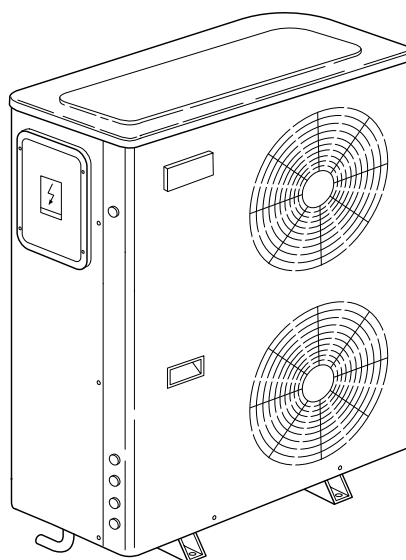




BY JOHNSON CONTROLS

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



### Technical Information

Ref.: N-27722\_EN 1110



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## Technical Information

## 1.1 General Information

### 1.1.1 Nomenclature

|   |                                |                |                                    |                |            |
|---|--------------------------------|----------------|------------------------------------|----------------|------------|
| Air-water cooling/heat pump with axial fans | Nominal cooling capacity in kW | R-410A version | M: Single-phase voltage (230.1.50) | With hydro kit | Soft Start |
|   |                                |                | T: Three-phase voltage (400.3.50)  |                |            |
| YLCA/YLHA PLUS                              | 5                              | G1             | T                                  | C              | S          |

### 1.1.2 General description of the unit

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

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

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

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

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

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

For further information, please see [Operating instructions µC2](#), see on page 47.

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

### 1.1.3 Models available and capacities

|                        |                 |                       |                       |                  |
|------------------------|-----------------|-----------------------|-----------------------|------------------|
| <b>Cool-only model</b> | <b>YLCA 5 M</b> | <b>YLCA 7 M and T</b> | <b>YLCA 9 M and T</b> | <b>YLCA 12 T</b> |
| Cooling capacity       | 5,38            | 7,13                  | 9,05                  | 12,40            |

|                        |                  |                  |                  |
|------------------------|------------------|------------------|------------------|
| <b>Cool-only model</b> | <b>YLCA 15 T</b> | <b>YLCA 20 T</b> | <b>YLCA 27 T</b> |
| Cooling capacity       | 14,5             | 19,52            | 25,60            |

|                        |                      |                            |                            |
|------------------------|----------------------|----------------------------|----------------------------|
| <b>Heat pump model</b> | <b>YLHA PLUS 5 M</b> | <b>YLHA PLUS 7 M and T</b> | <b>YLHA PLUS 9 M and T</b> |
| Cooling capacity       | 5,4                  | 7,10                       | 8,72                       |
| Heating capacity       | 6,3                  | 7,16                       | 10,1                       |

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

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

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

## 1.1.4 Features and advantages

### Features

- R-410A coolant
- Compact size
- Low height and weight
- Factory-tested equipment.
- Accessibility
- Easy maintenance
- Microprocessor for control and alarms
- Manufactured to ISO 9001
- Variable speed fan
- Option to omit inertia tank
- 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 sound level and condensation control
- For installations with low water volume
- Ideal for building management

### Dynamic Set Point and omission of inertia tank

The control system of the YLCA/YLHA PLUS 5 to 27 includes the Dynamic Set Point and Omission of Inertia Tank.

**Dynamic Set Point:** Modifies the set point for the control of the water temperature according to the outdoor temperature. The objective is to prevent an excessive difference in temperature between the interior and exterior of the air-conditioned area. If there is a large difference, this may result in discomfort or thermal shock for the users entering and leaving the area and could even endanger their health. In addition, this function, which increases the set point during the summer cycle and reduces it in the winter cycle, significantly contributes to the system's energy savings.

**Omission of inertia tank:** This function increases the temperature differential which, when added to the control set point, adjusts the stop/start cycles of the compressor when the unit is operating with a low load. It uses the length of the compressor operating cycles as reference. Therefore, when the water temperature falls quickly, it delays the stopping of the compressor by simulating the inertia tank function, thus avoiding too many stop / start cycles of the unit. This function, although slightly reducing the accuracy of the water temperature control, makes the use of the inertia tank unnecessary.

## 1.1.5 Technical specifications

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

### Sheeting casing

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

### Compressors

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

### Water side heat exchanger

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

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

### Control keyboard-display

This device is accessible through an external leak-tight plastic cover. This is an easy-to-use control with three access levels: direct, user (password) and factory (password). For further information, please see [Operating instructions µC2](#), see on page 47.

### Cooling circuit

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

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



**Hydro kit (pack)**

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

**Soft Start**

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

## Options and accessories

### Remote control

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

### Remote terminal

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

### BMS connections

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

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

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

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

### High pressure fans

### Inertia tank

With or without built-in auxiliary heater.

### Protecting grids

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



### NOTE

*See specific documentation for options and accessories.*

**Antivibration supports**

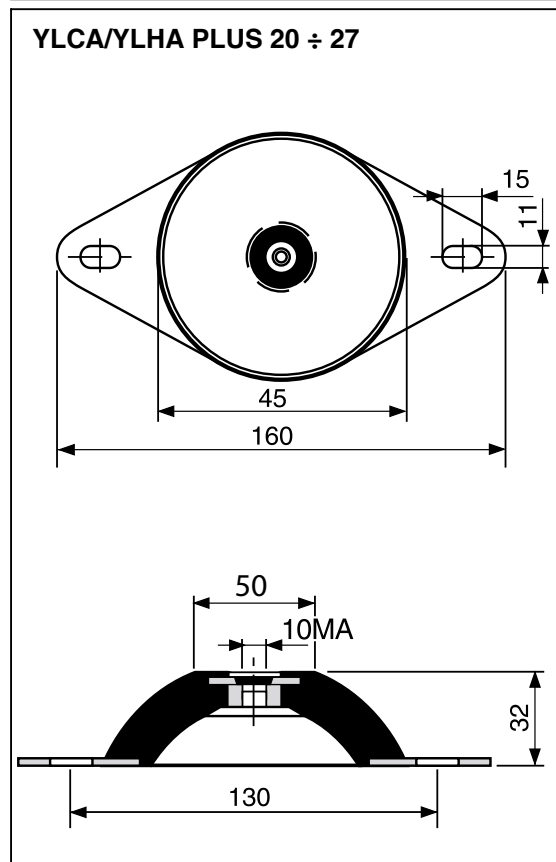
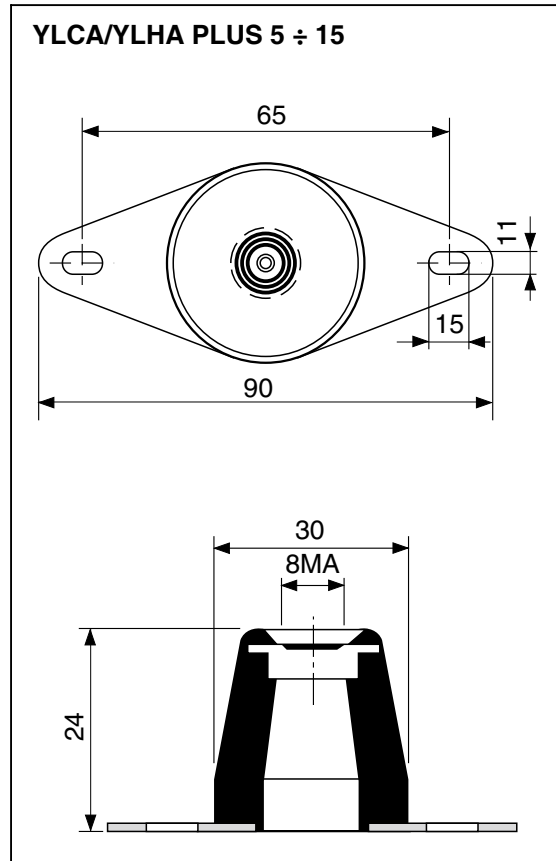
Whenever necessary to reduce vibrations and noise produced by the unit to the maximum, a set of rubber antivibration supports can be used. These should be installed between the chassis support of the unit and the base or floor on which it is to sit.

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

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

The antivibration support accessory includes 4 parts.

These spring supports should be distributed and fastened in the drilled holes at the base of the cooling unit, the location of which is detailed in the section *Measurements, clearances and accesses*, see on page 25.



## 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 protections and/or 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 cooling circuit is full of coolant 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 Warming 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 cooling unit:

- 1 Cooling capacity needed
- 2 Design cold water inlet and outlet temperatures.
- 3 Design water flow rate, if one of the temperatures of Point 2 above is unknown.
- 4 Design inlet temperature of air to the condenser. 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 evaporator.



#### 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 cooler is required to chill water from 13°C to 7°C, with a cooling capacity of 5 kW.

There are also other design conditions:

- Inlet ambient air in the condenser 35 °C
- Fouling factor: 0,044 m<sup>2</sup> °C/kW
- Altitude: Sea level

From a quick glance at the table *Cooling capacities YLCA 5 ÷ 27, see on page 35* it can be seen that a YLCA 5 gives approximately the required capacity of 5,38 kW.

As the factors appearing in tables *Fouling factors, see on page 16* and *Altitude factors, see on page 19* are not applicable, the conditions will be as follows:

- Cooling capacity: 5,38 kW
- Power consumed: 1,87 kW
- Water temperature: 13°C to 7°C (Temp. difference of 6)

$$\text{Water flow rate} = \frac{5,38 \times 860}{6} = 771 \text{ l/h}$$

Available pressure in the unit's hydraulic circuit:

- From table *Pressure available for the hydraulic circuit and pressure drop in the hydraulic circuit (without filter mounted), see on page 20* we infer that the YLCA 5 MC, with a flow rate of 771 l/h, has an available pressure of 56 kPa.

Pressure drop in filter:

- From table *Pressure drop in filters, see on page 21* we infer that with a flow rate of 771 l/h, there is a pressure drop of 1,3 kPa.

### YLHA PLUS selection method

- 1 Establish the correct size of YLHA PLUS by selecting the model from the tables *Heating capacities YLHA 5 ÷ 27, see on page 34* and *Cooling capacities YLCA 5 ÷ 27, see on page 35* that is closest to the cooling and heating capacities required in design conditions of the water outlet temperature and air inlet temperature.
- 2 Apply fouling correction factors (table *Fouling factors, see on page 16*) and height correction factors (table *Altitude factors, see on page 19*) to the capacity and power values shown in the corresponding tables of capacity for the cool and heat modes. 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 rate.
- 4 Check to make sure that these selections are within the YLCA/YLHA PLUS operating limits.

## YLHA PLUS SELECTION EXAMPLE

A YLHA PLUS 5 heat pump operating at a 35 °C ambient temperature should cool water from 13 °C to 7 °C, with a 5 kW cooling capacity.

A 4 kW heating capacity is required in 0 °C design ambient temperature and a hot water outlet temperature of 45 °C.

The fouling factor is 0,044 m<sup>2</sup> °C/kW, with the unit operating at sea level (no corrections). From a quick glance at the tables *Heating capacities YLHA 5 ÷ 27*, see on page 34 and *Cooling capacities YLCA 5 ÷ 27*, see on page 35 we see that a YLHA PLUS 5 heat pump approximately gives the required capacities:

- Cooling capacity = 5,4 kW
- Total unit absorbed power = 1,91 kW
- Cold water temperature = 13 °C to 7 °C (temp. diff. of 6 °C)
- Hot and cold water flow rate = 774 l/h
- Heating capacity = 4,15 kW
- Total unit absorbed power in heat mode = 1,88 kW
- Hot water outlet temperature = 45 °C

$$\text{Hot water temp. dif-ferential} = \frac{4,15 \times 860}{774} = 4,60 \text{ °C}$$

Thus, hot water return temperature is = 40,4 °C

All values are within operating limits:

- Available pressure in hydraulic circuit of a unit with pack:
- From table *Pressure available for the hydraulic circuit and pressure drop in the hydraulic circuit (without filter mounted)*, see on page 20 we infer that the YLHA PLUS 5 MC, with a flow rate of 748 l/h, has an available pressure of 56,5 kPa.
- Pressure drop in filter.
  - From table *Pressure drop in filters*, see on page 21, 1" filter, we infer that with a 748 l/h flow rate, said filter has a pressure drop of 1,2 kPa.



## 1.5.1 Selection guide with glycol (cool only units)

### Necessary information

The following information is needed to select a YLCA cooling unit:

- 1 Cooling capacity needed
- 2 Design cold water/glycol inlet and outlet temperatures.
- 3 Design water/glycol flow rate.
- 4 Design inlet temperature of air to the condenser. 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 evaporator.



### NOTE

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

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

*Temp. differential (°C) = Liquid Inlet Temp. - Liquid Outlet Temp.*

To determine the glycol factor, please see [Glycol concentration and correcting tables](#), see on page 17 (Recommended ethylene glycol concentrations) for ethylene glycol or (Recommended propylene glycol concentrations) for propylene glycol. For design outlet temperature, please see the recommended glycol concentration and the glycol factor in this concentration. This is the minimum concentration to be used for design outlet temperature. If a greater concentration is required, the glycol factor can be determined by means of [Glycol concentration and correcting tables](#), see on page 17 (Ethylene glycol in other concentrations) or (Propylene glycol in other concentrations).

### Selection method

- 1 Determine the correct cooling unit 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 cooler, set the design temperature range, or the flow rate, to balance the formulae appearing in [Selection guide \(YLCA/YLHA\)](#), see on page 11.
- 4 Always recheck to make sure these selections are within the specified design limits.

### Selection example

A cooler is required to chill ethylene glycol from 1 a to -4 °C, with an output of 3,5 kW.

The following design conditions are applicable:

- Fouling factor: 0,088m °C/kW
- Altitude: 1 200m
- Ambient air: 30 °C
- Glycol concentration: 30% w/w

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

From table [Cooling capacities YLCA 5 ÷ 27 \(35% ethylene glycol\)](#), see on page 36, we infer that a YLCA 5 unit, at the established design conditions, gives a capacity of 3,4 kW and a consumption of 1,35 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 16).

On design altitude, apply the capacity correcting factors x 10,973 and power x 1,020 (see [Altitude factors](#), see on page 19).

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 19).

Applying these factors to the selection: YLCA 5

$$\text{Capacity} = 3,44 \times 0,987 \times 0,973 \times 1,015 = 3,35 \text{ kW}$$

$$\text{Comp. power} = 1,35 \times 0,995 \times 1,020 \times 1,005 = 1,37 \text{ kW}$$

For the specified glycol concentration and a -4 °C outlet temperature, Figure 3 shows a 0,248 glycol factor. Thus, the flow rate can be determined with the formula appearing in [Selection guide \(YLCA/YLHA\)](#), see on page 11.

$$3,35 \text{ [kW]} = \frac{(1 - (-4)) \times \text{Flow rate [l / s]}}{0,248}$$

$$\text{Flow rate} = \frac{3,35 \times 0,248}{5} = 0,166 \text{ [l / s]} \text{ or } 598 \text{ [l / h]}$$

This covers the Limits of Use.

The evaporator pressure drop can be determined by taking the water pressure drop value for a YLCA unit and multiplying it by the correction factor (see [Glycol concentration and correcting tables](#), see on page 17) for a 30% concentration and an average temperature of -1,5 °C, i.e.:

$$-1,5 \text{ °C} = \frac{1 + (-4)}{2}$$

$$42 \text{ kPa} \times 1,22 = 51,2 \text{ kPa.}$$

## 1.6 Technical data

### 1.6.1 Limits of use

| Model     | Voltage limits |              | Inlet air temperature to the coil DB |          |            |          | Water outlet temperature |      |            |       | Temperature difference between water outlet and inlet |            |
|-----------|----------------|--------------|--------------------------------------|----------|------------|----------|--------------------------|------|------------|-------|---|------------|
|           | Nominal at 400 |              | Operating cycle                      |          |            |          | Operating cycle          |      |            |       | Minimum °C    Maximum °C                              |            |
|           |                |              | Minimum °C                           |          | Maximum °C |          | Minimum °C               |      | Maximum °C |       |   |            |
|           | Mini-<br>mum   | Maxi-<br>mum | Cold                                 | Hea<br>t | Cold       | Hea<br>t | Cold                     | Heat | Cold       | Heat  | Minimum °C  | Maximum °C |
| YLCA      |                |              |                                      | -        |            | -        |                          | -    |            | -     |   |            |
| YLHA PLUS | 342            | 436          | -10(2)                               | -15      | 46         | 20       | 5(1)                     | 30   | 15         | 50(3) |   |            |

- (1) At lower water temperatures, it is advisable to use glycol-type antifreeze mixtures. Minimum temp. with glycol -5 °C.
- (2) -18 °C with low temperature (optional in models YLCA 5, 7, 9, 12, 15).
- (3) 50 °C if the inlet air temp. is higher than 0 °C.

#### Prior to final approval of the installation

Check:

- Voltage remains between 342 - 436 V.A.



#### CAUTION

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

- 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 Correcting Factors

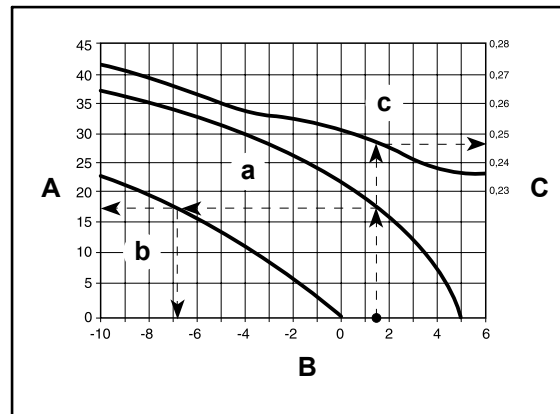
#### Fouling factors

| Evaporator                          |                 |                                  |
|-------------------------------------|-----------------|----------------------------------|
| Fouling Factor m <sup>2</sup> °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

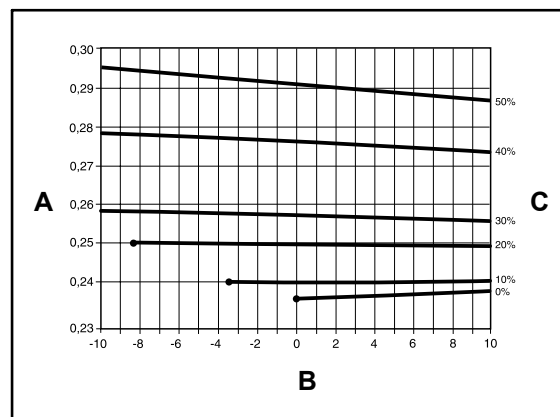
### Recommended ethylene glycol concentrations

|   |   |   |   |
|---|---|---|---|
| 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 |



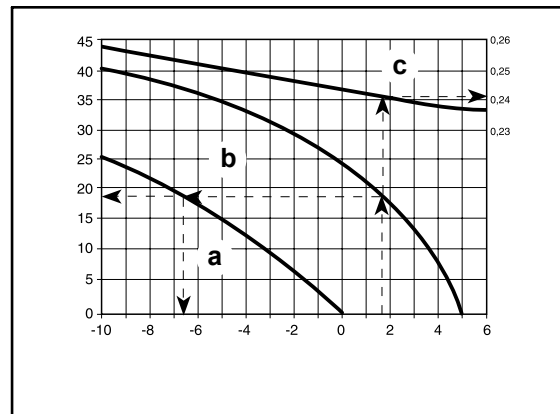
### Ethylene glycol in other concentrations.

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



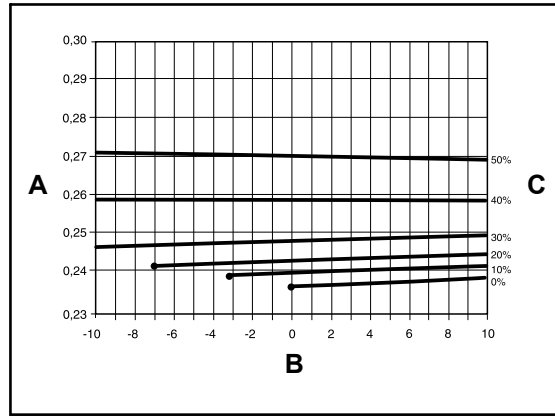
### Recommended propylene glycol concentrations

|   |   |   |   |
|---|---|---|---|
| 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 |



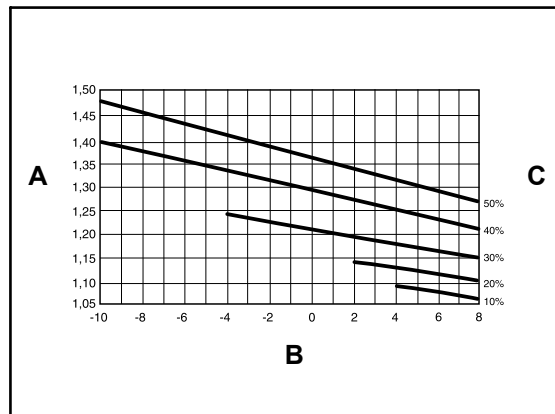
**Propylene glycol in other concentrations**

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



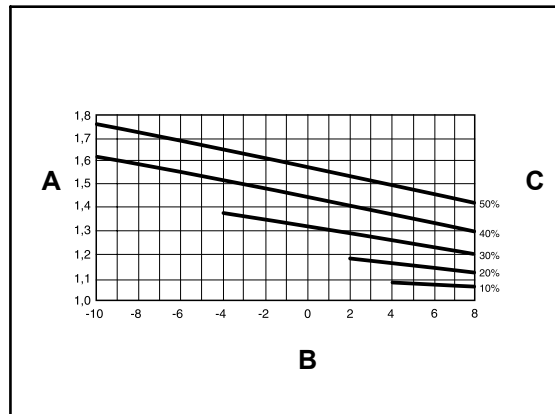
**Ethylene glycol pressure drop correcting factor**

- 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 available for the hydraulic circuit and pressure drop in the hydraulic circuit (without filter mounted)

| YLCA/YLHA PLUS model | Flow rate l/h | Avail. kPa | YLCA/YLHA PLUS model | Flow rate l/h | Avail. kPa |     |
|----------------------|---------------|------------|----------------------|---------------|------------|-----|
| 05                   | 600           | 61         | 15                   | 1 700         | 221        |     |
|                      | 800           | 55         |                      | 2 000         | 200        |     |
|                      | 1 000         | 46         |                      | 2 300         | 170        |     |
|                      | 1 200         | 36         |                      | 2 600         | 140        |     |
|                      | 1 400         | 25         |                      | 2 900         | 105        |     |
| 07                   | 800           | 96         |                      | 3 200         | 60         |     |
|                      | 1 000         | 91         |                      | 3 500         | 10         |     |
|                      | 1 200         | 81         |                      | 20            | 2 000      | 175 |
|                      | 1 400         | 70         |                      |               | 2 500      | 160 |
|                      | 1 600         | 58         |                      |               | 3 000      | 145 |
|                      | 1 800         | 45         | 3 500                |               | 125        |     |
|                      | 2 000         | 28         | 4 000                |               | 105        |     |
| 09                   | 1 000         | 95         | 4 500                |               | 83         |     |
|                      | 1 200         | 88         | 5 000                |               | 60         |     |
|                      | 1 400         | 80         | 5 500                | 30            |            |     |
|                      | 1 600         | 70         | 27                   | 3 000         | 245        |     |
|                      | 1 800         | 60         |                      | 3 500         | 228        |     |
|                      | 2 000         | 49         |                      | 4 000         | 208        |     |
|                      | 2 200         | 37         |                      | 4 500         | 187        |     |
|                      | 2 400         | 24         |                      | 5 000         | 163        |     |
| 12                   | 1 400         | 149        |                      | 5 500         | 140        |     |
|                      | 1 700         | 134        |                      | 6 000         | 112        |     |
|                      | 2 000         | 118        |                      | 6 500         | 83         |     |
|                      | 2 300         | 95         | 7 000                | 49            |            |     |
|                      | 2 600         | 62         | 7 500                | 15            |            |     |
|                      | 2 900         | 30         |                      |               |            |     |

Data with water at 10°C.

