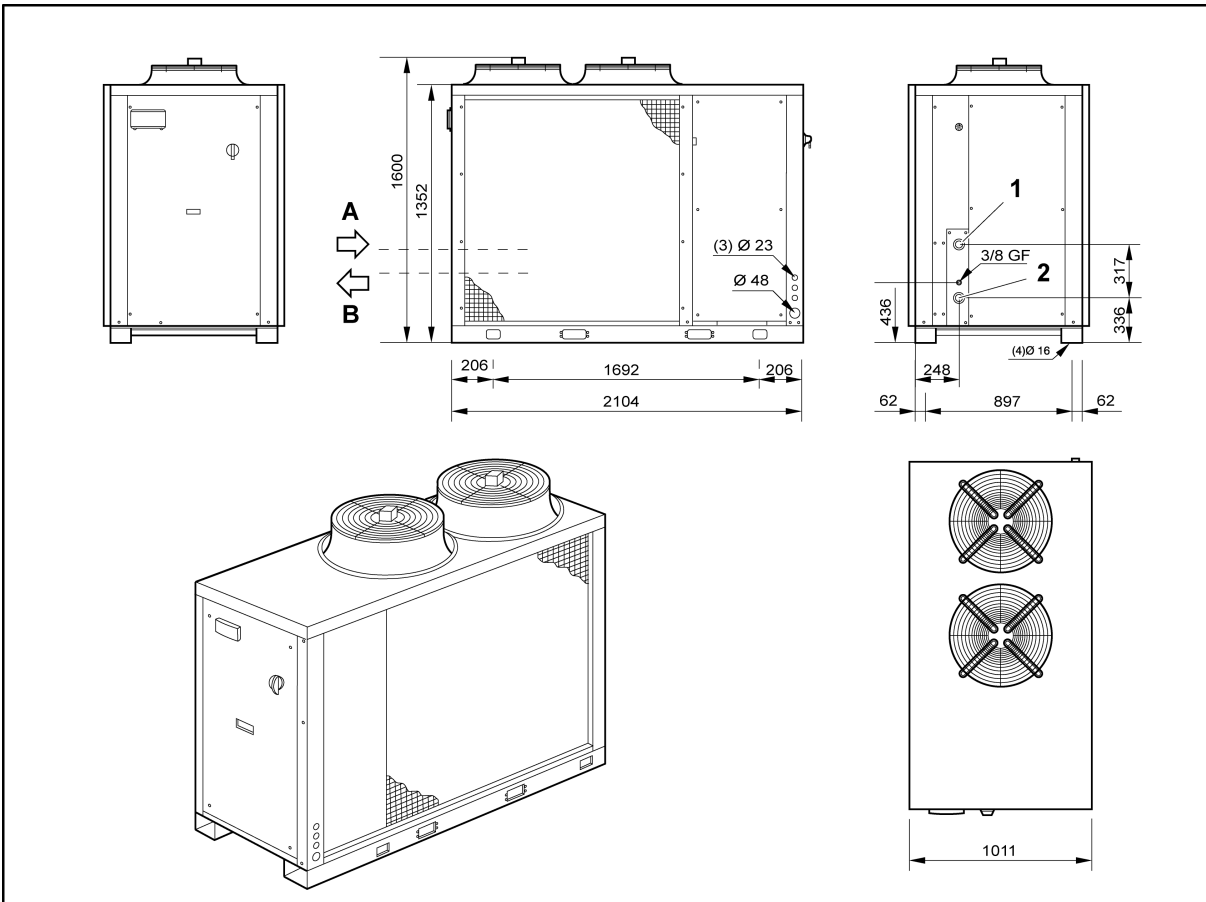
1.7.2 Dimensions and hydraulic connections (models YLCA/YLHA 40)



A Air outlet
B Water inlet

C Water outlet
D Air inlet

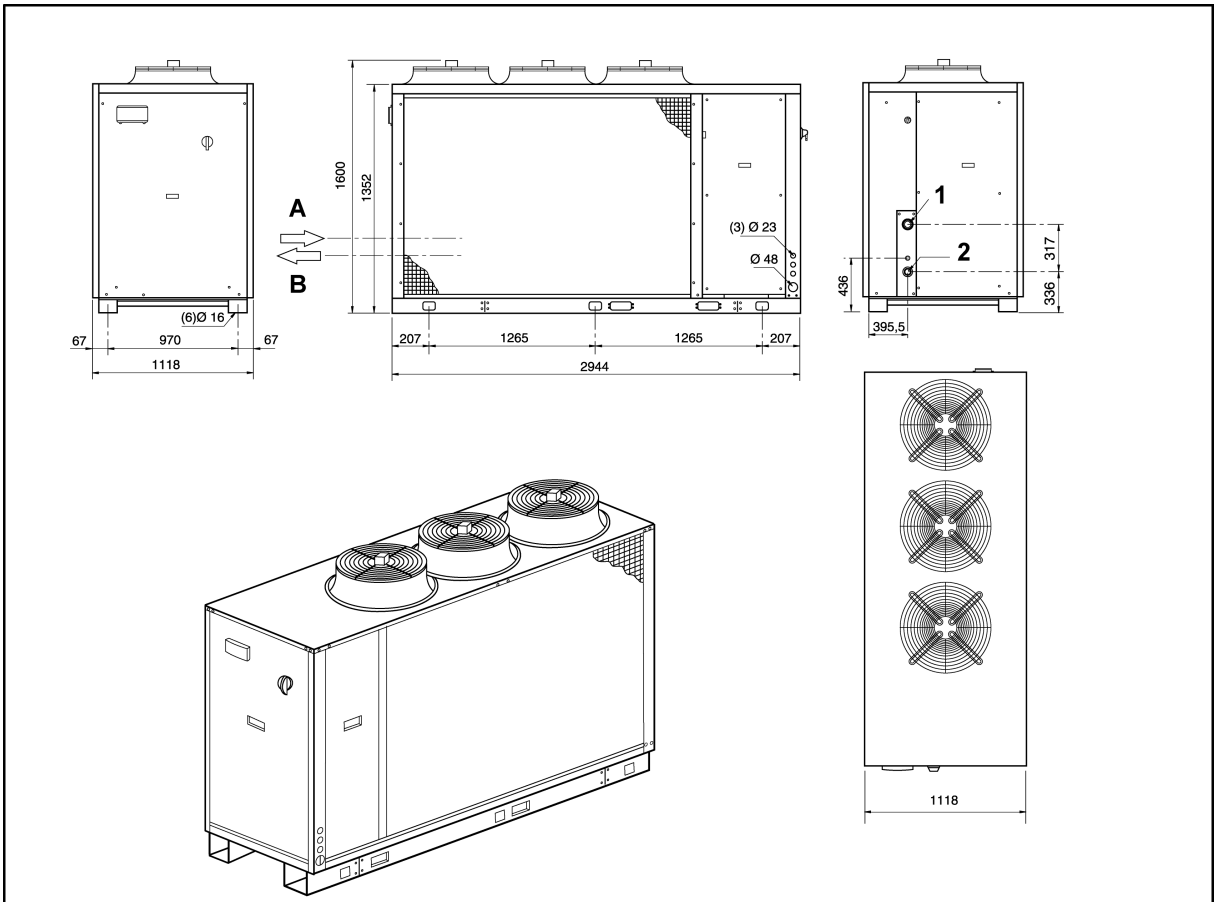
1.7.3 Dimensions and hydraulic connections (models YLCA/YLHA 50 and 60)



A Water inlet
B Water outlet

1 2" GF (Inlet)
2 2" GF (Outlet)

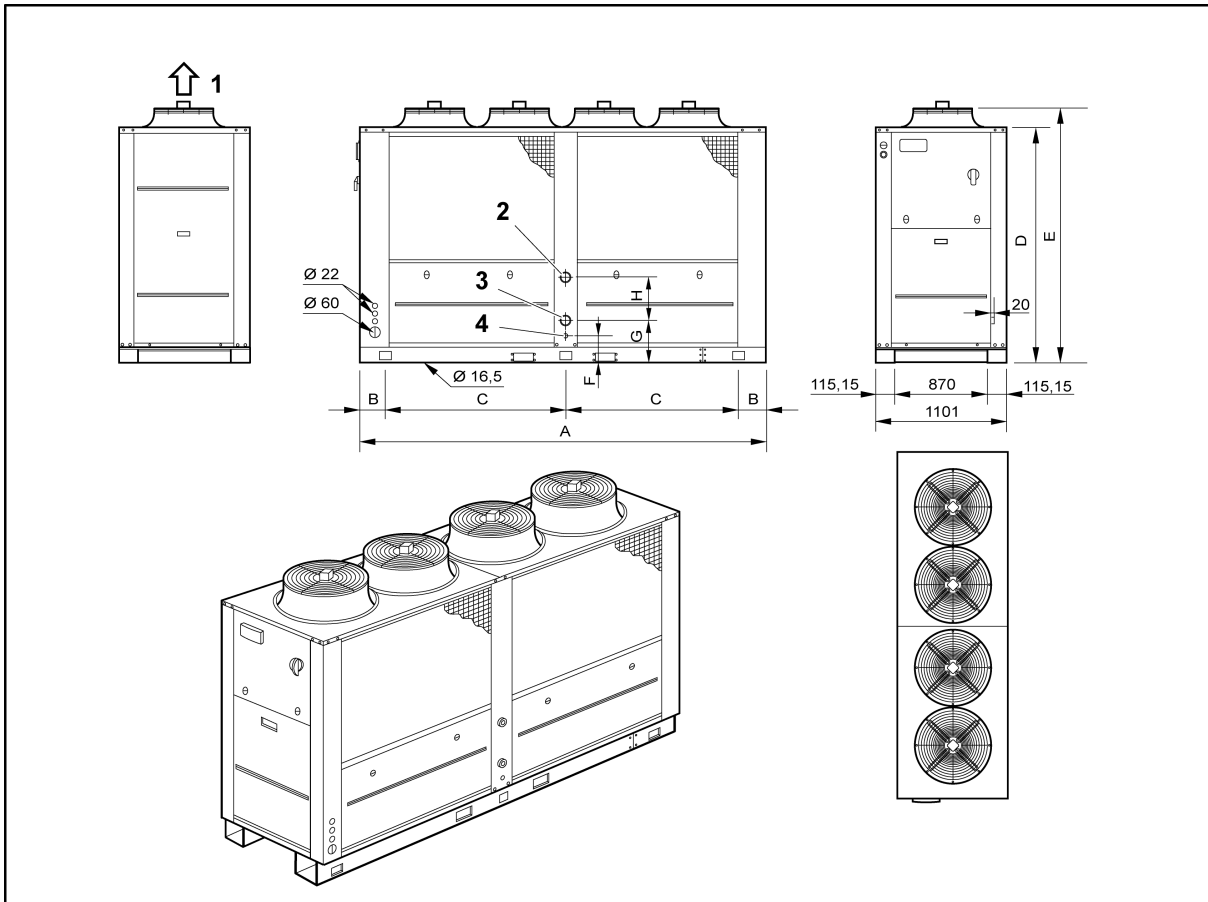
1.7.4 Dimensions and hydraulic connections (models YLCA/YLHA 80)



A Water inlet
B Water outlet

1 2" GF (Inlet)
2 2" GF (Outlet)

1.7.5 Dimensions and hydraulic connections (models YLCA/YLHA 100, 120 and 150)



- | | | | |
|---|------------------------|---|-----------------------|
| 1 | Air outlet | 3 | Water inlet Ø2 1/2" G |
| 2 | Water outlet Ø2 1/2" G | 4 | Drain Ø20 x 20 |

Model	A	B	C	D	E	F	G
YLCA/YLHA 100 and 120	3 416	183	1 525	1 942	2 190	199	289
YLCA/YLHA 150	3 770	255	1 630	1993	2 263	145	211

1.8 Capacities YLHA

1.8.1 Cooling capacities YLHA 40 ÷ 150

YLHA model	Water outlet temp. °C	Outdoor ambient temperature °C DB (80% RH)															
		20		25		30		32		35		40		43		46	
		Ca-pacity	Abs. power	Ca-pacity	Abs. power	Ca-pacity	Abs. power	Ca-pacity	Abs. power	Ca-pacity	Abs. power	Ca-pacity	Abs. power	Ca-pacity	Abs. power	Ca-pacity	Abs. power
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
40	5	41,15	10,5	40,3	10,9	38,33	11,8	36,8	12,45	35,08	13,1	31	14,5	30,1	14,9	29,1	15,3
	6	42,73	10,6	41,8	11	39,84	11,9	38,2	12,55	36,41	13,2	32,9	14,6	31,15	15	29,38	15,4
	7	44,9	10,7	43,44	11,1	41,37	12	39,7	12,65	37,82	13,3	34,8	14,7	33	15,1	31,21	15,5
	8	45,47	10,8	44,58	11,2	42,52	12,1	40,8	12,75	38,87	13,4	35,92	14,8	34,1	15,2	32,2	15,6
	10	47,92	11	47,05	11,4	44,82	12,3	43	12,95	40,98	13,6	38,24	15	36,27	15,4	34,31	15,8
	12	50,36	11,2	49,52	11,6	47,21	12,5	45,3	13,15	43,16	13,8	40,49	15,2	38,41	15,6	36,34	16
	15	57,22	11,5	53,23	11,9	50,75	12,8	48,7	13,45	46,4	14,1	44,01	15,5	41,76	15,9	39,51	16,4
50	5	56,1	13,9	54,9	14,5	52,2	15,5	50,5	16,3	48,9	17,1	44,2	19,4	41,8	20,6	39,5	21,8
	6	57,7	14	56,4	14,6	53,7	15,6	52,1	16,4	50,4	17,2	45,7	19,5	43,3	20,7	40,9	21,9
	7	59,3	14,1	58	14,7	55,2	15,7	53,6	16,5	52	17,3	47,2	19,6	44,8	20,8	42,3	22
	8	61,2	14,2	59,8	14,8	56,9	15,8	55,3	16,6	53,7	17,4	48,7	19,7	46,2	20,9	43,8	22,1
	10	64,9	14,3	63,5	14,9	60,4	15,9	58,8	16,8	57,1	17,6	51,8	19,9	49,2	21,1	46,6	22,3
	12	68,7	14,5	67,2	15,1	63,9	16,1	62,2	17	60,5	17,8	55	20,1	52,2	21,3	49,4	22,4
	15	74,4	14,8	72,8	15,4	69,2	16,4	67,4	17,3	65,6	18,1	59,7	20,4	56,7	21,6	53,8	22,7
60	5	67,1	15,5	64,05	16,4	60,56	17,73	58,42	18,66	56,28	19,6	52	21,47	49,51	22,51	47,02	23,55
	6	69,45	15,58	66,3	16,48	62,68	17,81	60,41	18,76	58,15	19,7	53,61	21,58	51,05	22,63	48,48	23,67
	7	71,8	15,65	68,54	16,56	64,8	17,9	62,65	18,95	60,5	19,6	55,22	21,7	52,57	22,75	49,93	23,8
	8	73,81	15,74	70,46	16,66	66,61	18	64,17	19,17	61,72	19,91	56,83	21,81	54,11	22,86	51,39	23,92
	10	77,83	15,93	74,3	16,86	70,24	18,22	67,69	19,17	65,14	20,13	60,05	22,04	51,17	23,1	54,3	24,17
	12	81,85	16,11	78,13	17,05	73,87	18,43	71,22	19,39	68,57	20,35	63,28	22,27	52,57	23,34	57,22	24,42
	15	87,9	16,4	83,91	17,35	79,33	18,76	76,53	19,72	73,73	20,68	68,12	22,61	54,86	23,71	61,6	24,8
80	5	78	20,7	76,4	21,8	72,3	23,5	69,7	24,8	67,2	26	62,1	28,5	59,1	29,9	57	30,9
	6	80,9	20,8	79,1	21,9	74,8	23,6	72,1	24,9	69,4	26,1	64	28,6	60,9	30	58,5	31,2
	7	83,8	20,9	81,8	22	77,3	23,7	74,8	24,9	72,2	26	65,9	28,8	62,7	30,2	59,6	31,6
	8	86,6	21,1	84,1	22,1	79,5	23,9	76,6	25,1	73,7	26,4	67,8	28,9	64,6	30,3	61,3	31,7
	10	91,7	21,3	88,7	22,4	83,8	24,2	80,8	25,4	77,7	26,7	71,7	29,2	68,2	30,6	64,8	32,1
	12	96	21,6	93,2	22,6	88,2	24,4	85	25,7	81,8	27	75,5	29,5	71,9	31	68,3	32,4
	15	103,2	22,4	100,1	23	94,7	24,9	91,3	26,2	88	27,4	81,3	30	77,4	31,4	74	32,9
100	5	106,8	28,4	104	30,1	96,6	32,7	93,7	33,8	89,3	34,4	82	38,1	77,4	39,5	74,5	42
	6	109,2	28,9	106,6	30,5	99,4	33	96,5	34,1	92,1	34,8	84,9	38,7	80,5	40,1	77,7	42,4
	7	111,5	29,4	109,2	31	102,1	33,4	99,2	34,6	96	35,5	87,9	39,3	83,6	40,6	80,8	42,7
	8	114,9	29,9	111,8	31,6	105	33,7	102,1	35,2	97,9	36,2	90,9	40	86,8	41,2	84	43
	10	122,2	30,7	117,1	32,4	110,4	34,4	107,7	36,2	103,7	36,9	97	40,6	92,9	41,8	90,3	43,7
	12	125,7	31,4	122,6	33,1	115,6	35,7	112,9	36,9	108,8	38,6	102,1	41,3	98	42,8	94,1	44,7
	15	133,4	34	130,4	35,5	123,4	37,9	120,7	38,8	116,7	40,2	109,8	42,6	105,6	44	99,8	45,4
120	5	126,8	34,6	123,5	36,6	114,7	39,8	111,2	41,1	106	41,9	97,3	46,3	92	48,1	88,4	51,1
	6	129,7	35,1	126,5	37,2	118	40,2	114,6	41,5	109,4	42,3	100,9	47,1	95,6	48,8	92,3	51,5
	7	132,4	35,7	129,7	37,8	121,3	40,6	117,8	42,1	114	43,2	104,4	47,8	99,2	49,4	96	51,9
	8	136,5	36,4	132,8	38,5	124,6	41	121,2	42,8	116,3	44,1	108	48,6	103,1	50,1	99,7	52,3
	10	142,7	37,4	139,1	39,5	131,1	41,9	127,9	44,1	123,1	44,9	115,1	49,4	110,4	50,8	107,2	53,1
	12	149,2	38,2	145,6	40,3	137,3	43,5	134	44,9	129,2	46,9	121,3	50,2	116,4	52,1	111,7	54,4
	15	158,4	41,4	154,8	43,2	146,6	46,1	143,3	47,2	138,5	48,9	130,4	51,8	125,4	53,6	118,6	55,3
150	5	161,2	40,5	157,1	42,8	145,9	46,6	141,5	48,1	134,9	49,1	123,8	54,2	117	56,4	112,5	59,9
	6	165	41,2	161	43,5	150,1	47,1	145,7	48,6	139,2	49,5	128,3	55,2	121,6	57,2	117,3	60,4
	7	168,4	41,9	165	44,2	154,3	47,5	149,9	49,3	145	50,6	132,8	56	126,2	57,9	122,1	60,8
	8	173,6	42,7	168,9	45,1	158,5	48	154,1	50,1	147,9	51,7	137,3	57	131,1	58,7	126,8	61,3
	10	181,6	43,8	176,9	46,2	166,8	49,1	162,7	51,7	156,6	52,6	146,5	57,9	140,4	59,5	136,3	62,2
	12	189,8	44,7	185,2	47,2	174,6	51	170,5	52,6	164,4	55	154,3	58,8	148	61,1	142,1	63,8
	15	201,5	48,5	196,9	50,6	186,4	54	182,3	55,3	176,2	57,3	165,8	60,7	159,5	62,7	150,8	64,8

1.8 Capacities YLHA

1.8.2 Cooling capacities YLHA 40 ÷ 150 (35% ethylene glycol)

YLHA model	Water outlet temp. °C	Outdoor ambient temperature °C DB (80% RH)															
		20		25		30		32		35		40		43		46	
		Ca-pacity kW	Abs. power kW	Ca-pacity kW	Abs. power kW	Ca-pacity kW	Abs. power kW	Ca-pacity kW	Abs. power kW	Ca-pacity kW	Abs. power kW	Ca-pacity kW	Abs. power kW	Ca-pacity kW	Abs. power kW	Ca-pacity kW	Abs. power kW
40	-5	26,35	7,39	25,27	8,04	24,18	8,8	23,73	9,13	22,9	10,21	21,18	10,6	20,18	11,2	19,11	11,88
	-4	27,86	7,61	26,69	8,26	25,34	9,04	24,82	9,37	22,73	10,45	22,03	10,89	20,89	11,5	19,64	12,29
	-2	30,58	8,03	29,42	8,67	27,82	9,5	27,18	9,85	26,09	10,94	23,98	11,42	22,65	12,08	21,14	12,84
	0	33,32	8,44	32,27	9,11	30,61	9,97	29,63	10,34	28,38	11,43	25,99	11,99	24,47	12,67	22,59	13,4
	2	37,19	8,85	35,28	9,58	33,33	10,46	32,27	10,85	30,85	11,94	28,14	12,57	26,43	13,27	24,76	13,96
	4	40,1	9,3	38,32	10,07	36,06	10,98	34,89	11,38	33,3	12,45	30,25	13,18	28,33	13,89	26,47	14,78
50	-5	34,8	10,4	33,3	11,3	31,7	12,2	31	12,6	29,8	13,3	27,3	14,5	25,9	15,3	24,4	16,1
	-4	36,7	10,6	35	11,5	33,2	12,5	32,4	12,9	31,2	13,6	28,7	14,9	27,1	15,6	25,5	16,6
	-2	40	11,2	38,5	12	36,4	13,1	35,6	13,5	34,3	14,2	31,5	15,6	29,7	16,4	27,8	17,3
	0	43,4	11,7	42,1	12,6	40	13,7	38,9	14,2	37,5	14,9	34,4	16,3	32,5	17,1	30,2	18
	2	48,1	12,2	45,9	13,2	43,6	14,3	42,5	14,8	40,9	15,6	37,6	17	35,5	17,9	33,5	18,7
	4	51,5	12,7	49,7	13,7	47,2	14,9	46,1	15,4	44,4	16,2	40,7	17,7	38,5	18,6	36,4	19,7
60	-5	40,54	11,76	38,72	12,75	36,87	13,87	36,01	14,33	34,69	15,07	31,82	16,47	30,11	17,31	28,44	18,23
	-4	42,65	12,05	40,78	13,04	38,64	14,2	37,74	14,66	36,36	15,42	33,34	16,87	31,55	17,72	29,65	18,82
	-2	46,59	12,64	44,83	13,64	42,38	14,86	41,41	15,35	39,9	16,14	36,6	17,62	34,61	18,55	32,37	19,6
	0	50,52	13,23	49,02	14,26	46,59	15,52	45,27	16,04	43,6	16,87	40,02	18,45	37,82	19,4	35,09	20,38
	2	55,96	13,82	53,4	14,91	50,73	16,21	49,45	16,75	47,63	17,62	43,71	19,27	41,32	20,26	39,02	21,17
	4	59,9	14,41	57,78	15,55	54,88	16,9	53,62	17,46	51,67	18,38	47,39	20,09	44,83	21,12	42,35	22,34
80	-5	48,4	15,6	46,2	16,9	44	18,4	43	19	41,4	20	38	21,8	35,9	23	33,9	24,2
	-4	50,9	16	48,7	17,3	46,1	18,8	45	19,4	43,4	20,5	39,8	22,4	37,7	23,5	35,4	25
	-2	55,6	16,8	53,5	18,1	50,6	19,7	49,4	20,4	47,6	21,4	43,7	23,4	41,3	24,6	38,6	26
	0	60,3	17,6	58,5	18,9	55,6	20,6	54	21,3	52	22,4	47,8	24,5	45,1	25,7	41,9	27
	2	66,8	18,3	63,7	19,8	60,5	21,5	59	22,2	56,8	23,4	52,2	25,6	49,3	26,9	46,6	28,1
	4	71,5	19,1	69	20,6	65,5	22,4	64	23,2	61,7	24,4	56,6	26,7	53,5	28	50,5	29,6
100	-5	64,3	21,3	61,4	23,1	58,5	25,1	57,1	26	55	27,3	50,5	29,8	47,8	31,4	45,1	33
	-4	67,7	21,8	64,7	23,6	61,3	25,7	59,9	26,6	57,7	27,9	52,9	30,5	50,1	32,1	47	34,1
	-2	73,9	22,9	71,1	24,7	67,3	26,9	65,7	27,8	63,3	29,2	58,1	31,9	54,9	33,6	51,4	35,5
	0	80,2	24	77,8	25,8	73,9	28,1	71,8	29,1	69,2	30,5	63,5	33,4	60	35,1	55,7	36,9
	2	88,8	25	84,7	27	80,5	29,4	78,5	30,3	75,6	31,9	69,4	34,9	65,6	36,7	61,9	38,3
	4	95	26,1	91,7	28,2	87,1	30,6	85,1	31,6	82	33,3	75,2	36,4	71,1	38,2	67,2	40,5
120	-5	76,4	25,9	73	28,1	69,5	30,6	67,9	31,6	65,4	33,2	60	36,3	56,7	38,2	53,6	40,2
	-4	80,4	26,6	76,8	28,8	72,8	31,3	71,1	32,3	68,5	34	62,8	37,2	59,5	39,1	55,9	41,5
	-2	87,8	27,9	84,5	30,1	79,9	32,7	78	33,8	75,2	35,6	69	38,8	65,2	40,9	61	43,2
	0	95,2	29,2	92,4	31,4	87,8	34,2	85,3	35,4	82,2	37,2	75,4	40,7	71,3	42,8	66,1	44,9
	2	105,5	30,5	100,6	32,9	95,6	35,7	93,2	36,9	89,8	38,8	82,4	42,5	77,9	44,7	73,5	46,7
	4	112,9	31,8	108,9	34,3	103,4	37,2	101	38,5	97,4	40,5	89,3	44,3	84,5	46,5	79,8	48,9
150	-5	97,2	30,4	92,8	32,9	88,4	35,8	86,3	37	83,1	38,9	76,3	42,5	72,2	44,7	68,2	47,1
	-4	102,2	31,1	97,7	33,7	92,6	36,7	90,5	37,8	87,1	39,8	79,9	43,5	75,6	45,8	71,1	48,6
	-2	111,7	32,6	107,4	35,2	101,6	38,4	99,2	39,6	95,6	41,7	87,7	45,5	82,9	47,9	77,6	50,6
	0	121,1	34,2	117,5	36,8	111,7	40,1	108,5	41,4	104,5	43,5	95,9	47,6	90,6	50,1	84,1	52,6
	2	134,1	35,7	128	38,5	121,6	41,8	118,5	43,2	114,2	45,5	104,7	49,7	99	52,3	93,5	54,6
	4	143,6	37,2	138,5	40,1	131,5	43,6	128,5	45,1	123,8	47,5	113,6	51,9	107,4	54,5	101,5	57,7

Abs. power = Includes compressor and fan consumption.