In the case of using glycol, apply the correcting factors indicated in Section [Correcting factors for other glycol concentrations](#), see on page 19.

## Pressure drop in filters

### 1" filter

|                       |      |      |      |      |      |      |
|-----------------------|------|------|------|------|------|------|
| Water flow rate (l/h) | 600  | 800  | 1000 | 1200 | 1400 | 1600 |
| kPa                   | 0,7  | 1,4  | 2,6  | 4,3  | 6,4  | 8,9  |
| Water flow rate (l/h) | 1800 | 2000 | 2200 | 2400 | 2600 |      |
| kPa                   | 11,8 | 15,1 | 18,8 | 22,8 | 27,1 |      |

### 1 1/4" filter

|                       |      |      |      |      |      |
|-----------------------|------|------|------|------|------|
| Water flow rate (l/h) | 1500 | 2000 | 2500 | 3000 | 3500 |
| kPa                   | 0,9  | 1,5  | 2,6  | 3,9  | 5,6  |
| Water flow rate (l/h) | 4000 | 4500 | 5000 | 5500 | 6000 |
| kPa                   | 7,7  | 10,1 | 12,8 | 15,7 | 18,8 |

Data with water at 10°C.

In the case of using glycol, apply the correcting factors indicated in Section [Correcting factors for other glycol concentrations](#), see on page 19.



### 1.6.3 Physical data

#### Physical data, YLCA units

##### Physical data

| Characteristics                    |   |          | YLCA (M and MC)  |      |          | YLCA (T and TC) |        |          |        |          |      |  |
|------------------------------------|---|----------|------------------|------|----------|-----------------|--------|----------|--------|----------|------|--|
|                                    |   |          | 5                | 7    | 9        | 7               | 9      | 12       | 15     | 20       | 27   |  |
| Cooling capacity                   | kW  | 5,38     | 7,13             | 9,05 | 7,13     | 9,05            | 12,4   | 14,5     | 19,52  | 25,6     |      |  |
| Capacity control                   | %   |          |                  |      |          |                 |        |          |        |          |      |  |
| Power supply                       | V/ph  | 230.1.50 |                  |      | 400.3.50 |                 |        |          |        |          |      |  |
| Max. unit power supply consumption | kW  | 2,57     | 3,61             | 4,36 | 3,61     | 4,36            | 5,68   | 8        | 9,17   | 12,09    |      |  |
| Max. unit current amperage         | A   | 11,75    | 17,1             | 23   | 7,6      | 8,25            | 11,6   | 15,8     | 18,1   | 23       |      |  |
| EER                                |   | 2,87     | 2,76             | 2,79 | 2,76     | 2,81            | 2,97   | 2,52     | 2,81   | 2,81     |      |  |
| Compressor                         | Compressor power  | kW       | 1,73             | 2,41 | 3,2      | 2,41            | 3,2    | 3,8      | 5,38   | 6,57     | 8,73 |  |
|                                    | Compressor amperage   | A        | 7,8              | 11,7 | 16       | 3,9             | 5,3    | 6,36     | 8,9    | 13       | 16,7 |  |
|                                    | No. of compressors  |          | 1                |      |          |                 |        |          |        |          |      |  |
|                                    | Compressor type   |          | SCROLL           |      |          |                 |        |          |        |          |      |  |
|                                    | Oil charge  | l        | 1,1              | 1,25 |          |                 |        | 1,95     | 1,66   | 2,51     | 3,25 |  |
|                                    | Oil type  |          | POLYOL ESTER OIL |      |          |                 |        |          |        |          |      |  |
|                                    | Compressor start-up current   | A        | 60               | 82   | 97       | 35              | 48     | 51       | 74     | 95       | 118  |  |
| Evaporator unit type               |   | PLATES   |                  |      |          |                 |        |          |        |          |      |  |
| Fan                                | No. of fans   |          | 1                |      |          |                 | 2      |          |        |          |      |  |
|                                    | Fan diameter  | mm       | 450              |      |          |                 |        |          |        |          | 560  |  |
|                                    | Fan power   | W        | 140              | 170  |          |                 |        | 2 x 185  |        | 2 x 175  |      |  |
|                                    | Fan amperage  | A        | 0,6              | 0,8  |          |                 |        | 2 x 0,87 |        | 2 x 0,85 |      |  |
|                                    | Total air flow rate   | m³/h     | 2900             | 3150 |          |                 |        | 6150     |        | 6300     | 7200 |  |
|                                    | Sound power   | dB(A)    | 70               | 70   | 71       | 70              | 71     | 73       | 73     | 74       | 78   |  |
|                                    | Sound pressure at 5 m   | dB(A)    | 44               | 44   | 45       | 44              | 45     | 47       | 47     | 48       | 51   |  |
|                                    | Sound pressure at 10 m  | dB(A)    | 40               | 40   | 41       | 40              | 41     | 43       | 43     | 44       | 48   |  |
|                                    | Available static pressure at nominal flow rate (without filter) (2) | kPa      | 51               | 80   | 78       | 80              | 75     | 115      | 152    | 134      | 191  |  |
|                                    | Available static pressure at nominal flow rate (with filter) (3)    | kPa      | 49               | 75,5 | 71       | 75,5            | 67,5   | 113      | 149    | 129,5    | 182  |  |
| Coolant                            | Coolant type  |          | R-410A           |      |          |                 |        |          |        |          |      |  |
|                                    | Coolant charge  | kg       | 2,08             | 2,55 | 2,25     | 2,55            | 2,15   | 3,17     | 3,1    | 5        | 7,8  |  |
|                                    | No. of coolant circuits   |          |                  |      |          |                 |        |          |        |          |      |  |
| Water circuit                      | Nominal water flow rate   | l/h      | 925              | 1225 | 1430     | 1225            | 1475   | 2065     | 2530   | 3360     | 4405 |  |
|                                    | Min water volume inst. (1)  | l        | 15               | 20   | 25       | 20              | 25     | 35       | 45     | 55       | 75   |  |
|                                    | Water connection, female  |          | 1"               |      |          |                 |        |          | 1 1/4" |          |      |  |
|                                    | water filter, female  |          | 1"               |      |          |                 | 1 1/4" |          |        |          |      |  |
|                                    | No. of pumps  |          | 1                |      |          |                 |        |          |        |          |      |  |
|                                    | Pump power  | W        | 160              | 210  |          |                 |        | 400      | 490    | 390      | 755  |  |
|                                    | Pump amperage   | A        | 0,65             | 0,95 |          |                 |        | 1,8      | 2,15   | 1,1      | 1,34 |  |
|                                    | Unit water content  | l        | 1                | 1,1  | 1,2      | 1,1             | 1,2    | 1,5      | 2      | 2,8      | 3,2  |  |
|                                    | Volume of expansion vessel  | l        | 1                | 2    |          |                 |        | 5        |        | 8        |      |  |
| Safety valve setting               | MPa (bar)   | 0,6 (6)  |                  |      |          |                 |        |          |        |          |      |  |
| Dimensions and weight              | Weight (4)(5)   | kg       | 75               | 99   | 100      | 99              | 100    | 146      | 160    | 220      | 290  |  |
|                                    | Length  | mm       | 905              |      |          |                 |        |          | 1430   |          | 1876 |  |
|                                    | Width   | mm       | 460              |      |          |                 |        |          | 502    |          |      |  |
|                                    | Height  | mm       | 762              | 965  |          |                 |        | 1270     |        |          |      |  |

- (1) Minimum volume of water in installation: In installations with smaller volumes, and under low load conditions, the function "Omission of inertia tank" is automatically activated. As a result, the water temperature becomes less accurate as the total volume of water in the installation is reduced.
- (2) Please enquire before applying values lower than those shown.
- (3) Static pressure available, Eurovent certified. Pressure with clean filter.
- (4) Weights for the empty unit.

## Physical data, YLHA units

### Physical data

| Characteristics                    |   | YLHA PLUS MC |                  |           |           | YLHA PLUS TC |          |           |           |           |      |
|------------------------------------|---|--------------|------------------|-----------|-----------|--------------|----------|-----------|-----------|-----------|------|
|                                    |   | 5            | 7                | 9         | 12        | 9            | 12       | 15        | 20        | 27        |      |
| Cooling capacity                   | kW  | 5,4          | 7,10             | 8,72      | 11,75     | 8,72         | 12       | 13,8      | 19,4      | 25,8      |      |
| Heating capacity                   | kW  | 6,3          | 7,16             | 10,1      | 12,25     | 10,1         | 12,4     | 16,1      | 20,9      | 27,5      |      |
| Power supply                       | V/ph  | 230.1.50     |                  |           |           | 400.3.50     |          |           |           |           |      |
| Max. unit power supply consumption | kW  | 2,57         | 3,48             | 4,79      | 5,51      | 4,79         | 5,68     | 7,6       | 8,70      | 12,09     |      |
| Max. unit current amperage         | A   | 11,75        | 16,4             | 23        | 25,7      | 5,5          | 11,6     | 12,4      | 15,5      | 21        |      |
| EER/COP nominal conditions         |   | 2,82/3,32    | 2,75/2,90        | 2,73/3,25 | 2,75/3,12 | 2,73/3,25    | 2,88/3   | 2,52/3,12 | 2,75/3,25 | 2,90/3,30 |      |
| COP air 7/6 - water 30/35          |   | 3,78         | 3,48             | 3,88      | 4,01      | 3,88         | 3,86     | 4         | 3,96      | 4,03      |      |
| Compressor                         | Compressor power in cooling   | kW           | 1,77             | 2,41      | 3,16      | 3,90         | 3,16     | 3,8       | 5,13      | 6,71      | 8,47 |
|                                    | Compressor power in heating   | kW           | 1,76             | 2,30      | 3,06      | 3,55         | 3,06     | 3,77      | 4,81      | 6,06      | 7,89 |
|                                    | Compressor amperage in cooling                                      | A            | 8,4              | 11,7      | 15,6      | 20,2         | 5,3      | 6,36      | 8,7       | 11,7      | 15,1 |
|                                    | Compressor amperage in heating                                      | A            | 8,1              | 11,2      | 14,4      | 18,7         | 5,1      | 6,38      | 8,2       | 10,8      | 14,3 |
|                                    | No. of compressors  |              | 1                |           |           |              |          |           |           |           |      |
|                                    | Compressor type   |              | SCROLL           |           |           |              |          |           |           |           |      |
|                                    | Oil charge  | l            | 1,1              | 1,25      | 1,24      | 1,25         | 1,24     | 1,89      | 2,51      | 3,25      |      |
|                                    | Oil type  |              | POLYOL ESTER OIL |           |           |              |          |           |           |           |      |
| Compressor start-up current (5)    | A   | 60/<45       | 82/<45           | 97/<45    | 116/<52   | 48           | 51       | 74        | 95        | 118       |      |
| Evaporator unit type               |   | PLATES       |                  |           |           |              |          |           |           |           |      |
| Fan                                | No. of fans   |              | 1                |           | 2         | 1            | 2        |           |           |           |      |
|                                    | Fan diameter  | mm           | 450              |           |           |              |          |           |           |           | 560  |
|                                    | Total fan power   | W            | 140              | 170       | 2 x 185   | 170          | 2 x 185  | 2 x 180   | 2 x 200   |           |      |
|                                    | Total fan current   | A            | 0,6              | 0,8       | 2 x 0,87  | 0,8          | 2 x 0,87 | 2 x 1,30  |           |           |      |
|                                    | Total air flow rate   | m³/h         | 2900             | 3150      |           |              | 6150     |           | 6300      | 7200      |      |
|                                    | Sound power   | dB(A)        | 70               | 70        | 71        | 73           | 71       | 73        | 73        | 74        | 78   |
|                                    | Sound pressure at 5 m   | dB(A)        | 44               | 44        | 45        | 47           | 45       | 47        | 47        | 48        | 51   |
|                                    | Sound pressure at 10 m  | dB(A)        | 40               | 40        | 41        | 43           | 41       | 43        | 43        | 44        | 48   |
|                                    | Available static pressure at nominal flow rate (without filter) (2) | kPa          | 51               | 80        | 75        | 116          | 75       | 118       | 160       | 130       | 191  |
|                                    | Available static pressure at nominal flow rate (with filter) (3)    | kPa          | 49               | 76        | 67,5      | 100          | 67,5     | 116       | 157,5     | 124       | 182  |
| Coolant                            | Coolant type  |              | R-410A           |           |           |              |          |           |           |           |      |
|                                    | Coolant charge  | kg           | 1,86             | 2,55      | 2,35      | 3,14         | 2,35     | 3,50      | 3,40      | 5,80      | 8,20 |
|                                    | No. of coolant circuits   |              |                  |           |           |              |          |           |           |           |      |
| Water circuit                      | Nominal water flow rate   | l/h          | 930              | 1220      | 1430      | 2020         | 1495     | 1980      | 2375      | 3335      | 4440 |
|                                    | Min water volume inst. (1)  | l            | 15               | 20        | 25        | 35           | 25       | 35        | 45        | 55        | 75   |
|                                    | Water connection, female  |              | 1"               |           |           |              |          |           | 1 1/4"    |           |      |
|                                    | water filter, female  |              | 1"               |           |           |              | 1 1/4"   |           |           |           |      |
|                                    | No. of pumps  |              | 1                |           |           |              |          |           |           |           |      |
|                                    | Pump power  | W            | 160              | 210       | 400       | 210          | 400      | 490       | 390       | 755       |      |
|                                    | Pump amperage   | A            | 0,65             | 0,95      | 1,8       | 0,95         | 1,8      | 2,15      | 1,1       | 1,34      |      |
|                                    | Unit water content  | l            | 1                | 1,1       | 1,2       | 1,5          | 1,2      | 1,5       | 2         | 2,8       | 3,2  |
|                                    | Volume of expansion vessel  | l            | 1                | 2         | 5         | 2            | 5        |           |           | 8         |      |
| Safety valve setting               | MPa (bar)   | 0,6 (6)      |                  |           |           |              |          |           |           |           |      |
| Dimensions and weight              | Weight (4)(5)   | kg           | 77               | 102       | 103       | 154          | 103      | 150       | 164       | 235       | 330  |
|                                    | Length  | mm           | 905              |           |           |              |          |           | 1430      | 1876      |      |
|                                    | Width   | mm           | 460              |           |           |              |          |           | 502       |           |      |
|                                    | Height  | mm           | 762              | 965       | 1270      | 965          | 1270     |           |           |           |      |

1.6 Technical data

- (1) Minimum volume of water in installation: In installations with smaller volumes, and under low load conditions, the function "Omission of inertia tank" is automatically activated. As a result, the water temperature becomes less accurate as the total volume of water in the installation is reduced.
- (2) Please enquire before applying values lower than those shown.
- (3) Static pressure available, Eurovent certified. Pressure with clean filter.
- (4) Weights for the empty unit.
- (5) With Soft Start.

1.6.4 Electrical specifications

| Model        | Power supply V.ph.Hz. | Compressor |       |            |            |            |      | Fans      |           | Pump      |           |
|--------------|-----------------------|------------|-------|------------|------------|------------|------|-----------|-----------|-----------|-----------|
|              |                       | Nominal A  |       | Start-up A |            | Nominal kW |      | Nominal A | Nominal W | Nominal A | Nominal W |
|              |                       | Cold       | Heat  | Standard   | Soft Start | Cold       | Heat |           |           |           |           |
| YLCA 5       | 230.1.50              | 7,80       | -     | 60         | <45        | 1,73       | -    | 0,60      | 140       | 0,65      | 160       |
| YLHA PLUS 5  |                       | 7,80       | 8,10  |            |            | 1,73       | 1,76 |           |           |           |           |
| YLCA 7       |                       | 11,70      | -     | 82         | <45        | 2,41       | -    | 0,80      | 170       | 0,95      | 210       |
| YLHA PLUS 7  |                       | 12,40      | 13,20 |            |            | 2,56       | 2,76 |           |           |           |           |
| YLCA 9       |                       | 17         | -     | 97         | <45        | 3,20       | -    |           |           |           |           |
| YLHA PLUS 9  |                       | 17         | 14,50 |            |            | 3,16       | 3,06 |           |           |           |           |
| YLHA PLUS 12 |                       | 16,30      | 14,80 | 116        | <52        | 3,29       | 2,98 | 2 x 0,87  | 2 x 185   | 1,80      | 400       |
| YLCA 7       | 400.3.50              | 3,90       | -     | 35         | -          | 2,41       | -    | 0,80      | 170       | 0,95      | 210       |
| YLHA PLUS 7  |                       | 4,10       | 4,80  |            | -          | 2,56       | 2,76 |           |           |           |           |
| YLCA 9       |                       | 5,70       | -     | 48         | -          | 3,20       | -    |           |           |           |           |
| YLHA PLUS 9  |                       | 6          | 5,80  |            | -          | 3,16       | 3,06 |           |           |           |           |
| YLCA 12      |                       | 6,36       | -     | 51         | -          | 3,80       | -    | 2 x 0,87  | 2 x 185   | 1,80      | 400       |
| YLHA PLUS 12 |                       | 6,36       | 6,38  |            | -          | 3,80       | 3,77 |           |           |           |           |
| YLCA 15      |                       | 8,90       | -     | 74         | -          | 5,38       | -    |           |           |           |           |
| YLHA PLUS 15 |                       | 8,70       | 8,90  |            | -          | 5,25       | 5,23 |           |           |           |           |
| YLCA 20      |                       | 13         | -     | 95         | -          | 6,65       | -    | 2 x 0,8   | 2 x 170   | 1,10      | 390       |
| YLHA PLUS 20 |                       | 12,20      | 11,70 |            | -          | 6,62       | 6,26 |           |           |           |           |
| YLCA 27      |                       | 16,70      | -     | 118        | -          | 8,73       | -    | 2 x 0,85  | 2 x 175   | 1,34      | 755       |
| YLHA PLUS 27 | 16,70                 | 16         | -     |            | 8,73       | 8,24       |      |           |           |           |           |

## 1.7 Measurements, clearances and accesses

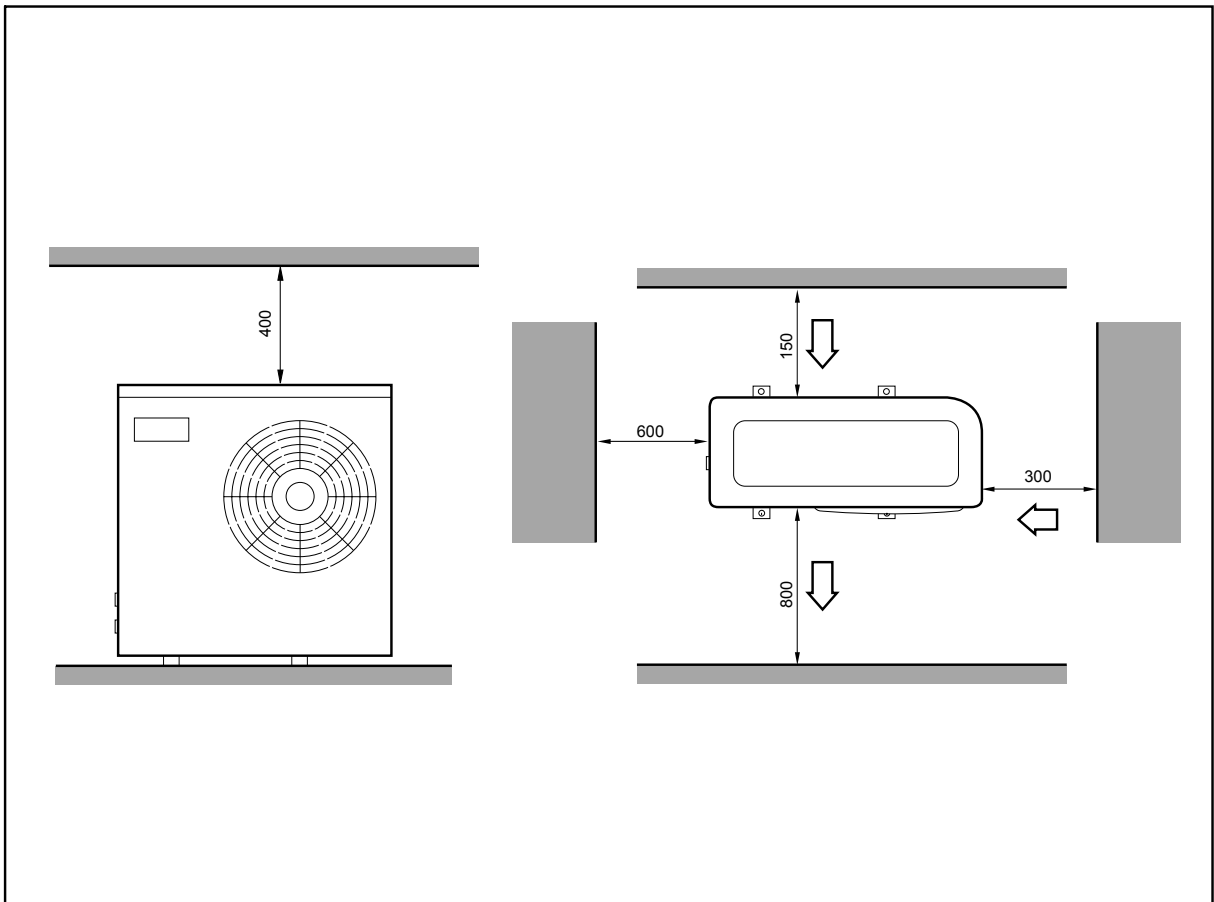
### 1.7.1 Clearances

When installing each unit, clearances should be left for:

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

To operate correctly, all minimum clearances shown on the general dimension diagrams should be respected, with regard to the possible obstruction of air circulation or of the work of an operator.

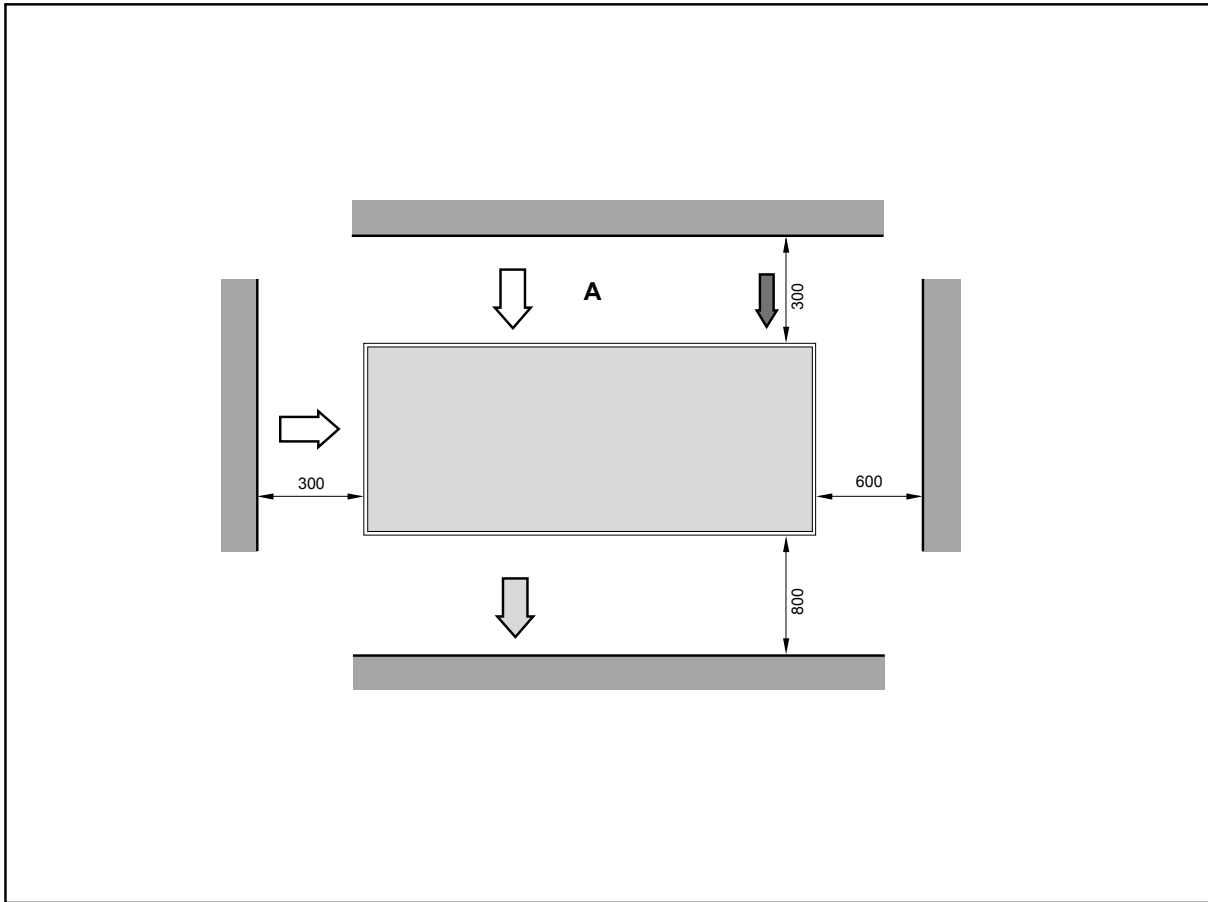
#### Minimum technical clearance YLCA 5, 7, 9, 12 and 15



**NOTE**

*Distances in millimetres*

## Minimum technical clearance YLCA/YLHA PLUS 20 and 27



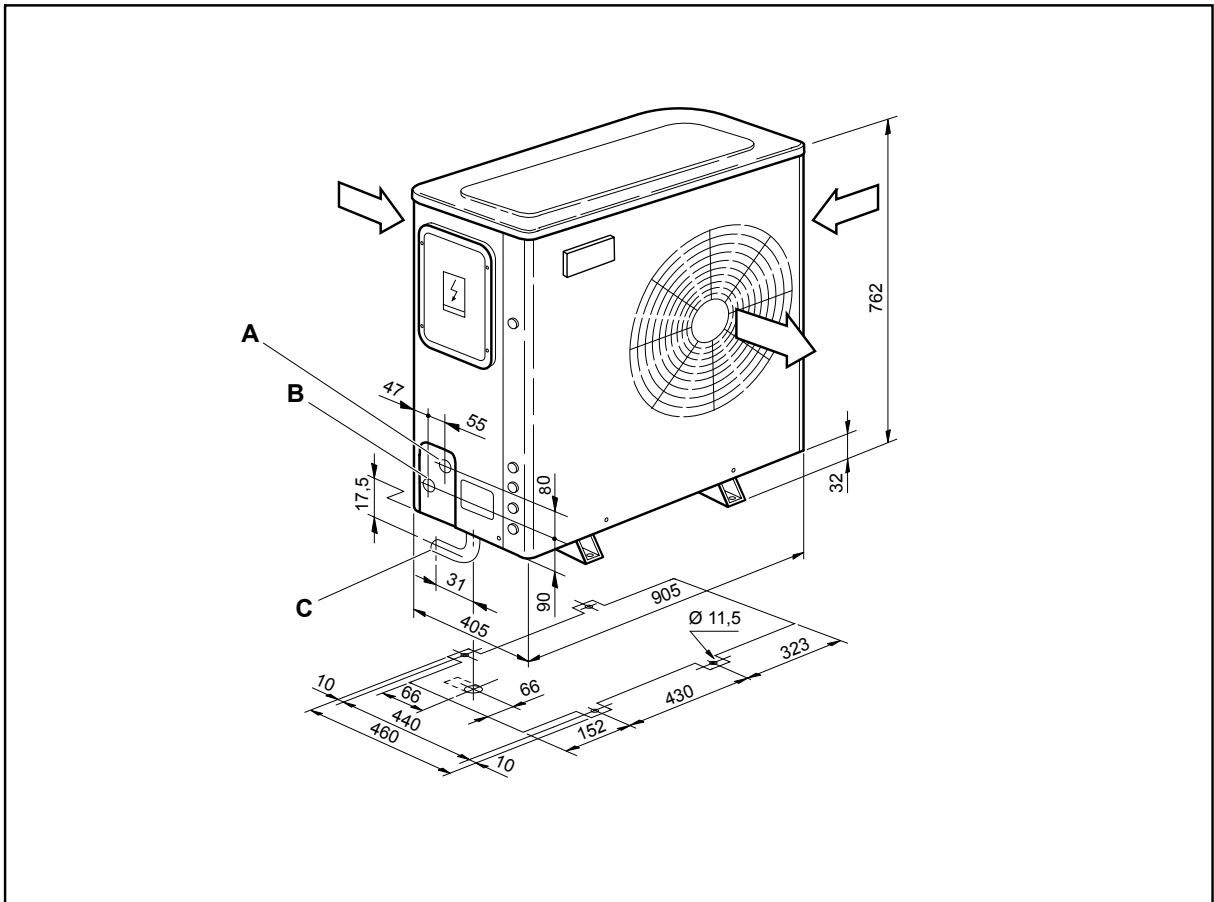
A Water inlet and outlet



**NOTE**

*Distances in millimetres*

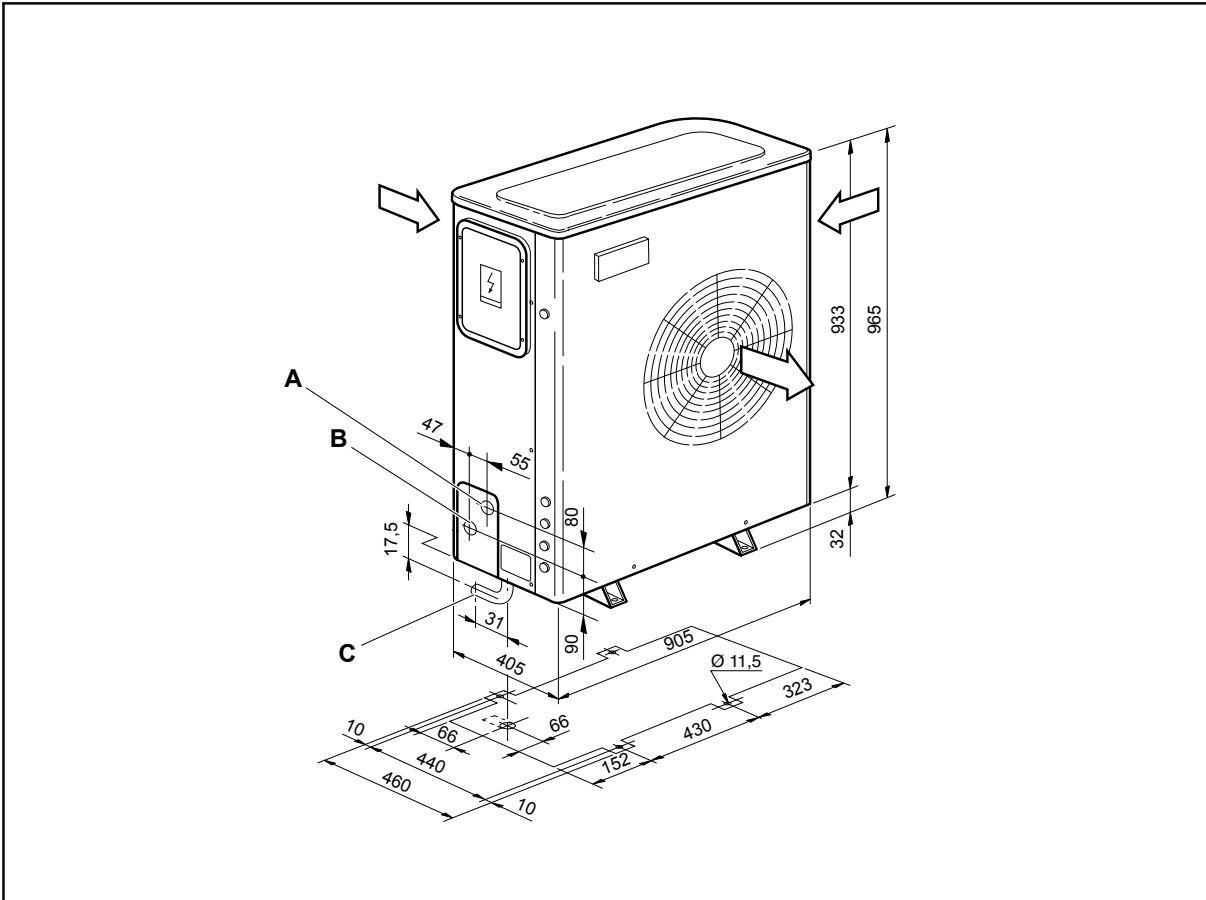
### 1.7.2 Dimensions and hydraulic connections (models YLCA/YLHA PLUS 5)



A Water inlet 1" G  
B Water outlet 1" G

C Drain connection Øext. 15

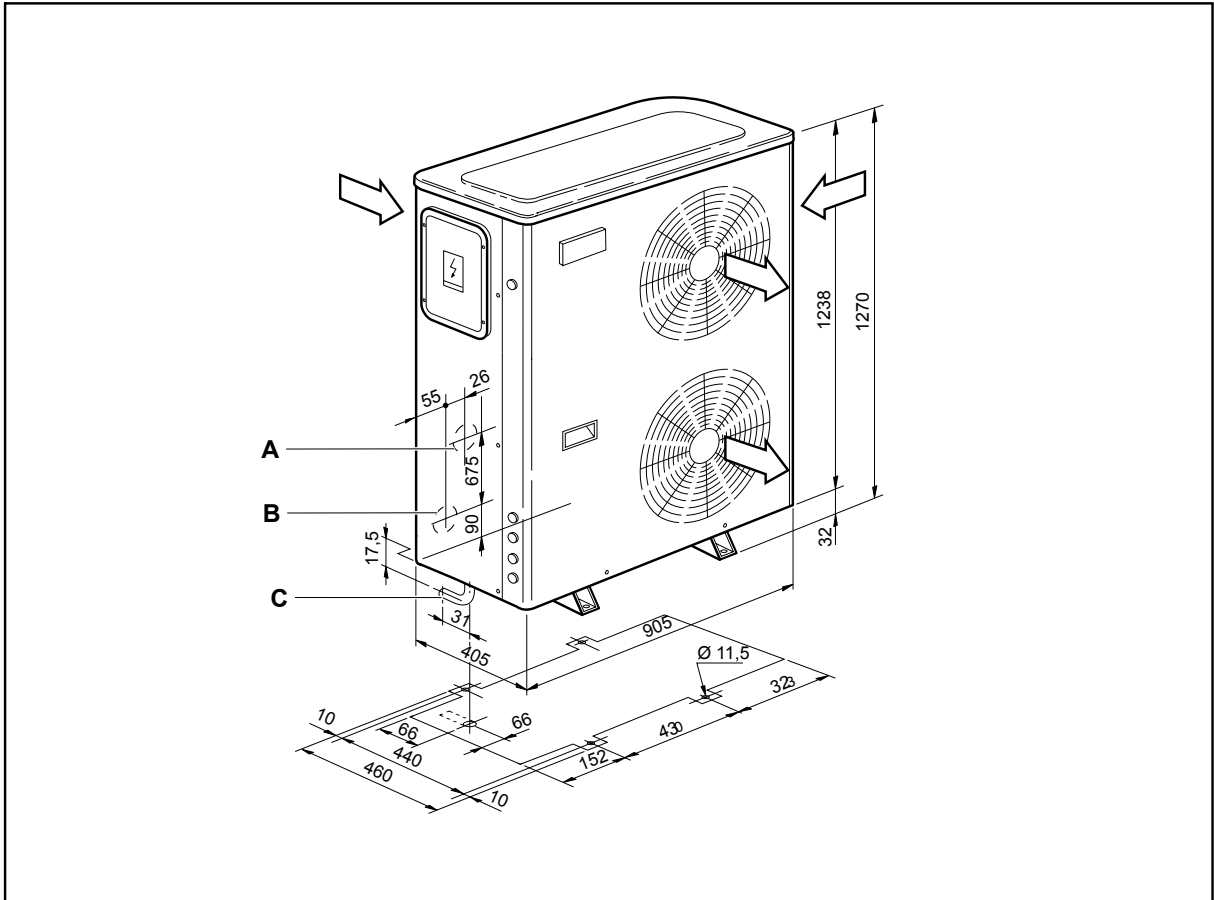
### 1.7.3 Dimensions and hydraulic connections (models YLCAYLHA PLUS 7 and 9)



A Water inlet 1" G  
B Water outlet 1" G

C Drain connection Øext. 15

### 1.7.4 Dimensions and hydraulic connections (models YLCA/YLHA PLUS 12 and 15)

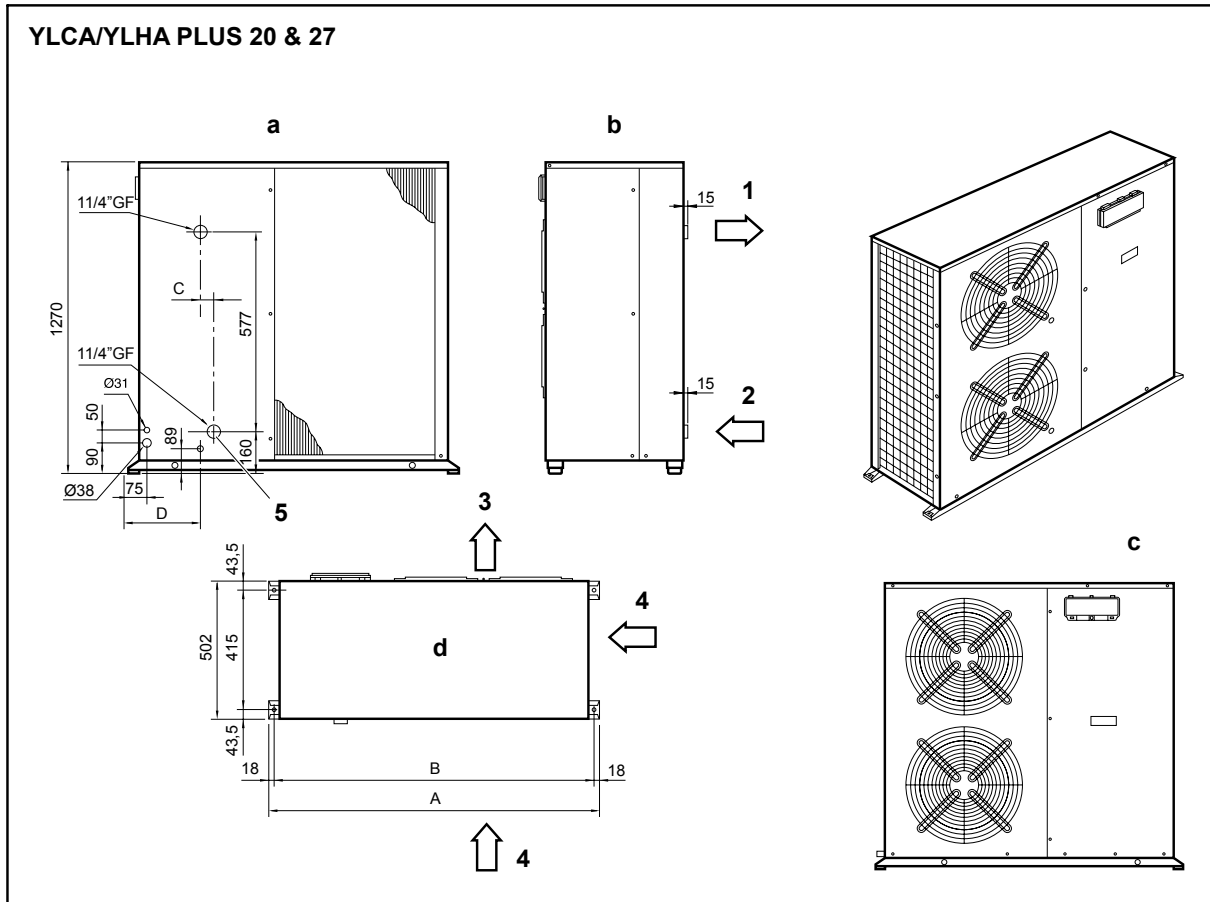


A Water inlet 1" G  
B Water outlet 1" G

C Drain connection  $\varnothing$ ext. 15



### 1.7.5 Dimensions and hydraulic connections (models YLCA/YLHA PLUS 20 and 27)



- |   |            |   |                |
|---|------------|---|----------------|
| a | Rear view  | 1 | Water outlet   |
| b | Side view  | 2 | Water inlet    |
| c | Front view | 3 | Air outlet     |
| d | Upper view | 4 | Air inlet      |
|   |            | 5 | Water drainage |

| Model             | A    | B    | C   | D   |
|-------------------|------|------|-----|-----|
| YLCA/YLHA PLUS 20 | 1430 | 1394 | 136 | 428 |
| YLCA/YLHA PLUS 27 | 1876 | 1840 | 144 | 432 |