1.8.3 Heating capacities YLHA 40 ÷ 150

YLHA model	Water outlet temp. °C	Outdoor ambient temperature °C DB (80% RH)																	
		-15		-10		-5		0		5		7		10		15		20	
		Ca- pacity kW	Abs. pow- er kW	Ca- pacity kW	Abs. pow- er kW	Ca- pacity kW	Abs. pow- er kW	Ca- pacity kW	Abs. pow- er kW	Ca- pacity kW	Abs. pow- er kW	Ca- pacity kW	Abs. pow- er kW	Ca- pacity kW	Abs. pow- er kW	Ca- pacity kW	Abs. pow- er kW	Ca- pacity kW	Abs. pow- er kW
40	30	16,6	7,6	21,3	8,2	28,5	8,5	36,7	9	37,8	9,1	39,6	9,3	42,5	9,4	46,9	9,4	51,2	9,5
	35	16	8,6	20,7	8,9	25,4	9,5	34,8	10	36,9	10,1	39,3	10,3	41,4	10,4	45,6	10,4	49,9	10,5
	40	13,8	9,5	20	9,7	23,2	10,5	32,2	11,2	35,5	11,3	38,9	11,5	40,2	11,6	44,3	11,6	48,4	11,7
	45	-	-	19,3	10,8	20,8	11,4	29,5	12,4	34,1	12,5	38,6	12,6	39	12,6	43	12,7	47	12,8
	50	-	-	18,1	11,4	19,7	12,1	27	13,3	32,5	13,4	37,9	13,5	36,7	13,6	39,1	13,7	45,6	13,8
50	30	22,6	10,8	28,9	11,8	38,8	12,2	49,9	12,9	51,5	13	53,9	13,3	57,8	13,4	63,7	13,4	69,7	13,5
	35	21,8	12,3	28,1	12,7	34,6	13,5	47,3	14,3	50,1	14,4	53,4	14,7	56,3	14,8	62	14,8	67,8	14,9
	40	-	-	27,3	13,8	31,5	14,9	43,8	16	48,3	16,2	52,9	16,4	54,7	16,5	60,2	16,5	65,9	16,6
	45	-	-	-	-	28,4	16,3	40,2	17,6	46,4	17,8	52,5	17,9	53,1	18	58,5	18,1	63,9	18,2
	50	-	-	-	-	26,8	17,2	36,7	19	44,2	19,1	51,6	19,3	49,9	19,4	53,1	19,5	62	19,6
60	30	25,6	12	32,8	13	44	13,4	56,6	14,3	58,4	14,4	61,1	14,7	65,6	14,8	72,4	14,9	79,1	14,9
	35	24,7	13,6	31,9	14	39,3	14,9	53,7	15,8	56,9	16	60,6	16,2	63,9	16,3	70,4	16,4	77	16,5
	40	21,3	14,9	30,9	15,2	35,8	16,5	49,7	17,7	54,9	17,9	60,1	18,1	62,1	18,2	68,4	18,3	74,8	18,4
	45	0	0	29,8	17	32,2	18	45,6	19,5	52,6	19,7	59,6	19,8	60,2	19,9	66,4	20	72,5	20,1
	50	0	0	28	18	30,4	19	41,7	21	50,1	21,2	58,6	21,3	56,7	21,5	60,3	21,6	70,4	21,7
80	30	32,1	16	41,2	17,3	55,2	17,9	71	19	73,2	19,2	76,6	19,6	82,3	19,7	90,7	19,8	99,2	19,9
	35	31	18,1	40	18,7	49,2	19,9	67,3	21	71,3	21,3	76	21,6	80,1	21,8	88,2	21,9	96,5	22
	40	-	-	38,8	20,3	44,8	22	62,3	23,6	68,8	23,8	75,3	24,2	77,8	24,3	85,7	24,4	93,7	24,5
	45	-	-	-	-	40,3	24	57,1	26	66	26,2	74,7	26,4	75,5	26,5	83,2	26,6	90,9	26,8
	50	-	-	-	-	-	-	52,3	28	62,8	28,2	73,4	28,4	71	28,6	75,6	28,8	88,3	29
100	30	44,5	22,5	57,3	24,4	76,8	25,2	98,8	26,7	101,9	27	106,7	27,5	114,5	27,7	126,3	27,8	138,1	27,9
	35	43,2	25,5	55,7	26,2	68,5	27,9	93,7	29,6	99,3	29,9	105,8	30,4	111,5	30,6	122,8	30,7	134,4	31
	40	-	-	54	28,6	62,8	30,9	86,8	33,2	95,7	33,5	104,9	33,9	108,4	34,1	119,3	34,3	130,5	34,5
	45	-	-	-	-	56,2	33,8	79,6	36,5	91,9	36,9	104	37,1	105,1	37,3	115,8	37,4	126,6	37,7
	50	-	-	-	-	53	35,6	72,8	39,3	87,5	39,6	102,2	39,9	98,9	40,2	105,2	40,5	122,9	40,7
120	30	51,2	24	65,9	26	88,3	26,9	113,6	28,5	117,2	28,8	122,7	29,4	131,7	29,6	145,2	29,7	158,8	29,8
	35	49,7	27,2	64,1	28	78,8	29,8	107,8	31,6	114,2	31,9	121,7	32,5	128,2	32,6	141,3	32,8	154,6	33
	40	42,7	29,8	62,1	30,5	72,2	33	99,8	35,4	110,1	35,8	120,6	36,2	124,6	36,4	137,2	36,6	150	36,8
	45	0	0	59,8	34,1	64,6	36	91,5	39	105,6	39,4	119,6	39,6	120,9	39,8	133,2	39,9	145,6	40,2
	50	0	0	56,2	36	61	38	83,7	42	100,6	42,3	117,5	42,6	113,7	42,9	121	43,2	141,3	43,4
150	30	64,2	32,4	82,7	35,1	110,8	36,3	142,5	38,5	147	38,9	153,9	39,7	165,2	40	182,1	40,1	199,1	40,3
	35	62,3	36,7	80,4	37,8	98,8	40,3	135,2	42,6	143,3	43,1	152,6	43,9	160,8	44,1	177,2	44,3	193,8	44,6
	40	53,5	40,3	77,9	41,2	90,5	44,6	125,1	47,8	138,1	48,3	151,3	48,9	156,3	49,2	172,1	49,5	188,2	49,7
	45	0	0	75	46	81	48,7	114,8	52,6	132,5	53,2	150	53,5	151,6	53,8	167,1	54	182,6	54,3
	50	0	0	70,5	48,7	76,5	51,4	105	56,7	126,2	57,2	147,4	57,5	142,6	58	151,7	58,4	177,2	58,7

Integrated heating capacity includes the defrost cycles

Abs. power = Includes compressor and fan consumption.

1.9 Capacites YLCA

1.9 Capacites YLCA

1.9.1 Cooling capacities YLCA 40 ÷ 150

YLCA Model	Water outlet temp. °C	Outdoor ambient temperature °C DB (80% RH)															
		20		25		30		32		35		40		43		46	
		Ca-pacity	Abs. power	Ca-pacity	Abs. power	Ca-pacity	Abs. power	Ca-pacity	Abs. power	Ca-pacity	Abs. power	Ca-pacity	Abs. power	Ca-pacity	Abs. power	Ca-pacity	Abs. power
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
40	5	42,09	10,3	41	10,9	39,14	12,04	38,19	12,45	33,79	13,12	32,51	14,61	30,81	15,49	28,9	16,51
	6	43,05	10,4	42	11	40,69	12,11	39,66	12,52	38,19	13,19	34,5	14,68	32,66	15,65	30,81	16,64
	7	43,9	10,5	43	11,1	41,2	12,18	41,21	12,58	39,66	13,26	36,49	14,75	34,57	15,83	32,73	16,85
	8	46,52	10,6	45,26	11,2	43,42	12,25	42,31	12,65	40,77	13,33	37,67	14,82	35,68	15,9	33,76	16,98
	10	49,02	10,8	47,77	11,4	45,78	12,31	44,67	12,72	42,98	13,4	40,1	14,88	37,96	15,97	35,97	17,05
	12	51,53	11	50,28	11,6	48,21	12,31	47,03	12,72	45,26	13,4	42,46	14,95	40,25	16,03	38,11	17,12
	15	55,29	11,4	54,03	11,9	51,28	12,38	50,57	12,79	48,65	13,46	46,15	15,02	43,71	16,03	41,43	17,18
50	5	56,2	14,45	54,98	15,06	52,3	16,08	50,63	16,91	48,96	17,74	44,27	20,16	41,92	21,37	39,58	22,58
	6	57,79	14,54	56,53	15,16	53,78	16,18	52,15	17,01	50,53	17,85	45,76	20,27	43,38	21,49	41	22,7
	7	59,39	14,63	58,1	15,25	55,27	16,28	53,69	17,12	52,1	17,96	47,26	20,38	44,84	21,59	42,42	22,8
	8	61,28	14,71	59,95	15,33	57,03	16,37	55,41	17,21	53,8	18,06	48,82	20,48	46,33	21,69	43,84	22,9
	10	65,06	14,88	63,65	15,51	60,55	16,56	58,88	17,41	57,21	18,27	51,95	20,68	49,32	21,89	46,69	23,1
	12	68,84	15,06	67,34	15,7	64,06	16,76	62,34	17,62	60,61	18,49	55,07	20,89	52,3	22,1	49,53	23,3
	15	74,51	15,32	72,89	15,97	69,34	17,05	67,55	17,93	65,76	18,81	59,81	21,2	56,83	22,4	53,86	23,6
60	5	67,1	15,5	64,05	16,4	60,56	17,73	58,42	18,66	56,28	19,6	52	21,47	49,51	22,51	47,02	23,55
	6	69,45	15,58	66,3	16,48	62,68	17,81	60,41	18,76	58,15	19,7	53,61	21,58	51,05	22,63	48,48	23,67
	7	71,8	15,65	68,54	16,56	64,8	17,9	62,65	18,75	60,5	19,6	55,22	21,7	52,57	22,75	49,93	23,8
	8	73,81	15,74	70,46	16,66	66,61	18	64,17	18,95	61,72	19,91	56,83	21,81	54,11	22,86	51,39	23,92
	10	77,83	15,93	74,3	16,86	70,24	18,22	67,69	19,17	65,14	20,13	60,05	22,04	57,17	23,1	54,3	24,17
	12	81,85	16,11	78,13	17,05	73,87	18,43	71,22	19,39	68,57	20,35	63,28	22,27	60,25	23,34	57,22	24,42
	15	87,9	16,4	83,91	17,35	79,33	18,76	76,53	19,72	73,73	20,68	68,12	22,61	64,86	23,71	61,6	24,8
80	5	85,36	21,04	82,16	22,26	77,67	24,06	74,93	25,33	72,18	26,6	66,69	29,14	63,5	30,55	61,3	31,65
	6	88,46	21,14	85,04	22,37	80,4	24,18	77,49	25,45	74,58	26,73	68,76	29,29	65,47	30,71	62,86	31,92
	7	91,23	21,4	86,95	22,67	81,98	24,4	80,36	25,45	77,6	26,6	70,82	29,45	67,43	30,88	64,04	32,3
	8	94,67	21,36	90,37	22,6	85,44	24,55	82,3	25,72	79,17	27,02	72,89	29,6	69,4	31,03	65,92	32,46
	10	99,83	21,62	95,3	22,88	90,1	24,73	86,83	26,02	83,56	27,32	77,02	29,91	73,33	31,35	69,65	32,8
	12	104,98	21,86	100,22	23,13	94,75	25,01	91,35	26,31	87,96	27,61	81,16	30,22	77,28	31,68	73,39	33,14
	15	112,74	22,61	107,63	23,55	101,75	25,46	98,16	26,76	94,56	28,07	87,37	30,69	83,19	32,17	79,54	33,66
100	5	109	27	106,2	28,6	98,6	31,1	95,6	32,1	91,2	32,8	83,7	36,2	79,1	37,7	76	40
	6	111,5	27,5	108,8	29,1	101,5	31,4	98,5	32,5	94	33,1	86,7	36,9	82,2	38,2	79,3	40,3
	7	113,8	28	111,5	29,6	104,3	31,8	101,3	32,9	98	33,8	89,8	37,4	85,3	38,7	82,5	40,6
	8	117,3	28,5	114,1	30,1	107,1	32,1	104,2	33,5	100	34,5	92,8	38	88,6	39,2	85,7	41
	10	122,7	29,3	119,6	30,9	112,7	32,8	109,9	34,5	105,8	35,1	99	38,7	94,9	39,8	92,2	41,6
	12	128,3	29,9	125,2	31,5	118	34	115,2	35,1	111,1	36,7	104,3	39,3	100,1	40,8	96	42,6
	15	136,2	32,4	133,1	33,8	126	36,1	123,2	36,9	119,1	38,3	112,3	40,6	107,8	41,9	101,9	43,3
120	5	132,3	32	128,9	33,9	119,7	36,8	116,1	38	110,7	38,8	101,6	42,9	96	44,6	92,3	47,3
	6	135,4	32,5	132,1	34,4	123,2	37,2	119,6	38,4	114,2	39,2	105,3	43,6	99,8	45,2	96,3	47,7
	7	138,2	33,1	135,4	35	126,6	37,6	123	39	119	40	109	44,3	103,6	45,8	100,2	48,1
	8	142,4	33,7	138,6	35,6	130,1	38	126,5	39,6	121,4	40,8	112,7	45	107,6	46,4	104,1	48,5
	10	149	34,6	145,2	36,6	136,9	38,8	133,5	40,8	128,5	41,6	120,2	45,8	115,2	47,1	111,9	49,2
	12	155,8	35,4	151,1	37,6	143,3	40,3	139,9	41,6	134,9	43,4	126,6	46,5	121,5	48,3	116,6	50,4
	15	165,3	38,3	161,6	40	153	42,7	149,6	43,7	144,6	45,3	136,1	48	130,9	49,6	123,8	51,2
150	5	162,7	46	81,4	23	151,9	49,4	147,3	51	140,5	52	128,9	57,5	58,8	31,6	117,6	63,2
	6	168,6	46,3	84,3	23,2	156,3	49,9	151,8	51,5	144,9	52,5	133,6	58,5	61	31,8	121,9	63,6
	7	174,5	46,7	87,3	23,3	160,6	50,4	156,1	52,2	151	53,6	138,3	59,3	63,1	32	126,3	64
	8	180,4	47	90,2	23,5	165,1	50,9	160,5	53,1	154	54,7	143	60,3	65,3	32,2	130,6	64,4
	10	192,2	47,7	96,1	23,8	173,7	52	169,4	54,7	163,1	55,7	152,5	61,3	69,7	32,6	139,3	65,3
	12	204,1	48,4	102,1	24,2	181,8	54	177,5	55,7	171,2	58,2	160,6	62,3	74	33	148	66,1
	15	221,8	49,4	110,9	24,7	194,1	57,2	189,8	58,6	183,5	60,7	172,7	64,3	80,5	33,7	161	67,3

1.9.2 Cooling capacities YLCA 40 ÷ 150 (35% ethylene glycol)

YLCA Model	Water outlet temp. °C	Outdoor ambient temperature °C DB (80% RH)															
		20		25		30		32		35		40		43		46	
		Ca-pacity kW	Abs. power kW	Ca-pacity kW	Abs. power kW	Ca-pacity kW	Abs. power kW	Ca-pacity kW	Abs. power kW	Ca-pacity kW	Abs. power kW	Ca-pacity kW	Abs. power kW	Ca-pacity kW	Abs. power kW	Ca-pacity kW	Abs. power kW
40	-5	27,64	7,38	26,5	8,03	25,35	8,78	24,88	9,11	24,1	10,2	22,21	10,59	21,16	11,18	20,04	11,86
	-4	29,22	7,6	27,99	8,24	26,57	9,03	26,03	9,35	23,83	10,43	23,1	10,87	21,9	11,49	20,6	12,27
	-2	32,07	8,01	30,85	8,65	29,17	9,49	28,5	9,83	27,36	10,92	25,15	11,4	23,75	12,06	22,17	12,82
	0	34,94	8,43	33,84	9,1	32,1	9,95	31,07	10,32	29,76	11,41	27,26	11,97	25,66	12,65	23,69	13,38
	2	39	8,83	37	9,57	34,95	10,45	33,84	10,83	32,35	11,92	29,51	12,55	27,71	13,25	25,96	13,38
	4	42,05	9,29	40,19	10,06	37,81	10,96	36,59	11,36	34,92	12,44	31,72	13,16	29,71	13,87	27,76	14,75
50	-5	34,91	10,78	33,34	11,68	31,75	12,71	31,01	13,13	29,87	13,81	27,4	15,09	25,93	15,86	24,49	16,7
	-4	36,73	11,05	35,12	11,95	33,27	13,01	32,5	13,43	31,31	14,13	28,71	15,45	27,17	16,24	25,53	17,24
	-2	40,12	11,58	38,6	12,5	36,5	13,61	35,66	14,07	34,36	14,79	31,52	16,15	29,8	16,99	27,87	17,96
	0	43,5	12,12	42,21	13,07	40,12	14,22	38,99	14,7	37,55	15,45	34,46	16,9	32,57	17,78	30,22	18,68
	2	48,19	12,66	45,98	13,66	43,69	14,85	42,58	15,35	41,02	16,15	37,64	17,66	35,59	18,56	33,6	19,4
	4	51,58	13,2	49,76	14,25	47,26	15,48	46,17	16	44,49	16,84	40,81	18,41	38,6	19,35	36,47	20,47
60	-5	40,54	11,76	38,72	12,75	36,87	13,87	36,01	14,33	34,69	15,07	31,82	16,47	30,11	17,31	28,44	18,23
	-4	42,65	12,05	40,78	13,04	38,64	14,2	37,74	14,66	36,36	15,42	33,34	16,87	31,55	17,72	29,65	18,82
	-2	46,59	12,64	44,83	13,64	42,38	14,86	41,41	15,35	39,9	16,14	36,6	17,62	34,61	18,55	32,37	19,6
	0	50,52	13,23	49,02	14,26	46,59	15,52	45,27	16,04	43,6	16,87	40,02	18,45	37,82	19,4	35,09	20,38
	2	55,96	18,32	53,4	14,91	50,73	16,21	49,45	16,75	47,63	17,62	43,71	19,27	41,32	20,26	39,02	21,17
	4	59,9	14,41	57,78	15,55	54,88	16,9	53,62	17,46	51,67	18,38	47,39	20,09	44,83	21,12	42,35	22,34
80	-5	51,99	15,96	49,66	17,3	47,29	18,82	46,19	19,45	44,49	20,45	40,81	22,35	38,62	23,49	36,47	24,74
	-4	54,71	16,36	52,3	17,7	49,56	19,27	48,41	19,89	46,63	20,92	42,77	22,89	40,47	24,05	38,02	25,54
	-2	59,75	17,16	57,5	18,51	54,36	20,16	53,11	20,83	51,18	21,91	46,95	23,92	44,39	25,17	41,52	26,6
	0	64,8	17,96	62,87	19,36	59,75	21,06	58,07	21,77	55,93	22,89	51,33	25,04	48,51	26,33	45,01	27,66
	2	71,78	18,75	68,49	20,23	65,07	22	63,42	22,73	61,1	23,92	56,06	26,15	53	27,49	50,05	28,73
	4	76,82	19,55	74,11	21,1	70,39	22,93	68,77	23,69	66,27	24,95	60,78	27,27	57,5	28,66	54,32	30,32
100	-5	65,7	20,3	62,7	22	59,7	23,9	58,3	24,7	56,2	26	51,5	28,4	48,8	29,9	46,1	31,4
	-4	69,1	20,8	66,1	22,5	62,6	24,5	61,1	25,3	58,9	26,6	54	29,1	51,1	30,6	48	32,4
	-2	75,5	21,8	72,6	23,5	68,7	25,6	67,1	26,5	64,6	27,8	59,3	30,4	56,1	32	52,4	33,8
	0	81,8	22,8	79,4	24,6	75,5	26,8	73,3	27,7	70,6	29,1	64,8	31,8	61,3	33,5	56,8	35,2
	2	90,7	23,8	86,5	25,7	82,2	27,9	80,1	28,9	77,2	30,4	70,8	33,2	66,9	34,9	63,2	36,5
	4	97	24,8	93,6	26,8	88,9	29,1	86,9	30,1	83,7	31,7	76,8	34,7	72,6	36,4	68,6	38,5
120	-5	79,7	24	76,2	26	72,5	28,3	70,8	29,2	68,2	30,8	62,6	33,6	59,2	35,3	55,9	37,2
	-4	83,9	24,6	80,2	26,6	76	29	74,2	29,9	71,5	31,5	65,6	34,4	62,1	36,2	58,3	38,4
	-2	91,6	25,8	88,2	27,8	83,4	30,3	81,4	31,3	78,5	32,9	72	36	68,1	37,8	63,7	40
	0	99,4	27	96,4	29,1	91,6	31,7	89	32,7	85,8	34,4	78,7	37,6	74,4	39,6	69	41,6
	2	110,1	28,2	105	30,4	99,8	33,1	97,3	34,2	93,7	36	86	39,3	81,3	41,3	76,8	43,2
	4	117,8	29,4	113,6	31,7	107,9	34,5	105,5	35,6	101,6	37,5	93,2	41	88,2	43,1	83,3	45,6
150	-5	101,2	32,2	96,6	34,9	92	37,9	89,9	39,2	86,6	41,2	79,4	45	75,1	47,3	71	49,8
	-4	106,5	33	101,3	35,7	96,4	38,8	94,2	40,1	90,7	42,2	83,2	46,1	78,8	48,5	74	51,5
	-2	116,3	34,6	111,9	37,3	105,8	40,6	103,3	42	99,6	44,1	91,4	48,2	86,4	50,7	80,8	53,6
	0	126,1	36,2	122,3	39	116,3	42,4	113	43,9	108,8	46,1	99,9	50,4	94,4	53,1	87,6	55,7
	2	139,7	37,8	133,3	40,8	126,3	44,3	123,4	45,8	118,9	48,2	109,1	52,7	103,1	55,4	97,4	57,9
	4	149,5	39,4	144,2	42,5	137	46,2	133,8	47,7	128,9	50,3	118,3	55	111,9	57,7	105,7	61,1

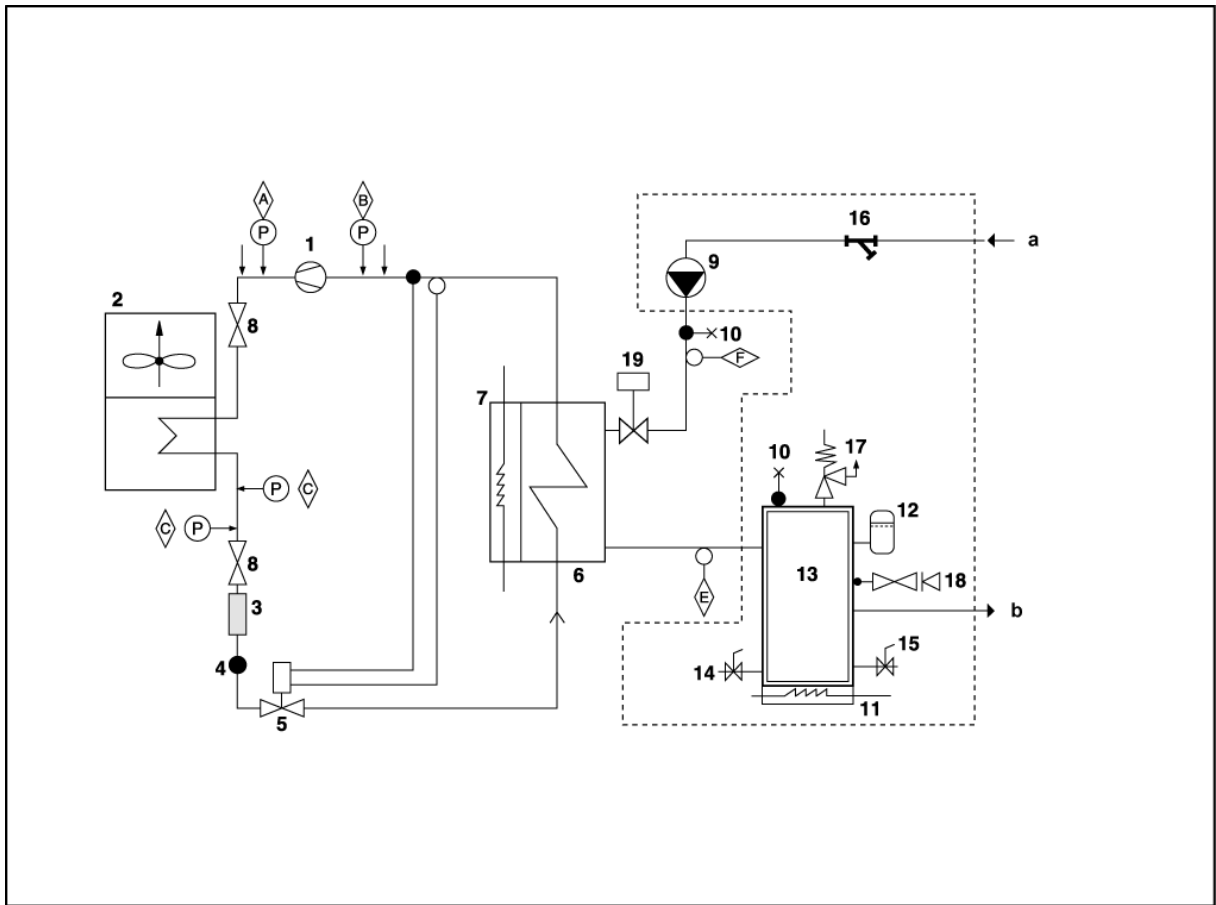
Abs. power = Includes compressor and fan consumption.