## 1.8 Capacities YLHA

### 1.8.1 Cooling capacities YLHA 5 ÷ 27

| YLHA PLUS | Water outlet temp °C | Outdoor ambient temperature °C DB (80% RH) |            |       |            |       |            |       |            |       |            |       |            |       |            |       |            |
|-----------|----------------------|--|------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|
|           |                      | 20   |            | 25    |            | 30    |            | 32    |            | 35    |            | 40    |            | 43    |            | 46    |            |
|           |                      | Cap.                                       | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power |
|           |                      | kW   | kW         | kW    | kW         | kW    | kW         | kW    | kW         | kW    | kW         | kW    | kW         | kW    | kW         | kW    | kW         |
| 5 M       | 5                    | 6,00                                       | 1,50       | 5,70  | 1,58       | 5,25  | 1,70       | 5,10  | 1,80       | 5,06  | 1,90       | 4,49  | 2,10       | 4,22  | 2,23       | 3,88  | 2,50       |
|           | 6                    | 6,25                                       | 1,50       | 5,80  | 1,59       | 5,45  | 1,71       | 5,29  | 1,81       | 5,23  | 1,90       | 4,77  | 2,11       | 4,47  | 2,23       | 4,07  | 2,50       |
|           | 7                    | 6,50                                       | 1,51       | 5,90  | 1,60       | 5,60  | 1,72       | 5,48  | 1,81       | 5,40  | 1,91       | 5,06  | 2,12       | 4,72  | 2,24       | 4,22  | 2,51       |
|           | 8                    | 6,60                                       | 1,51       | 6,00  | 1,61       | 5,67  | 1,73       | 5,59  | 1,82       | 5,55  | 1,92       | 5,21  | 2,13       | 4,87  | 2,26       | 4,41  | 2,51       |
|           | 10                   | 6,70                                       | 1,51       | 6,20  | 1,61       | 5,86  | 1,75       | 5,70  | 1,84       | 5,70  | 1,95       | 5,36  | 2,16       | 5,10  | 2,29       | 4,64  | 2,52       |
|           | 12                   | 6,80                                       | 1,52       | 6,40  | 1,62       | 6,01  | 1,76       | 5,86  | 1,85       | 5,82  | 1,97       | 5,51  | 2,19       | 5,32  | 2,32       | 4,98  | 2,52       |
|           | 15                   | 7,00                                       | 1,52       | 6,70  | 1,63       | 6,24  | 1,78       | 6,08  | 1,87       | 5,97  | 2,00       | 5,70  | 2,22       | 5,59  | 2,37       | 5,30  | 2,53       |
| 7 M       | 5                    | 7,60                                       | 2,06       | 7,30  | 2,14       | 6,90  | 2,30       | 6,70  | 2,43       | 6,65  | 2,56       | 5,90  | 2,84       | 5,55  | 3,01       | 5,10  | 3,20       |
|           | 6                    | 7,75                                       | 2,07       | 7,45  | 2,15       | 7,10  | 2,31       | 6,95  | 2,44       | 6,88  | 2,57       | 6,28  | 2,85       | 5,88  | 3,02       | 5,35  | 3,24       |
|           | 7                    | 7,90                                       | 2,07       | 7,60  | 2,16       | 7,30  | 2,32       | 7,20  | 2,45       | 7,10  | 2,58       | 6,65  | 2,86       | 6,20  | 3,03       | 5,55  | 3,28       |
|           | 8                    | 8,05                                       | 2,08       | 7,75  | 2,17       | 7,45  | 2,34       | 7,35  | 2,46       | 7,30  | 2,60       | 6,85  | 2,88       | 6,40  | 3,05       | 5,80  | 3,32       |
|           | 10                   | 8,30                                       | 2,08       | 7,90  | 2,18       | 7,70  | 2,36       | 7,50  | 2,48       | 7,50  | 2,63       | 7,05  | 2,92       | 6,70  | 3,09       | 6,10  | 3,38       |
|           | 12                   | 8,55                                       | 2,09       | 8,20  | 2,19       | 7,90  | 2,38       | 7,70  | 2,50       | 7,65  | 2,66       | 7,25  | 2,96       | 7,00  | 3,14       | 6,55  | 3,42       |
|           | 15                   | 8,90                                       | 2,09       | 8,50  | 2,20       | 8,20  | 2,40       | 8,00  | 2,53       | 7,85  | 2,70       | 7,50  | 3,00       | 7,35  | 3,20       | 6,97  | 3,48       |
| 9 M       | 5                    | 9,31                                       | 2,76       | 8,95  | 2,87       | 8,45  | 3,08       | 8,21  | 3,26       | 8,15  | 3,43       | 7,23  | 3,81       | 6,80  | 4,04       | 6,25  | 4,29       |
|           | 6                    | 9,50                                       | 2,78       | 9,13  | 2,88       | 8,70  | 3,10       | 8,52  | 3,27       | 8,42  | 3,45       | 7,69  | 3,82       | 7,20  | 4,04       | 6,56  | 4,35       |
|           | 7                    | 9,68                                       | 2,78       | 9,31  | 2,90       | 8,95  | 3,11       | 8,82  | 3,29       | 8,70  | 3,46       | 8,15  | 3,84       | 7,60  | 4,06       | 6,80  | 4,40       |
|           | 8                    | 9,86                                       | 2,79       | 9,50  | 2,91       | 9,13  | 3,14       | 9,01  | 3,30       | 8,95  | 3,49       | 8,39  | 3,86       | 7,84  | 4,09       | 7,11  | 4,45       |
|           | 10                   | 10,17                                      | 2,79       | 9,68  | 2,92       | 9,44  | 3,16       | 9,19  | 3,33       | 9,19  | 3,53       | 8,64  | 3,92       | 8,21  | 4,14       | 7,47  | 4,53       |
|           | 12                   | 10,48                                      | 2,80       | 10,05 | 2,94       | 9,68  | 3,19       | 9,44  | 3,35       | 9,37  | 3,57       | 8,88  | 3,97       | 8,58  | 4,21       | 8,03  | 4,59       |
|           | 15                   | 10,91                                      | 2,80       | 10,42 | 2,95       | 10,05 | 3,22       | 9,80  | 3,39       | 9,62  | 3,62       | 9,19  | 4,02       | 9,01  | 4,29       | 8,54  | 4,67       |
| 9 T       | 5                    | 9,31                                       | 2,76       | 8,95  | 2,87       | 8,45  | 3,08       | 8,21  | 3,26       | 8,15  | 3,43       | 7,23  | 3,81       | 6,80  | 4,04       | 6,25  | 4,29       |
|           | 6                    | 9,50                                       | 2,78       | 9,13  | 2,88       | 8,70  | 3,10       | 8,52  | 3,27       | 8,42  | 3,45       | 7,69  | 3,82       | 7,20  | 4,04       | 6,56  | 4,35       |
|           | 7                    | 9,68                                       | 2,78       | 9,31  | 2,90       | 8,95  | 3,11       | 8,82  | 3,29       | 8,70  | 3,46       | 8,15  | 3,84       | 7,60  | 4,06       | 6,80  | 4,40       |
|           | 8                    | 9,86                                       | 2,79       | 9,50  | 2,91       | 9,13  | 3,14       | 9,01  | 3,30       | 8,95  | 3,49       | 8,39  | 3,86       | 7,84  | 4,09       | 7,11  | 4,45       |
|           | 10                   | 10,17                                      | 2,79       | 9,68  | 2,92       | 9,44  | 3,16       | 9,19  | 3,33       | 9,19  | 3,53       | 8,64  | 3,92       | 8,21  | 4,14       | 7,47  | 4,53       |
|           | 12                   | 10,48                                      | 2,80       | 10,05 | 2,94       | 9,68  | 3,19       | 9,44  | 3,35       | 9,37  | 3,57       | 8,88  | 3,97       | 8,58  | 4,21       | 8,03  | 4,59       |
|           | 15                   | 10,91                                      | 2,80       | 10,42 | 2,95       | 10,05 | 3,22       | 9,80  | 3,39       | 9,62  | 3,62       | 9,19  | 4,02       | 9,01  | 4,29       | 8,54  | 4,67       |
| 12 M      | 5                    | 12,63                                      | 3,36       | 12,08 | 3,48       | 11,60 | 3,81       | 11,09 | 4,02       | 11,01 | 4,24       | 9,76  | 4,70       | 9,18  | 4,98       | 8,60  | 5,28       |
|           | 6                    | 12,90                                      | 3,37       | 12,33 | 3,50       | 11,90 | 3,82       | 11,50 | 4,04       | 11,38 | 4,25       | 10,38 | 4,71       | 9,72  | 4,99       | 8,85  | 5,32       |
|           | 7                    | 13,40                                      | 3,39       | 12,99 | 3,52       | 12,43 | 3,84       | 11,92 | 4,05       | 11,75 | 4,27       | 11,01 | 4,73       | 10,26 | 5,01       | 9,18  | 5,34       |
|           | 8                    | 13,55                                      | 3,44       | 12,83 | 3,59       | 12,55 | 3,87       | 12,16 | 4,07       | 12,08 | 4,30       | 11,34 | 4,77       | 10,59 | 5,05       | 9,60  | 5,36       |
|           | 10                   | 13,74                                      | 3,44       | 13,07 | 3,61       | 12,74 | 3,91       | 12,41 | 4,10       | 12,41 | 4,35       | 11,67 | 4,83       | 11,09 | 5,11       | 10,10 | 5,40       |
|           | 12                   | 14,15                                      | 3,46       | 13,57 | 3,62       | 13,07 | 3,94       | 12,74 | 4,14       | 12,66 | 4,40       | 12,00 | 4,90       | 11,58 | 5,20       | 10,84 | 5,44       |
|           | 15                   | 14,73                                      | 3,46       | 14,07 | 3,64       | 13,57 | 3,97       | 13,24 | 4,19       | 12,99 | 4,47       | 12,41 | 4,97       | 12,16 | 5,30       | 11,53 | 5,52       |
| 12 T      | 5                    | 12,90                                      | 3,27       | 12,34 | 3,39       | 11,85 | 3,71       | 11,32 | 3,92       | 11,24 | 4,13       | 9,97  | 4,58       | 9,38  | 4,85       | 8,78  | 5,14       |
|           | 6                    | 13,17                                      | 3,28       | 12,59 | 3,41       | 12,15 | 3,72       | 11,75 | 3,93       | 11,62 | 4,14       | 10,61 | 4,59       | 9,93  | 4,86       | 9,04  | 5,18       |
|           | 7                    | 13,69                                      | 3,30       | 13,27 | 3,43       | 12,69 | 3,74       | 12,17 | 3,95       | 12,00 | 4,16       | 11,24 | 4,61       | 10,48 | 4,89       | 9,38  | 5,20       |
|           | 8                    | 13,84                                      | 3,35       | 13,10 | 3,50       | 12,82 | 3,77       | 12,42 | 3,97       | 12,34 | 4,19       | 11,58 | 4,64       | 10,82 | 4,92       | 9,80  | 5,22       |
|           | 10                   | 14,03                                      | 3,35       | 13,35 | 3,52       | 13,01 | 3,81       | 12,68 | 4,00       | 12,68 | 4,24       | 11,92 | 4,71       | 11,32 | 4,98       | 10,31 | 5,26       |
|           | 12                   | 14,45                                      | 3,37       | 13,86 | 3,53       | 13,35 | 3,84       | 13,01 | 4,03       | 12,93 | 4,29       | 12,25 | 4,77       | 11,83 | 5,06       | 11,07 | 5,30       |
|           | 15                   | 15,04                                      | 3,37       | 14,37 | 3,55       | 13,86 | 3,87       | 13,52 | 4,08       | 13,27 | 4,35       | 12,68 | 4,84       | 12,42 | 5,16       | 11,78 | 5,38       |
| 15 T      | 5                    | 14,83                                      | 4,30       | 14,19 | 4,46       | 13,62 | 4,88       | 13,02 | 5,15       | 12,93 | 5,43       | 11,47 | 6,02       | 10,79 | 6,38       | 10,10 | 6,76       |
|           | 6                    | 15,15                                      | 4,32       | 14,48 | 4,48       | 13,98 | 4,90       | 13,51 | 5,17       | 13,36 | 5,45       | 12,20 | 6,03       | 11,42 | 6,39       | 10,40 | 6,82       |
|           | 7                    | 15,74                                      | 4,34       | 15,26 | 4,51       | 14,60 | 4,92       | 13,99 | 5,19       | 13,80 | 5,47       | 12,93 | 6,06       | 12,05 | 6,42       | 10,79 | 6,84       |
|           | 8                    | 15,91                                      | 4,41       | 15,06 | 4,60       | 14,74 | 4,96       | 14,29 | 5,22       | 14,19 | 5,51       | 13,31 | 6,11       | 12,44 | 6,47       | 11,27 | 6,87       |
|           | 10                   | 16,13                                      | 4,41       | 15,35 | 4,62       | 14,97 | 5,00       | 14,58 | 5,26       | 14,58 | 5,58       | 13,70 | 6,19       | 13,02 | 6,55       | 11,86 | 6,92       |
|           | 12                   | 16,62                                      | 4,43       | 15,94 | 4,64       | 15,35 | 5,05       | 14,97 | 5,30       | 14,87 | 5,64       | 14,09 | 6,28       | 13,61 | 6,66       | 12,73 | 6,97       |
|           | 15                   | 17,30                                      | 4,43       | 16,52 | 4,66       | 15,94 | 5,09       | 15,55 | 5,36       | 15,26 | 5,72       | 14,58 | 6,36       | 14,29 | 6,78       | 13,55 | 7,07       |

1.8 Capacities YLHA

| YLHA PLUS | Water outlet temp °C | Outdoor ambient temperature °C DB (80% RH) |            |       |            |       |            |       |            |       |            |       |            |       |            |       |            |
|-----------|----------------------|--|------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|
|           |                      | 20   |            | 25    |            | 30    |            | 32    |            | 35    |            | 40    |            | 43    |            | 46    |            |
|           |                      | Cap.                                       | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power |
|           |                      | kW   | kW         | kW    | kW         | kW    | kW         | kW    | kW         | kW    | kW         | kW    | kW         | kW    | kW         | kW    | kW         |
| 20 T      | 5                    | 21,00                                      | 5,36       | 20,83 | 5,69       | 20,09 | 5,96       | 19,74 | 6,19       | 19,16 | 6,67       | 17,06 | 7,35       | 16,29 | 7,83       | 14,21 | 8,35       |
|           | 6                    | 22,24                                      | 5,39       | 21,68 | 5,75       | 20,88 | 6,02       | 20,45 | 6,25       | 19,80 | 7,00       | 17,97 | 7,40       | 17,12 | 7,93       | 16,20 | 8,40       |
|           | 7                    | 23,17                                      | 5,43       | 22,58 | 5,80       | 21,67 | 6,08       | 21,21 | 6,30       | 19,40 | 7,04       | 18,87 | 7,46       | 17,91 | 8,05       | 16,97 | 8,45       |
|           | 8                    | 23,89                                      | 5,46       | 23,25 | 5,83       | 22,30 | 6,14       | 21,73 | 6,36       | 20,86 | 7,08       | 19,31 | 7,52       | 18,27 | 8,11       | 17,26 | 8,50       |
|           | 10                   | 25,30                                      | 5,54       | 24,60 | 5,89       | 23,53 | 6,20       | 22,88 | 6,42       | 21,88 | 7,11       | 20,38 | 7,58       | 19,22 | 8,17       | 18,12 | 8,55       |
|           | 12                   | 26,79                                      | 5,60       | 25,99 | 5,93       | 24,79 | 6,23       | 24,02 | 6,46       | 22,94 | 7,11       | 21,39 | 7,64       | 20,14 | 8,23       | 18,92 | 8,60       |
|           | 15                   | 29,24                                      | 5,69       | 28,04 | 6,01       | 26,64 | 6,30       | 25,75 | 6,53       | 24,54 | 7,15       | 23,05 | 7,72       | 21,62 | 8,27       | 20,30 | 8,70       |
| 27 T      | 5                    | 28,29                                      | 6,97       | 27,71 | 7,17       | 26,71 | 7,51       | 26,26 | 7,80       | 25,49 | 8,78       | 22,69 | 9,26       | 21,67 | 9,87       | 20,49 | 10,60      |
|           | 6                    | 29,58                                      | 7,01       | 28,84 | 7,25       | 27,77 | 7,58       | 27,19 | 7,87       | 26,33 | 8,82       | 23,90 | 9,33       | 22,77 | 10,00      | 21,55 | 10,71      |
|           | 7                    | 30,82                                      | 7,09       | 30,03 | 7,31       | 28,82 | 7,66       | 28,20 | 7,94       | 25,80 | 8,87       | 25,09 | 9,40       | 23,82 | 10,14      | 22,57 | 10,86      |
|           | 8                    | 31,77                                      | 7,12       | 30,92 | 7,34       | 29,66 | 7,73       | 28,90 | 8,01       | 27,74 | 8,92       | 25,68 | 9,47       | 24,30 | 10,22      | 22,95 | 10,98      |
|           | 10                   | 33,64                                      | 7,20       | 32,72 | 7,43       | 31,30 | 7,81       | 30,43 | 8,09       | 29,10 | 8,96       | 27,11 | 9,55       | 25,56 | 10,30      | 24,10 | 11,06      |
|           | 12                   | 35,63                                      | 7,23       | 34,57 | 7,47       | 32,96 | 7,85       | 31,94 | 8,13       | 30,50 | 8,96       | 28,45 | 9,63       | 26,79 | 10,37      | 25,16 | 11,14      |
|           | 15                   | 38,52                                      | 7,33       | 37,30 | 7,57       | 35,43 | 7,94       | 34,25 | 8,23       | 32,63 | 9,01       | 30,65 | 9,73       | 28,75 | 10,41      | 26,95 | 11,22      |

Abs. power = Includes compressor and fan consumption.