1.10 Cooling operation and hydraulic diagrams

1.10.1 YLCA models: cooling only

- 1 Heat exchange takes place between the heat transfer liquid (water or glycol water) and the refrigerant in the plate heat exchanger.
- 2 Water is cooled, and refrigerant is evaporated and reheated.
- 3 Then the Scroll compressor condenses the refrigerant (gas) until the condensing pressure is reached, and the refrigerant goes to the air cooled condensing unit.
- 4 In the air cooled condensing unit, heat is exchanged between the air and the refrigerant.
- 5 The air is heated and evacuated from the chiller (heat rejection).
- 6 The refrigerant is condensed and sub-cooled.
- 7 Then the refrigerant (liquid) goes on to the expansion element (expansion valve in YLCA 50 to 150 models) where it is expanded until the evaporating pressure is reached, at which time it goes to the plate heat exchanger to start a new cooling cycle.

Cooling operation and hydraulic diagram YLCA 40 (cool only)



Safety/Control devices

- A High-pressure switch
- B Low-pressure switch
- C Condensing pressure transducer
- E Water outlet temp. sensor (Antifreeze and display)
- F Water inlet temp. sensor (Setting and display)

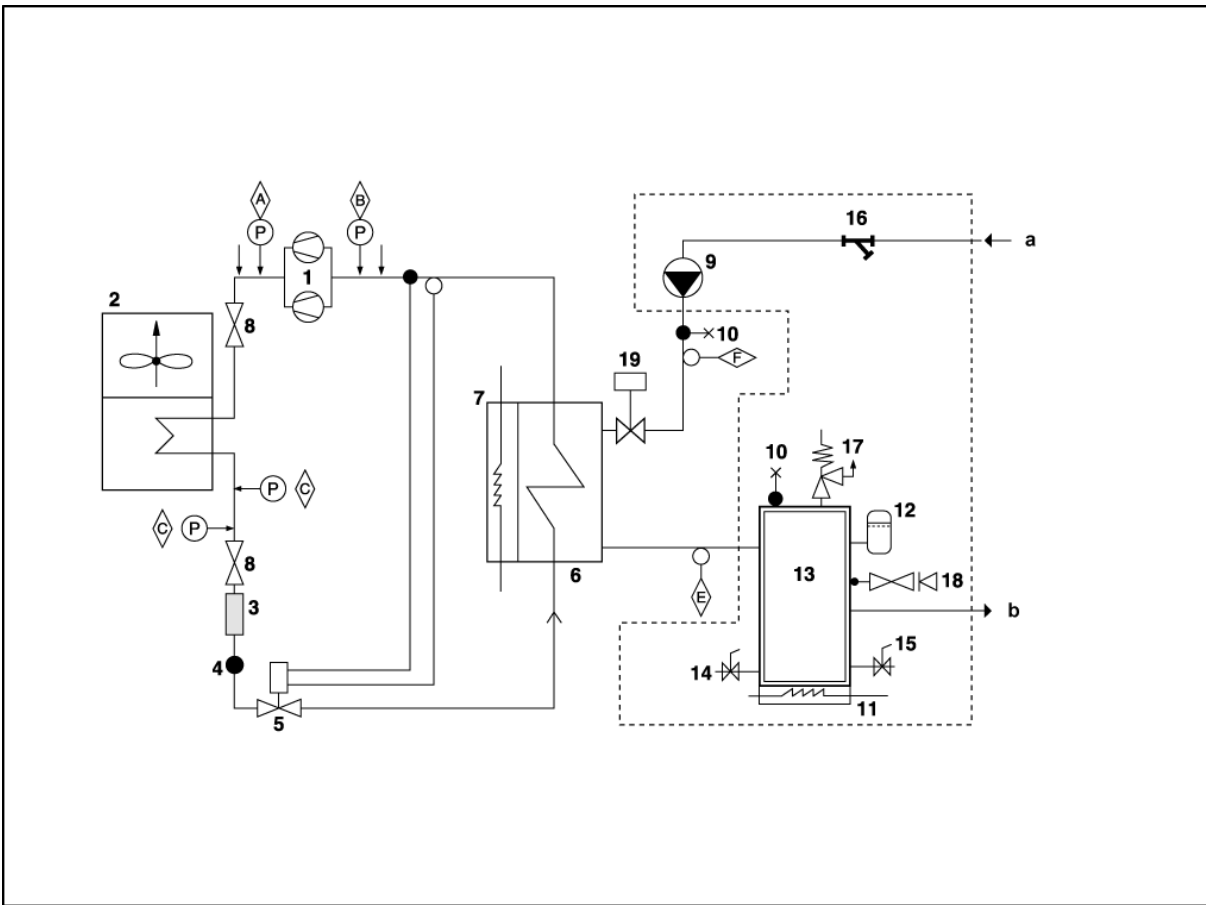
- 1 Tandem compressor
- 2 Air-cooled condenser
- 3 Filter dryer
- 4 Sight glass
- 5 Expansion valve
- 6 Plate heat exchanger
- 7 Heat exchanger antifreeze heater
- 8 Globe valve
- 9 Water pump
- 10 Automatic air bleed
- 11 Water tank antifreeze heater
- 12 Expansion vessel

Components

- 13 Water tank
- 14 Charge valve
- 15 Drain valve
- 16 Water filter (not inside the unit)
- 17 Safety valve
- 18 Pressure gauge
- 19 Flow switch
- Pipe connection with "Schrader" valve
- - - For units with hydro kit only
- a Water inlet
- b Water outlet

1.10 Cooling operation and hydraulic diagrams

Cooling operation and hydraulic diagram YLCA 50-80 (cool only)



Safety/Control devices

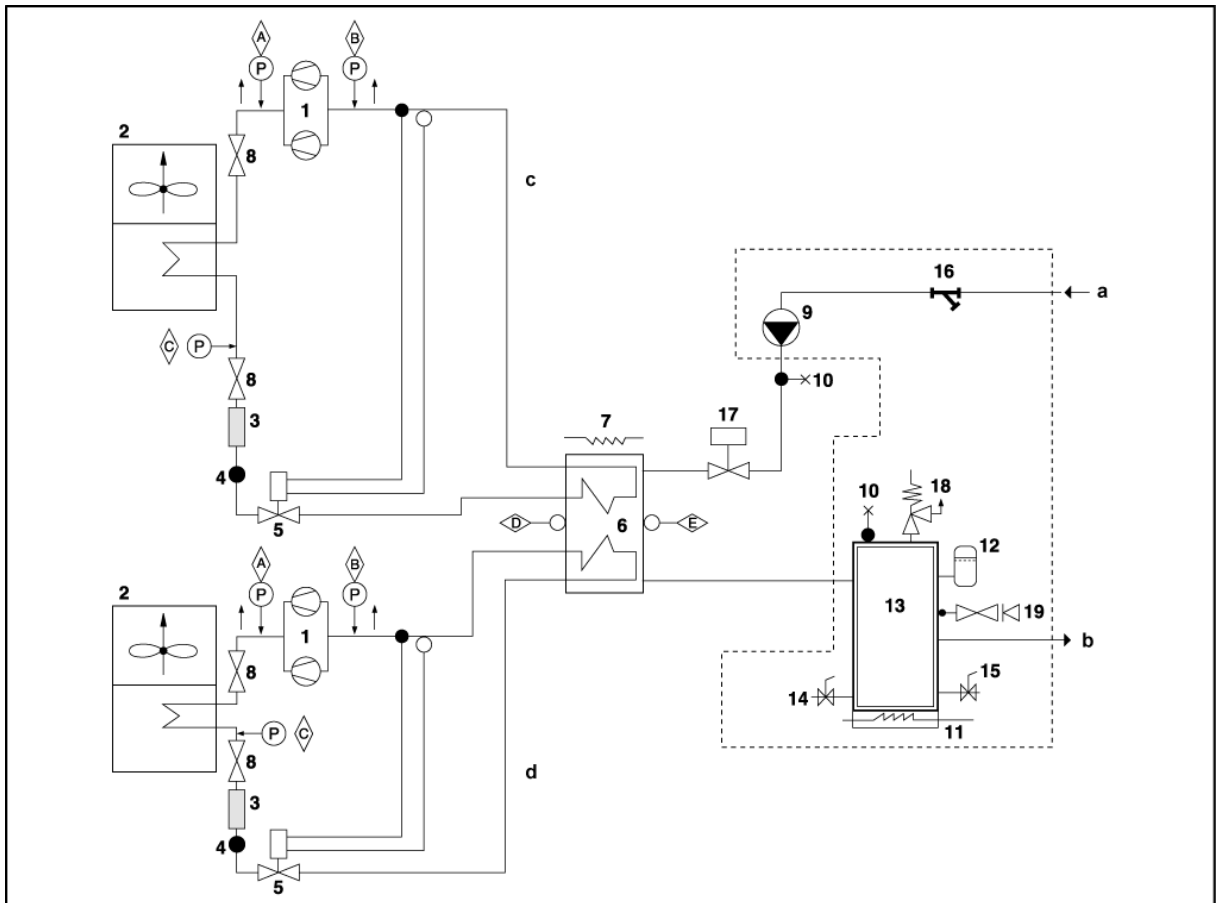
- A High-pressure switch
- B Low-pressure switch
- C Condensing pressure transducer
- E Water outlet temp. sensor (Antifreeze and display)
- F Water inlet temp. sensor (Setting and display)

- 1 Tandem compressor
- 2 Air-cooled condenser
- 3 Filter dryer
- 4 Sight glass
- 5 Expansion valve
- 6 Plate heat exchanger
- 7 Heat exchanger antifreeze heater
- 8 Globe valve
- 9 Water pump
- 10 Automatic air bleed
- 11 Water tank antifreeze heater
- 12 Expansion vessel

Components

- 13 Water tank
- 14 Charge valve
- 15 Drain valve
- 16 Water filter (not inside the unit)
- 17 Safety valve
- 18 Pressure gauge
- 19 Flow switch
- Pipe connection with "Schrader" valve
- For units with hydro kit only
- a Water inlet
- b Water outlet

Cooling operation and hydraulic diagram YLCA 100, 120 and 150 (cool only)



Safety/Control devices

- A High-pressure switch
- B Low-pressure switch
- C Pressure transducer port. (Fan speed setting - condensing pressure display)
- D Water outlet temp. sensor (Antifreeze and display)
- E Water inlet temp. sensor (Setting and display)

Components

- 1 Tandem compressor
- 2 Air-cooled condenser
- 3 Filter dryer
- 4 Sight glass
- 5 Expansion valve
- 6 Plate heat exchanger
- 7 Heat exchanger antifreeze heater
- 8 Globe valve
- 9 Water pump
- 10 Automatic air bleed
- 11 Water tank antifreeze heater
- 12 Expansion vessel
- 13 Water tank
- 14 Charge valve
- 15 Drain valve
- 16 Water filter (not inside the unit)
- 17 Flow switch
- 18 Safety valve
- 19 Pressure gauge
- Pipe connection with "Schrader" valve
- - - For units with hydro kit only
- a Water inlet
- b Water outlet
- c Circuit 1
- d Circuit 2

1.10.2 YLHA models: heat pump

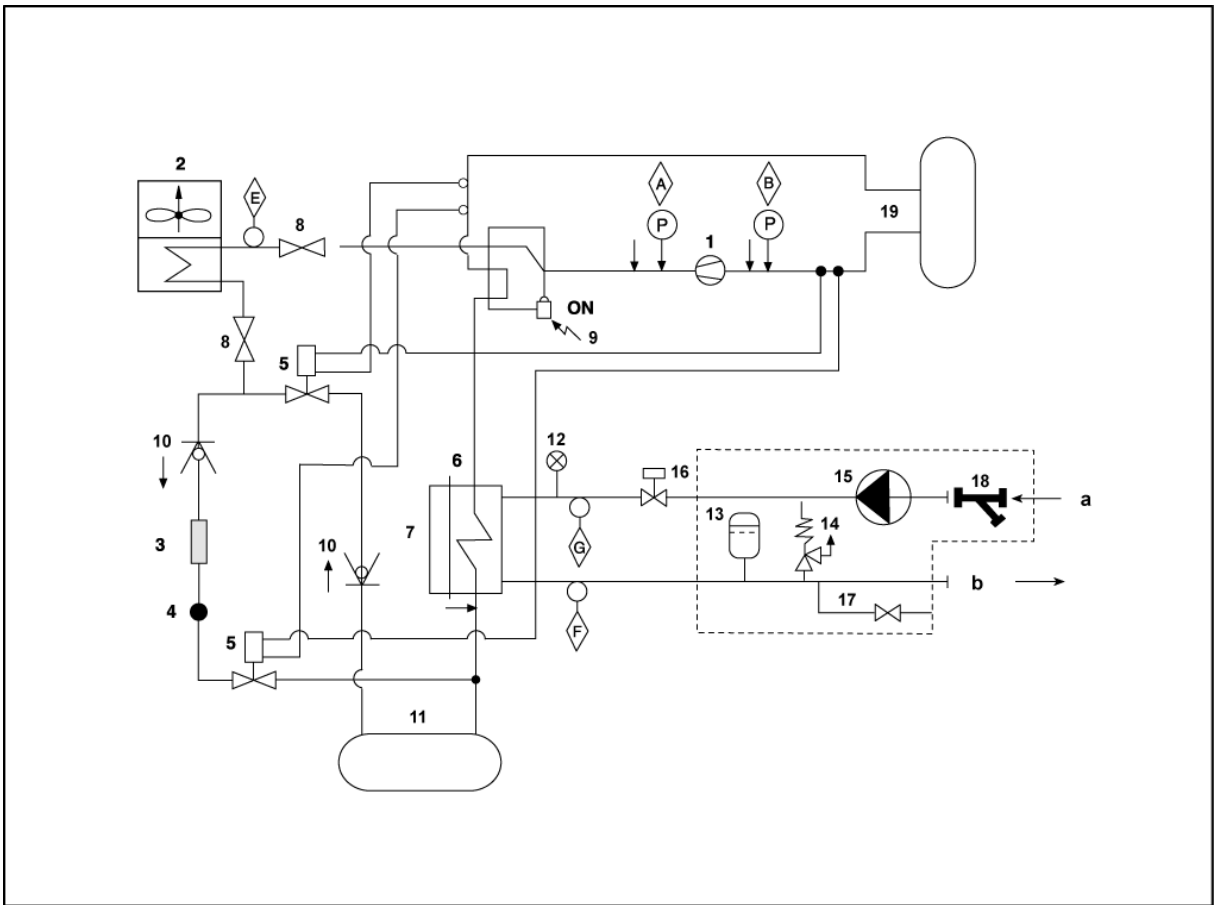
Cooling cycle

- 1 The 4-way valve is activated.
- 2 Heat exchange takes place between the heat transfer liquid (water or glycol water) and the refrigerant in the plate heat exchanger. Water is cooled, and refrigerant is evaporated and reheated.
- 3 Then the Scroll-type compressor condenses the refrigerant (gas) until the condensing pressure is reached, and the refrigerant goes to the air cooled condensing unit.
- 4 In the air cooled condensing unit, heat is exchanged between the air and the refrigerant. The air is heated and evacuated from the chiller (heat rejection).
- 5 The refrigerant is condensed and sub-cooled.
- 6 Then the refrigerant (liquid) goes on to the expansion element where it is expanded until the evaporating pressure is reached, at which time it goes to the plate heat exchanger to start a new cooling cycle.

Heating cycle

The cycle is reversed to heating mode. The 4-way valve is not activated. The condensing unit becomes the evaporating unit and the evaporating unit becomes the condensing unit. The water in the plate heat exchanger is heated.

Cooling operation and hydraulic diagram YLHA 40 (heat pump)



Safety/Control devices

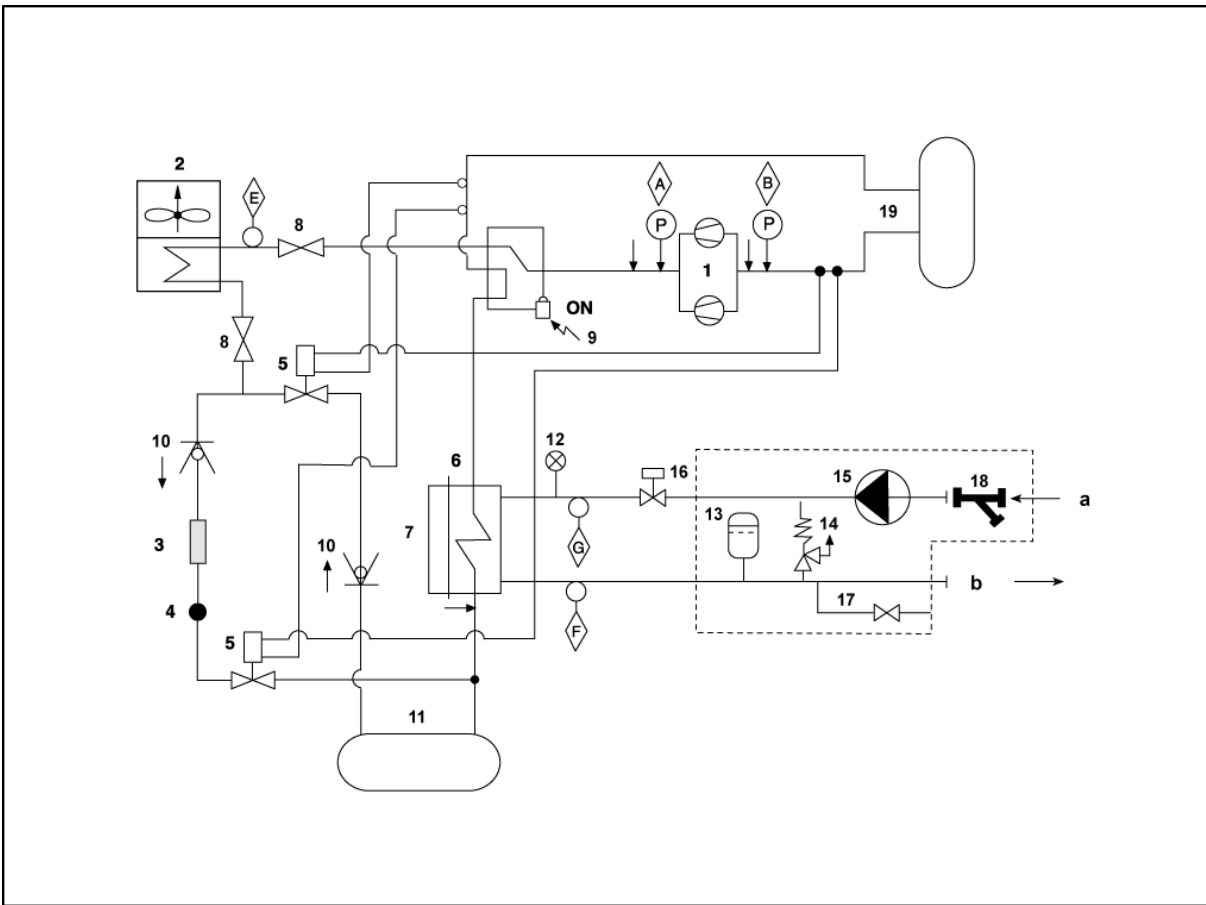
- A High-pressure switch
- B Low-pressure switch
- E Pressure transducer port. Fan speed setting, defrost management, condensing pressure display (cooling cycle) or evaporating pressure display (heating cycle)
- F Water outlet temp. sensor (Antifreeze, setting and display)
- G Water inlet temp. sensor (Setting and display)

Components

- 1 Compressor
- 2 Air-cooled condenser
- 3 Filter dryer
- 4 Sight glass
- 5 Expansion valve
- 6 Plate heat exchanger
- 7 Heat exchanger antifreeze heater
- 8 Globe valve
- 9 Four-way valve
- 10 Check valve
- 11 Liquid receiver
- 12 Automatic air bleed
- 13 Expansion vessel
- 14 Safety valve
- 15 Water pump
- 16 Flow switch
- 17 Drain connection
- 18 Water filter (not inside the unit)
- 19 Suction accumulator
- Pipe connection with "Schrader" valve
- - - For units with hydro kit only
- a Water inlet
- b Water outlet

1.10 Cooling operation and hydraulic diagrams

Cooling operation and hydraulic diagram YLHA 50-80 (heat pump)



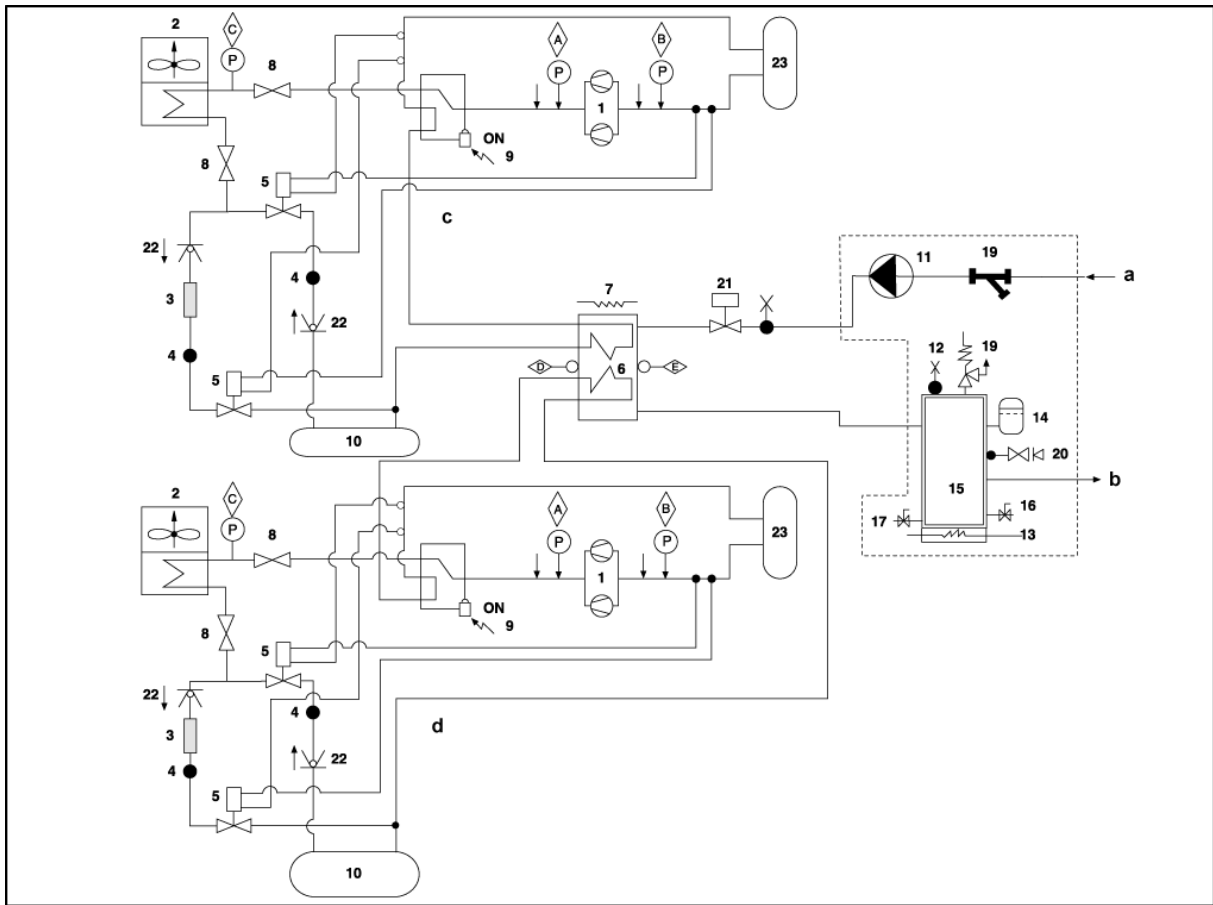
Safety/Control devices

- A High-pressure switch
- B Low-pressure switch
- E Pressure transducer port. Fan speed setting, defrost management, condensing pressure display (cooling cycle) or evaporating pressure display (heating cycle)
- F Water outlet temp. sensor (Antifreeze, setting and display)
- G Water inlet temp. sensor (Setting and display)

Components

- 1 Compressor
- 2 Air-cooled condenser
- 3 Filter dryer
- 4 Sight glass
- 5 Expansion valve
- 6 Plate heat exchanger
- 7 Heat exchanger antifreeze heater
- 8 Globe valve
- 9 Four-way valve
- 10 Check valve
- 11 Liquid receiver
- 12 Automatic air bleed
- 13 Expansion vessel
- 14 Safety valve
- 15 Water pump
- 16 Flow switch
- 17 Drain connection
- 18 Water filter (not inside the unit)
- 19 Suction accumulator
- Pipe connection with "Schrader" valve
- For units with hydro kit only
- a Water inlet
- b Water outlet

Cooling operation and hydraulic diagram YLHA 100, 120 and 150 (heat pump)



Safety/Control devices

- A High-pressure switch
- B Low-pressure switch
- C Pressure transducer port. (Fan speed setting - condensing pressure display)
- D Water outlet temp. sensor (Antifreeze and display)
- E Water inlet temp. sensor (Setting and display)

Components

- 1 Tandem compressor
 - 2 Air-cooled condenser
 - 3 Filter dryer
 - 4 Sight glass
 - 5 Expansion valve
 - 6 Plate heat exchanger
 - 7 Heat exchanger antifreeze heater
 - 8 Globe valve
 - 9 Four-way valve
 - 10 Liquid receiver
 - 11 Water pump
 - 12 Automatic air bleed
 - 13 Water tank antifreeze heater
 - 14 Expansion vessel
 - 15 Water tank
 - 16 Charge valve
 - 17 Drain valve
 - 18 Water filter (not inside the unit)
 - 19 Safety valve
 - 20 Water pressure gauge
 - 21 Flow switch
 - 22 Check valve
 - 23 Suction accumulator
- Pipe connection with "Schrader" valve
- - - For units with hydro kit only
- a Water inlet
 - b Water outlet
 - c Circuit 1
 - d Circuit 2

1.11 Instructions for installation and connection of the unit

1.11 Instructions for installation and connection of the unit

1.11.1 Characteristics of the location

Before locating the unit, make sure you have received the appropriate product by checking the specifications described on the outside of same.