## 1.8.2 Cooling capacities YLHA 5 ÷ 27 (35% ethylene glycol)

| YLHA PLUS | Water outlet temp °C | Outdoor ambient temperature °C DB (80% RH) |            |       |            |       |            |       |            |       |            |       |            |       |            |       |            |
|-----------|----------------------|--|------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|
|           |                      | 20   |            | 25    |            | 30    |            | 32    |            | 35    |            | 40    |            | 43    |            | 46    |            |
|           |                      | Cap.                                       | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power |
|           |                      | kW   | kW         | kW    | kW         | kW    | kW         | kW    | kW         | kW    | kW         | kW    | kW         | kW    | kW         | kW    | kW         |
| 5 M       | -5                   | 3,62                                       | 1,15       | 3,46  | 1,24       | 3,29  | 1,35       | 3,21  | 1,40       | 3,10  | 1,47       | 2,84  | 1,61       | 2,69  | 1,69       | 2,54  | 1,78       |
|           | -4                   | 3,81                                       | 1,17       | 3,64  | 1,27       | 3,45  | 1,38       | 3,37  | 1,43       | 3,25  | 1,50       | 2,98  | 1,64       | 2,82  | 1,73       | 2,65  | 1,83       |
|           | -2                   | 4,16                                       | 1,23       | 4,00  | 1,33       | 3,78  | 1,45       | 3,70  | 1,50       | 3,56  | 1,57       | 3,27  | 1,72       | 3,09  | 1,81       | 2,89  | 1,91       |
|           | 0                    | 4,51                                       | 1,29       | 4,38  | 1,39       | 4,16  | 1,51       | 4,04  | 1,56       | 3,89  | 1,64       | 3,57  | 1,80       | 3,38  | 1,89       | 3,13  | 1,99       |
|           | 2                    | 5,00                                       | 1,35       | 4,77  | 1,45       | 4,53  | 1,58       | 4,41  | 1,63       | 4,25  | 1,72       | 3,90  | 1,88       | 3,69  | 1,97       | 3,48  | 2,06       |
| 7 M       | 4                    | 5,35                                       | 1,40       | 5,16  | 1,52       | 4,90  | 1,65       | 4,79  | 1,70       | 4,61  | 1,79       | 4,23  | 1,96       | 4,00  | 2,06       | 3,78  | 2,18       |
|           | -5                   | 4,76                                       | 1,55       | 4,54  | 1,68       | 4,33  | 1,83       | 4,23  | 1,89       | 4,07  | 1,98       | 3,73  | 2,17       | 3,53  | 2,28       | 3,34  | 2,40       |
|           | -4                   | 5,01                                       | 1,59       | 4,79  | 1,72       | 4,53  | 1,87       | 4,43  | 1,93       | 4,27  | 2,03       | 3,91  | 2,22       | 3,70  | 2,33       | 3,48  | 2,48       |
|           | -2                   | 5,47                                       | 1,66       | 5,26  | 1,80       | 4,97  | 1,96       | 4,86  | 2,02       | 4,68  | 2,12       | 4,30  | 2,32       | 4,06  | 2,44       | 3,80  | 2,58       |
|           | 0                    | 5,93                                       | 1,74       | 5,75  | 1,88       | 5,47  | 2,04       | 5,31  | 2,11       | 5,12  | 2,22       | 4,70  | 2,43       | 4,44  | 2,55       | 4,12  | 2,68       |
| 9 M       | 2                    | 6,57                                       | 1,82       | 6,27  | 1,96       | 5,95  | 2,13       | 5,80  | 2,20       | 5,59  | 2,32       | 5,13  | 2,54       | 4,85  | 2,67       | 4,58  | 2,79       |
|           | 4                    | 7,03                                       | 1,90       | 6,78  | 2,05       | 6,44  | 2,22       | 6,29  | 2,30       | 6,06  | 2,42       | 5,56  | 2,65       | 5,26  | 2,78       | 4,97  | 2,94       |
|           | -5                   | 5,83                                       | 2,08       | 5,57  | 2,25       | 5,30  | 2,45       | 5,18  | 2,53       | 4,99  | 2,66       | 4,58  | 2,91       | 4,33  | 3,06       | 4,09  | 3,22       |
|           | -4                   | 6,13                                       | 2,13       | 5,86  | 2,30       | 5,56  | 2,51       | 5,43  | 2,59       | 5,23  | 2,72       | 4,79  | 2,98       | 4,54  | 3,13       | 4,26  | 3,32       |
|           | -2                   | 6,70                                       | 2,23       | 6,45  | 2,41       | 6,09  | 2,62       | 5,95  | 2,71       | 5,74  | 2,85       | 5,26  | 3,11       | 4,98  | 3,27       | 4,65  | 3,46       |
| 9 T       | 0                    | 7,26                                       | 2,34       | 7,05  | 2,52       | 6,70  | 2,74       | 6,51  | 2,83       | 6,27  | 2,98       | 5,76  | 3,26       | 5,44  | 3,43       | 5,05  | 3,60       |
|           | 2                    | 8,05                                       | 2,44       | 7,68  | 2,63       | 7,30  | 2,86       | 7,11  | 2,96       | 6,85  | 3,11       | 6,28  | 3,40       | 5,94  | 3,58       | 5,61  | 3,74       |
|           | 4                    | 8,61                                       | 2,54       | 8,31  | 2,74       | 7,89  | 2,98       | 7,71  | 3,08       | 7,43  | 3,24       | 6,81  | 3,55       | 6,45  | 3,73       | 6,09  | 3,94       |
|           | -5                   | 5,83                                       | 2,08       | 5,57  | 2,25       | 5,30  | 2,45       | 5,18  | 2,53       | 4,99  | 2,66       | 4,58  | 2,91       | 4,33  | 3,06       | 4,09  | 3,22       |
|           | -4                   | 6,13                                       | 2,13       | 5,86  | 2,30       | 5,56  | 2,51       | 5,43  | 2,59       | 5,23  | 2,72       | 4,79  | 2,98       | 4,54  | 3,13       | 4,26  | 3,32       |
| 12 M      | -2                   | 6,70                                       | 2,23       | 6,45  | 2,41       | 6,09  | 2,62       | 5,95  | 2,71       | 5,74  | 2,85       | 5,26  | 3,11       | 4,98  | 3,27       | 4,65  | 3,46       |
|           | 0                    | 7,26                                       | 2,34       | 7,05  | 2,52       | 6,70  | 2,74       | 6,51  | 2,83       | 6,27  | 2,98       | 5,76  | 3,26       | 5,44  | 3,43       | 5,05  | 3,60       |
|           | 2                    | 8,05                                       | 2,44       | 7,68  | 2,63       | 7,30  | 2,86       | 7,11  | 2,96       | 6,85  | 3,11       | 6,28  | 3,40       | 5,94  | 3,58       | 5,61  | 3,74       |
|           | 4                    | 8,61                                       | 2,54       | 8,31  | 2,74       | 7,89  | 2,98       | 7,71  | 3,08       | 7,43  | 3,24       | 6,81  | 3,55       | 6,45  | 3,73       | 6,09  | 3,94       |
|           | -5                   | 7,87                                       | 2,56       | 7,52  | 2,78       | 7,16  | 3,02       | 6,99  | 3,12       | 6,74  | 3,28       | 6,18  | 3,59       | 5,85  | 3,77       | 5,52  | 3,97       |
| 12 T      | -4                   | 8,28                                       | 2,63       | 7,92  | 2,84       | 7,50  | 3,09       | 7,33  | 3,19       | 7,06  | 3,36       | 6,48  | 3,67       | 6,13  | 3,86       | 5,76  | 4,10       |
|           | -2                   | 9,05                                       | 2,75       | 8,71  | 2,97       | 8,23  | 3,24       | 8,04  | 3,34       | 7,75  | 3,52       | 7,11  | 3,84       | 6,72  | 4,04       | 6,29  | 4,27       |
|           | 0                    | 9,81                                       | 2,88       | 9,52  | 3,11       | 9,05  | 3,38       | 8,79  | 3,49       | 8,47  | 3,67       | 7,77  | 4,02       | 7,35  | 4,23       | 6,82  | 4,44       |
|           | 2                    | 10,87                                      | 3,01       | 10,37 | 3,25       | 9,85  | 3,53       | 9,60  | 3,65       | 9,25  | 3,84       | 8,49  | 4,20       | 8,03  | 4,41       | 7,58  | 4,61       |
|           | 4                    | 11,63                                      | 3,14       | 11,22 | 3,39       | 10,66 | 3,68       | 10,41 | 3,80       | 10,03 | 4,00       | 9,20  | 4,38       | 8,71  | 4,60       | 8,23  | 4,87       |
| 15 T      | -5                   | 8,04                                       | 2,50       | 7,68  | 2,71       | 7,31  | 2,94       | 7,14  | 3,04       | 6,88  | 3,20       | 6,31  | 3,50       | 5,97  | 3,67       | 5,64  | 3,87       |
|           | -4                   | 8,46                                       | 2,56       | 8,09  | 2,77       | 7,66  | 3,01       | 7,49  | 3,11       | 7,21  | 3,27       | 6,61  | 3,58       | 6,26  | 3,76       | 5,88  | 3,99       |
|           | -2                   | 9,24                                       | 2,68       | 8,89  | 2,89       | 8,41  | 3,15       | 8,21  | 3,26       | 7,91  | 3,43       | 7,26  | 3,74       | 6,86  | 3,94       | 6,42  | 4,16       |
|           | 0                    | 10,02                                      | 2,81       | 9,72  | 3,03       | 9,24  | 3,29       | 8,98  | 3,40       | 8,65  | 3,58       | 7,94  | 3,92       | 7,50  | 4,12       | 6,96  | 4,33       |
|           | 2                    | 11,10                                      | 2,93       | 10,59 | 3,16       | 10,06 | 3,44       | 9,81  | 3,56       | 9,45  | 3,74       | 8,67  | 4,09       | 8,20  | 4,30       | 7,74  | 4,49       |
| 20 T      | 4                    | 11,88                                      | 3,06       | 11,46 | 3,30       | 10,89 | 3,59       | 10,64 | 3,71       | 10,25 | 3,90       | 9,40  | 4,26       | 8,89  | 4,48       | 8,40  | 4,74       |
|           | -5                   | 9,25                                       | 3,28       | 8,83  | 3,56       | 8,41  | 3,87       | 8,21  | 4,00       | 7,91  | 4,21       | 7,26  | 4,60       | 6,87  | 4,83       | 6,49  | 5,09       |
|           | -4                   | 9,73                                       | 3,36       | 9,30  | 3,64       | 8,81  | 3,96       | 8,61  | 4,09       | 8,29  | 4,30       | 7,61  | 4,71       | 7,20  | 4,95       | 6,76  | 5,25       |
|           | -2                   | 10,63                                      | 3,53       | 10,22 | 3,81       | 9,67  | 4,15       | 9,44  | 4,28       | 9,10  | 4,50       | 8,35  | 4,92       | 7,89  | 5,18       | 7,38  | 5,47       |
|           | 0                    | 11,52                                      | 3,69       | 11,18 | 3,98       | 10,63 | 4,33       | 10,33 | 4,48       | 9,95  | 4,71       | 9,13  | 5,15       | 8,63  | 5,41       | 8,00  | 5,69       |
| 27 T      | 2                    | 12,77                                      | 3,86       | 12,18 | 4,16       | 11,57 | 4,52       | 11,28 | 4,67       | 10,87 | 4,92       | 9,97  | 5,38       | 9,43  | 5,65       | 8,90  | 5,91       |
|           | 4                    | 13,66                                      | 4,02       | 13,18 | 4,34       | 12,52 | 4,72       | 12,23 | 4,87       | 11,78 | 5,13       | 10,81 | 5,61       | 10,22 | 5,89       | 9,66  | 6,24       |
|           | -5                   | 13,00                                      | 4,22       | 12,42 | 4,58       | 11,82 | 4,98       | 11,55 | 5,15       | 11,12 | 5,41       | 10,20 | 5,92       | 9,65  | 6,22       | 9,12  | 6,55       |
|           | -4                   | 13,68                                      | 4,33       | 13,08 | 4,69       | 12,39 | 5,10       | 12,10 | 5,27       | 11,66 | 5,54       | 10,69 | 6,06       | 10,12 | 6,37       | 9,51  | 6,76       |
|           | -2                   | 14,94                                      | 4,54       | 14,37 | 4,90       | 13,59 | 5,34       | 13,28 | 5,51       | 12,79 | 5,80       | 11,74 | 6,33       | 11,10 | 6,66       | 10,38 | 7,04       |
| 27 T      | 0                    | 16,20                                      | 4,75       | 15,72 | 5,12       | 14,94 | 5,57       | 14,52 | 5,76       | 13,98 | 6,06       | 12,83 | 6,63       | 12,13 | 6,97       | 11,25 | 7,32       |
|           | 2                    | 17,95                                      | 4,96       | 17,12 | 5,35       | 16,27 | 5,82       | 15,86 | 6,02       | 15,27 | 6,33       | 14,01 | 6,92       | 13,25 | 7,28       | 12,51 | 7,60       |
|           | 4                    | 19,21                                      | 5,17       | 18,53 | 5,58       | 17,60 | 6,07       | 17,19 | 6,27       | 16,57 | 6,60       | 15,20 | 7,22       | 14,37 | 7,58       | 13,58 | 8,03       |
|           | -5                   | 17,29                                      | 5,32       | 16,51 | 5,77       | 15,72 | 6,28       | 15,36 | 6,48       | 14,79 | 6,82       | 13,57 | 7,45       | 12,84 | 7,83       | 12,13 | 8,25       |
|           | -4                   | 18,19                                      | 5,46       | 17,39 | 5,90       | 16,48 | 6,43       | 16,09 | 6,63       | 15,50 | 6,98       | 14,22 | 7,63       | 13,46 | 8,02       | 12,64 | 8,52       |
| 27 T      | -2                   | 19,87                                      | 5,72       | 19,12 | 6,17       | 18,07 | 6,72       | 17,66 | 6,95       | 17,01 | 7,30       | 15,61 | 7,98       | 14,76 | 8,39       | 13,80 | 8,87       |
|           | 0                    | 21,54                                      | 5,99       | 20,90 | 6,45       | 19,87 | 7,02       | 19,31 | 7,26       | 18,59 | 7,63       | 17,07 | 8,35       | 16,13 | 8,78       | 14,96 | 9,22       |
|           | 2                    | 23,87                                      | 6,25       | 22,77 | 6,75       | 21,64 | 7,33       | 21,09 | 7,58       | 20,31 | 7,98       | 18,64 | 8,72       | 17,62 | 9,17       | 16,64 | 9,58       |
|           | 4                    | 25,54                                      | 6,52       | 24,64 | 7,04       | 23,40 | 7,65       | 22,87 | 7,90       | 22,03 | 8,32       | 20,21 | 9,09       | 19,12 | 9,56       | 18,06 | 10,11      |

1.8 Capacities YLHA

Abs. power = Includes compressor and fan consumption.

1.8.3 Heating capacities YLHA 5 ÷ 27

| YLHA PLUS | Water outlet temp °C | Outdoor ambient temperature °C DB (80% RH) |            |       |            |       |            |       |            |       |            |       |            |       |            |       |            |       |            |
|-----------|----------------------|--|------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|-------|------------|
|           |                      | -15  |            | -10   |            | -7    |            | 0     |            | 5     |            | 7     |            | 10    |            | 15    |            | 20    |            |
|           |                      | Cap.                                       | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power | Cap.  | Abs. power |
|           |                      | kW   | kW         | kW    | kW         | kW    | kW         | kW    | kW         | kW    | kW         | kW    | kW         | kW    | kW         | kW    | kW         | kW    | kW         |
| 5 M       | 30                   | 1,60                                       | 1,40       | 1,69  | 1,41       | 2,48  | 1,42       | 4,30  | 1,43       | 5,32  | 1,43       | 6,46  | 1,44       | 6,74  | 1,45       | 7,58  | 1,45       | 7,85  | 1,46       |
|           | 35                   | 1,51                                       | 1,35       | 1,89  | 1,55       | 2,40  | 1,56       | 4,25  | 1,57       | 5,28  | 1,58       | 6,40  | 1,60       | 6,62  | 1,60       | 7,52  | 1,61       | 7,63  | 1,62       |
|           | 40                   | -  | -          | 2,04  | 1,72       | 2,35  | 1,72       | 4,20  | 1,73       | 5,24  | 1,74       | 6,35  | 1,75       | 6,46  | 1,75       | 7,45  | 1,76       | 7,45  | 1,77       |
|           | 45                   | -  | -          | -     | -          | 2,32  | 1,91       | 4,15  | 1,88       | 5,19  | 1,89       | 6,30  | 1,90       | 6,45  | 1,91       | 7,39  | 1,92       | 7,32  | 1,92       |
|           | 50                   | -  | -          | -     | -          | -     | -          | 4,10  | 2,00       | 5,11  | 2,02       | 6,25  | 2,03       | 6,43  | 2,05       | 6,85  | 2,06       | 7,19  | 2,08       |
| 7 M       | 30                   | 1,82                                       | 1,82       | 2,84  | 1,85       | 4,10  | 1,93       | 5,06  | 1,85       | 6,00  | 1,86       | 7,29  | 1,87       | 7,60  | 1,88       | 8,54  | 1,89       | 8,85  | 1,90       |
|           | 35                   | 1,70                                       | 1,75       | 2,83  | 2,03       | 3,87  | 2,11       | 4,95  | 2,04       | 5,95  | 2,06       | 7,21  | 2,07       | 7,46  | 2,08       | 8,47  | 2,09       | 8,60  | 2,10       |
|           | 40                   | -  | -          | 2,81  | 2,21       | 3,76  | 2,23       | 4,85  | 2,25       | 5,90  | 2,26       | 7,16  | 2,27       | 7,29  | 2,28       | 8,40  | 2,29       | 8,40  | 2,30       |
|           | 45                   | -  | -          | -     | -          | 3,59  | 2,45       | 4,77  | 2,45       | 5,85  | 2,46       | 7,10  | 2,47       | 7,27  | 2,48       | 8,32  | 2,49       | 8,25  | 2,50       |
|           | 50                   | -  | -          | -     | -          | -     | -          | 4,65  | 2,60       | 5,75  | 2,62       | 7,04  | 2,64       | 7,25  | 2,66       | 7,72  | 2,68       | 8,10  | 2,70       |
| 9 M       | 30                   | 2,41                                       | 2,00       | 3,52  | 2,05       | 5,09  | 2,13       | 6,69  | 2,20       | 8,04  | 2,20       | 9,77  | 2,21       | 10,19 | 2,22       | 11,46 | 2,23       | 12,28 | 2,25       |
|           | 35                   | 2,28                                       | 2,20       | 3,51  | 2,23       | 4,81  | 2,33       | 6,58  | 2,46       | 7,98  | 2,48       | 9,67  | 2,49       | 10,00 | 2,50       | 11,36 | 2,52       | 12,05 | 2,53       |
|           | 40                   | -  | -          | 3,49  | 2,43       | 4,67  | 2,54       | 6,46  | 2,72       | 7,91  | 2,76       | 9,59  | 2,77       | 9,77  | 2,78       | 11,26 | 2,80       | 11,81 | 2,81       |
|           | 45                   | -  | -          | -     | -          | 4,45  | 2,74       | 6,34  | 2,97       | 7,85  | 3,09       | 9,52  | 3,15       | 9,74  | 3,16       | 11,16 | 3,18       | 11,58 | 3,18       |
|           | 50                   | -  | -          | -     | -          | -     | -          | 6,22  | 3,20       | 7,71  | 3,21       | 9,45  | 3,31       | 9,72  | 3,32       | 10,36 | 3,33       | 11,42 | 3,35       |
| 9 T       | 30                   | 2,41                                       | 2,00       | 3,52  | 2,05       | 5,09  | 2,13       | 6,69  | 2,20       | 8,04  | 2,20       | 9,77  | 2,21       | 10,19 | 2,22       | 11,46 | 2,23       | 12,28 | 2,25       |
|           | 35                   | 2,28                                       | 2,20       | 3,51  | 2,23       | 4,81  | 2,33       | 6,58  | 2,46       | 7,98  | 2,48       | 9,67  | 2,49       | 10,00 | 2,50       | 11,36 | 2,52       | 12,05 | 2,53       |
|           | 40                   | -  | -          | 3,49  | 2,43       | 4,67  | 2,54       | 6,46  | 2,72       | 7,91  | 2,76       | 9,59  | 2,77       | 9,77  | 2,78       | 11,26 | 2,80       | 11,81 | 2,81       |
|           | 45                   | -  | -          | -     | -          | 4,45  | 2,74       | 6,34  | 2,97       | 7,85  | 3,09       | 9,52  | 3,15       | 9,74  | 3,16       | 11,16 | 3,18       | 11,58 | 3,18       |
|           | 50                   | -  | -          | -     | -          | -     | -          | 6,22  | 3,20       | 7,71  | 3,21       | 9,45  | 3,31       | 9,72  | 3,32       | 10,36 | 3,33       | 11,42 | 3,35       |
| 12 M      | 30                   | 3,11                                       | 2,40       | 4,75  | 2,50       | 6,78  | 2,60       | 8,20  | 2,72       | 10,35 | 2,74       | 12,57 | 2,75       | 13,11 | 2,76       | 14,74 | 2,78       | 15,80 | 2,80       |
|           | 35                   | 2,93                                       | 2,70       | 4,73  | 2,80       | 6,41  | 2,90       | 8,06  | 3,08       | 10,26 | 3,09       | 12,44 | 3,10       | 12,86 | 3,11       | 14,62 | 3,13       | 15,50 | 3,15       |
|           | 40                   | -  | -          | 4,71  | 3,00       | 6,24  | 3,10       | 7,90  | 3,42       | 10,18 | 3,44       | 12,35 | 3,45       | 12,57 | 3,46       | 14,49 | 3,48       | 15,20 | 3,50       |
|           | 45                   | -  | -          | -     | -          | 5,95  | 3,40       | 7,80  | 3,70       | 10,10 | 3,85       | 12,25 | 3,92       | 12,54 | 3,94       | 14,36 | 3,95       | 14,90 | 3,96       |
|           | 50                   | -  | -          | -     | -          | -     | -          | 7,70  | 3,90       | 9,93  | 4,00       | 12,15 | 4,12       | 12,51 | 4,13       | 13,33 | 4,15       | 14,70 | 4,17       |
| 12 T      | 30                   | 3,15                                       | 2,86       | 3,66  | 2,86       | 5,08  | 2,87       | 8,33  | 2,88       | 10,51 | 2,90       | 12,77 | 2,91       | 13,31 | 2,92       | 14,97 | 2,94       | 16,05 | 2,96       |
|           | 35                   | 2,98                                       | 3,23       | 3,45  | 3,24       | 4,77  | 3,33       | 8,19  | 3,26       | 10,42 | 3,27       | 12,64 | 3,28       | 13,06 | 3,29       | 14,84 | 3,31       | 15,74 | 3,33       |
|           | 40                   | -  | -          | 3,25  | 3,49       | 4,57  | 3,49       | 8,02  | 3,62       | 10,34 | 3,64       | 12,54 | 3,65       | 12,77 | 3,66       | 14,71 | 3,68       | 15,44 | 3,71       |
|           | 45                   | -  | -          | -     | -          | 4,27  | 3,65       | 7,92  | 3,92       | 10,25 | 4,08       | 12,44 | 4,15       | 12,73 | 4,17       | 14,58 | 4,18       | 15,13 | 4,19       |
|           | 50                   | -  | -          | -     | -          | -     | -          | 7,82  | 4,13       | 10,08 | 4,23       | 12,34 | 4,36       | 12,70 | 4,37       | 13,53 | 4,39       | 14,93 | 4,41       |
| 15 T      | 30                   | 4,08                                       | 3,50       | 6,05  | 3,56       | 8,75  | 3,57       | 10,78 | 3,58       | 13,60 | 3,61       | 16,52 | 3,62       | 17,23 | 3,63       | 19,38 | 3,66       | 20,77 | 3,69       |
|           | 35                   | 3,85                                       | 3,80       | 6,02  | 3,87       | 8,26  | 4,03       | 10,59 | 4,05       | 13,49 | 4,07       | 16,35 | 4,08       | 16,91 | 4,09       | 19,21 | 4,12       | 20,37 | 4,15       |
|           | 40                   | -  | -          | 6,00  | 4,22       | 8,02  | 4,41       | 10,38 | 4,50       | 13,38 | 4,53       | 16,23 | 4,54       | 16,52 | 4,55       | 19,04 | 4,58       | 19,98 | 4,61       |
|           | 45                   | -  | -          | -     | -          | 7,65  | 4,75       | 10,25 | 4,87       | 13,27 | 5,07       | 16,10 | 5,16       | 16,48 | 5,18       | 18,88 | 5,20       | 19,58 | 5,21       |
|           | 50                   | -  | -          | -     | -          | -     | -          | 10,12 | 5,13       | 13,05 | 5,27       | 15,97 | 5,42       | 16,44 | 5,44       | 17,52 | 5,46       | 19,32 | 5,49       |
| 20 T      | 30                   | 8,55                                       | 4,25       | 10,29 | 4,32       | 14,87 | 4,48       | 18,60 | 4,80       | 19,40 | 4,85       | 20,66 | 4,90       | 22,81 | 4,56       | 25,15 | 4,65       | 26,30 | 4,77       |
|           | 35                   | 8,30                                       | 4,70       | 9,68  | 4,77       | 13,27 | 4,97       | 18,15 | 5,26       | 19,26 | 5,32       | 20,49 | 5,41       | 22,63 | 5,60       | 24,94 | 5,99       | 25,87 | 5,25       |
|           | 40                   | -  | -          | 9,08  | 5,27       | 12,15 | 5,50       | 16,80 | 5,90       | 18,48 | 5,96       | 20,31 | 6,04       | 22,45 | 6,12       | 24,72 | 6,57       | 25,45 | 5,75       |
|           | 45                   | -  | -          | -     | -          | 10,82 | 5,99       | 15,41 | 6,49       | 17,78 | 6,56       | 20,14 | 6,60       | 22,23 | 6,46       | 24,50 | 6,50       | 25,02 | 6,55       |
|           | 50                   | -  | -          | -     | -          | -     | -          | 14,09 | 7,00       | 16,92 | 7,05       | 19,79 | 7,10       | 21,37 | 6,57       | 22,74 | 6,62       | 24,60 | 6,72       |
| 27 T      | 30                   | 11,25                                      | 5,20       | 13,43 | 5,35       | 19,42 | 5,83       | 23,80 | 6,15       | 25,17 | 6,25       | 26,98 | 6,38       | 30,01 | 5,91       | 33,09 | 6,03       | 35,90 | 6,25       |
|           | 35                   | 10,92                                      | 5,90       | 12,94 | 6,04       | 17,32 | 6,47       | 23,50 | 6,85       | 25,12 | 6,92       | 26,75 | 7,04       | 29,78 | 7,26       | 32,81 | 7,77       | 34,80 | 6,80       |
|           | 40                   | -  | -          | 12,45 | 6,73       | 15,87 | 7,16       | 21,94 | 7,68       | 24,21 | 7,76       | 26,53 | 7,86       | 29,54 | 7,93       | 32,53 | 8,52       | 34,00 | 7,45       |
|           | 45                   | -  | -          | -     | -          | 14,86 | 7,73       | 20,12 | 8,45       | 23,23 | 8,54       | 26,30 | 8,59       | 29,25 | 8,37       | 32,24 | 8,42       | 33,50 | 8,49       |
|           | 50                   | -  | -          | -     | -          | -     | -          | 18,41 | 9,11       | 22,12 | 9,18       | 25,85 | 9,24       | 28,12 | 8,51       | 29,92 | 8,58       | 32,80 | 9,15       |

Integrated heating capacity includes the defrost cycles

Abs. power = Includes compressor and fan consumption.