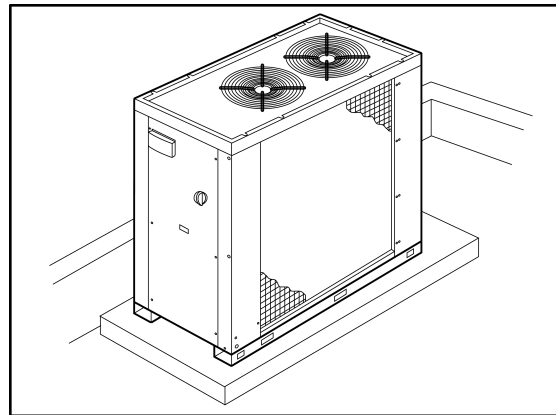
The unit should be placed on a perfectly horizontal plane, making sure the base can support the weight of the unit.

If vibration-free operation is required, the unit can be placed on a cork or similar anti-vibratory base, or fastened to the base with anti-vibratory plates or supports.

1.11.2 Specifications for the foundation or anchoring of the unit

Where the unit is to be installed at ground level, the characteristics of the ground it will sit on must be taken into account.

Characteristics, such as acceptable surface firmness, must be suitable for the foundation the unit requires.



1.11.3 Hydraulic connections

The hydraulic connections of the water inlet and outlet of the unit should be carried out respecting the inlet and outlet directions indicated.

Galvanised iron or copper piping can be used, with dimensions no lower than those indicated, and keeping in mind the pressure drops at said connections and in the internal exchanger of the installation.

Pump dimensioning should be carried out in accordance with a nominal flow that allows an Δt within the operating limits.

In all cases, a flow switch should be installed so as to avoid the possibility of operation without water flow.

An adequate expansion vessel for the total volume of the water in the installation should also be installed in the water return piping.

During the winter season, with outdoor temperatures below 0°C, take precautions to avoid freezing of the water in the piping network.

Usually, a filling solution is applied to the circuit with an antifreeze mixture (glycol).

1.11.4 Rotational direction of Scroll compressors

The Scroll compressors and the fans only operate correctly if they rotate in the correct direction. All of the motors and compressors in the unit are connected so that they rotate correctly.

If the compressors are not connected correctly and are rotating in the wrong direction:

- The compressor will not compress.
- Operating noise will be abnormal.
- Electricity consumption (A) will be low.
- They overheat.

The phase detector must have both LEDs lit for correct operation:

- Green LED lit means: Power ON.
- Yellow LED lit means: Relay ON.

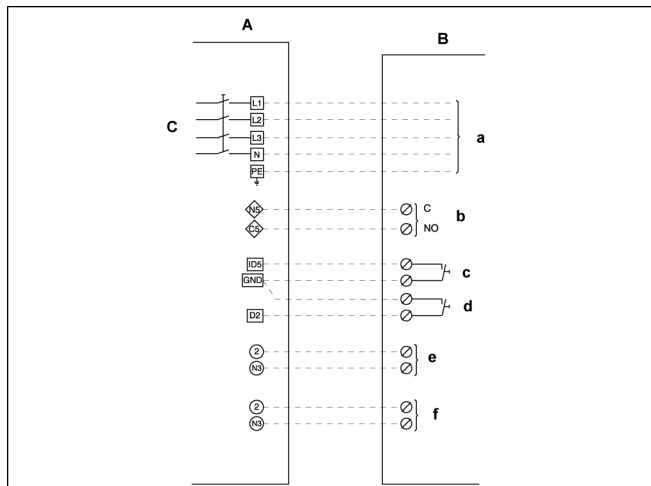
1.11.5 Preparation and connecting to the various utilities

Electricity. Power and control

Wiring diagrams

Electrical installation YLCA / YLHA 40

- | | | | |
|---|--|---|--|
| A | YLCA / YLHA terminal strip | c | Remote ON / OFF switch |
| B | Outdoor terminal strip | | Remote COOL / HEAT switch
CLOSED = COOL
OPEN = HEAT
(YLHA units only) |
| C | Main switch | d | |
| a | Supply (400 - 3 + N - ph - 50 Hz) | e | Auxiliary heater |
| | General alarm (voltage-free inverter contact max. 2A resist. at 230 Vac) | f | Pump relay (max. 2A resist. at 230 Vac)
(version with no Hydro kit only) |



- | | | | |
|---|----------------------------|-------|---------------------------------------|
| □ | YLCA / YLHA strip terminal | ◇ | Voltage-free terminal strip contact A |
| ∅ | Outdoor unit terminals | - - - | Client's electrical installation |
| ○ | 230 Vac terminal | | |

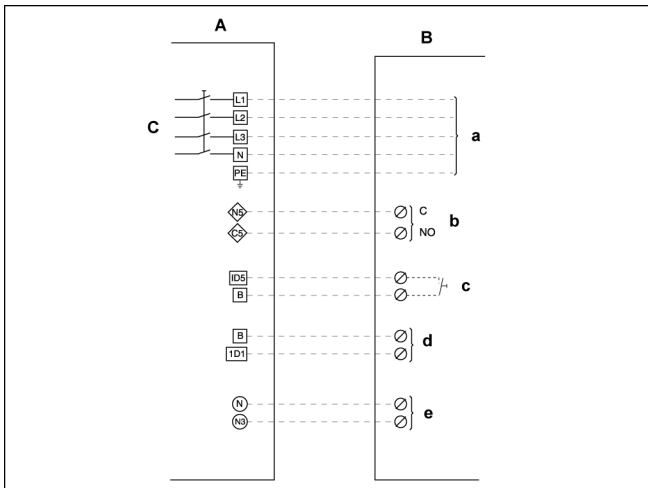


CAUTION

The cable used for the unit power supply must be H05 RN - F

Electrical installation, YLCA 50, 60 and 80

- | | | | |
|---|-----------------------------------|---|--|
| A | YLCA terminal strip | b | General alarm (voltage-free inverter contact max. 2A resist. at 230 Vac) |
| B | Outdoor terminal strip | c | Remote ON / OFF switch |
| C | Main switch | d | Pump heat protectors
Auxiliary contacts
Pump contacts |
| a | Supply (400 - 3 + N - ph - 50 Hz) | e | Pump relay (max. 2A resist. at 230 Vac)
(Hydro kit version only) |



- | | | | |
|---|------------------------|-------|-------------------------------------|
| □ | Strip terminals | ◇ | Voltage-free terminal strip contact |
| ∅ | Outdoor unit terminals | - - - | Client's electrical installation |
| ○ | 230 Vac terminal | | |

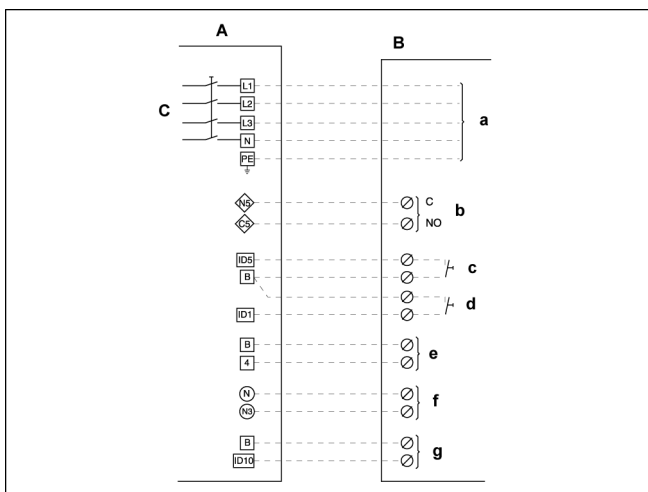


CAUTION

The cable used for the unit power supply must be H05 RN - F

Electrical installation YLHA 50, 60 and 80

- | | | | |
|---|--|---|---|
| A | YLHA terminal strip | c | Remote ON / OFF switch |
| | | | Remote COOL / HEAT switch |
| B | Outdoor terminal strip | d | CLOSED = COOL
OPEN = HEAT
(YLHA units only) |
| C | Main switch | e | Pump heat protectors
Auxiliary contacts
Pump contactors |
| a | Supply (400 - 3 + N - ph - 50 Hz) | f | Pump relay (max. 2A resist. at 230 Vac)
(Hydro kit version only) |
| b | General alarm (voltage-free inverter contact max. 2A resist. at 230 Vac) | g | General outdoor protection |



- | | | | |
|---|--------------------------------|-------|--|
| □ | Strip terminals
YLCA / YLHA | ◇ | Voltage-free terminal strip contact
YLCA / YLHA |
| ∅ | Outdoor unit terminals | - - - | Client's electrical installation |
| ○ | 230 Vac terminal | | |

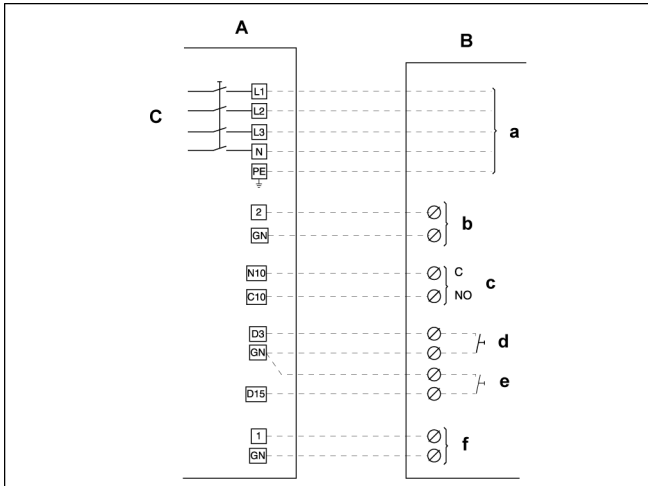


CAUTION

The cable used for the unit power supply must be H05 RN - F

Electrical installation YLCA/YLHA 100, 120 and 150

- | | | | |
|---|-----------------------------------|---|--|
| A | YLCA / YLHA terminal strip | c | General alarm (voltage-free inverter contact max. 2A resist. at 230 Vac) |
| B | Outdoor terminal strip | d | Remote ON / OFF switch |
| C | Main switch | | Remote COOL / HEAT switch
CLOSED = COOL
OPEN = HEAT
(YLHA units only) |
| a | Supply (400 - 3 + N - ph - 50 Hz) | e | |
| b | Flow switch | f | General outdoor protection |



□ Strip terminals

- - - Client's electrical installation

∅ Outdoor unit terminals



CAUTION

The cable used for the unit power supply must be H05 RN - F

1.12 Unit sound power spectrum data

Standard models

YLCA-YLHA standard models							
Frequency (Hz)	40	50	60	80	100	120	150
125 Hz	84	70	77	78	73	78	75
250 Hz	79	79	81	80	81	80	79
500 Hz	80	73	83	79	83	81	85
1,000 Hz	75	76	78	76	75	79	77
2,000 Hz	71	69	73	74	71	75	70
4,000 Hz	65	63	64	65	62	68	63
8,000 Hz	59	56	59	58	56	63	55
Sound power level dB (A)	81	83	85	86	86	86	87

Low noise models

YLCA-YLHA low noise models							
Frequency (Hz)	40	50	60	80	100	120	150
125 Hz	79	71	73	75	75	75	76
250 Hz	74	73	75	76	76	76	78
500 Hz	75	74	76	77	77	77	79
1,000 Hz	70	67	70	73	73	73	73
2,000 Hz	66	62	65	59	59	59	68
4,000 Hz	60	53	54	58	58	58	59
8,000 Hz	54	48	50	53	53	53	54
Sound power level dB (A)	76	78	80	82	82	82	83

1.13 Operating instructions

1.13.1 Operating instructions μ C2 (YLCA/YLHA 40)

DESCRIPTION OF THE CONTROL UNIT

This is a multipurpose controller specially programmed for use with air-water chillers 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 (accessory serial connection 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 sensors 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) 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.

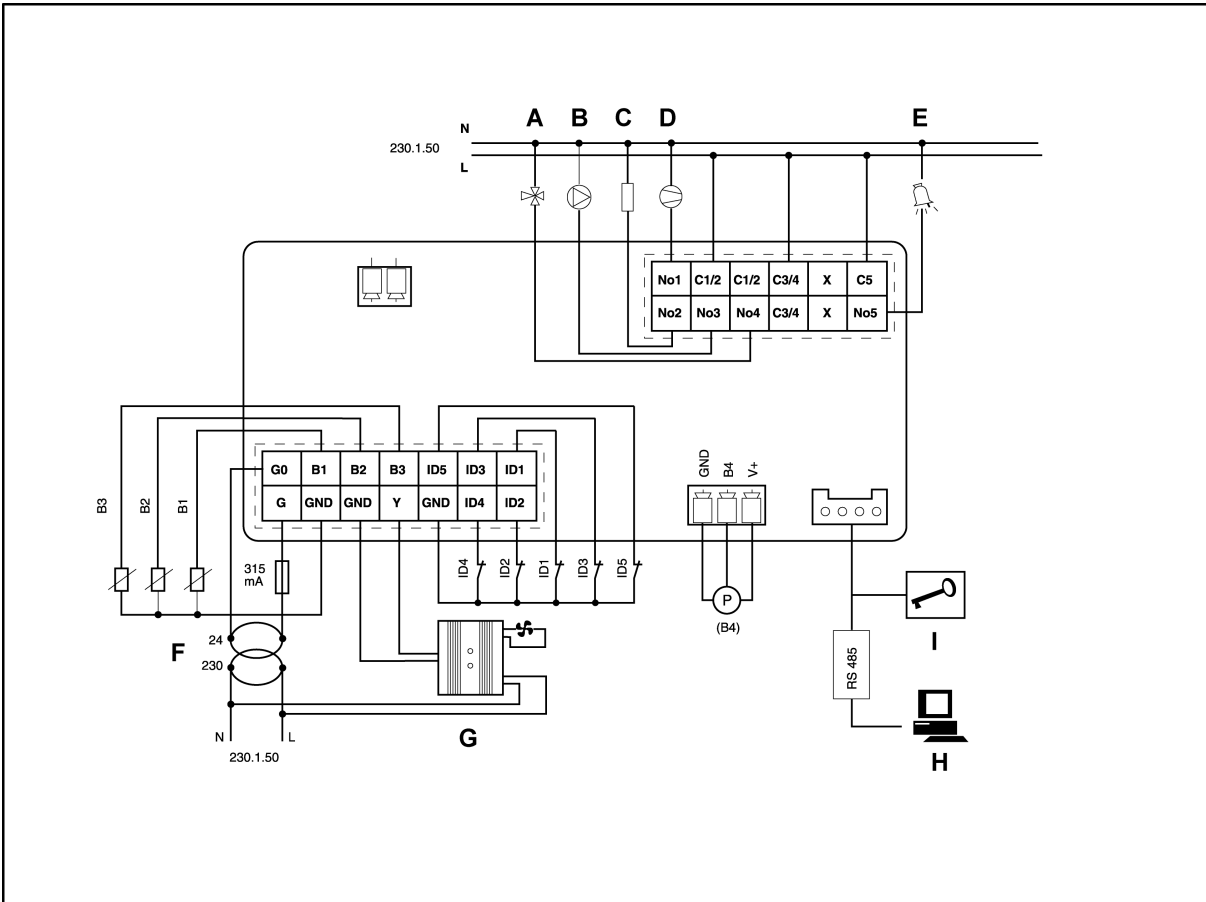
Direct Level

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.

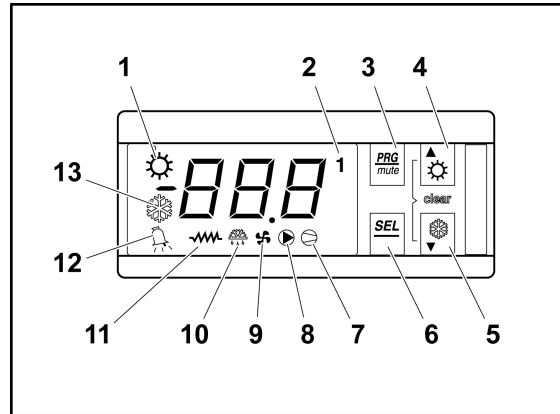
General diagram, YLCA / YLHA 40



A	Four-way valve	B2	Water outlet temperature sensor (Antifreeze protection)
B	Pump	B3	Outdoor temperature sensor (Dynamic set point)
C	Heater	B4	Radiometric pressure sensor (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 sensor (Control set point)	L	Phase

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).



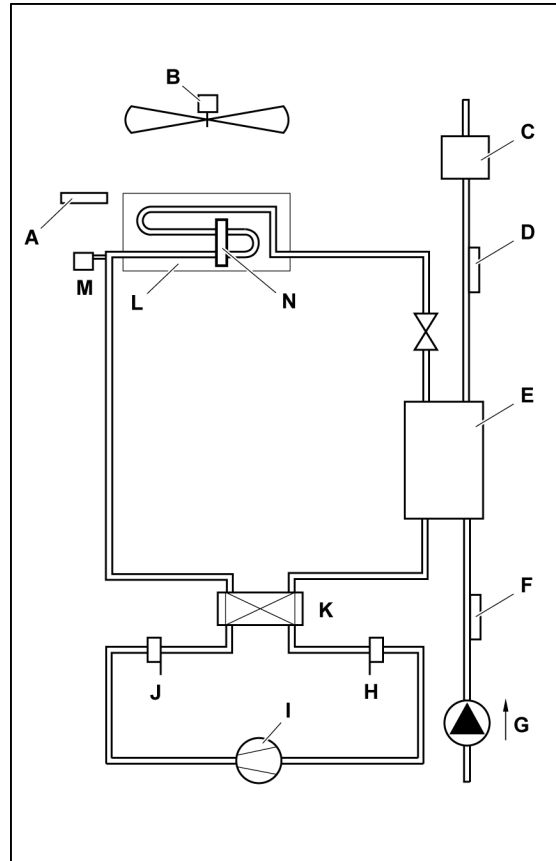
Button	Colour	Meaning	
		LED permanently lit	LED flashing
-2-	Orange	Compressor operating *	Timing start-up
-7-		Compressor on call	-
-8-		Water pump operating	-
-9-		Fans operating	-
-10-		Defrost active	-
-12-	Red	Alarm activated	-
-13-	Orange	Cool cycle	-
-1-		Heat cycle	-

(*) 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

Location of controls (YLCA / YLHA 40)

- | | | | |
|---|------------------------------|---|---------------------------|
| A | Temperature sensor (B3) | H | Low-pressure switch (LP) |
| B | Fan | I | Compressor |
| 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) |
| G | Pump | | |



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		

Parameters relating to sensors

Parameters relating to sensors							
Display	Description	Level	VS	Unit	Max.	Min.	Value
/01	NTC B1 sensor (water inlet): 0=Always ON (function not available) 1= Present	F	1 (R/W)	-	1	0	1
/02	NTC B2 sensor (water outlet): 0=Always ON (function not available) 1= Present	F	2 (R/W)	-	1	0	1
/03	NTC B3 sensor: 1= Condensation sensor 2= Outdoor sensor	F	14 (R/W)	-	1	0	2
/04	B4 sensor: 0= Absent 1= ON/OFF 2= Outdoor NTC sensor 3= Ratiometric 5 Vdc	F	15 (R/W)	-	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	F	6 (R/W)	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)	°C/bar	-	-	-

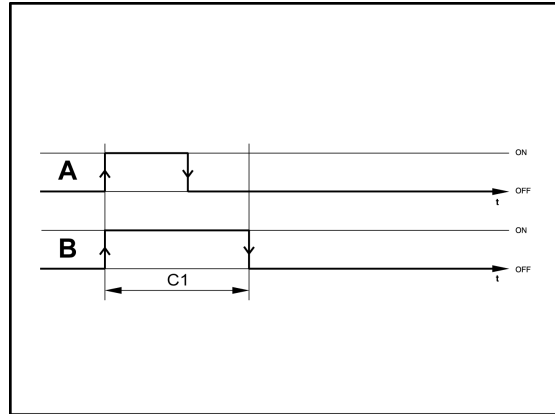
Parameters relating to the compressor

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
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

Operating graphics

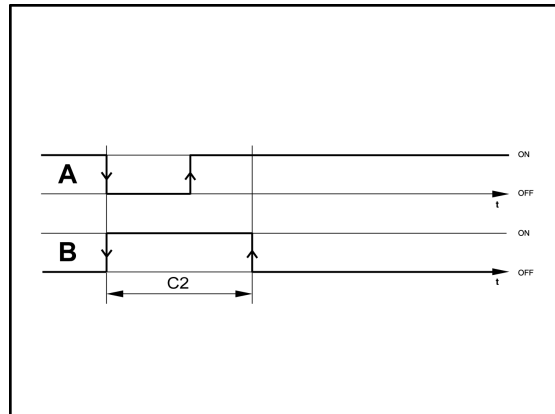
Min. operating time of a compressor

- A Signal
- B Compressor



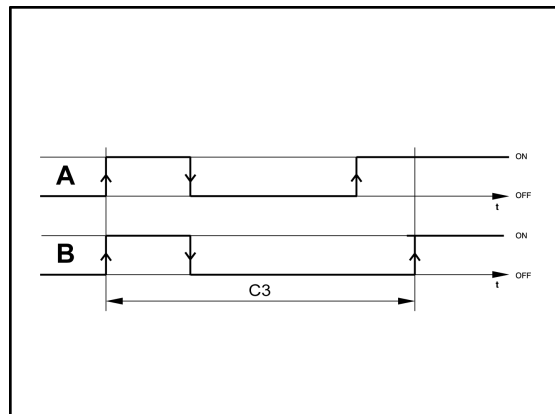
Min. stoppage time of a compressor

- A Signal
- B Compressor



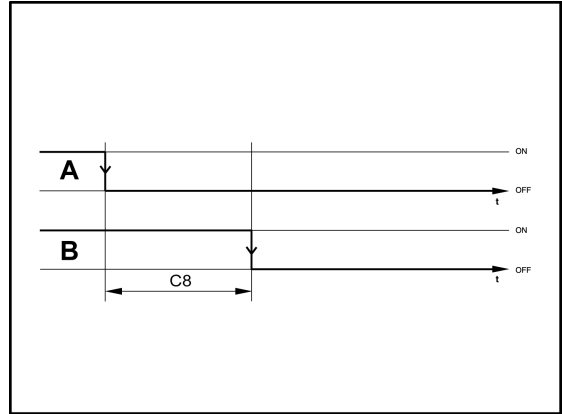
Min. time between compressor start-ups

- A Signal
- B Compressor



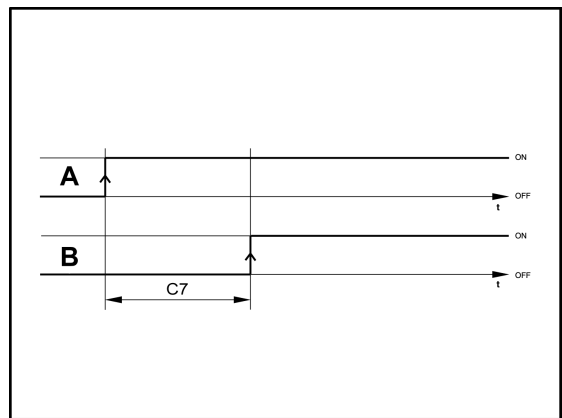
Compressor / pump stoppage delays

- A Compressor
- B Pump



Pump / compressor start-up delays

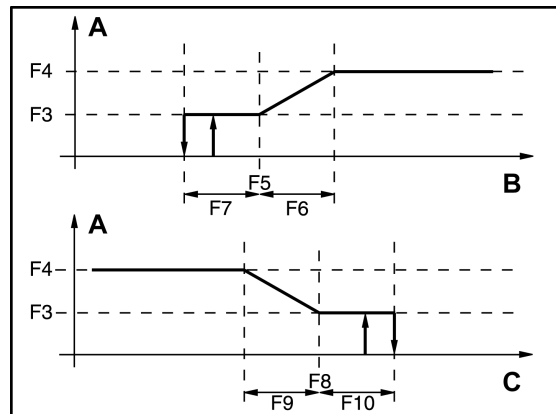
- A Pump
- B Compressor



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	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 pressure differential	F	32 (R/W)	bar	50	0	0,9
F10	Heat cycle fan stoppage pressure 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 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

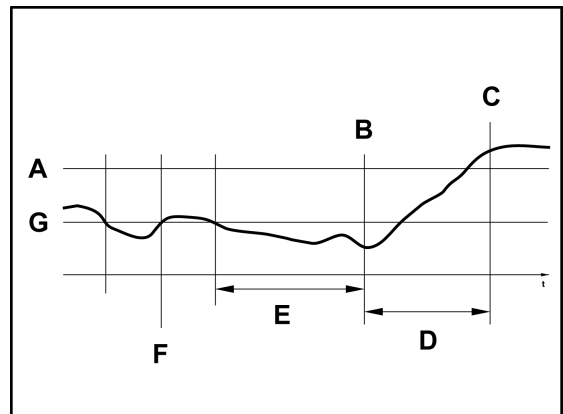
- A Fan speed
- B Condensing temperature
- C Evaporating temperature



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	50	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)	-	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

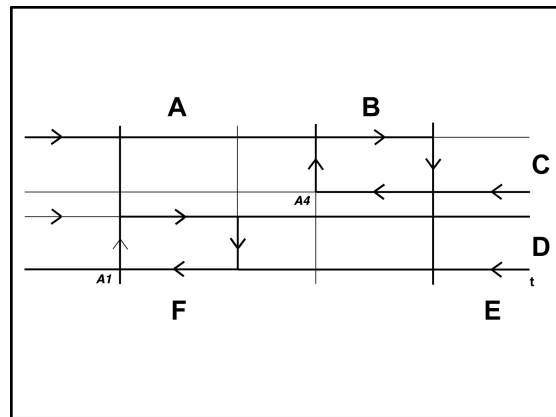
- A Defrost end temperature (d04)
- B Defrost start
- C Defrost end
- D Maximum defrost duration (d06)
- E Minimum defrost start time (d05)
- F Timer start
- G Defrost start temperature (d03)



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= Water pump+heater 2= Water pump+heater+ compressor (heat pumps only) 3= Heater	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) |



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)				2 (YLCA) 3 (YLHA)
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)				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

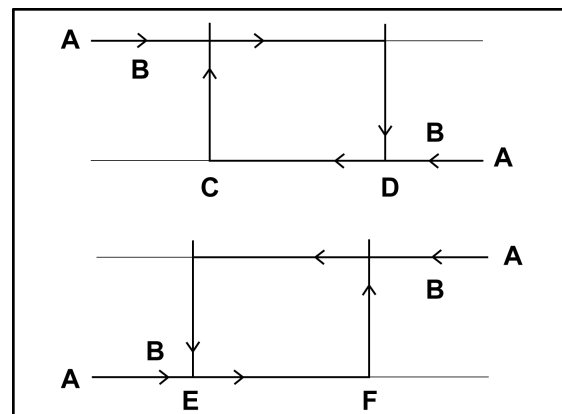
Alarm configuration parameters

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

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 adjustment 0= Proportional. Input 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
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) |



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
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	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

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 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 y /16. See Table [Parameters relating to sensors](#), see on page 57.

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.

1.13.2 Operating instructions μ C2 (YLCA 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.

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.

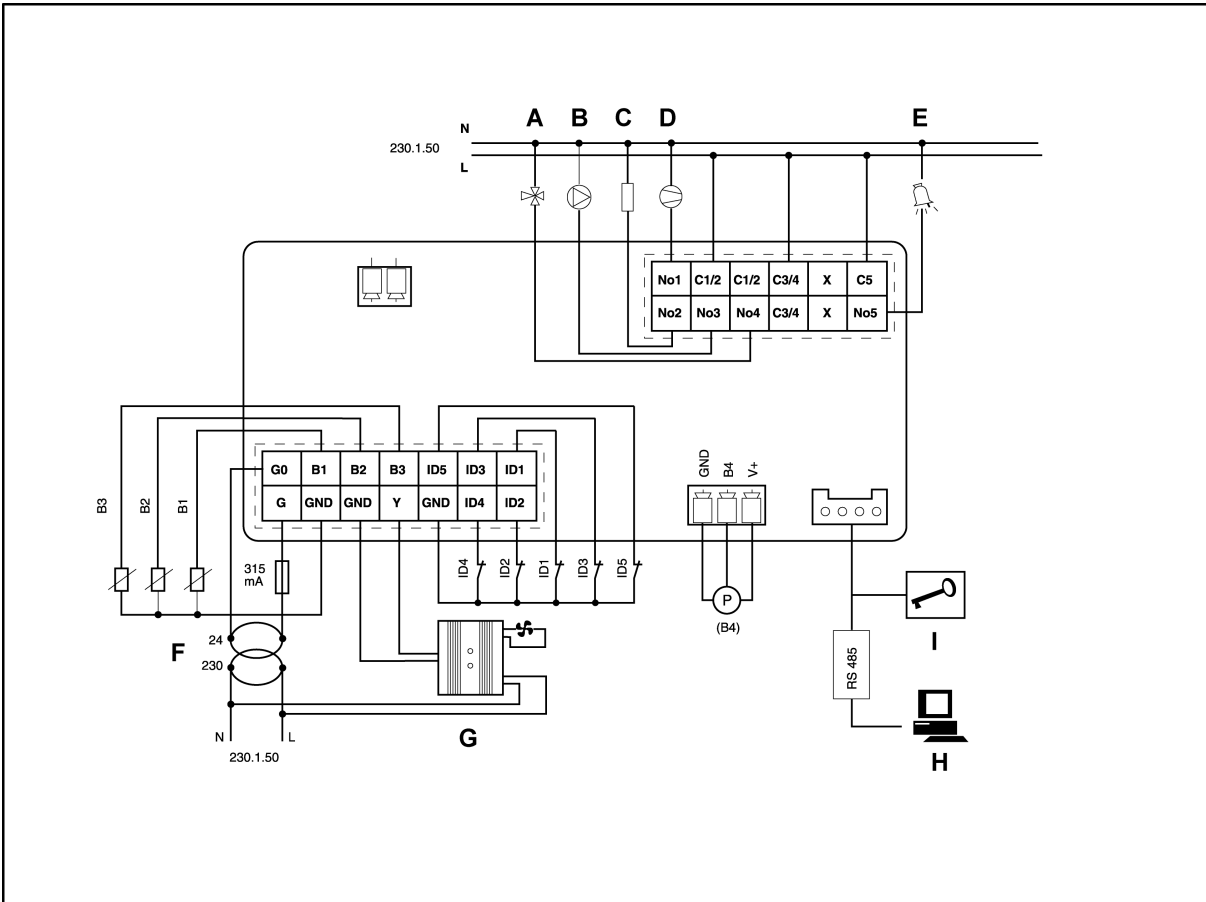
Direct Level

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.

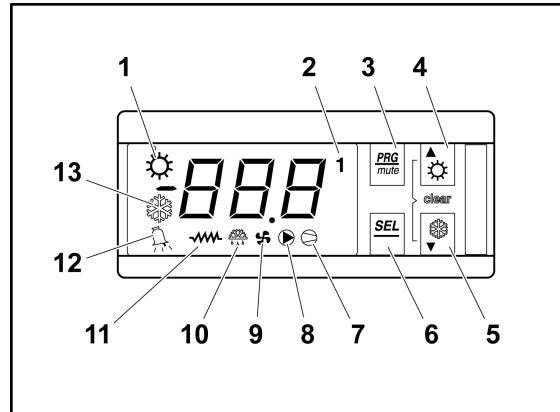
General diagram, YLCA 50, 60 and 80



A	Compressor 2	B2	Water outlet temperature sensor (Antifreeze protection)
B	Pump	B3	Outdoor temperature sensor (Dynamic set point)
C	Heater	B4	Radiometric pressure sensor (Fan speed and defrost control)
D	Compressor 1	ID1	Water flow switch
E	Alarm	ID2	Fan heat switches
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 sensor (Control set point)	L	Phase

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).



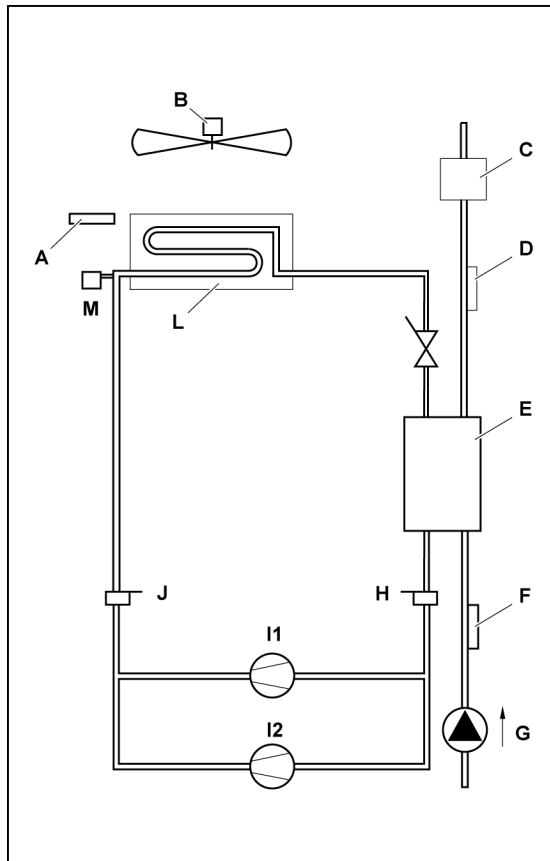
Button	Colour	Meaning	
		LED permanently lit	LED flashing
-2-	Orange	Compressor operating *	Timing start-up
-7-		Compressor on call	-
-8-		Water pump operating	-
-9-		Fans operating	-
-10-		Defrost active	-
-12-	Red	Alarm activated	-
-13-	Orange	Cool cycle	-
-1-		Heat cycle	-

(*) 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

Location of controls (YLCA 50, 60 and 80)

- | | | | |
|---|------------------------------|----|---------------------------|
| A | Temperature sensor (B3) | H | Low-pressure switch (LP) |
| B | Fan | I1 | Compressor 1 |
| C | Flow switch (FS) | I2 | Compressor 2 |
| D | NTC water outlet sensor (B2) | J | high-pressure switch (HP) |
| E | Indoor heat exchanger | L | Outdoor heat exchanger |
| F | NTC water inlet sensor (B1) | M | Pressure sensor (B4) |
| G | Pump | | |



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		

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=Always ON (function not available) 1= Present	F	2 (R/W)	-	1	0	1
/03	NTC B3 sensor: 1= Condensation sensor 2= Outdoor sensor	F	14 (R/W)	-	1	0	2
/04	B4 sensor: 0= Absent 1= ON/OFF 2= Outdoor NTC sensor 3= Ratiometric 5 Vdc	F	15 (R/W)	-	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	F	6 (R/W)	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)	°C/bar	-	-	-

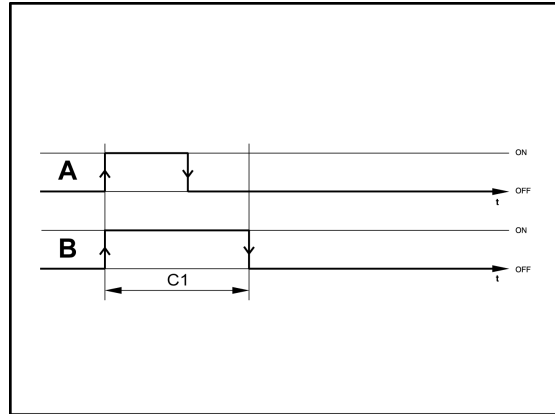
Parameters relating to the compressor

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
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

Operating graphics

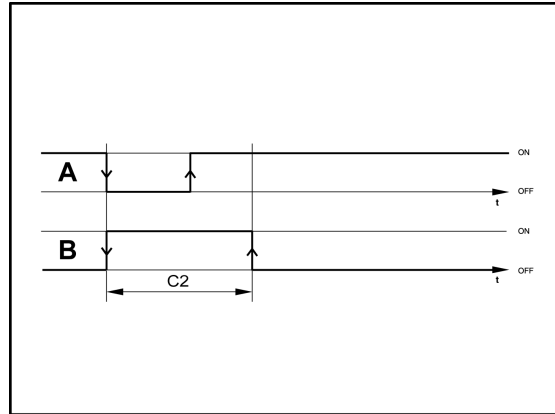
Min. operating time of a compressor

- A Signal
- B Compressor



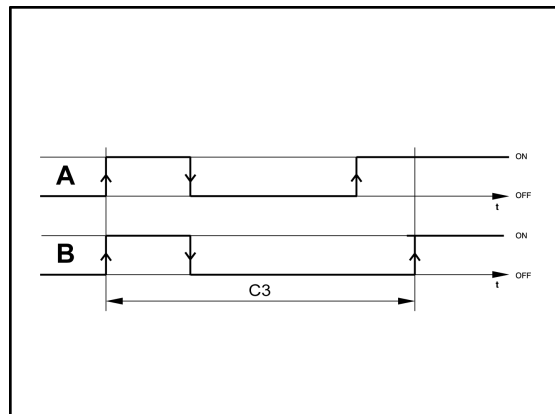
Min. stoppage time of a compressor

- A Signal
- B Compressor



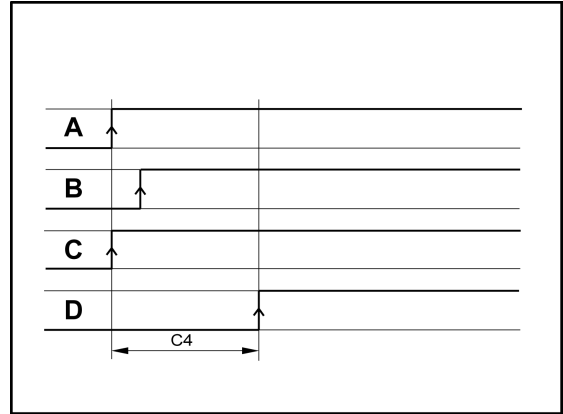
Min. time between compressor start-ups

- A Signal
- B Compressor



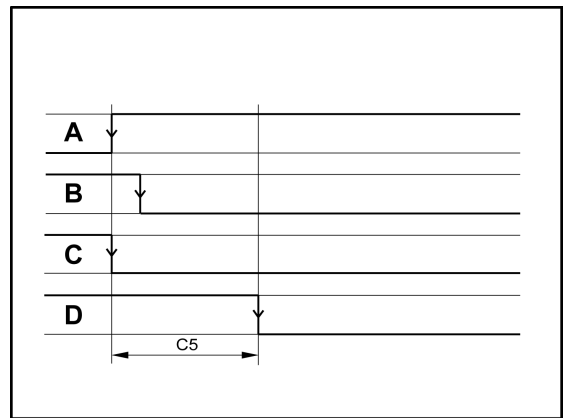
Min. time between start-up of two compressors

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



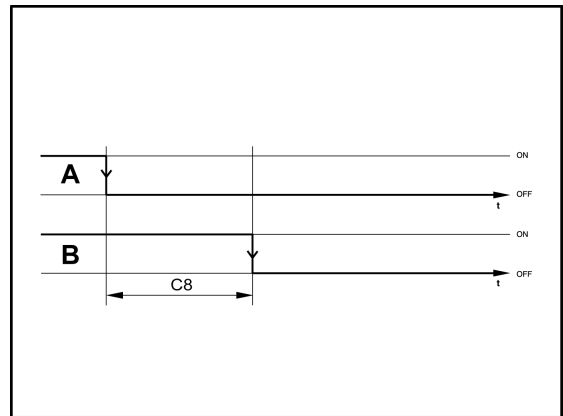
Time between stoppage of two compressors

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



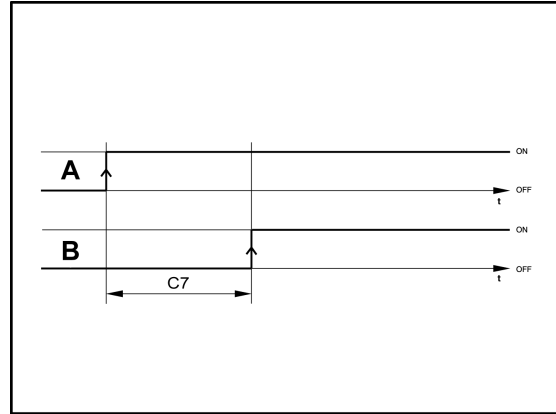
Compressor / pump stoppage delays

- A Compressor
- B Pump



Pump / compressor start-up delays

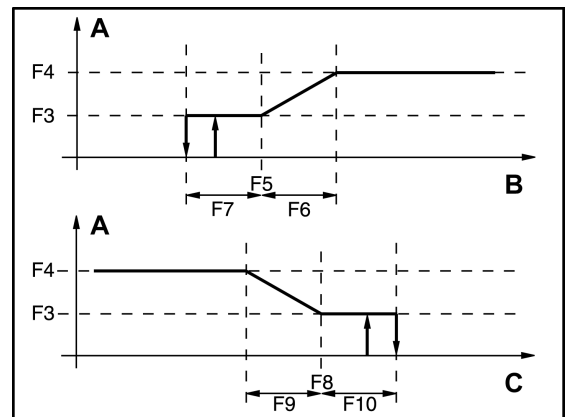
- A Pump
- B Compressor



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 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	92
F05	Cool cycle minimum speed pressure	+	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
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
F14	Fan operating when starting with high ambient temperature	U	91 (R/W)	Seconds	999	0	30

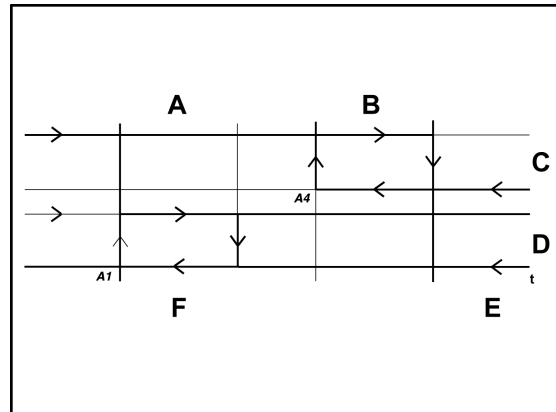
- A Fan speed
- B Condensing temperature
- C Evaporating temperature



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= Water pump+heater 2= Water pump + heater + compressor (heat pumps only) 3= Heater	U	23 (R/W)		3	0	1

- 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)



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)				2
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)				1
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	1
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

1.13 Operating instructions

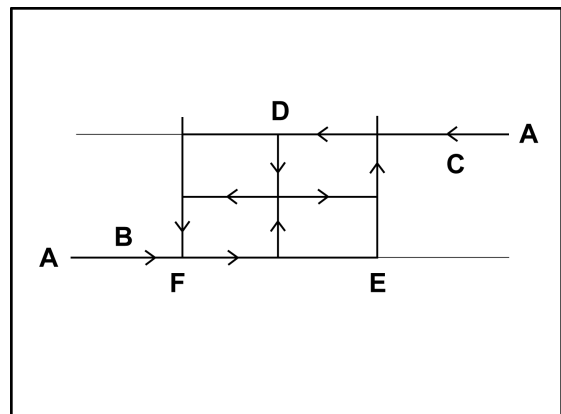
Alarm configuration parameters

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

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
r05	Compressor rotation 0= Disabled 1= FIFO type 2= Per operating hours	F	78 (R/W)		2	0	2
r06	Type of adjustment 0= Proportional. Input 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

- | | | | |
|---|-------------------|---|---|
| A | Temperature | D | Differential /2 (r02 / 2) |
| B | First compressor | E | COOL set point (r01) + Differential (r02) |
| C | Second compressor | F | COOL set point (r01) |



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
E1	B1 sensor	Automatic
E2	B2 sensor	Automatic
E3	B3 sensor	Automatic
E4	B4 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
EL 1-2	Problem at fan voltage control	Automatic
FL	Flow switch / pump protector	Manual
Hc1/Hc2	Compressor maintenance alarm	Automatic
HP	High pressure	Manual
Ht	High water temperature alarm	Automatic
LP	Low pressure	Manual
PC1	Compressor partialisation (high pressure)	Automatic
tC1	Fan heat switches	Manual

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.

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 73](#).

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.

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.

1.13.3 Operating instructions μ C2 (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.

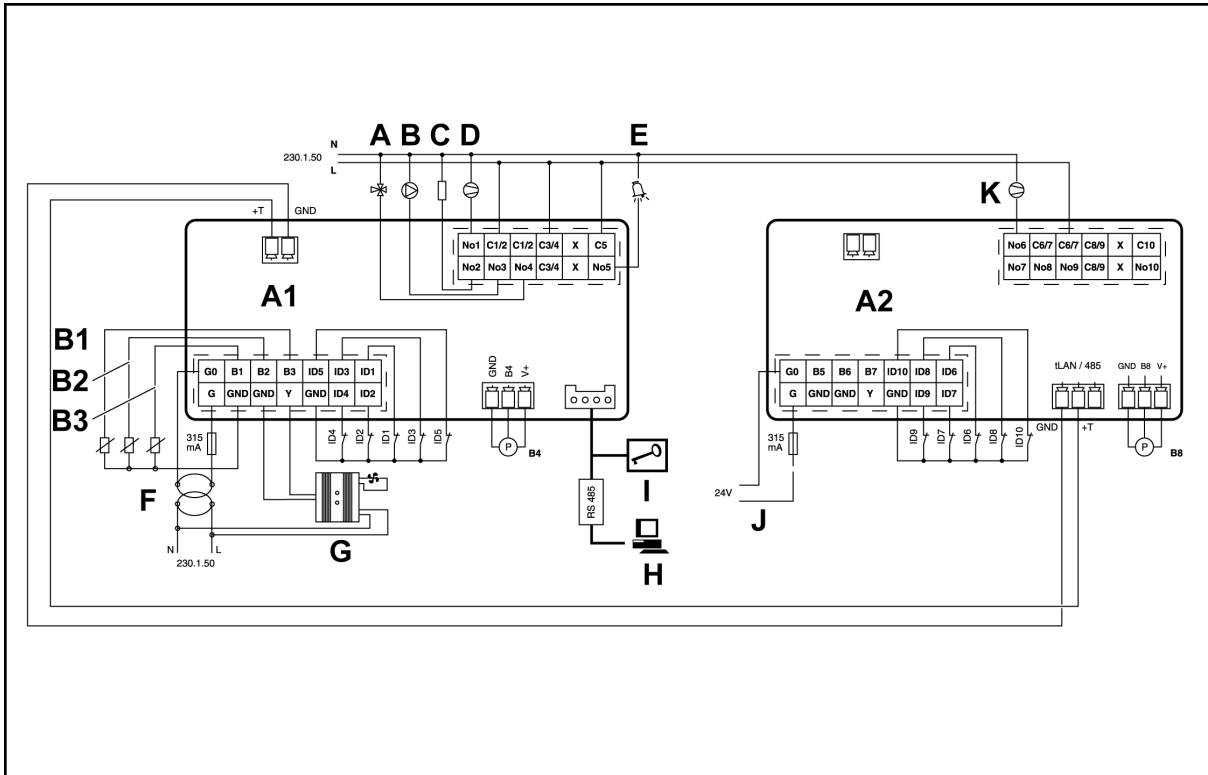
Direct Level

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.

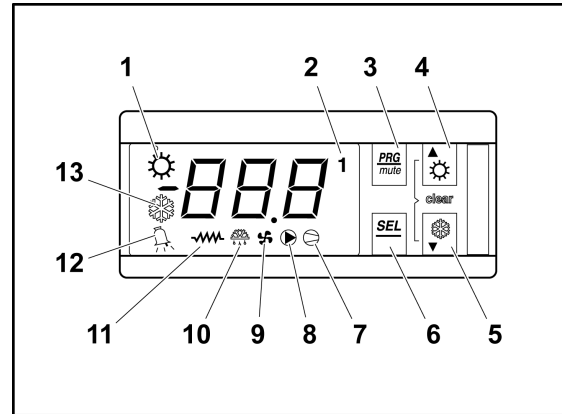
General diagram



A1	µchiller ²	N	Neutral
A2	µchiller 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

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).



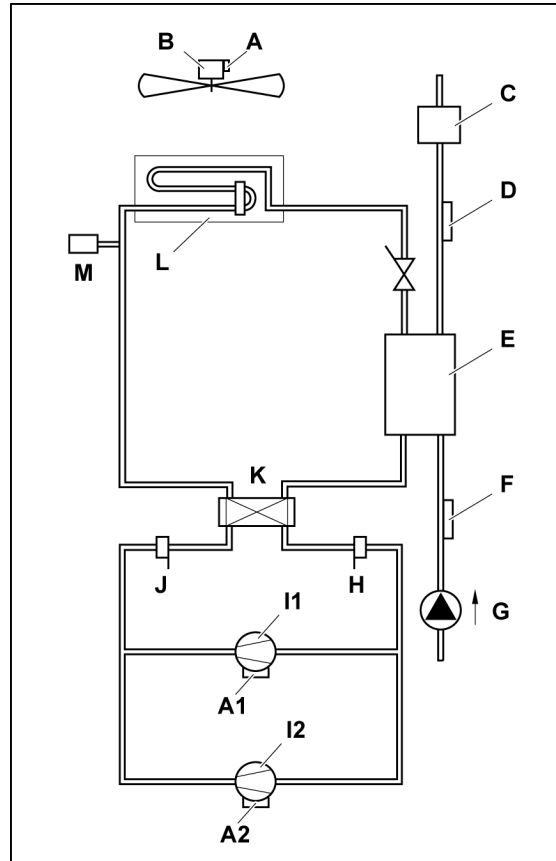
Button	Colour	Meaning	
		LED permanently lit	LED flashing
-2-	Orange	Compressor operating *	Timing start-up
-7-		Compressor on call	-
-8-		Water pump operating	-
-9-		Fans operating	-
-10-		Defrost active	-
-12-	Red	Alarm activated	-
-13-	Orange	Cool cycle	-
-1-		Heat cycle	-

(*) 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

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		

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	-	-	-

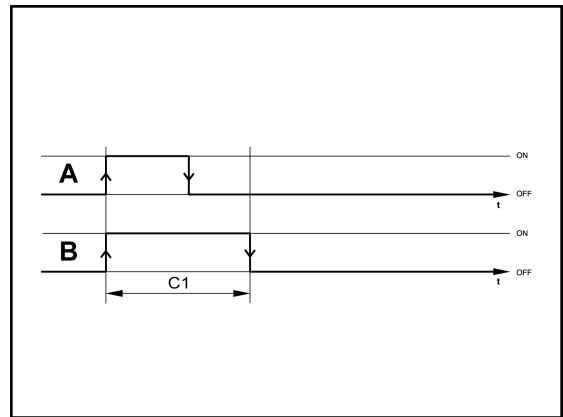
Parameters relating to the compressor

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

Operating graphics

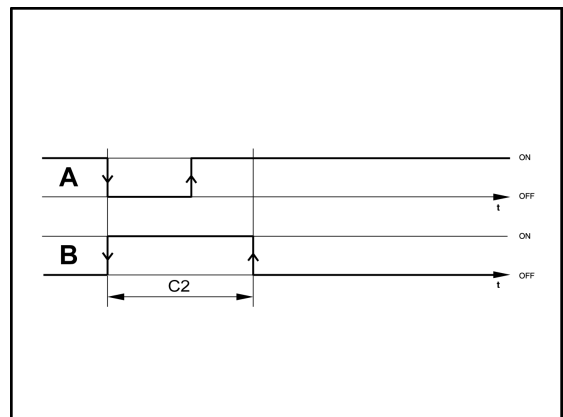
Min. operating time of a compressor

- A Signal
- B Compressor



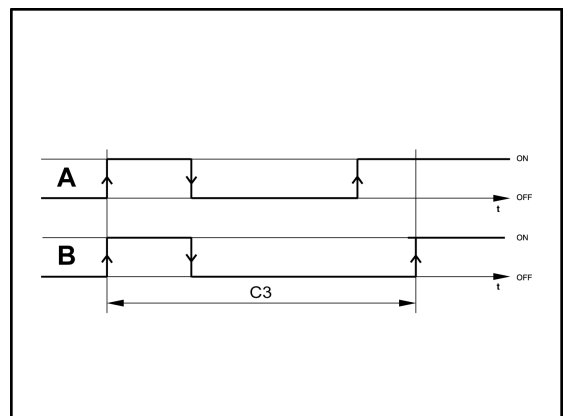
Min. stoppage time of a compressor

- A Signal
- B Compressor



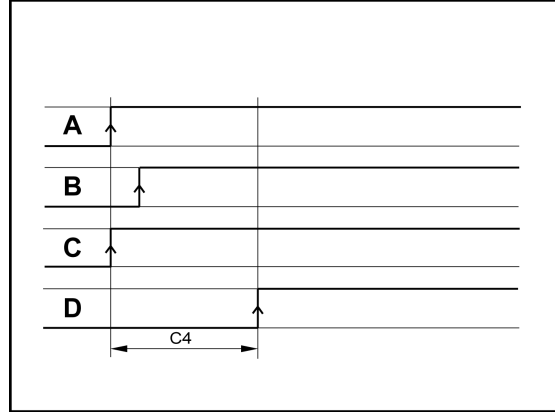
Min. time between compressor start-ups

- A Signal
- B Compressor



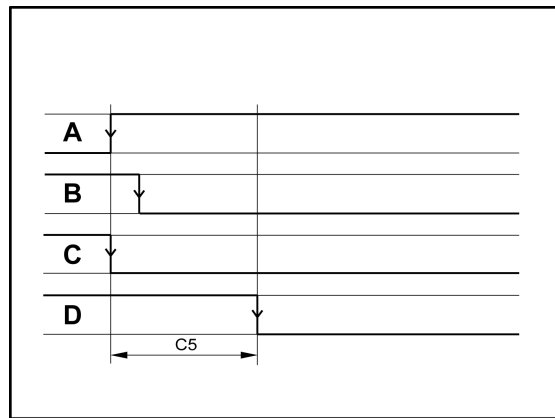
Min. time between start-up of two compressors