## 1.9 Capacities YLCA

### 1.9.1 Cooling capacities YLCA 5 ÷ 27

| YLCA | Water outlet temp °C | Outdoor ambient temperature °C DB (80% RH) |      |       |      |       |      |       |      |       |      |       |      |       |       |       |       |
|------|----------------------|--|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|-------|-------|-------|
|      |                      | 20   |      | 25    |      | 30    |      | 32    |      | 35    |      | 40    |      | 43    |       | 46    |       |
|      |                      | Cap.                                       | Unit | Cap.  | Unit | Cap.  | Unit | Cap.  | Unit | Cap.  | Unit | Cap.  | Unit | Cap.  | Unit  | Cap.  | Unit  |
|      |                      | kW   | kW   | kW    | kW   | kW    | kW   | kW    | kW   | kW    | kW   | kW    | kW   | kW    | kW    | kW    | kW    |
| 5    | 5                    | 5,71                                       | 1,59 | 5,55  | 1,63 | 5,31  | 1,70 | 5,18  | 1,76 | 4,99  | 1,85 | 4,41  | 2,06 | 4,18  | 2,18  | 3,92  | 2,33  |
|      | 6                    | 5,93                                       | 1,59 | 5,76  | 1,64 | 5,52  | 1,71 | 5,38  | 1,77 | 5,18  | 1,86 | 4,68  | 2,07 | 4,43  | 2,21  | 4,18  | 2,35  |
|      | 7                    | 6,15                                       | 1,60 | 5,98  | 1,65 | 5,73  | 1,72 | 5,59  | 1,77 | 5,38  | 1,87 | 4,95  | 2,08 | 4,69  | 2,23  | 4,44  | 2,38  |
|      | 8                    | 6,31                                       | 1,60 | 6,14  | 1,65 | 5,89  | 1,73 | 5,74  | 1,78 | 5,53  | 1,88 | 5,11  | 2,09 | 4,84  | 2,24  | 4,58  | 2,39  |
|      | 10                   | 6,65                                       | 1,61 | 6,48  | 1,66 | 6,21  | 1,74 | 6,06  | 1,79 | 5,83  | 1,89 | 5,44  | 2,10 | 5,15  | 2,25  | 4,88  | 2,40  |
|      | 12                   | 6,99                                       | 1,61 | 6,82  | 1,66 | 6,54  | 1,74 | 6,38  | 1,79 | 6,14  | 1,89 | 5,76  | 2,11 | 5,46  | 2,26  | 5,17  | 2,41  |
|      | 15                   | 7,50                                       | 1,62 | 7,33  | 1,67 | 7,03  | 1,75 | 6,86  | 1,80 | 6,60  | 1,90 | 6,26  | 2,12 | 5,93  | 2,26  | 5,62  | 2,42  |
| 7    | 5                    | 7,11                                       | 2,18 | 6,99  | 2,24 | 6,69  | 2,32 | 6,66  | 2,40 | 6,28  | 2,53 | 5,49  | 2,86 | 5,21  | 3,04  | 4,78  | 3,27  |
|      | 6                    | 7,39                                       | 2,18 | 7,25  | 2,24 | 6,95  | 2,33 | 6,92  | 2,41 | 6,52  | 2,54 | 5,83  | 2,87 | 5,52  | 3,07  | 5,10  | 3,29  |
|      | 7                    | 7,58                                       | 2,19 | 7,50  | 2,27 | 7,22  | 2,35 | 7,19  | 2,42 | 7,13  | 2,58 | 6,17  | 2,88 | 5,84  | 3,11  | 5,41  | 3,33  |
|      | 8                    | 7,86                                       | 2,19 | 7,73  | 2,27 | 7,42  | 2,36 | 7,38  | 2,44 | 7,29  | 2,59 | 6,37  | 2,90 | 6,03  | 3,12  | 5,58  | 3,36  |
|      | 10                   | 8,28                                       | 2,20 | 8,16  | 2,27 | 7,82  | 2,37 | 7,79  | 2,45 | 7,45  | 2,60 | 6,78  | 2,91 | 6,42  | 3,14  | 5,95  | 3,37  |
|      | 12                   | 8,71                                       | 2,20 | 8,59  | 2,28 | 8,23  | 2,37 | 8,20  | 2,45 | 7,73  | 2,61 | 7,18  | 2,92 | 6,80  | 3,15  | 6,30  | 3,39  |
|      | 15                   | 9,34                                       | 2,22 | 9,23  | 2,28 | 8,85  | 2,38 | 8,82  | 2,46 | 8,31  | 2,62 | 7,80  | 2,94 | 7,39  | 3,15  | 6,85  | 3,40  |
| 9    | 5                    | 8,61                                       | 2,60 | 8,80  | 2,89 | 8,33  | 2,99 | 8,06  | 3,09 | 7,60  | 3,30 | 6,65  | 3,69 | 6,30  | 3,93  | 5,78  | 4,22  |
|      | 6                    | 8,94                                       | 2,61 | 9,13  | 2,90 | 8,66  | 3,01 | 8,37  | 3,11 | 7,89  | 3,31 | 7,06  | 3,71 | 6,68  | 3,94  | 6,17  | 4,24  |
|      | 7                    | 9,86                                       | 2,62 | 9,44  | 2,91 | 8,99  | 3,03 | 8,70  | 3,13 | 8,63  | 3,33 | 7,46  | 3,72 | 7,07  | 3,95  | 6,55  | 4,26  |
|      | 8                    | 9,51                                       | 2,63 | 9,73  | 2,92 | 9,24  | 3,04 | 8,93  | 3,15 | 8,81  | 3,35 | 7,71  | 3,73 | 7,30  | 3,96  | 6,76  | 4,28  |
|      | 10                   | 10,03                                      | 2,66 | 10,27 | 2,94 | 9,74  | 3,05 | 9,43  | 3,19 | 9,00  | 3,37 | 8,20  | 3,75 | 7,77  | 3,98  | 7,20  | 4,32  |
|      | 12                   | 10,54                                      | 2,68 | 10,81 | 2,96 | 10,26 | 3,06 | 9,93  | 3,23 | 9,36  | 3,39 | 8,69  | 3,77 | 8,23  | 4,00  | 7,63  | 4,36  |
|      | 15                   | 11,31                                      | 2,71 | 11,62 | 2,99 | 11,02 | 3,08 | 10,67 | 3,29 | 10,06 | 3,45 | 9,44  | 3,80 | 8,94  | 4,07  | 8,47  | 4,39  |
| 12   | 5                    | 12,37                                      | 3,06 | 12,15 | 3,43 | 11,63 | 3,80 | 11,58 | 3,88 | 10,93 | 4,13 | 9,55  | 4,62 | 9,06  | 4,92  | 8,31  | 5,28  |
|      | 6                    | 12,85                                      | 3,08 | 12,61 | 3,45 | 12,09 | 3,82 | 12,03 | 3,90 | 11,34 | 4,15 | 10,14 | 4,64 | 9,60  | 4,97  | 8,86  | 5,30  |
|      | 7                    | 13,78                                      | 3,10 | 13,49 | 3,47 | 12,97 | 3,84 | 12,50 | 3,92 | 12,40 | 4,17 | 10,72 | 4,66 | 10,16 | 5,03  | 9,41  | 5,32  |
|      | 8                    | 14,03                                      | 3,12 | 13,82 | 3,49 | 13,15 | 3,86 | 12,83 | 3,94 | 12,65 | 4,19 | 11,07 | 4,68 | 10,49 | 5,05  | 9,71  | 5,34  |
|      | 10                   | 14,41                                      | 3,16 | 14,19 | 3,53 | 13,60 | 3,90 | 13,55 | 3,96 | 12,90 | 4,21 | 11,79 | 4,70 | 11,16 | 5,07  | 10,35 | 5,36  |
|      | 12                   | 15,14                                      | 3,20 | 14,93 | 3,57 | 14,32 | 3,92 | 14,26 | 3,96 | 13,44 | 4,22 | 12,48 | 4,73 | 11,83 | 5,09  | 10,96 | 5,38  |
|      | 15                   | 16,25                                      | 3,26 | 16,05 | 3,63 | 15,39 | 3,95 | 15,34 | 3,98 | 14,45 | 4,23 | 13,56 | 4,75 | 12,85 | 5,11  | 11,54 | 5,40  |
| 15   | 5                    | 14,47                                      | 4,54 | 14,21 | 4,67 | 13,60 | 4,84 | 13,54 | 5,00 | 12,78 | 5,33 | 11,17 | 5,96 | 10,59 | 6,35  | 9,72  | 6,81  |
|      | 6                    | 15,02                                      | 4,56 | 14,75 | 4,69 | 14,13 | 4,86 | 14,07 | 5,03 | 13,26 | 5,35 | 11,86 | 5,99 | 11,22 | 6,41  | 10,36 | 6,87  |
|      | 7                    | 15,42                                      | 4,57 | 15,25 | 4,71 | 14,68 | 4,89 | 14,61 | 5,05 | 14,50 | 5,38 | 12,54 | 6,01 | 11,88 | 6,19  | 11,01 | 6,95  |
|      | 8                    | 15,99                                      | 4,59 | 15,72 | 4,72 | 15,08 | 4,92 | 15,01 | 5,08 | 14,16 | 5,41 | 12,95 | 6,04 | 12,26 | 6,52  | 11,36 | 7,01  |
|      | 10                   | 16,85                                      | 4,59 | 16,59 | 4,73 | 15,90 | 4,95 | 15,84 | 5,11 | 14,93 | 5,43 | 13,78 | 6,07 | 13,05 | 6,54  | 12,10 | 7,03  |
|      | 12                   | 17,71                                      | 4,61 | 17,46 | 4,75 | 16,75 | 4,97 | 16,68 | 5,11 | 15,72 | 5,44 | 14,59 | 6,10 | 13,83 | 6,57  | 12,82 | 7,06  |
|      | 15                   | 19,00                                      | 4,62 | 18,77 | 4,76 | 18,00 | 5,00 | 17,93 | 5,14 | 16,90 | 5,46 | 15,86 | 6,12 | 15,02 | 6,60  | 13,94 | 7,09  |
| 20   | 5                    | 21,41                                      | 5,45 | 20,97 | 5,61 | 20,22 | 5,87 | 19,88 | 6,10 | 19,29 | 6,87 | 17,18 | 7,24 | 16,40 | 7,72  | 15,51 | 8,29  |
|      | 6                    | 22,39                                      | 5,48 | 21,93 | 5,67 | 21,02 | 5,93 | 20,58 | 6,16 | 19,40 | 6,90 | 18,90 | 7,30 | 17,24 | 7,82  | 16,31 | 8,38  |
|      | 7                    | 23,33                                      | 5,54 | 22,73 | 5,72 | 21,82 | 5,99 | 21,35 | 6,21 | 19,52 | 6,94 | 18,99 | 7,36 | 18,03 | 7,94  | 17,08 | 8,50  |
|      | 8                    | 24,05                                      | 5,57 | 23,40 | 5,75 | 22,45 | 6,05 | 21,88 | 6,27 | 21,00 | 6,98 | 18,44 | 7,41 | 18,40 | 8,00  | 17,37 | 8,59  |
|      | 10                   | 25,47                                      | 5,64 | 24,77 | 5,81 | 23,69 | 6,11 | 23,03 | 6,33 | 22,03 | 7,01 | 20,52 | 7,47 | 19,35 | 8,06  | 18,25 | 8,66  |
|      | 12                   | 26,97                                      | 5,65 | 26,17 | 5,85 | 24,95 | 6,14 | 24,18 | 6,36 | 23,09 | 7,01 | 21,54 | 7,54 | 20,28 | 8,11  | 19,05 | 8,72  |
|      | 15                   | 29,16                                      | 5,74 | 28,23 | 5,92 | 26,82 | 6,21 | 25,92 | 6,44 | 24,70 | 7,05 | 23,20 | 7,61 | 21,76 | 8,15  | 20,40 | 8,78  |
| 27   | 5                    | 28,60                                      | 6,90 | 27,49 | 7,53 | 25,77 | 8,17 | 26,05 | 8,64 | 24,28 | 8,99 | 22,52 | 9,48 | 21,50 | 10,10 | 19,60 | 10,97 |
|      | 6                    | 30,03                                      | 7,00 | 28,61 | 7,58 | 26,81 | 8,24 | 26,98 | 8,71 | 24,94 | 9,03 | 23,72 | 9,55 | 22,60 | 10,23 | 21,38 | 11,02 |
|      | 7                    | 30,62                                      | 7,11 | 29,32 | 7,63 | 27,63 | 8,33 | 27,98 | 8,78 | 25,60 | 9,08 | 24,90 | 9,62 | 23,63 | 10,39 | 22,39 | 11,07 |
|      | 8                    | 32,21                                      | 7,22 | 30,68 | 7,76 | 28,69 | 8,53 | 28,68 | 8,86 | 27,52 | 9,18 | 25,48 | 9,70 | 24,11 | 10,46 | 22,77 | 11,12 |
|      | 10                   | 34,07                                      | 7,30 | 32,47 | 7,84 | 30,32 | 8,61 | 30,19 | 8,93 | 28,88 | 9,28 | 26,90 | 9,77 | 25,36 | 10,54 | 23,92 | 11,22 |
|      | 12                   | 36,04                                      | 7,42 | 34,30 | 7,89 | 31,97 | 8,65 | 31,69 | 8,98 | 30,27 | 9,43 | 28,23 | 9,86 | 26,58 | 10,62 | 24,97 | 11,32 |
|      | 15                   | 38,59                                      | 7,54 | 37,01 | 7,99 | 34,42 | 8,74 | 33,98 | 9,08 | 32,38 | 9,58 | 30,41 | 9,96 | 28,53 | 10,66 | 26,96 | 11,47 |

1.9 Capacities YLCA

1.9.2 Cooling capacities YLCA 5 ÷ 27 (35% ethylene glycol)

| YLCA | Water outlet temp °C | Outdoor ambient temperature °C DB (80% RH) |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
|------|----------------------|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|      |                      | 20   |         | 25      |         | 30      |         | 32      |         | 35      |         | 40      |         | 43      |         | 46      |         |
|      |                      | Cap. kW                                    | Unit kW | Cap. kW | Unit kW | Cap. kW | Unit kW | Cap. kW | Unit kW | Cap. kW | Unit kW | Cap. kW | Unit kW | Cap. kW | Unit kW | Cap. kW | Unit kW |
| 5    | -5                   | 3,60                                       | 1,12    | 3,44    | 1,22    | 3,28    | 1,32    | 3,20    | 1,37    | 3,08    | 1,44    | 2,83    | 1,57    | 2,68    | 1,65    | 2,53    | 1,74    |
|      | -4                   | 3,79                                       | 1,15    | 3,63    | 1,24    | 3,44    | 1,35    | 3,36    | 1,40    | 3,23    | 1,47    | 2,97    | 1,61    | 2,81    | 1,69    | 2,64    | 1,80    |
|      | -2                   | 4,14                                       | 1,21    | 3,99    | 1,30    | 3,77    | 1,42    | 3,68    | 1,46    | 3,55    | 1,54    | 3,25    | 1,68    | 3,08    | 1,77    | 2,88    | 1,87    |
|      | 0                    | 4,49                                       | 1,26    | 4,36    | 1,36    | 4,14    | 1,48    | 4,03    | 1,53    | 3,88    | 1,61    | 3,56    | 1,76    | 3,36    | 1,85    | 3,12    | 1,94    |
|      | 2                    | 4,98                                       | 1,32    | 4,75    | 1,42    | 4,51    | 1,55    | 4,40    | 1,60    | 4,24    | 1,68    | 3,89    | 1,84    | 3,67    | 1,93    | 3,47    | 2,02    |
|      | 4                    | 5,33                                       | 1,37    | 5,14    | 1,48    | 4,88    | 1,61    | 4,77    | 1,67    | 4,59    | 1,75    | 4,21    | 1,92    | 3,99    | 2,01    | 3,77    | 2,13    |
| 7    | -5                   | 4,49                                       | 1,53    | 4,34    | 1,66    | 4,13    | 1,81    | 4,12    | 1,87    | 3,88    | 1,96    | 3,52    | 2,18    | 3,34    | 2,30    | 3,08    | 2,44    |
|      | -4                   | 4,73                                       | 1,57    | 4,57    | 1,70    | 4,33    | 1,85    | 4,31    | 1,91    | 4,07    | 2,01    | 3,69    | 2,23    | 3,50    | 2,36    | 3,21    | 2,52    |
|      | -2                   | 5,16                                       | 1,65    | 5,02    | 1,78    | 4,75    | 1,94    | 4,73    | 2,00    | 4,47    | 2,10    | 4,05    | 2,33    | 3,83    | 2,47    | 3,51    | 2,62    |
|      | 0                    | 5,60                                       | 1,72    | 5,49    | 1,86    | 5,22    | 2,02    | 5,18    | 2,09    | 4,88    | 2,20    | 4,43    | 2,44    | 4,19    | 2,58    | 3,80    | 2,73    |
|      | 2                    | 6,20                                       | 1,80    | 5,98    | 1,94    | 5,68    | 2,11    | 5,65    | 2,18    | 5,33    | 2,30    | 4,84    | 2,55    | 4,58    | 2,69    | 4,23    | 2,83    |
|      | 4                    | 6,64                                       | 1,88    | 6,47    | 2,03    | 6,14    | 2,20    | 6,13    | 2,28    | 5,78    | 2,40    | 5,25    | 2,66    | 4,97    | 2,81    | 4,59    | 2,99    |
| 9    | -5                   | 5,78                                       | 2,00    | 5,52    | 2,17    | 5,26    | 2,36    | 5,14    | 2,43    | 4,95    | 2,56    | 4,54    | 2,80    | 4,29    | 2,94    | 4,06    | 3,10    |
|      | -4                   | 6,08                                       | 2,05    | 5,82    | 2,22    | 5,51    | 2,41    | 5,38    | 2,49    | 5,19    | 2,62    | 4,76    | 2,87    | 4,50    | 3,01    | 4,23    | 3,20    |
|      | -2                   | 6,65                                       | 2,15    | 6,39    | 2,32    | 6,05    | 2,52    | 5,91    | 2,61    | 5,69    | 2,74    | 5,22    | 2,99    | 4,94    | 3,15    | 4,62    | 3,33    |
|      | 0                    | 7,21                                       | 2,25    | 6,99    | 2,42    | 6,65    | 2,64    | 6,46    | 2,73    | 6,22    | 2,87    | 5,71    | 3,13    | 5,40    | 3,30    | 5,01    | 3,46    |
|      | 2                    | 7,98                                       | 2,35    | 7,62    | 2,53    | 7,24    | 2,75    | 7,05    | 2,85    | 6,79    | 2,99    | 6,23    | 3,27    | 5,89    | 3,44    | 5,57    | 3,60    |
|      | 4                    | 8,54                                       | 2,45    | 8,24    | 2,64    | 7,83    | 2,87    | 7,65    | 2,97    | 7,37    | 3,12    | 6,76    | 3,41    | 6,39    | 3,59    | 6,04    | 3,80    |
| 12   | -5                   | 8,31                                       | 2,50    | 7,94    | 2,71    | 7,56    | 2,95    | 7,38    | 3,05    | 7,11    | 3,21    | 6,52    | 3,50    | 6,17    | 3,68    | 5,83    | 3,88    |
|      | -4                   | 8,74                                       | 2,56    | 8,36    | 2,78    | 7,92    | 3,02    | 7,74    | 3,12    | 7,45    | 3,28    | 6,83    | 3,59    | 6,47    | 3,77    | 6,08    | 4,00    |
|      | -2                   | 9,55                                       | 2,69    | 9,19    | 2,90    | 8,69    | 3,16    | 8,49    | 3,27    | 8,18    | 3,43    | 7,50    | 3,75    | 7,09    | 3,95    | 6,63    | 4,17    |
|      | 0                    | 10,35                                      | 2,81    | 10,05   | 3,03    | 9,55    | 3,30    | 9,28    | 3,41    | 8,94    | 3,59    | 8,20    | 3,92    | 7,75    | 4,13    | 7,19    | 4,34    |
|      | 2                    | 11,47                                      | 2,94    | 10,94   | 3,17    | 10,40   | 3,45    | 10,13   | 3,56    | 9,76    | 3,75    | 8,96    | 4,10    | 8,47    | 4,31    | 8,00    | 4,50    |
|      | 4                    | 12,28                                      | 3,06    | 11,84   | 3,31    | 11,25   | 3,60    | 10,99   | 3,71    | 10,59   | 3,91    | 9,71    | 4,28    | 9,19    | 4,49    | 8,68    | 4,75    |
| 15   | -5                   | 9,72                                       | 3,23    | 9,28    | 3,50    | 8,84    | 3,81    | 8,63    | 3,93    | 8,31    | 4,14    | 7,63    | 4,52    | 7,22    | 4,75    | 6,82    | 5,00    |
|      | -4                   | 10,22                                      | 3,31    | 9,77    | 3,58    | 9,26    | 3,90    | 9,05    | 4,02    | 8,71    | 4,23    | 7,99    | 4,63    | 7,56    | 4,86    | 7,11    | 5,16    |
|      | -2                   | 11,17                                      | 3,47    | 10,74   | 3,74    | 10,16   | 4,08    | 9,92    | 4,21    | 9,56    | 4,43    | 8,77    | 4,84    | 8,29    | 5,09    | 7,76    | 5,38    |
|      | 0                    | 12,11                                      | 3,63    | 11,75   | 3,92    | 11,17   | 4,26    | 10,85   | 4,40    | 10,45   | 4,63    | 9,59    | 5,06    | 9,06    | 5,33    | 8,41    | 5,60    |
|      | 2                    | 13,41                                      | 3,79    | 12,80   | 4,09    | 12,16   | 4,45    | 11,85   | 4,60    | 11,42   | 4,84    | 10,47   | 5,29    | 9,90    | 5,56    | 9,35    | 5,81    |
|      | 4                    | 14,36                                      | 3,95    | 13,85   | 4,27    | 13,15   | 4,64    | 12,85   | 4,79    | 12,38   | 5,05    | 11,36   | 5,52    | 10,74   | 5,80    | 10,15   | 6,13    |
| 20   | -5                   | 13,61                                      | 3,86    | 13,05   | 4,20    | 12,48   | 4,60    | 12,25   | 4,77    | 11,74   | 5,34    | 10,94   | 5,54    | 10,42   | 5,85    | 9,87    | 6,21    |
|      | -4                   | 14,39                                      | 3,98    | 13,78   | 4,31    | 13,08   | 4,73    | 12,82   | 4,89    | 11,87   | 5,46    | 11,38   | 5,69    | 10,79   | 6,01    | 10,14   | 6,42    |
|      | -2                   | 15,79                                      | 4,19    | 15,19   | 4,53    | 14,37   | 4,97    | 14,03   | 5,15    | 13,47   | 5,72    | 12,38   | 5,97    | 11,70   | 6,31    | 10,92   | 6,71    |
|      | 0                    | 17,20                                      | 4,41    | 16,66   | 4,76    | 15,81   | 5,21    | 15,30   | 5,40    | 14,65   | 5,97    | 13,42   | 6,26    | 12,64   | 6,62    | 11,67   | 7,00    |
|      | 2                    | 19,20                                      | 4,62    | 18,22   | 5,01    | 17,21   | 5,47    | 16,66   | 5,67    | 15,93   | 6,24    | 14,53   | 6,57    | 13,65   | 6,94    | 12,79   | 7,29    |
|      | 4                    | 20,71                                      | 4,86    | 19,79   | 5,26    | 18,62   | 5,74    | 18,02   | 5,95    | 17,20   | 6,51    | 15,62   | 6,89    | 14,63   | 7,26    | 13,67   | 7,72    |
| 27   | -5                   | 17,84                                      | 5,05    | 17,10   | 5,50    | 16,36   | 6,01    | 16,06   | 6,24    | 15,56   | 6,98    | 14,34   | 7,25    | 13,66   | 7,66    | 12,93   | 8,12    |
|      | -4                   | 18,86                                      | 5,20    | 18,07   | 5,64    | 17,15   | 6,18    | 16,80   | 6,40    | 16,61   | 7,14    | 14,91   | 7,45    | 14,14   | 7,87    | 13,30   | 8,40    |
|      | -2                   | 20,70                                      | 5,49    | 19,92   | 5,93    | 18,83   | 6,50    | 18,40   | 6,73    | 17,66   | 7,48    | 16,23   | 7,81    | 15,33   | 8,26    | 14,31   | 8,78    |
|      | 0                    | 22,55                                      | 5,77    | 21,84   | 6,23    | 20,72   | 6,81    | 20,06   | 7,07    | 19,21   | 7,81    | 17,60   | 8,20    | 16,56   | 8,66    | 15,29   | 9,16    |
|      | 2                    | 25,17                                      | 6,05    | 23,88   | 6,55    | 22,56   | 7,16    | 21,84   | 7,42    | 20,88   | 8,16    | 19,05   | 8,60    | 17,89   | 9,08    | 16,76   | 9,54    |
|      | 4                    | 27,14                                      | 6,36    | 25,94   | 6,89    | 24,41   | 7,51    | 23,62   | 7,78    | 22,54   | 8,52    | 20,47   | 9,01    | 19,18   | 9,50    | 17,92   | 10,10   |