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



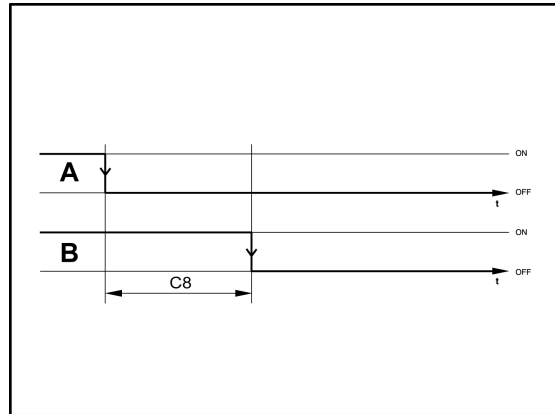
Time between stoppage of two compressors

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



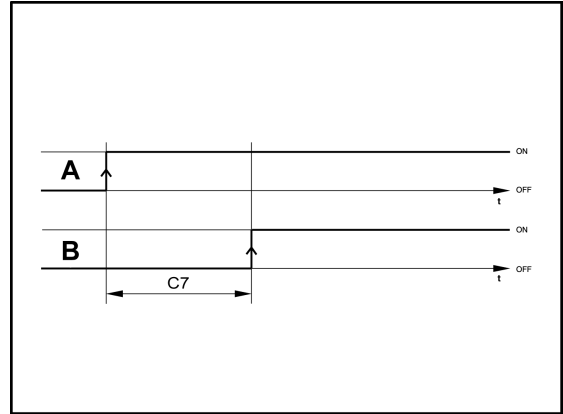
Compressor / pump stoppage delays

- | | |
|---|------------|
| A | Compressor |
| B | Pump |



Pump / compressor start-up delays

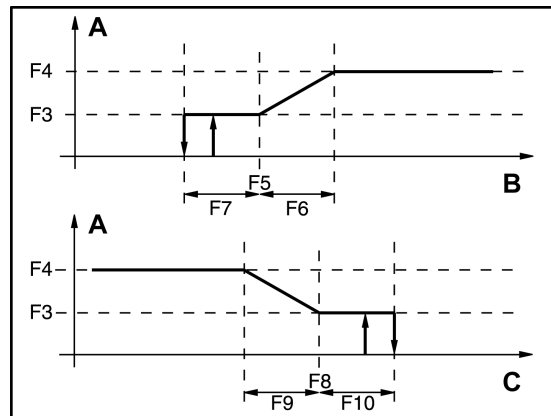
- A Pump
- B Compressor



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

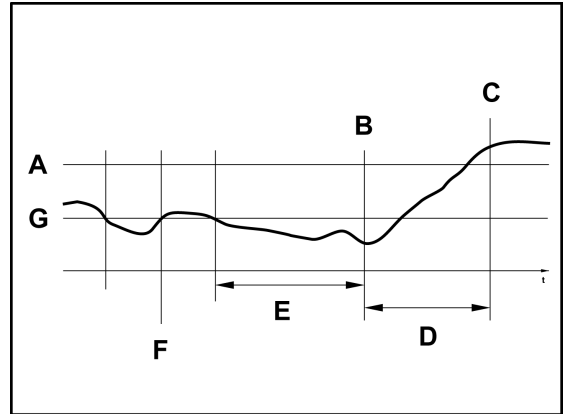
- A Fan speed
- B Condensing temperature
- C Evaporating temperature



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

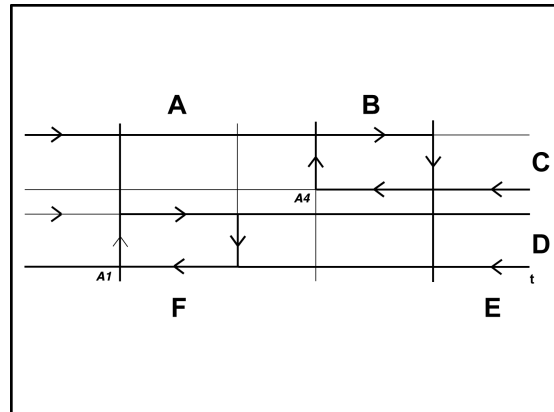
- | | | | |
|---|--------------------------------|---|----------------------------------|
| A | Defrost end temperature (d04) | E | Minimum defrost start time (d05) |
| B | Defrost start | F | Timer start |
| C | Defrost end | G | Defrost start temperature (d03) |
| D | Maximum defrost duration (d06)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



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



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

1.13 Operating instructions

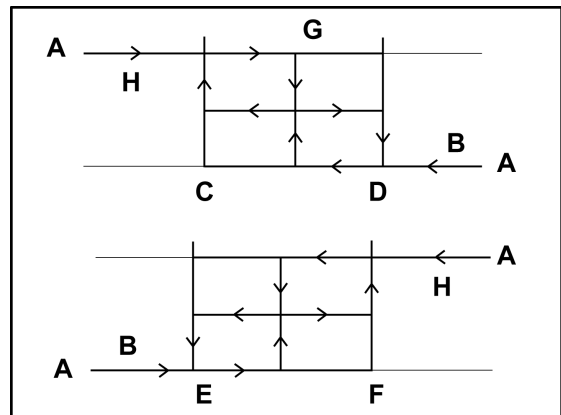
Alarm configuration parameters

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

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



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

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 89.

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.

1.13.4 Operating instructions μ C3 (YLCA / YLHA 100, 120 and 150)

This is a specially programmed controller for air-water chillers and heat pumps with four capacity stages. These are divided into two independent cooling circuits equipped with two tandems that act upon a common water circuit. Both systems are equipped with two fans each, the speed of which is controlled by pressure sensors. The controller operates through the following intakes and outlets.

Digital inputs

ID1 - J1/8	General protection (PG)
ID2 - J1/1	Flow switch (FS)
ID3 - J1/9	Remote ON/OFF (ROO)
ID4 - J1/2	Pump protector No. 1 (Q5)
ID5 - J1/10	Low-pressure switch circuit 1 (LP1)
ID6 - J4/8	High-pressure switch circuit 1 (HP1)
ID7 - J4/1	Thermal protector compressor 1 (THPC1)
ID8 - J4/9	Thermal protector compressor 2 (THPC2)
ID9 - J4/2	Thermal protector circuit 1 fans (THPF 1-2)
ID10 - J4/10	Low-pressure switch circuit 2 (LP2)
ID11 - J7/6	High-pressure switch circuit 2 (HP2)
ID12 - J7/1	Thermal protector compressor 3 (THPC3)
ID13 - J7/8	Thermal protector compressor 4 (THPC4)
ID14 - J7/3	Thermal protector circuit 2 fans (THPF 3-4)
ID15 - J7/9	Remote COOL/HEAT (RCH)
ID18 - J7/5	Pump protector No. 2 (Q6)

Digital outputs

N01/C1-2	Compressor 1 circuit 1 (K1)
N02/C1-2	Compressor 2 circuit 1 (K2)
N05/C5	Pump 1
N06/C6-7	Compressor 3 circuit 2 (K3)
N07/C6-7	Compressor 4 circuit 2 (K4)
N08/C8-9	Pump 2
N010/C10	Alarm
N011/C11-12	Antifreeze heater circuit 1-2
N012/C11-12	Back-up heater
N013/C13-14	4-way valve circuit 1 (V4V1)
N014/C13-14	4-way valve circuit 2 (V4V2)

Analogue inputs

B3 - J2	Coil pressure circuit 1
B4 - J3	Coil pressure circuit 2
B5 - J4/13	Water temperature at exchanger inlet
B6 - J4/12	Water temperature at exchanger outlet

Analogue outputs

Y3	Circuit 1 fan speed control (PWM)
Y4	Circuit 2 fan speed control (PWM)

System components

The system is made up of the following basic components:

- Touch screen
- μ C3 controller
- Fan speed controllers (FSC1 and FSC2)
- Pressure sensors (B3 and B4)
- NTC sensors (B5 and B6)

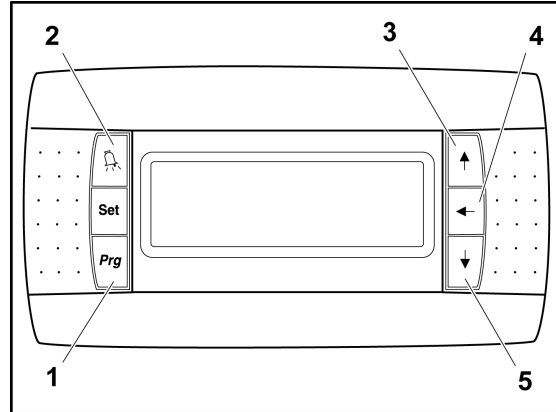
Touch screen

This consists of a screen and six keys with the following functions:

- Alarm -2-
- Programming -1-
- Esc (Escape)
- Up -3-
- Enter -4-
- Down -5-

The following functions can be selected from this screen:

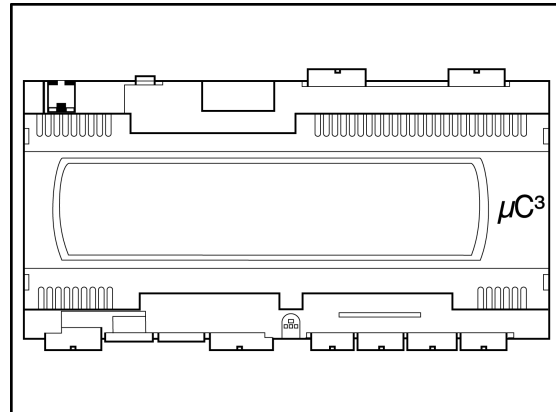
- ON/OFF
- COLD/HEAT
- Read the unit status
- Access the configuration menus (by means of a password)
- Read the alarm messages and reset these alarms
- Read operating pressures and temperatures
- etc...



μ C3 controller

This contains the unit software and the entire digital and analogue input and output connector system.

This module is also equipped with connectors the program download key and the serial communication connection to an RS485 monitoring system.



Sensors and probes

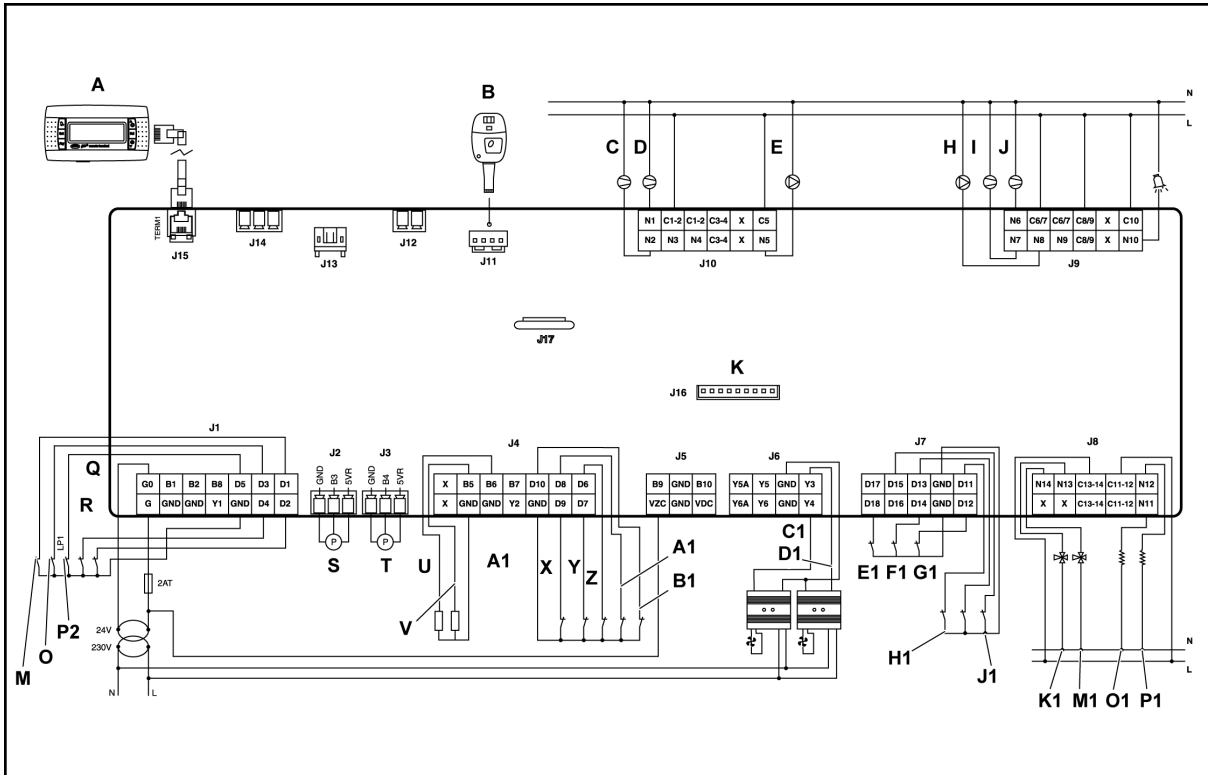
Pressure sensors (B3 and B4)

One for each cooling circuit and connector to the coil collectors. They provide information to the system for fan speed adjustment in the summer and winter cycles, management of defrosts in the heat pumps, prevent and lockout functions of the system by excessively high pressure.

NTC probes(B5 and B6)

- B5- For the detection and control of water inlet temperature (cool only and heat pump units).
- B6- For the detection of water outlet temperature. It provides information for antifreeze protection and control of the antifreeze and backup heaters. If required, allows controlling water temperature at the heat exchanger discharge

General diagram, (YLCA / YLHA 100,120 and 150)



A	Keyboard - display terminal	U	Water outlet
B	Programme download key	V	Water inlet
D/J/C/I	Comp. 1 / Comp. 2 / Comp. 3 / Comp. 4	X	Fan protection 12
E/H	Pump 1 / Pump 2	Y/A1/G1/ I1	Protection comp. 1 / Protection comp. 2 / Protection comp. 3 / Protection comp. 4
K	RS485 serial connection	Z/H1	HP1 / HP2 (High-pressure switch)
L	Phase (board power supply)	C1	Fan 3.4
M	General protection	D1	Fan 1.2
N	Neutral (board power supply)	F1	Fan protection 3.4
O	Remote ON / OFF	J1	Remote COOL / HEAT
P2/B1	LP1 / LP2 (Low-pressure switch)	K1	4-way valve, circuit 1
Q/E1	Pump 1 protection / Pump 2 protection	M1	4-way valve, circuit 2
R	Flow switch	O1	Antifreeze heater
S/T	Circuit 1 pressure sensor / Circuit 2 pressure sensor	P1	Back-up heater

Start-up

About 45 seconds after powering the unit, the start-up display is activated.

Default language: English.

1st Display. START-UP

(information on water temperature/unit status)

- Water inlet temperature
- Water outlet temperature
- Unit status (ON/OFF)

Press "down" to access the second display.

2nd Display. STATUS AND OPERATING MODE SELECTION

Status selection **ON/OFF** (with **ENTER**, **Up** and **Down**).

On the heat pump units, select the **COOL/HEAT** operating mode (with **ENTER**, **Up** and **Down**).

Press **ESC** to return to the 1st display.

SYSTEM CONFIGURATION

(For authorised servicing personnel only)

3rd Display. ENTER PASSWORD

The 3rd Enter password display is accessed by pressing **Up** from the 1st display (**Start-up**), or **Down** from the 2nd display (**Status / operating mode selection**)

- 1 From the **Enter password** display, press **ENTER**.
- 2 Enter the password using the **Up** key.
- 3 Press **ENTER** to access the 4th **Menu** display.

4th Display. MENU

From this display we can access a set of submenus that provide information on the unit or allow for its operating parameters to be configured. These submenus are as follows:

-/-	Sensors	Sensors config.
-A-	Antifreeze	Antifreeze
-B-	Input/output	Input/output
-c-	Compressors	Comps. conf.
-d-	Defrost	Defrost
-F-	Condensation (fans)	Condensation
-H-	Unit configuration	Unit config.
-P-	Alarms	Alarm settings
-r-	Temperature control	Control param.
-Fr-	Software version / language selection	Soft. version
-t-	Time (not available)	Time config.

To enter a submenu:

- 1 Select it using the **Up** or **Down** key and then activate it using the **ENTER** key
- 2 Once the parameters are set with the **ENTER**, **Up** and **Down** keys, press **Prg** to confirm the modification and return to the **MENU** display.
- 3 To exit the **MENU** display, press the **Esc** key.

1.13 Operating instructions

-/- Configuration of sensors

Description		Range	Units	Value
Sensor B3 calibration.	Coil pressure circuit 1	-9,9/9,9	bar	0
Sensor B4 calibration.	Coil pressure circuit 2	-9,9/9,9	bar	0
Sensor B5 calibration.	Inlet water temp. to exchanger.	-9,9/9,9	K	0
Sensor B6 calibration.	Outlet water temp. to exchanger.	-9,9/9,9	K	0
Sensor B7 calibration.	Outdoor temperature	-9,9/9,9	K	0
Sensor B8 calibration.	Dynamic set point	-9,9/9,9	%	0
Enabling sensor B1		YES / NO	-	NO
Enabling sensor B2		YES / NO	-	NO
Enabling sensor B3.	Coil pressure circuit 1	YES / NO	-	YES
Enabling sensor B4.	Coil pressure circuit 2	YES / NO	-	YES
Enabling sensor B5.	Inlet water temp. to exchanger.	YES / NO	-	YES
Enabling sensor B6.	Outlet water temp. to exchanger.	YES / NO	-	YES
Enabling sensor B7		YES / NO	-	NO
Enabling sensor B8		YES / NO	-	NO
Enabling sensor B9.		YES / NO	-	NO
Enabling sensor B10.		YES / NO	-	NO
Sensor B3 configuration.	Minimum value	-30/150	bar	0
Sensor B3 configuration.	Maximum value	-30/151	bar	45
Sensor B4 configuration.	Minimum value	-30/152	bar	0
Sensor B4 configuration.	Maximum value	-30/153	bar	45

-A- Antifreeze

Description	Range	Units	Value
Antifreeze alarm set point	-99,9/99,9	°C	3
Antifreeze alarm set point differential	99,9	°K	5
Lower antifreeze alarm set point limit	-99,9/99,9	°C	3
Upper antifreeze alarm set point limit	-99,9/99,9	°C	5
Antifreeze alarm reset	MANUAL AUTOMATIC	-	MANUAL
Antifreeze alarm delay (If automatic reset has been selected)	0/540	Minutes	0
Antifreeze heater trigger set point	-99,9/99,9	°C	3
Antifreeze heater trigger set point differential	-99,9/99,9	°K	2
Auxiliary heater trigger set point (winter cycle)	-99,9/99,9	°C	25
Auxiliary heater trigger set point differential (winter cycle)	-99,9/99,9	°K	5
Auxiliary heater trigger delay	0/60	Minutes	15
Automatic enabling of the frost protection system with the unit OFF	DISABLED HEATER AND PUMP HEATER AND UNIT HEATER	-	HEATER

-C- Compressor configuration

Description	Range	Units	Value
Min. operating time of a compressor	0 / 9999	Seconds	120
Min. stoppage time of a compressor	0 / 9999	Seconds	60
Start-up time between different compressors	0 / 9999	Seconds	3
Start-up time of one compressor	0 / 9999	Seconds	300
Start-up time between pump and compressor	0 / 999	Seconds	20
Stoppage time between compressor and pump	0 / 999	Seconds	20
Pump 1 operating hours			
Pump 2 operating hours			
Compressor 1 operating hours			
Compressor 2 operating hours			
Compressor 3 operating hours			
Compressor 4 operating hours			
Operating hours for pump maintenance alarm	1000 / 999000	Hours	0 x 1000
Operating hours for compressor 1 / circuit 1 maintenance alarm	1000 / 999000	Hours	0x 1000
Operating hours for compressor 2 / circuit 1 maintenance alarm	1000 / 999000	Hours	0x 1000
Operating hours for compressor 1 / circuit 2 maintenance alarm	1000 / 999000	Hours	0x 1000
Operating hours for compressor 2 / circuit 2 maintenance alarm	1000 / 999000	Hours	0x 1000
Tandem compressor rotation time		Minutes	20
Enabling of compressors C ^{1/1} , C ^{2/1} , C ^{1/2} , C ^{2/2}	YES / NO		YES
Forced manual compressor operations	YES / NO		NO

-d- Defrost

When a defrost cycle is being carried out, the message **DEFROST REQ** appears on the start-up display.

Description	Range	Units	Value
Defrost sensor selection	Pressure temp.	-	Pressure
	Pressure switch		
Separate or simultaneous defrost (contemporaneous)	Separate	-	Separate
	Simultaneous		
End defrost by interval of	Time	-	Temp. / Pressure
	Temp. / Pressure		
Defrost start pressure	-99,8 / 99,9	bar	5,8
Defrost end pressure	-99,8 / 99,9	bar	26
Defrost call delay	1 / 32000	Seconds	180
Max. defrost time	1 / 32000	Seconds	420
Min. defrost time	1 / 32000	Seconds	0
Timing between defrosts of a single circuit	1 / 32000	Seconds	1800
Timing between defrosts of different circuits	1 / 32000	Seconds	300
Forced compressor stoppage time at start and end of defrost	0 / 999	Seconds	0
4-way valve inversion delay	0 / 999	Seconds	0
Manual defrost	Enabled	-	Disabled
	Disabled		

1.13 Operating instructions

-F- Condensation (fans)

Description	Range	Units	Value
Type of fan control	Temp. pressure ON/OFF	-	Pressure
No. of condensers	1-2	-	2
Control device	Fans	-	Inverter
	Inverter	-	
Power supply frequency	50 / 60	Hz	50
PWM max. triac cut-off	0 / 100	%	92
PWM min. triac cut-off	0 / 100	%	35
Triac impulse duration	0 / 10	ms	2
Condensing pressure in summer cycle	0 / 99,9	bar	21
Condensing pressure differential in summer cycle	0 / 99,9	bar	5
Evaporating pressure in winter cycle	0 / 99,9	bar	9,5
Evaporating pressure differential in summer cycle	0 / 99,9	bar	1,5
Min. fan speed differential	-99,9 / 99,9	bar	3
Max. inverter speed	0 / 10	V	10
Min. inverter speed	0 / 10	V	1
Inverter speed-up time	0 / 999	Seconds	5
Prevent function activation (HP)	YES / NO	-	YES
Selection of sensor for HP prevention	Pressure	-	Pressure
	Temperature		
HP prevention pressure	-99,9 / 99,9	bar	38
HP prevention pressure differential	0 / 99,9	bar	4
LP prevention pressure	-99,9 / 99,9	bar	3
LP prevention pressure differential	0 / 99,9	bar	1,5
Fan management in case of sensor failure	Fan OFF		Fan OFF
	Fan ON and Compressor ON		
Prevent function timing	0 / 99	Seconds	0

-H- Unit configuration

Description	Range	Units	Value
Unit type	0 - 7	-	2 (COOLER) 3 (HEAT PUMP)
Number of compressors/circuits		-	4 / 2
Compressor rotation	LIFO FIFO PERSONALISED TIME	-	FIFO
No. of evaporators	1 - 2	-	1
Driver number (EVD400)	0-1-2-4	-	0
Cycle inversion valve logic	NO / NC	-	NC
No. of pumps	1 - 2	-	1 (SINGLE PUMP) 2 (TWO-PUMP ACCESSORY)
Pump rotation	START-UP TIME	-	TIME
Pump operation	ON WITH COMP. ON ALWAYS OFF ALWAYS ON SAFETY ON/ OFF		ALWAYS ON
No. of hours for pump rotation	0 - 9999	Hours	12
ON/OFF digital input activation	YES / NO	-	NO
WINTER/SUMMER digital input activation	YES / NO	-	NO
ON/OFF activation with Monitor	YES / NO	-	NO
WINTER/SUMMER activation with Monitor	YES / NO	-	NO
WINTER/SUMMER operation inversion delay		Seconds	10
Monitoring protocol	CAREL GSM MODEM ANALOGUE MODEM RS 232 LONWORKS MODBUS	-	CAREL
Selection of communication speed	1200 2400 4800 9600 19200	Bauds	19200
Monitoring ID number	0 - 200	-	1
Selection of language at start-up	YES / NO	-	YES
Restore default values (Warning!)	YES / NO	-	NO

1.13 Operating instructions

-B- Inputs/Outputs

Description	Range	Units	Value
Analogue input 3. Coil pressure circuit 1 (B3)		bar	INSTANT READ OUT
Analogue input 4. Coil pressure circuit 2 (B4)		bar	INSTANT READ OUT
Analogue input 5. Inlet water temperature (B5)		°C	INSTANT READ OUT
Analogue input 6. Outlet water temperature (B6)		°C	0 = OPEN C = CLOSED
Digital input 1. External alarm	O/C		0 = OPEN C = CLOSED
Digital input 2. Flow switch	O/C		0 = OPEN C = CLOSED
Digital input 3. Remote ON/OFF	O/C		0 = OPEN C = CLOSED
Digital input 4. Pump 1 protector	O/C		0 = OPEN C = CLOSED
Digital input 5. Low-pressure switch circuit 1	O/C		0 = OPEN C = CLOSED
Digital input 6. High-pressure switch circuit 1	O/C		0 = OPEN C = CLOSED
Digital input 7. Thermal protector compressor 1 circuit 1	O/C		0 = OPEN C = CLOSED
Digital input 8. Thermal protector compressor 2 circuit 1	O/C		0 = OPEN C = CLOSED
Digital input 9. Fan 1-2 protectors circuit 1	O/C		0 = OPEN C = CLOSED
Digital input 10. Low-pressure switch circuit 2	O/C		0 = OPEN C = CLOSED
Digital input 11. High-pressure switch circuit 2	O/C		0 = OPEN C = CLOSED
Digital input 12. Thermal protector compressor 3 circuit 2	O/C		0 = OPEN C = CLOSED
Digital input 13. Thermal protector compressor 4 circuit 2	O/C		0 = OPEN C = CLOSED
Digital input 14. Fan 3-4 protector circuit 2	O/C		0 = OPEN C = CLOSED
Digital input 15. Remote COOL/HEAT	O/C		0 = OPEN C = CLOSED
Digital input 16. Not used			
Digital input 17. Not used			
Digital input 18. Pump 2 protector			0 = OPEN C = CLOSED
Digital output 1. Compressor 1 circuit 1	O/C		0 = OPEN C = CLOSED
Digital output 2. Compressor 2 circuit 1	O/C		0 = OPEN C = CLOSED
Digital output 3. (Not used)			
Digital output 4. (Not used)			
Digital output 5. Pump 1	O/C		0 = OPEN C = CLOSED
Digital output 6. Compressor 3 circuit 2	O/C		0 = OPEN C = CLOSED
Digital output 7. Compressor 4 circuit 2	O/C		0 = OPEN C = CLOSED
Digital output 8. (Not used)			
Digital output 9. (Not used)			
Digital output 10. External alarm / fuse failure	O/C		0 = OPEN C = CLOSED
Digital output 11. Antifreeze heater	O/C		0 = OPEN C = CLOSED
Digital output 12. Backup heater	O/C		0 = OPEN C = CLOSED
Digital output 13. 4-way valve circuit 1	O/C		0 = OPEN C = CLOSED
Digital output 14. 4-way valve circuit 2	O/C		0 = OPEN C = CLOSED

-P- Alarms

Description	Range	Units	Value
High-pressure alarm set point (transducer B3; B4)	0 / 99,9	bar	41
High-pressure alarm differential (transducer B3; B4)	0 / 99,9	bar	10
Summer low-pressure alarm	0 / 99,9	bar	3
Winter low-pressure alarm	0 / 99,9	bar	2
Defrost low-pressure alarm	0 / 99,9	bar	1
Low-pressure differential	0 / 99,9	bar	1
Low-pressure alarm delay on cold cycle start-up	0 - 999	Seconds	60
Low-pressure alarm delay on heat cycle and defrost	0 - 999	Seconds	0
Water flow control (flow switch) alarm delay on start-up	0 - 999	Seconds	20
Water flow control (flow switch) alarm delay on operating	0 - 9999	Seconds	5
Number of automatic reset alarm stoppages	0 - 4		1
Maximum period for automatic reset alarms	0 - 99	Minutes	60
Alarm selection with automatic reset: compressor thermal breaker	AUTOMATIC / MANUAL		AUTOMATIC
Alarm selection with automatic reset: fan thermal breaker	AUTOMATIC / MANUAL		AUTOMATIC
Alarm selection with automatic reset: low-pressure switch	AUTOMATIC / MANUAL		AUTOMATIC
Alarm selection with automatic reset: high-pressure switch	AUTOMATIC / MANUAL		AUTOMATIC

-r- Control

When this submenu is activated, the dynamic **set point** temperature appears (if this function is enabled). Press **Down** to access the configuration menu.

Description	Range	Units	Value
Set point in COOL		°C	12
Set point in HEAT		°C	40
Temperature control adjustment range		°K	3
COOL set point lower limit		°C	6
COOL set point upper limit		°C	20
HEAT set point lower limit		°C	25
HEAT set point upper limit		°C	45
Temperature setting type	INPUT / OUTPUT	-	INPUT
Setting type with input sensor	PROPORTIONAL / P+I		PROPORTIONAL
Integration time in each adjustment P+I	0 / 9999	Seconds	600
Max. increase time of call (output adjustment)	0 / 9999	Seconds	20
Min. increase time of call (output adjustment)	0 / 9999	Seconds	20
Max. decrease time of call (output adjustment)	0 / 9999	Seconds	10
Min. decrease time of call (output adjustment)	0 / 9999	Seconds	10
Temp. differential in which increase and decrease times vary (output adjustment)	-99,9 / 99,9	°C	2
Forced stoppage in COOL cycle (output adjustment)	-99,9 / 99,9	°C	5
Forced stoppage in HEAT cycle (output adjustment)	-99,9 / 99,9	°C	47

μC3 functions

F-r. Software version / Language selection

- Read out of the μC3 software version and update date.
- The **Up**, **Down** and **Enter** keys select the language: English or Italian.

Temperature control

Two different modes (Control Menu):

1 Adjustment by water temperature at the heat exchanger inlet (sensor B5).

This control carries out a proportional type adjustment based on a set point and a proportional band distributed over 4 stages. This is the controller default type.

It is also possible to carry out a proportional and integral adjustment. In this case, said function must be enabled and the integration time set (**CONTROL MENU**).

Control sensor: B5 ((inlet water temperature to heat exchanger).

Parameters to be used:

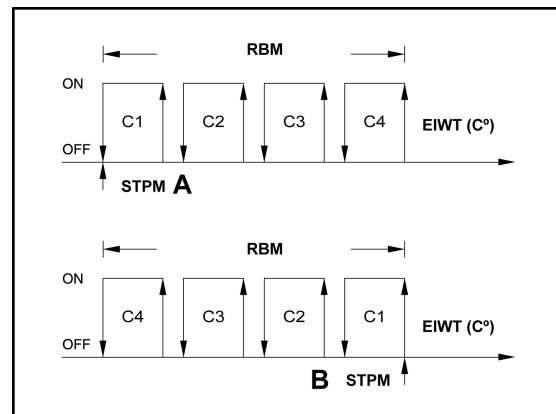
- Set point.
- Proportional band for inlet adjustment.
- Type of adjustment (Proportional or Proportional + Integral)
- Integration time (if the Proportional + Integral adjustment has been enabled).

Control outputs: N1, N2, N6 and N7 (compressor contactors).

Description of the operation:

Temperature control depends upon the value measured by the sensor located at the water inlet to the heat exchanger. It follows a proportional logic in which the proportional band is subdivided into four equal stages that give way to on/off functions of the compressors. In Proportional + Integral operation behaviour is similar, but affected by ai algorithm that takes time into account (integration time parameter).

STPM	Set point: A = Cool B = Heat	EWT	Exchanger inlet temperature
RBM	Control band	C1, C2, C3, C4	Compressor stages



2 Adjustment by water temperature at the outlet of the heat exchanger.

Thermostatic control is based on the temperature value detected by sensor B6. Based on the set point value (STPM) and the control base (RBM), it defines a neutral temperature zone (NZ).

- The temperature values comprised between the set point and the set point plus the band ($STP \leq \text{Temperature} \leq STP + RBM$) do not cause the on/off function of the compressors.
- Temperature values above the set point plus the band ($\text{Temperature} > STP + RBM$) cause compressor operation.
- Temperature values below the set point ($\text{Temperature} < STP$) cause compressor stoppage.

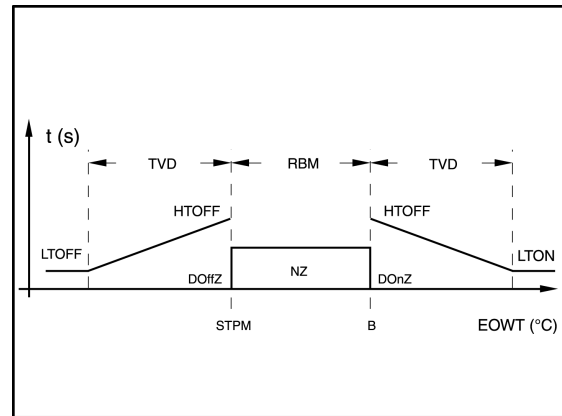
The on/off process of the compressors is controlled by a variable delay time.

Based on the time differential calculated as the delay, and in accordance with the temperature detected by sensor B6, this control will modulate the on/off process of the compressors.

If set to 0, minimum delay time at increase/decrease of the power demand, this function is disabled.

There is a different temperature differential for the cool/heat cycles (below or above...), as of which there is an unconditional off of the devices installed to avoid excessive cool/heat cycles.

STP M	Set point	TVD	Phase input/output time variation differential
RBM	Control band	HTON	Stage activation maximum time delay
NZ	Neutral zone	LTON	Stage activation minimum time delay
EOW T	Water temperature at exchanger outlet	HT OFF	Stage deactivation maximum time delay
DonZ	Compressor zone	LT OFF	Stage deactivation minimum time delay
DoffZ	Compressor off zone	t	Time



Compressor rotation

The controller provides a FIFO type rotation in which the first compressor to go on will also be the first to go off.

Start-up sequence: C1, C2, C3, C4.

Stoppage sequence: C1, C2, C3, C4.

HP prevent

When this function is enabled, the controller attempts to avoid the blockage of the unit due to excessively high pressure. When said pressure reaches a preestablished value near the off pressure, the controller speeds up the fans to a maximum (if in cool cycle), or slows them down to a minimum (if in heat cycle). If the operating pressure continues getting close to the HP Prevent pressure, the controller turns off a compressor in the tandem of the affected circuit. The parameters of said function are accessed from the **CONDENSATION** menu.

Defrost cycle

If the evaporating pressure of one of the systems remains below the value set for starting defrost during an accumulated period of time equal to the period established as the delay between defrosts, simultaneous defrost of all unit coils is started. The cycle ends once the pressure set as end defrost is reached, or at the end of the time period set as maximum duration of the cycle.

The defrost sequence is as follows:

- 1 Compressor are turned off
- 2 After 15 sec., the 4-way valves are inverted
- 3 After 45 sec., the compressors start with the fans off
- 4 Once defrost is completed, the compressors stop
- 5 After 15 sec., the 4-way valves are inverted
- 6 After 45 sec., the compressors and the fans start

Control sensors: Pressure transducers B3 and B4.

Parameters used:

- Simultaneous defrost.
- Defrost start pressure
- Defrost end pressure
- Defrost call delay
- Max. defrost time
- Min. defrost time
- Forced compressor stoppage time due to cycle inversion
- 4-way valve inversion delay

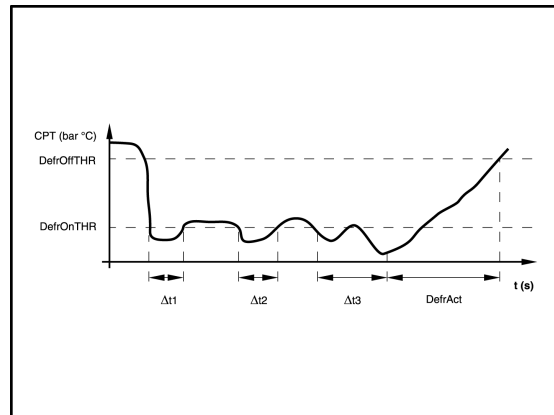
Affected outputs:

- Compressors (N1, N2, N3 and N4)

1.13 Operating instructions

- 4-way valves (N13 and N14)
- Fans (Y3 and Y4)

DefrOff	Defrost end pressure	DefrAct	Defrost active
DefrOn	Defrost start pressure	t	Time
t 1...3	Partial times remaining in defrost start pressure zone		



Antifreeze protection

If the B6 temperature sensor (water outlet) detects a temperature below the antifreeze set temperature, the unit is blocked and in a state of alarm (manual reset). Simultaneously, the protecting heaters of the plate heat exchanger (output N11) are connected. If the unit includes a hydro kit, the accumulator tank protection heaters will also be activated.

Said heaters will turn off when the D6 sensor detects a temperature equal to the antifreeze temperature, plus a preestablished differential.

The antifreeze system will operate despite the status and mode of the unit.

Antifreeze protection can also include start-up of the pump and unit (see parameters in the **ANTI-FREEZE** menu).

Back-up heater

If following a preestablished time period after unit start-up in heat mode the water outlet temperature detected by B6 does not reach the minimum value, backup heater output (N12) is activated. Once the water temperature has reached said value, plus a preestablished differential, said output will be deactivated (see parameters in the **ANTIFREEZE** menu).

Remote ON/OFF

A digital ON/OFF remote input can be installed between terminals ID3-G0, and enabled with the corresponding parameters of the **H unit config** menu.

If the contact is open, the unit will remain OFF. If the contact is closed, the unit will remain ON.

If the unit is OFF due to said digital input, a message appears on the display indicating as such.

The unit will remain OFF whenever any of its inputs: user keyboard, digital or monitoring input are OFF.

Remote COOL / HEAT

A digital COOL/HEAT remote input can be installed between terminals ID15-G0, and enabled with the corresponding parameters of the **H** menu.

If the contact is open, the unit will remain in HEAT cycle. If the contact is closed, the unit will remain in COOL cycle.

If the digital COOL/HEAT input is enabled, said selection cannot be made from the user's or supervisor's keyboard.

To change the cycle, either from the digital input, the user's keyboard or the supervisor's keyboard, the unit must be OFF.

If the digital COOL/HEAT input is not enabled, said function can be carried out indifferently from the user's or supervisor's keyboard.

Second pump

A second pump can be enabled by means of the **-H-unit config** menu. To do this, install the contactor (pump 230-1-50) between terminals N8-N, and the corresponding protector (contact NC) between terminals DI18-G0.

This second pump will operate alternately with the first pump, taking into account the number of operating hours or start-up cycles. In the case of a protector failure of one of the two pumps, the available pump will activate immediately.

Download key

The central C3 module has a connector (J11) for connection of a download key (PSOPZKEYAO) with the unit operational programme.

Serial connection for monitoring

Controller C3 allows connecting to a monitoring system using an RS485 serial board. It is possible to configure and enable this function from the **-H- unit config** menu. The system has two monitoring protocols: Carel and Modbus.

AUTO-RESTART

When the unit is turned off by a power shortage, and once this has been restored, the unit retains the same operating mode and status that was present before the shortage.

Alarm system

When an alarm is triggered, the red key on the upper left corner of the user's keyboard-display lights up. By pressing this key, the cause of the alarm appears on the display. Then press the **Up** or **Down** keys to check for further causes of the failure, which will appear on the display successively. When the alarms are automatically reset, unit operations are restored once the causes of the alarm have disappeared. If the failure is manually reset, and once its cause has disappeared, the **Alarm** key must be pressed to restore unit operations. Then press the **Esc** button to return to the initial display.

1.13 Operating instructions

Alarm table

Description	Input	Off circ.1	Off circ.2	Off fan	Off pump	Off sys	Reset	Delay	Notes
Serious alarm FC, PG	ID1	X					MANUAL	-	general Phase control protection
Antifreeze alarm	B6	X	X	X	X	X	MANUAL	-	The pump can be running in OFF mode. See antifreeze menu.
Pump 1 heat switch Q5	ID4	X	X	X	X	X	MANUAL	-	If available, pump 1 starts up. If not, the entire system stops.
Pump 2 heat switch Q6	ID18	X	X	X	X	X	MANUAL	-	If available, pump 1 starts up. If not, the entire system stops.
PDW flow switch, FS	ID2	X	X	X	X	X	MANUAL	Selectable	Delays on start-up and while operating
Circ. 1 fan heat switches THPF1, THPF2	ID9	X	-	Circ. 1	-	-	AUTO/ MANUAL	1st fault within 60' interval, automatic reset	2nd fault within 60' interval, manual reset
Circ. 2 fan heat switches THPF3, THPF4	ID14	-	X	Circ. 2	-	-	AUTO/ MANUAL	2nd fault within 60' interval, automatic reset	2nd fault within 60' interval, manual reset
Compressor 1 A1 heat switches (YCSA/LCA 150, YCSA-H/BRAW 150)	ID7	Comp 1	-	-	-	-	AUTO/ MANUAL	3rd fault within 60' interval, automatic reset	3rd fault within 60' interval, manual reset
Compressor 2 A2 heat switches (YCSA/LCA 150, YCSA-H/BRAW 150)	ID8	Comp 2	-	-	-	-	AUTO/ MANUAL	4th fault within 60' interval, automatic reset	4th fault within 60' interval, manual reset
Compressor 3 A3 heat switches (YCSA/LCA 150, YCSA-H/BRAW 150)	ID12	-	Comp 3	-	-	-	AUTO/ MANUAL	5th fault within 60' interval, automatic reset	5th fault within 60' interval, manual reset
Compressor 4 A4 heat switches (YCSA/LCA 150, YCSA-H/BRAW 150)	ID13	-	Comp 4	-	-	-	AUTO/ MANUAL	6th fault within 60' interval, automatic reset	6th fault within 60' interval, manual reset
Circ. 1 high-pressure switch HP1	ID6	X	-	Circ. 1	-	-	AUTO/ MANUAL		manual reset
Circ. 2 high-pressure switch HP2	ID11	-	X	Circ. 2	-	-	AUTO/ MANUAL		manual reset
Circ. 1 high-pressure switch LP1	ID5	X	-	Circ. 1	-	-	AUTO/ MANUAL		manual reset
Circ. 2 high-pressure switch LP2	ID10	-	X	Circ. 2	-	-	AUTO/ MANUAL		manual reset
Circ. 1 high-pressure switch by transducer	B3	X	-	Circ. 1	-	-	MANUAL		manual reset
Circ. 2 high-pressure switch by transducer	B4	-	X	Circ. 2	-	-	MANUAL		manual reset
B3 sensor faulty	B3	X	X	X	X	X	MANUAL	60'	
B4 sensor faulty	B4	X	X	X	X	X	MANUAL	60'	
B5 sensor faulty	B5						MANUAL	60'	
B6 sensor faulty	B6						MANUAL	60'	
B7 sensor faulty	B7						MANUAL	60'	
B8 sensor faulty	B8						MANUAL	60'	
Pump 1 maintenance	System						MANUAL		Set period in Compressor menu
Pump 2 maintenance	System						MANUAL		Set period in Compressor menu
Compressor 1 maintenance	System						MANUAL		Set period in Compressor menu
Compressor 2 maintenance	System						MANUAL		Set period in Compressor menu

Description	Input	Off circ.1	Off circ.2	Off fan	Off pump	Off sys	Reset	Delay	Notes
Compressor 3 maintenance	System						MANUAL		Set period in Compressor menu
Compressor 4 maintenance	System						MANUAL		Set period in Compressor menu

1.13 Operating instructions

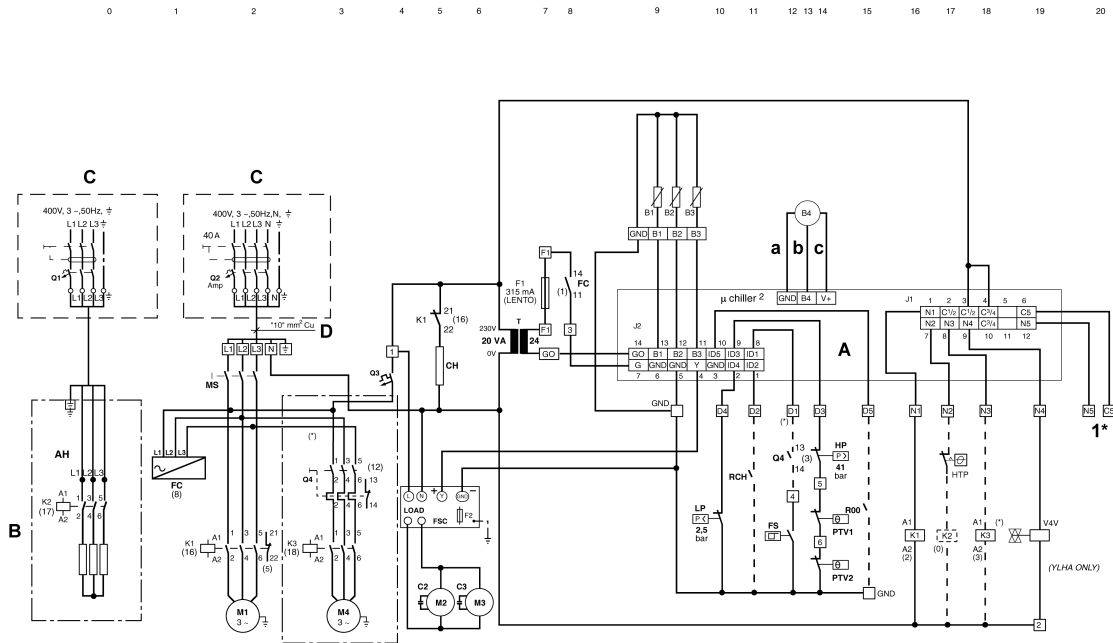
Temperature/resistance properties of NTC control sensors (10kOhms)

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		

1.14 Wiring diagrams

1.14.1 Unit wiring diagrams

Wiring diagram, YLCA/YLHA 40, 400.3.50



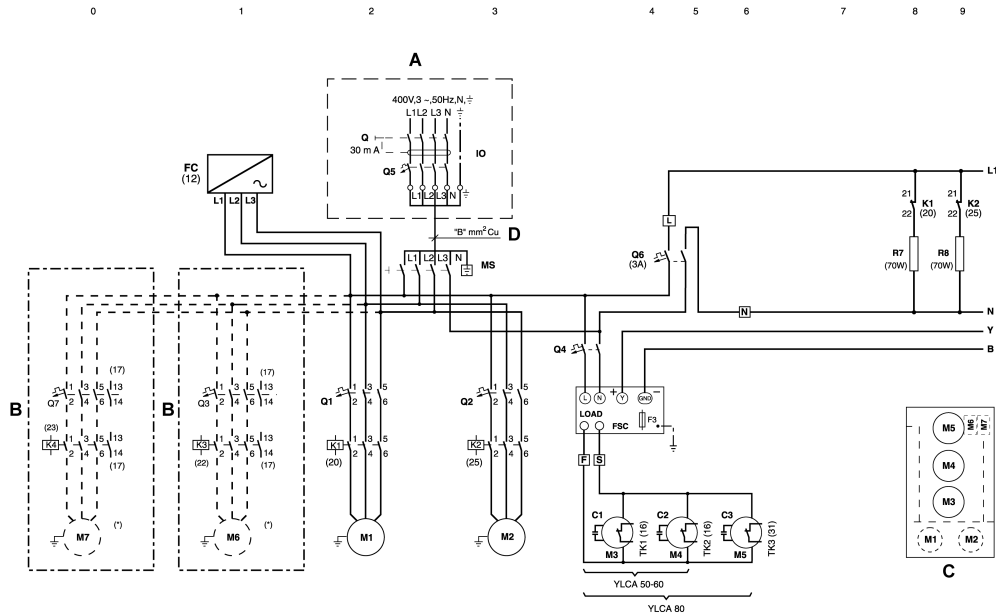
1-26293
YLCA/YLHA 40
400.3.50

1.14 Wiring diagrams

(*) On units with hydro kit only

1*	Alarm	HTP	Heater thermal protection
A	Electronic control	K1	Compressor contactor
B	The components in the box are standard accessories supplied by the manufacturer	K2	Auxiliary heater contactor
C	The components in the box are not supplied by the manufacturer	K3	Pump contactor (TC units)
D	"B" mm ² Cu	LAK	Low ambient kit accessory
a	Green wire	LP	Low-pressure switch (2.5 bar)
b	White wire	M1	Compressor
c	Black wire	M2	Fan Motor 1
AH	Auxiliary heater	M3	Fan Motor 2
B1	Water inlet temperature sensor (NTC)	M4	Pump (TC units)
B2	Water outlet temperature sensor (NTC)	MS	Main switch
B3	Outdoor temperature sensor (NTC)	Q1	Back-up heater magneto-thermal protector
B4	Ratiometric pressure sensor	Q2	General compressor magneto-thermal protector
C2, C3	Fan condenser	Q3	General magnetic-thermal protector, 230V / Fan / Pump / Sump heater
CH	Compressor sump heater	Q4	Pump magneto-thermal protector (TC units)
F1	24V electronic control fuse	R00	Remote ON / OFF switch
F2	Fan speed controller fuse	RCH	Remote COOL / HEAT switch
FC	Phase control	T	230 / 24V 20VA transformer
FS	Water flow switch (TC units)	TK1, TK2	Fan heat switch
FSC	Fan speed controller	V4V	4-way valve
HP	High-pressure switch (41 bar)		

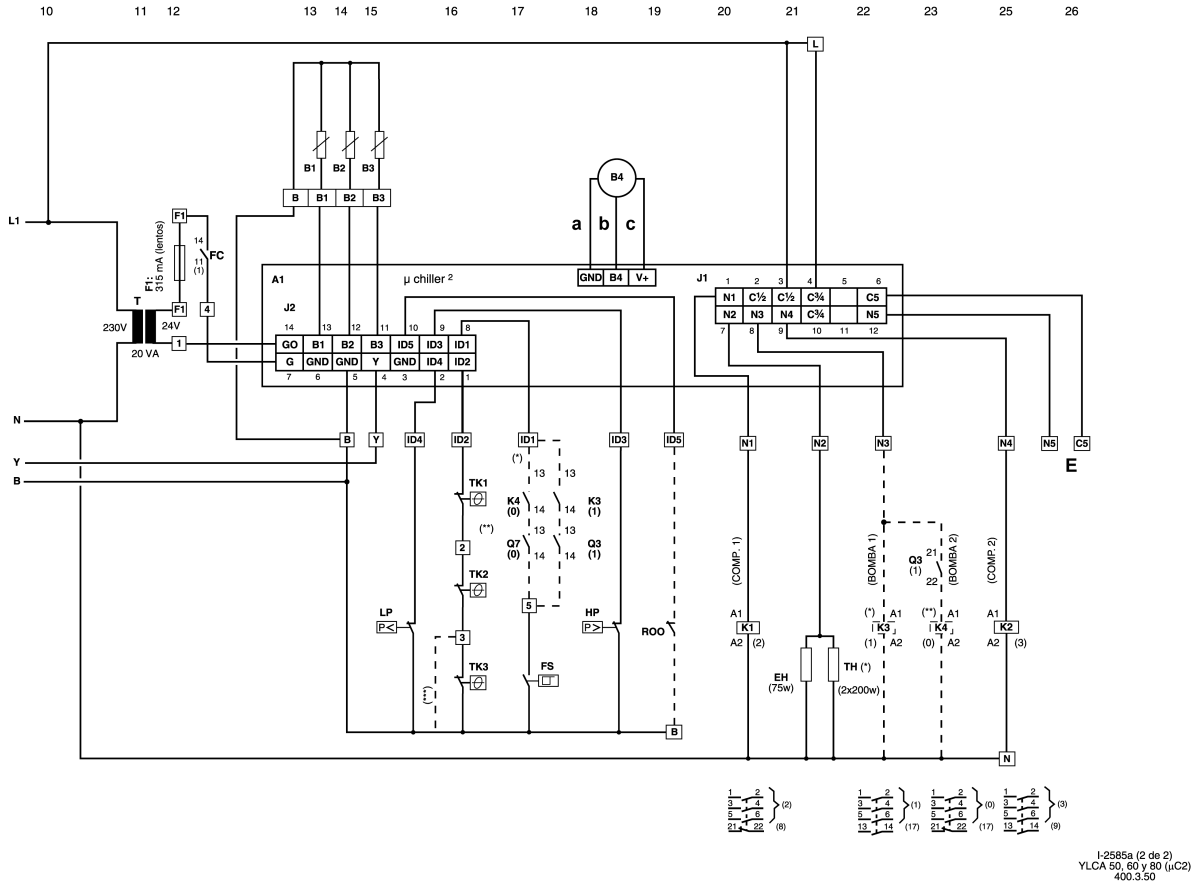
Wiring diagrams YLCA 50, 60 and 80 (μC2), 400.3.50