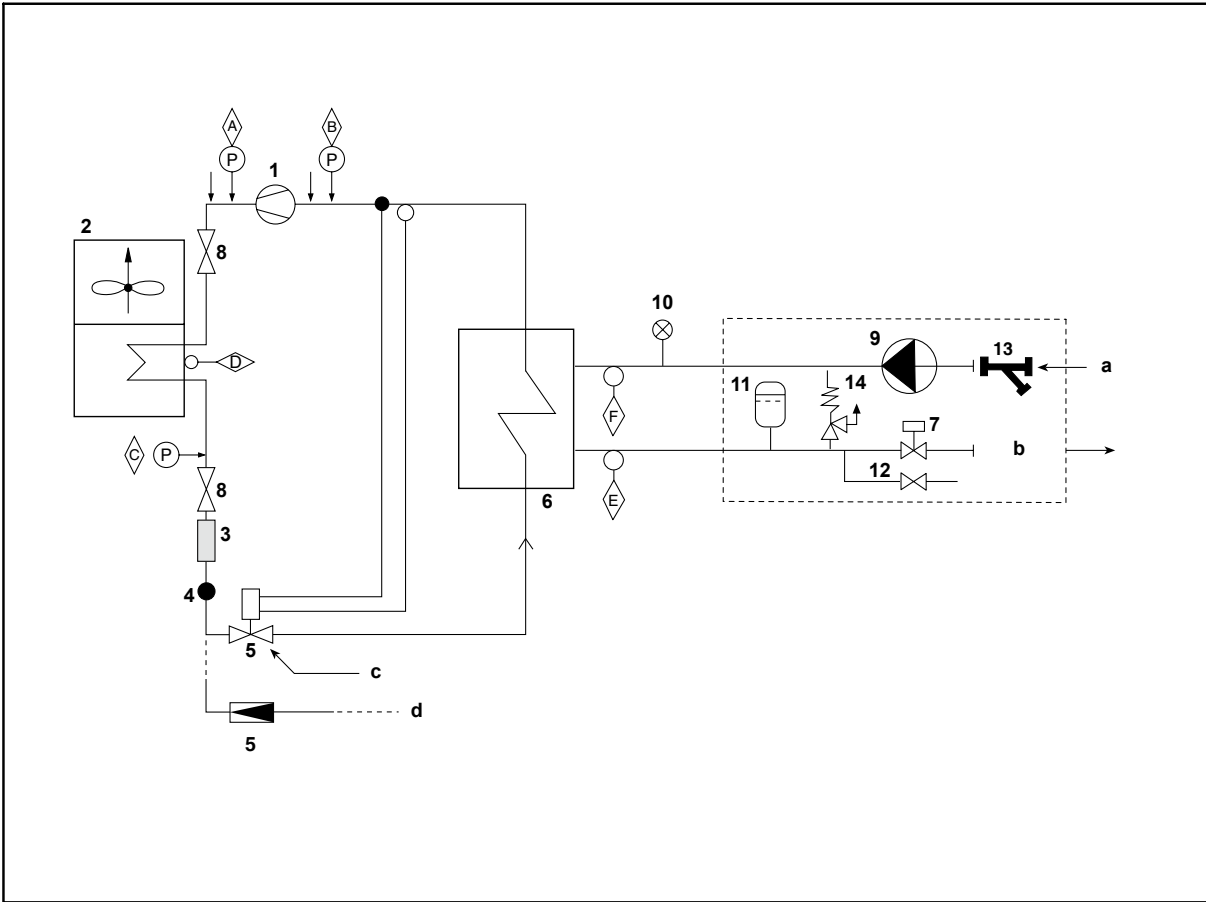
## 1.10 Cooling operation and hydraulic diagrams

### 1.10.1 YLCA models: cooling only

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



**Cooling operation and hydraulic diagram YLCA (only cooling)**



**Safety/Control devices**

- A High-pressure switch
- B Low pressure switch
- C Condensing pressure transducer (Optional LAK YLCA 5 to 15) (Standard YLCA 20, 27)
- D Battery temperature sensor. (Standard YLCA 5 to 15)
- E Water outlet temp. sensor (Antifreeze and display)
- F Water inlet temp. sensor (Setting and display)

- 1 Compressor
- 2 Air-cooled condenser
- 3 Filter dryer
- 4 Sight glass (YLCA 20, 27)
- 5 Expansion element
- 6 Plate heat exchanger
- 7 Flow switch
- 8 Ball valve (YLCA 27)
- 9 Water pump
- 10 Automatic air bleed

**Components**

- 11 Expansion vessel
- 12 Drain connection
- 13 Water filter (to be installed outside the unit)
- 14 Safety valve
- Pipe connection with Schrader valve
- - - For units with hydro kit only
- a Water inlet
- b Water outlet
- c Expansion valve YLCA 20 to 27
- d RESTRICTOR YLCA 5 to 15

## 1.10.2 YLHA PLUS models: heat pump

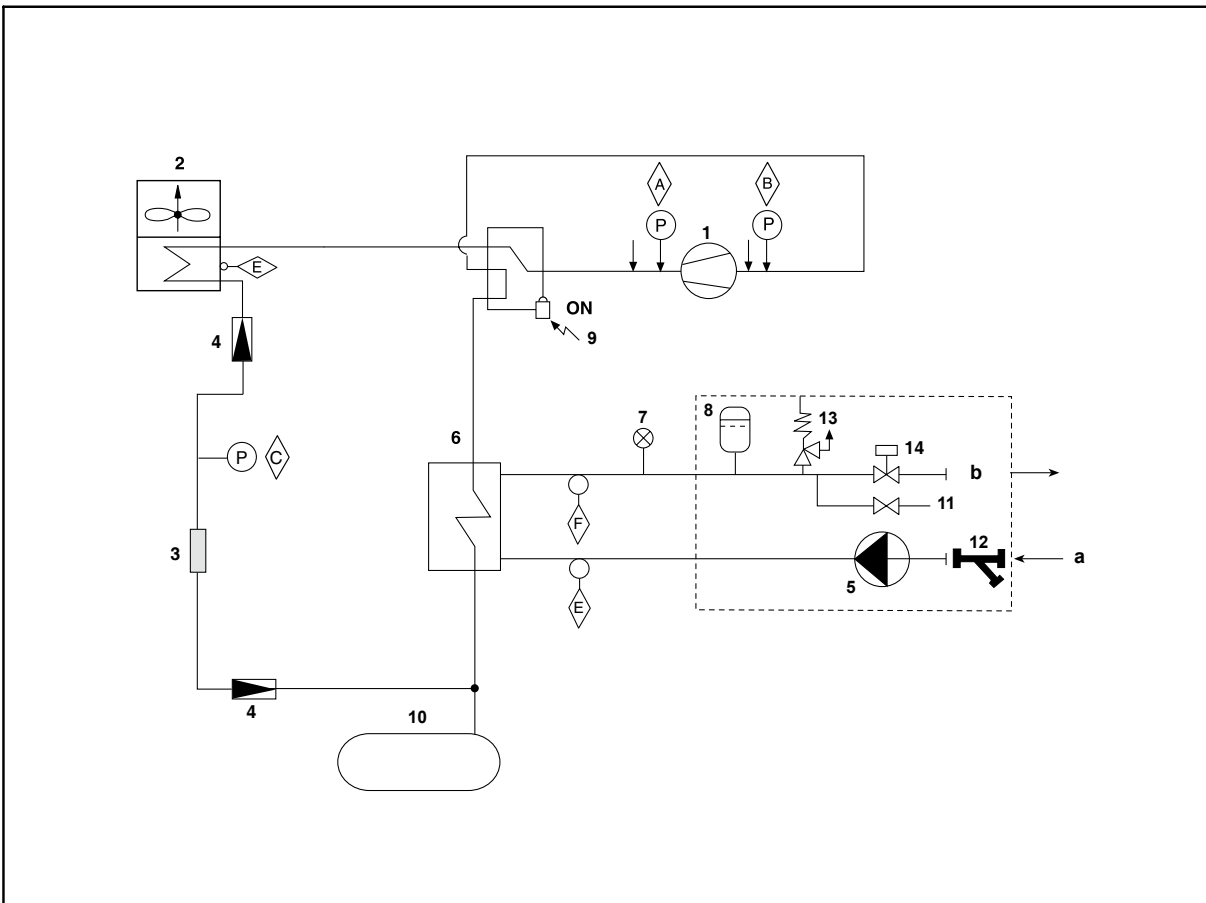
### Cooling cycle

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

### Heating cycle

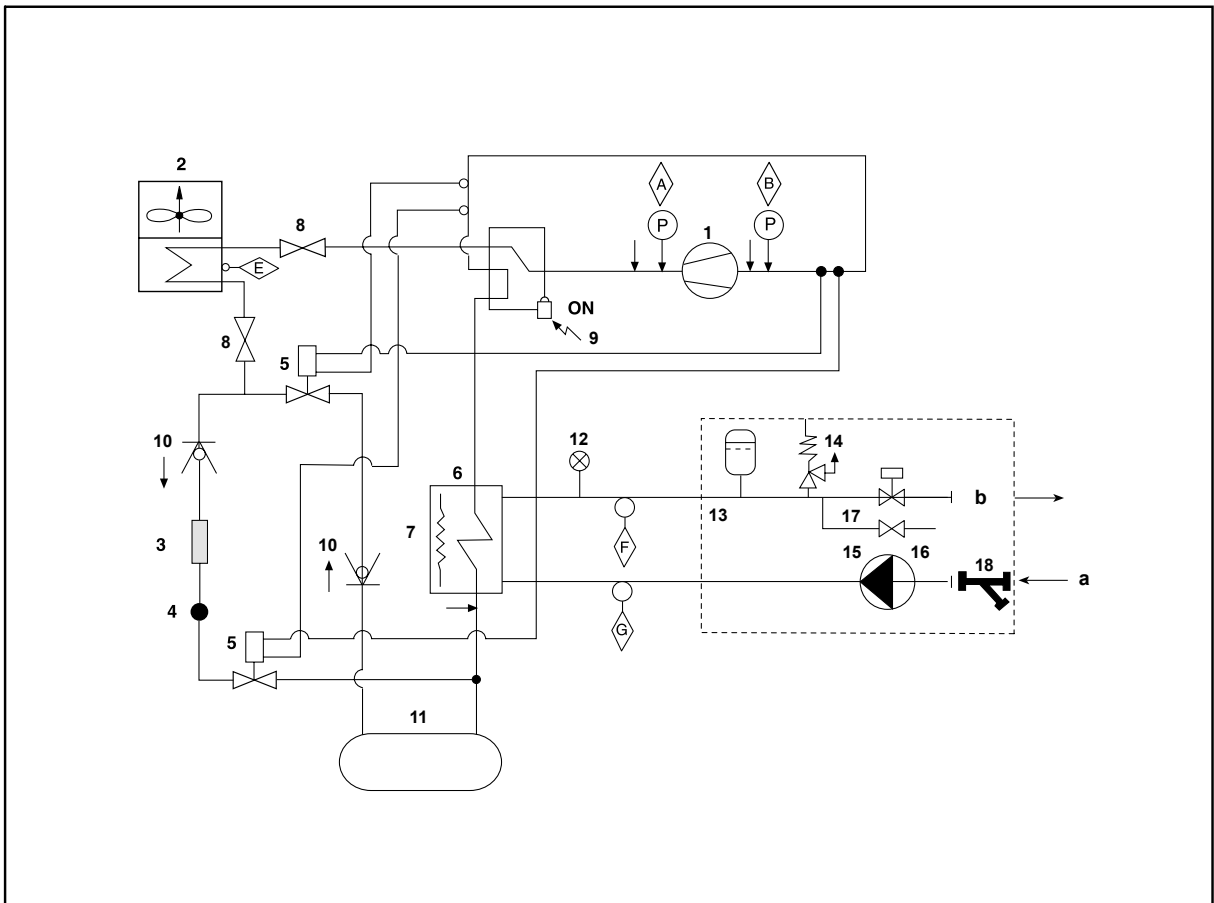
The cycle is reversed to heating mode. The 4-way valve is not activated. The condenser unit becomes the evaporator and the evaporator becomes the condenser. The water in the plate heat exchanger is heated.

Cooling operation and hydraulic diagram YLHA PLUS 5 to 15



| Safety/Control devices |  | Components |                      |       |   |
|------------------------|--|------------|----------------------|-------|---|
| A                      | High-pressure switch   | 1          | Compressor           | 10    | Liquid receiver                                 |
| B                      | Low pressure switch  | 2          | Air-cooled condenser | 11    | Drain connection                                |
| C                      | Pressure transducer port.  | 3          | Filter dryer         | 12    | Water filter (to be installed outside the unit) |
| E                      | Condenser unit temp. sensor (fan speed regulation, defrost, reading) | 4          | Expansion element    | 13    | Safety valve                                    |
| F                      | Water outlet temp. sensor (anti-freeze, regulation and display)      | 5          | Water pump           | 14    | Flow switch                                     |
| G                      | Water inlet temp. sensor (Setting and display)                       | 6          | Plate heat exchanger | →     | Pipe connection with Schrader valve             |
|                        |  | 7          | Automatic air bleed  | - - - | For units with hydro kit only                   |
|                        |  | 8          | Expansion vessel     | a     | Water inlet                                     |
|                        |  | 9          | Four-way valve       | b     | Water outlet                                    |

Cooling operation and hydraulic diagram YLHA PLUS 20 and 27



**Safety/Control devices**

- A High-pressure switch
- B Low pressure switch
- E Condenser unit temp. sensors (fan speed regulation and reading)
- F Water outlet temp. sensor (anti-freeze, regulation and display)
- G Water inlet temp. sensor (Setting and display)

- 1 Compressor
- 2 Air-cooled condenser
- 3 Filter dryer
- 4 Sight glass
- 5 Expansion valve
- 6 Heat exchanger
- 7 Heat exchanger antifreeze heater
- 8 Globe valve
- 9 Four-way valve
- 10 Check valve
- 11 Liquid receiver

**Components**

- 12 Automatic air bleed
- 13 Expansion vessel
- 14 Safety valve
- 15 Water pump
- 16 Flow switch
- 17 Drain connection
- 18 Water filter (outside the unit)
- Pipe connection with Schrader valve
- - - For units with hydro kit only
- a Water inlet
- b Water outlet

## 1.11 Instructions for installation and connection of the unit

### 1.11.1 Characteristics of the location

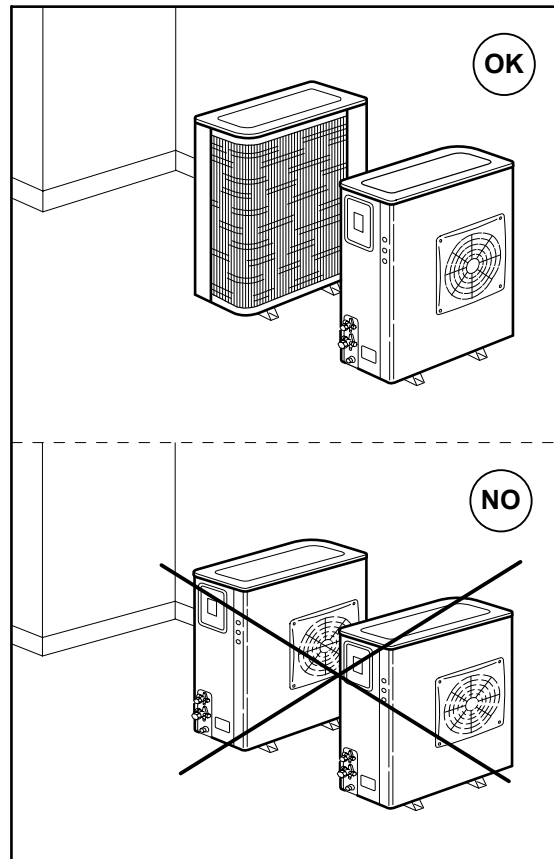
Before locating the unit, make sure you have received the appropriate product by checking the specifications described on the outside of same.

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.

#### Location of various units

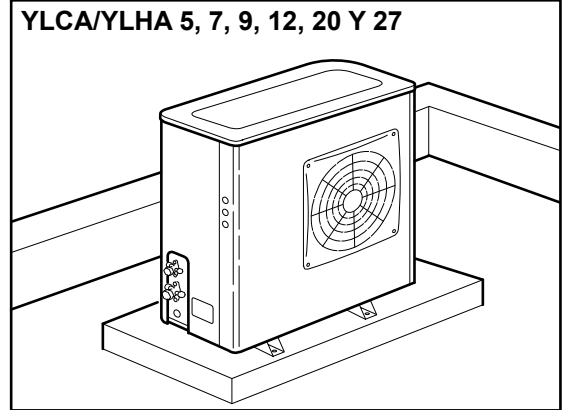
Avoid recirculation of air between units.