I-2585a (1 de 2)
YLCA 50, 60 y 80 (μC2)
400.3.50

YLCA	Q5	D
50	63	3 x 25 + GND, N
60	80A	3 x 25 + GND, N
80	100A	3 x 35 + GND, N

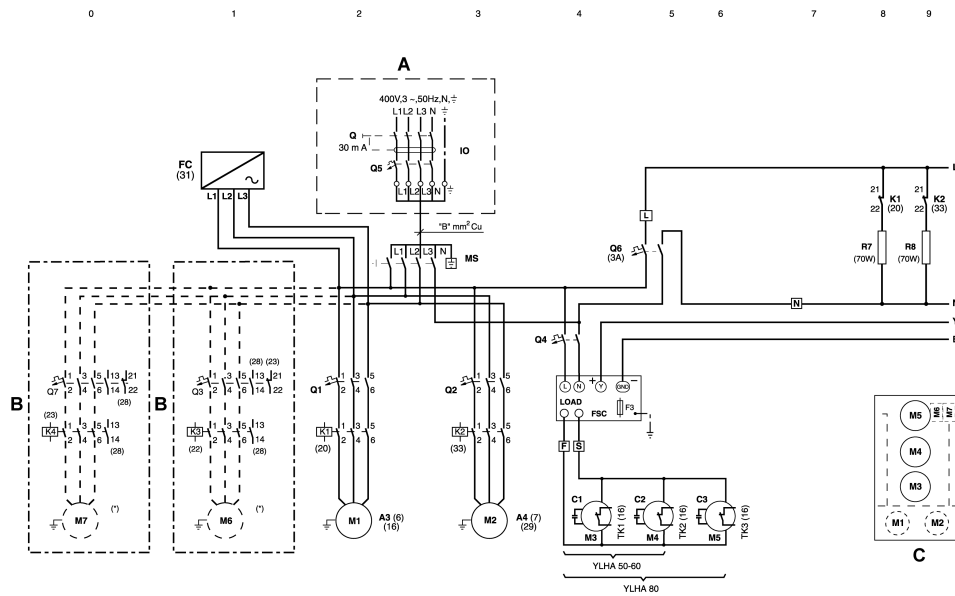
1.14 Wiring diagrams



- (*) On units with hydro kit only
- (**) On units with hydro kit and two pumps only
- (***) On 50 and 60 units only

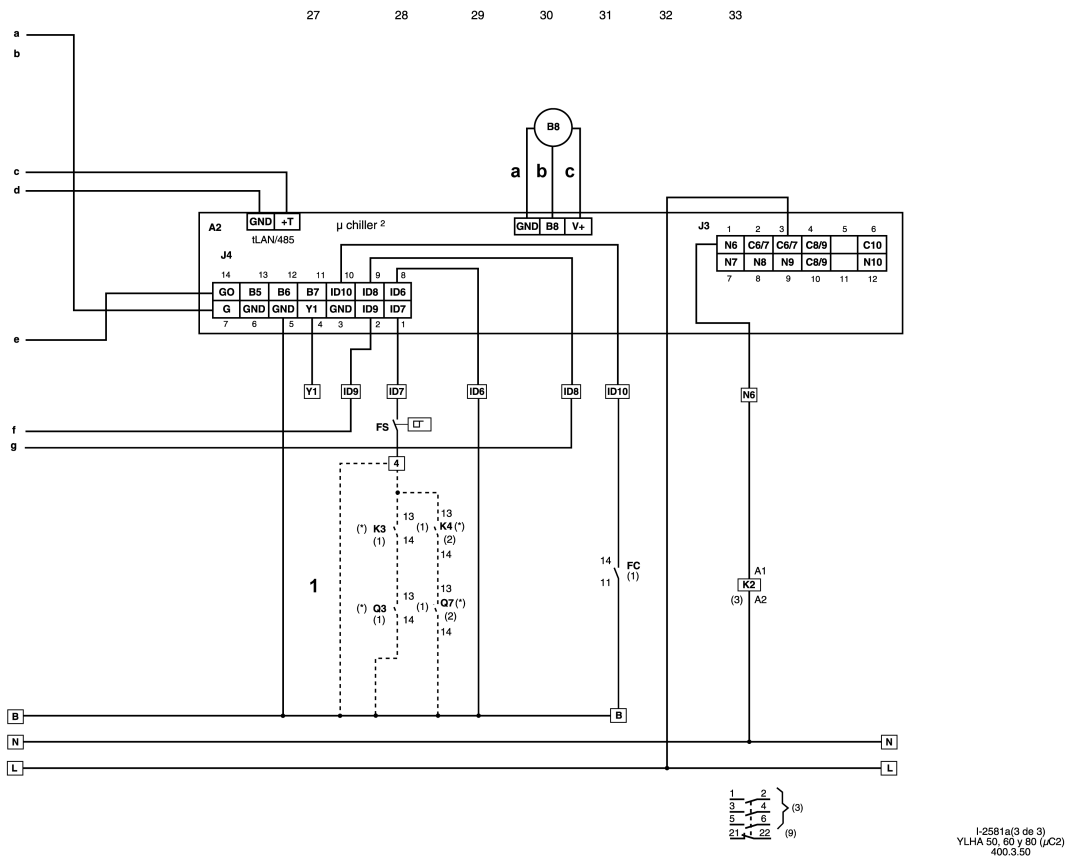
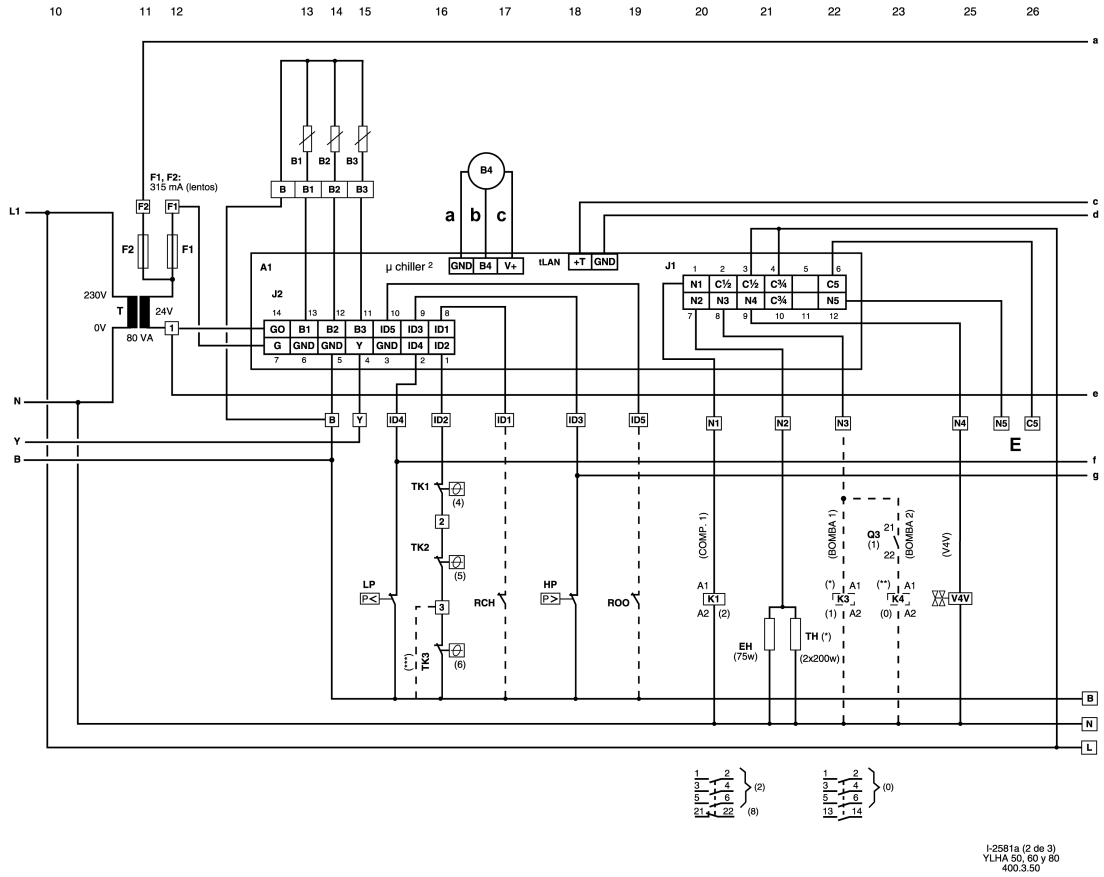
A	The components in the box are not supplied by the manufacturer	FS	Water flow switch
B	The components in the box are standard accessories supplied by the manufacturer	FSC	Fan speed controller
C	Motor position	HP	High-pressure switch (automatic reset)
D	"B" mm ² Cu	LP	Low-pressure switch (automatic reset)
E	Alarm	K1, K2	Compressor contactor 1 and 2
a	Green wire	K3, K4	Pump contactor 1 and 2
b	White wire	M1, M2	Compressor 1 and 2
c	Black wire	M2	Fan Motor 1
A1	Control module	M3, M4, M5	Fan motors
B1	Water inlet temperature sensor (NTC)	M6, M7	Pump 1 and 2
B2	Water outlet temperature sensor (NTC)	MS	Main switch
B3	Outdoor temperature sensor (NTC)	Q	Circuit breakers
B4	Ratiometric pressure sensor	R7	Sump heater compressor 1
C1, C2, C3	Fan motor condenser	R8	Sump heater compressor 2
EH	Evaporating unit heater	R00	Remote ON / OFF switch
F1	A1 and A2 protecting fuses (315 mA slow)	RCH	Remote COOL / HEAT switch
F2	Fan speed controller fuse	T	230 / 24V 20VA transformer
FC	Phase control	TK1, TK2, TK3	Fan heat protectors M3, M4 and M5

Wiring diagrams YLHA 50, 60 and 80 (μC_2), 400.3.50



I-2581a (1 de 3)
YLHA 50, 60 Y 80
400.3.50

YLHA	Q5	D
50	63A	3 x 25 + GND, N
60	80A	3 x 25 + GND, N
80	100A	3 x 35 + GND, N

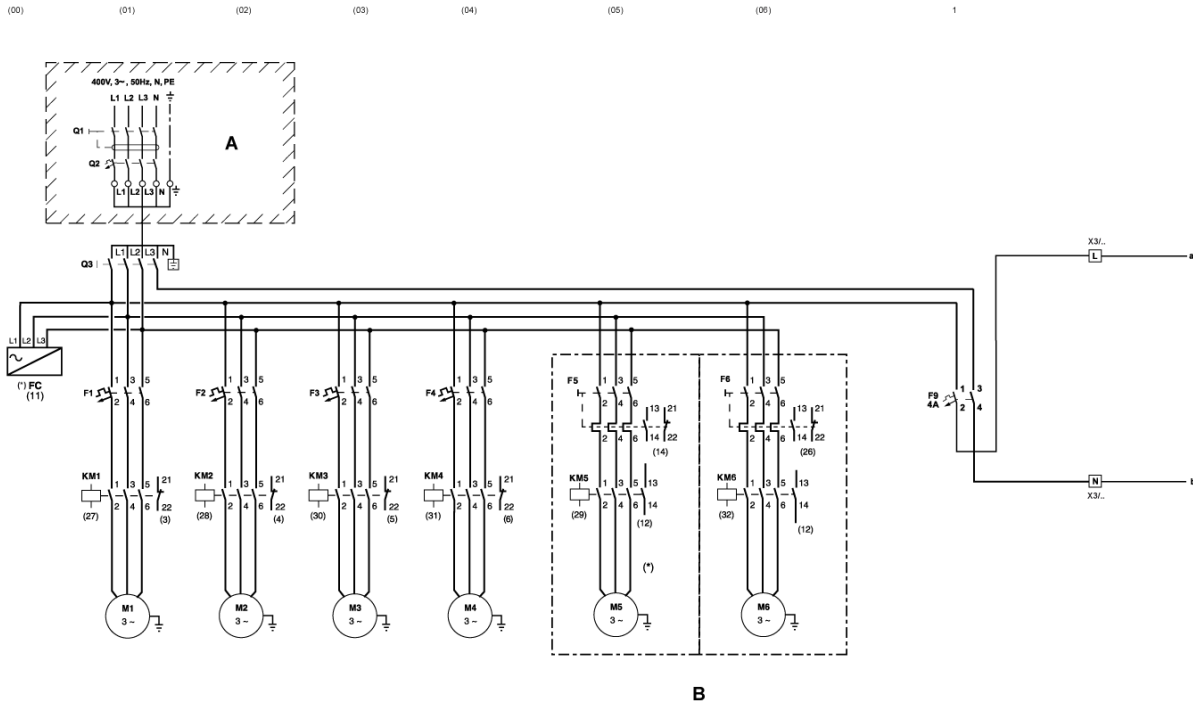


- (*) On units with hydro kit only
- (**) On units with hydro kit and two pumps only
- (***) On 50 and 60 units only
- (1) Units without pump

A	The components in the box are not supplied by the manufacturer	FS	Water flow switch
B	The components in the box are standard accessories supplied by the manufacturer	FSC	Fan speed controller
C	Motor position	HP	High-pressure switch (automatic reset)
D	"B" mm ² Cu	LP	Low-pressure switch (automatic reset)
E	Alarm	K1, K2	Compressor contactor 1 and 2
a	Green wire	K3	Pump contactor
b	White wire	M1, M2	Compressor 1 and 2
c	Black wire	M3, M4, M5	Fan motors
A1	Base control module	M6, M7	Pump 1 and 2
A2	Expansion module	MS	Main switch
B1	Water inlet temperature sensor (Transducer)	Q	Circuit breakers
B2	Water outlet temperature sensor (Transducer)	R7	Sump heater compressor 1
B3	Outdoor temperature sensor (NTC)	R8	Sump heater compressor 2
B4	Cooling pressure, fan speed control A1 fan module (NTC)	R00	Remote ON / OFF switch
B8	Cooling pressure, fan speed control A2 fan module (NTC)	RCH	Remote COOL / HEAT switch
C1, C2, C3	Fan motor condensers	T	230 / 24V transformer
EH	Evaporating unit heater	TH	Tank heater
F1, F2	A1 and A2 protecting fuses (315 mA slow)	TK1, TK2, TK3	Fan heat protectors M3, M4 and M5
F3	Fan speed controller fuse	V4V	4-way valves (on YLHA only)
FC	Phase control		

1.14 Wiring diagrams

Wiring diagrams YLCA / YLHA 100, 120 and 150 (μC3) 400.3.50



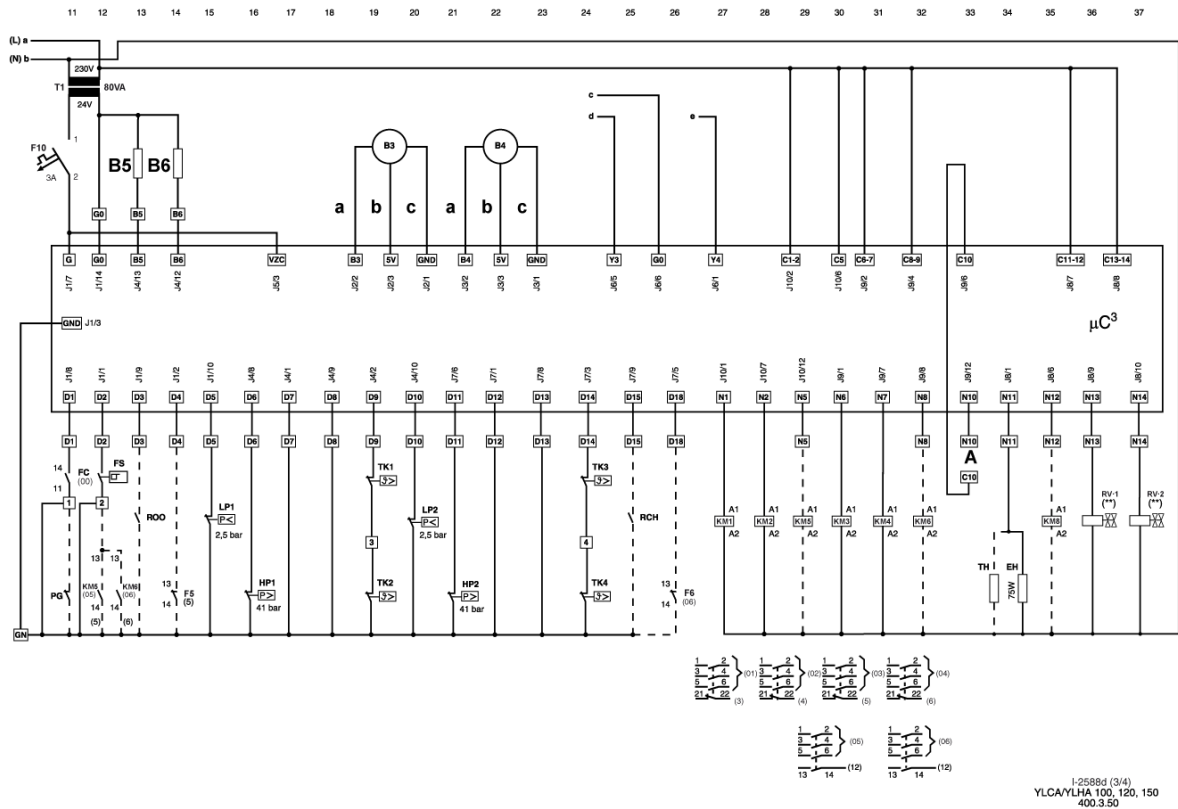
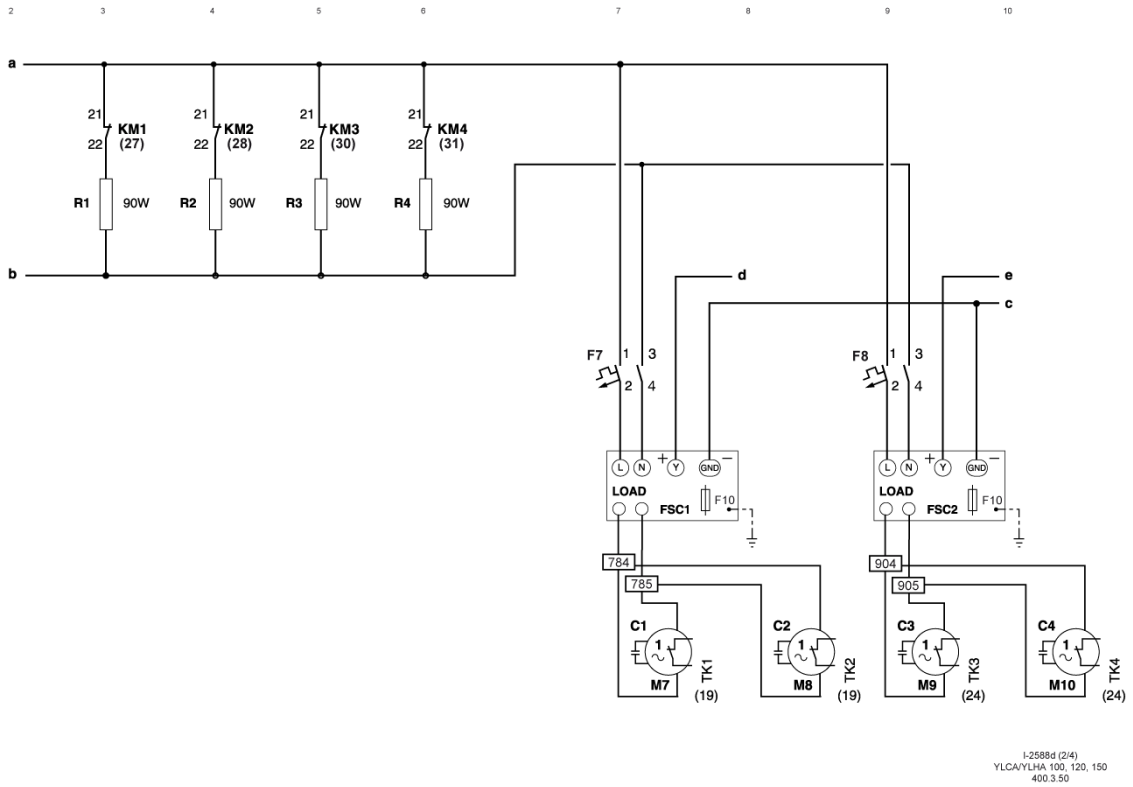
I-2588d (1/4)
YLCA/YLHA 100, 120, 150
400.3.50

A	The components in the box are not supplied by the manufacturer
B	The components in the box are standard accessories supplied by the manufacturer

(*) On units with hydro kit only

(*)FC If the unit has power and the digital input D1 is open, check that the sequence of phases L1, L2, L3 is correct

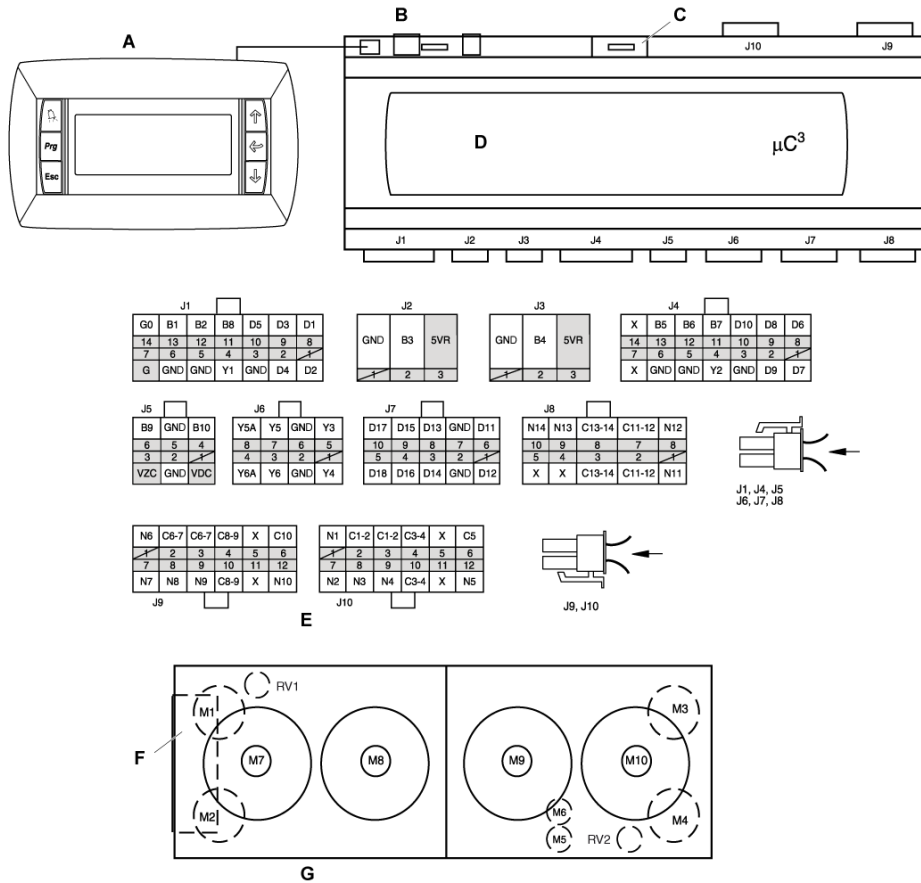
Model	Q2 [A]	Cross-section B mm ²	F1 [A]	F2 [A]	F3 [A]	F4 [A]	F5 [A] REG	F6 [A] REG	F7 [A] REG	F8 [A] REG
100	100	5 x 35	25	25	25	25	5,4	5,4	8	8
120	125	5 x 50	25	25	25	25	6	6	8	8
150	160	5 x 50	32	32	32	32	6,8	6,8	10	10



1.14 Wiring diagrams

(**) Pm YLHA
units only N10 - C10 = Voltage-free contact (-A- general protection alarm)

a	White	c	Green
b	Black		



L-2558d (4/4)
YLCA/VLJA 100, 120, 150
400.3.50

A	Keyboard-display terminal	FSC1, FSC2	Circuit 1 and 2 fan speed controllers
B	Terminal connection	F10 (FSC1, FSC2)	Fuses of the fan speed controllers
C	Programmable key connection	HP1, HP2	High-pressure switches, circuits 1 and 2
D	Control module	KM1, KM2, KM3, KM4	Compressor contactors
E	Identification of the connectors and their terminals	KM5, KM6	Pump contactors
F	Control box	KM8	Back-up heater contactor
G	Distribution of motors and valves	LP1, LP2	Low-pressure switches, circuits 1 and 2
L	phase	M1, M2, M3, M4	Compressor motors
N	Neutral	M5, M6	Pump motors
B3, B4	Coil pressure sensors, circuits 1 and 2	M7, M8, M9, M10	Fan motors
B5	Water inlet temperature sensor (NTC)	μC ₃	Microchiller controller 3
B6	Water outlet temperature sensor (NTC)	Q2	Main switch
C1, C2, C3, C4	Fan condensers	Q3	Main switch
EH	Evaporating unit antifreeze heater	R1, R2, R3, R4	Compressor sum heaters
F1, F2, F3, F4	Compressor circuit breakers	RCH	Remote cool / heat
F5, F6	M5 and M6 pump circuit breakers	ROO	Remote on / off
F7, F8	Circuit 1 and 2 fan circuit breakers	RV1, RV2	4-way valves, circuits 1 and 2
F9	Operating circuit breakers	TH	Tank antifreeze heater
F10	Controller μc circuit breaker ₃	TK1, TK2, TK3, TK4	Fan heat protectors
FC	Phase control (compressor rotational direction)	T1	230 / 24, 80 VA transformer
FS	Water flow switch		