### 1.11.2 Specifications for anchoring the unit

Before installing the unit, make sure the structure can support the weight of same. If the unit is to be placed on the floor, a concrete base should be prepared so as to distribute weight evenly.

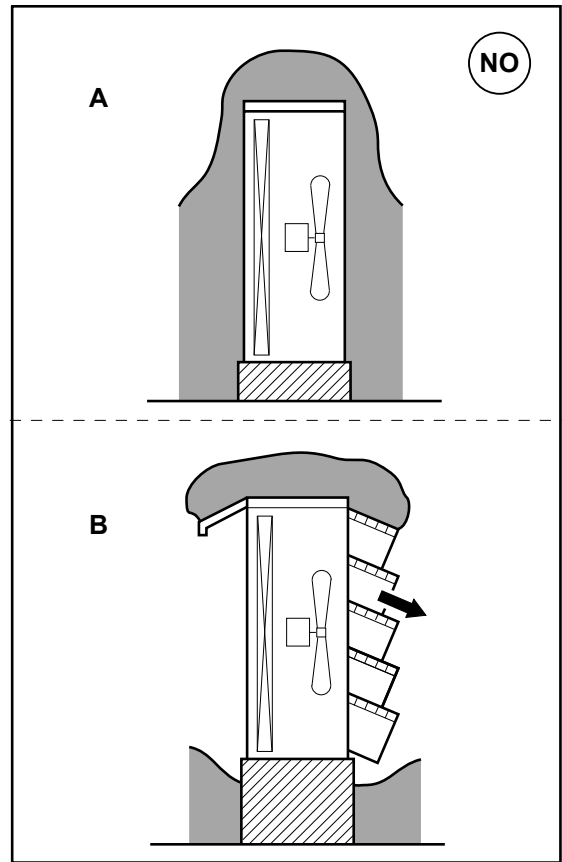
Place the unit on top of a firm base and secure it with bolts through the four holes on the base.



#### Areas with regular snowfall

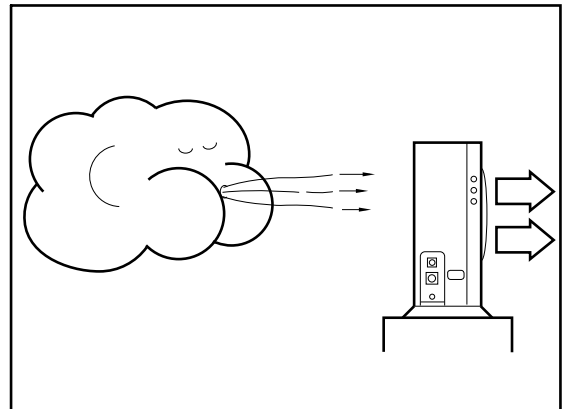
If the unit is mounted outdoors at ground level, it should be lifted onto supports to prevent a build-up of snow from obstructing the passage of air. These supports must be above the level normally reached by the snow. Anti-snow grilles should be fitted.

- A Without anti-snow grilles (low platform)
- B With anti-snow grilles (low platform)



#### Orientation

Turn the unit to face the prevailing wind.



## 1.11 Instructions for installation and connection of the unit

### 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 rate that allows an  $f_{\text{c}}$  within the operating limits.

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

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 only operate correctly in one direction of rotation. Although these units are protected by a phase order detector, when the unit is started, check that the unit rotates in the correct direction. If it is not correct:

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

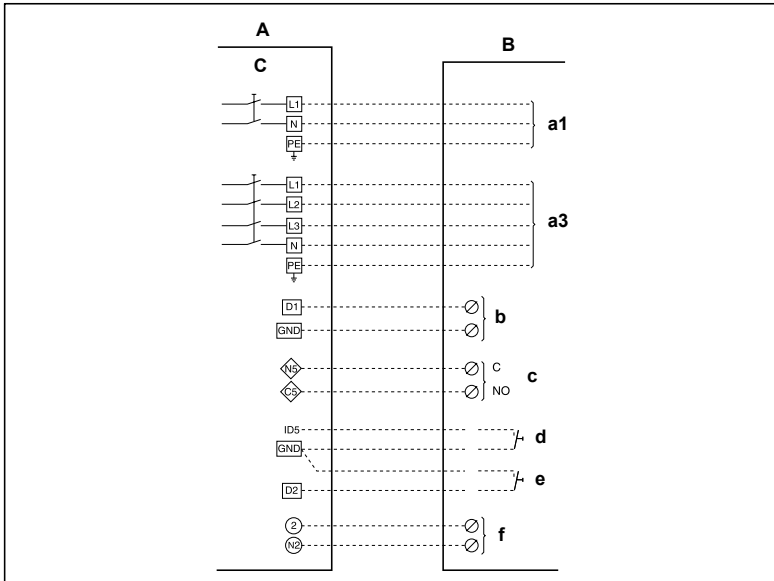
- The compressor will not compress.
- Operating noise will be abnormal.
- Electricity consumption (A) will be low.
- They overheat.

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 Wiring diagrams

#### Electrical installation YLCA / YLHA PLUS 5 to 27



- |    |  |   |   |
|----|--|---|---|
| A  | YLCA terminal strip                                    | b | Flow Switch (only in units without hydraulic group)                         |
| B  | Outdoor terminal strip                                 | c | General alarm (voltage-free inverter contact max. 2A resist. A 230 Vac)     |
| C  | Main switch  | d | Remote ON / OFF switch  |
| a1 | Supply (200 - 1 + N - ph - 50 Hz) (single-phase units) | e | Remote COOL / HEAT switch<br>CLOSED = COOL<br>OPEN = HEAT (YLHA units only) |
| a3 | Supply (400 - 3 + N - ph - 50 Hz) (three-phase units)  | f | Auxiliary heater  |

- Terminal strips YLCA / YLHA PLUS
- ∅ Outdoor unit terminals
- 230 Vac terminal

- ◇ Voltage-free terminal strip contact YLCA / YLHA PLUS
- - - Client's electrical installation



**CAUTION**

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



## 1.12 Unit sound power spectrum data

### YLCA-YLHA Plus models

| YLCA-YLHA Plus models    |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|
| Frequency (Hz)           | 5    | 7    | 9    | 12   | 15   | 20   | 27   |
| 125 Hz                   | 66,2 | 66,2 | 74   | 79,6 | 79,6 | 77   | 75,6 |
| 250 Hz                   | 70,5 | 70,5 | 72,3 | 74,3 | 74,3 | 72,4 | 81,3 |
| 500 Hz                   | 67,7 | 67,7 | 67,9 | 70,2 | 70,2 | 72,9 | 75,9 |
| 1000 Hz                  | 65,7 | 65,7 | 66,1 | 67,5 | 67,5 | 69,1 | 70,8 |
| 2000 Hz                  | 60,2 | 60,2 | 61,8 | 62,7 | 62,7 | 63,9 | 68,6 |
| 4000 Hz                  | 55,1 | 55,1 | 56,3 | 57,7 | 57,7 | 58,2 | 63,3 |
| 8000 Hz                  | 48,8 | 48,8 | 52,3 | 51   | 51   | 52,5 | 55,7 |
| Sound power level dB (A) | 70   | 70   | 71   | 73   | 73   | 74   | 78   |

The data given in this table are sound power values in accordance with ISO EN3743.

## 1.13 Operating instructions

### 1.13.1 Operating instructions $\mu$ C2

#### DESCRIPTION OF THE CONTROL UNIT

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

#### Main functions

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

#### Devices controlled

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

#### STANDARD COMPONENTS

##### Control module

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

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

##### Fan speed control module

Operates by phase cut-off. Includes fuse

##### NTC and ratiometric (pressure) probes

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

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

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

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

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

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

#### Parameters

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

**Factory Level**

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

**Super User Level**

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

**User Level**

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

**Direct Level**

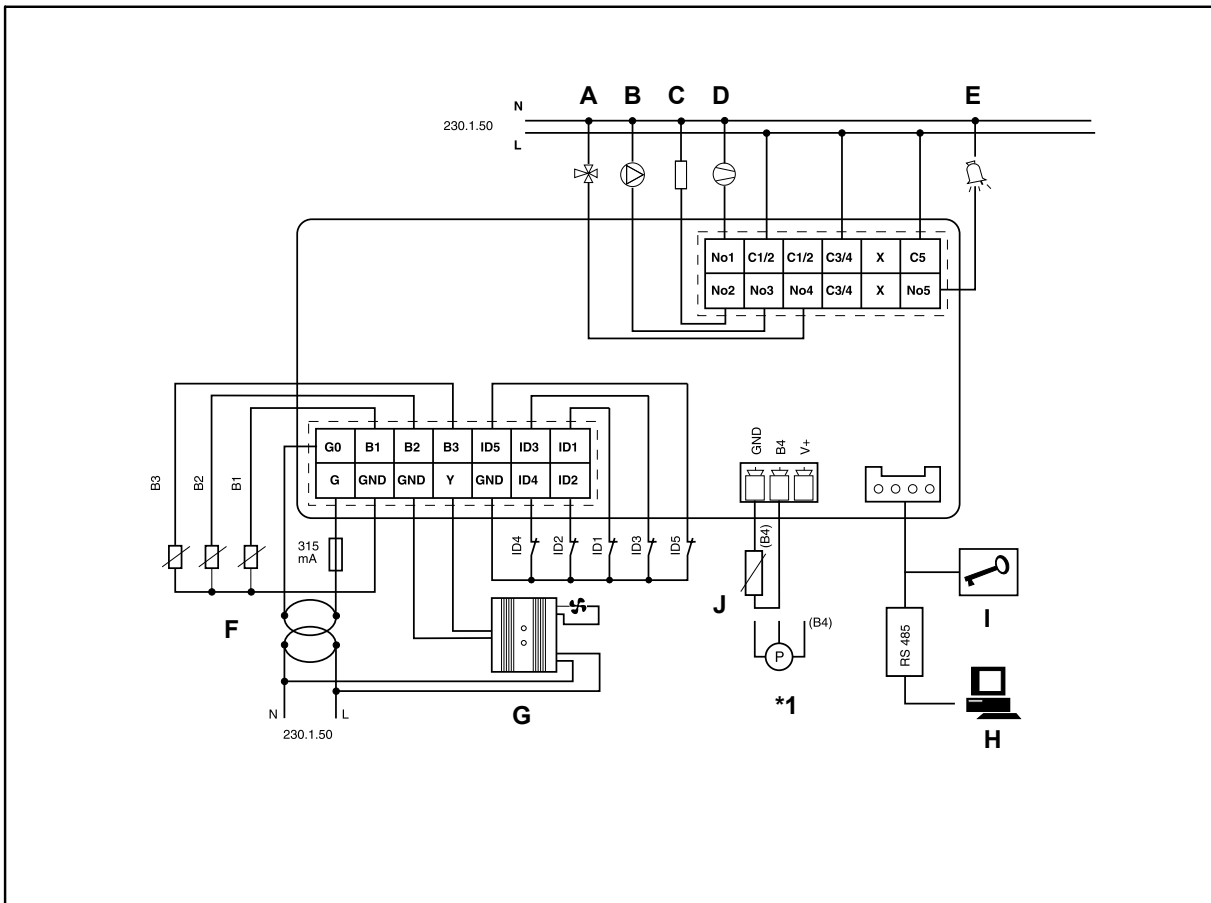
Accessible without a password. Allows for reading of the values detected by the probes, as well as other system values. Can be used by the user without affecting unit operation.

**General**

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

## General diagram

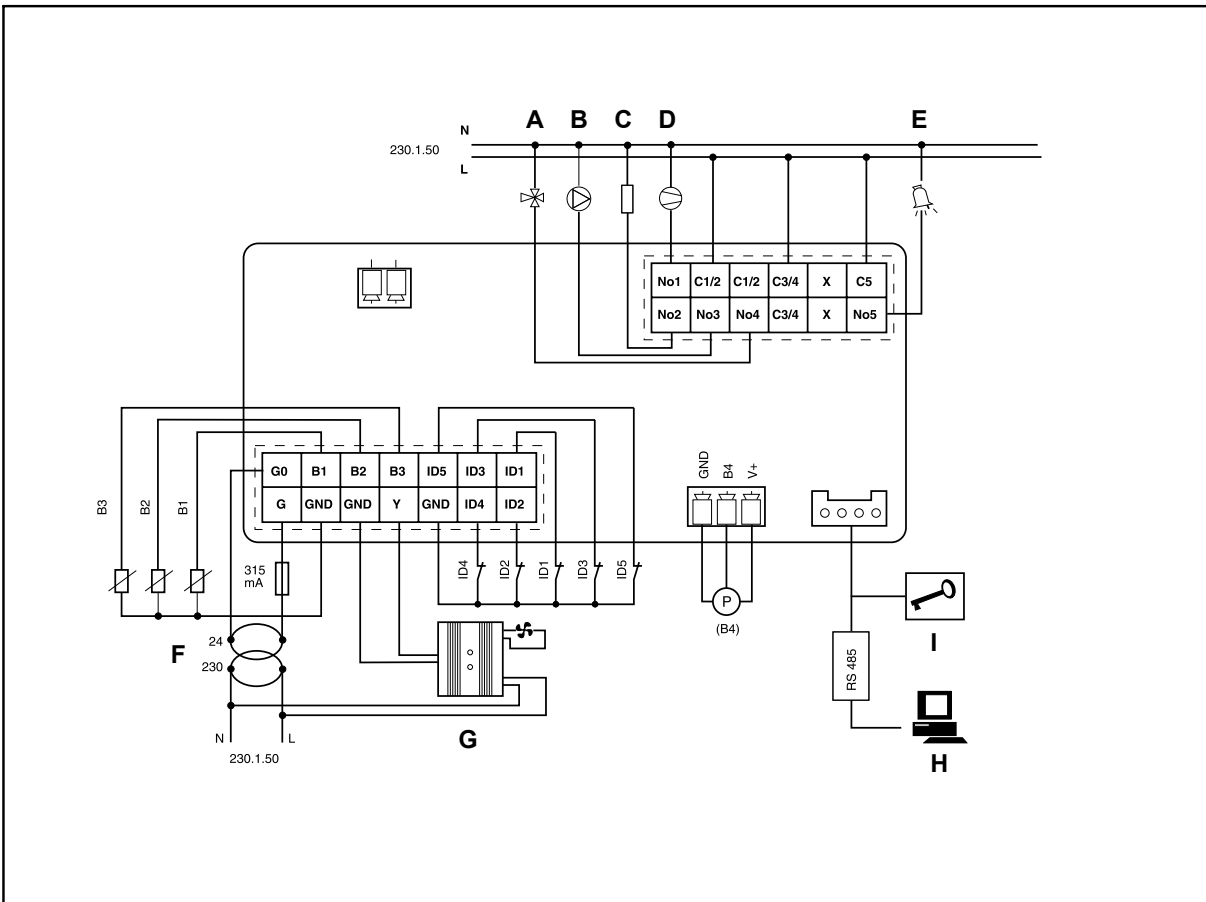
### General diagram YLCA 5 + 15



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

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

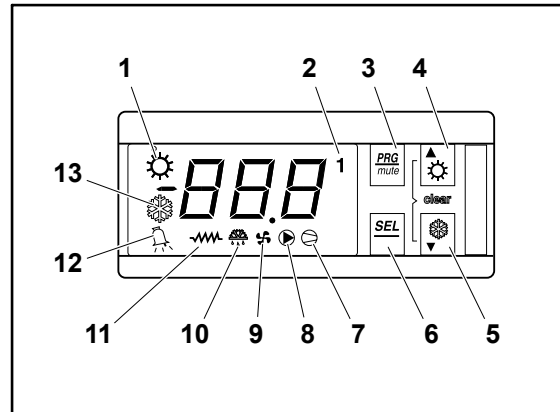
### General diagram YLCA 20 ÷ 27 and YLHA 5 ÷ 27



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

## Symbols on the display

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



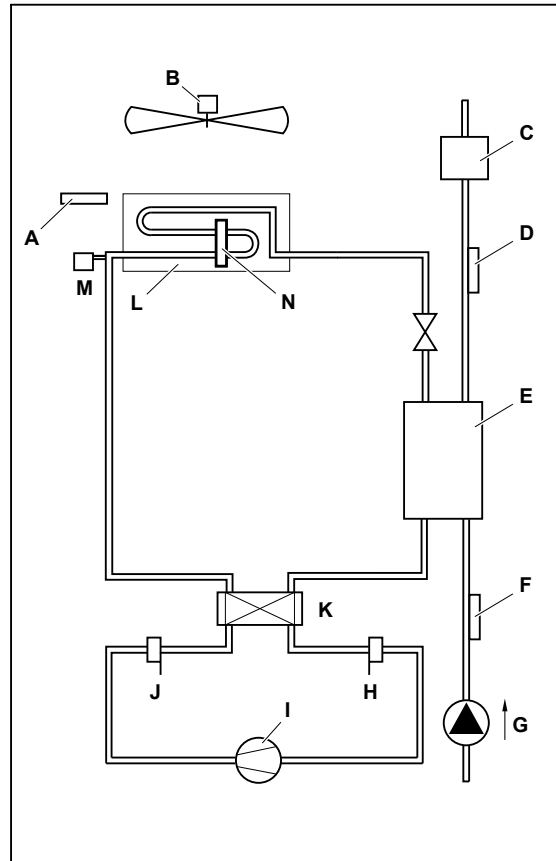
| Button | Colour | Meaning                |                 |
|--------|--------|------------------------|-----------------|
|        |        | LED permanently lit    | LED flashing    |
| -2-    | Orange | Compressor operating * | Timing start-up |
| -7-    |        | Compressor on call     | -  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

(\*) Operational compressor number

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

## Control layout

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



## Parameter tables

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

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

## Parameters relating to probes

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

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

## Parameters relating to the compressor

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

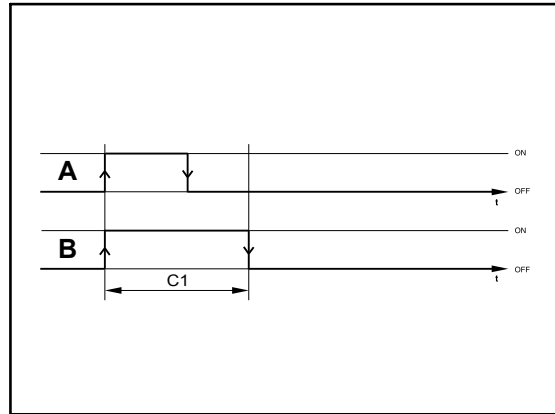
- (a) Units without Soft - Start  
 (b) Units with Soft - Start



## Operating graphics

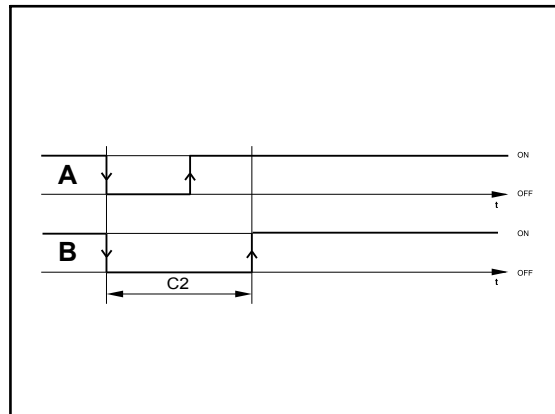
### Min. operating time of a compressor

- A Signal
- B Compressor



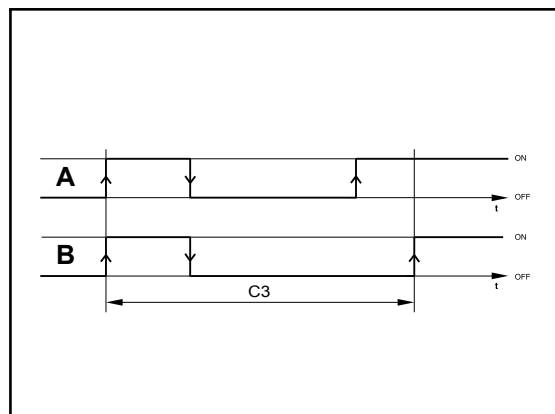
### Min. stoppage time of a compressor

- A Signal
- B Compressor



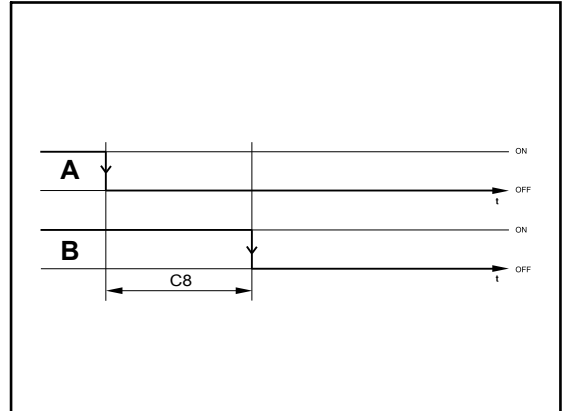
### Min. time between compressor start-ups

- A Signal
- B Compressor



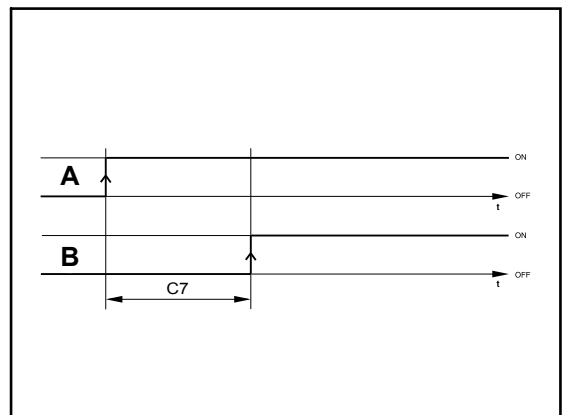
**Compressor / pump stoppage delays**

- A Compressor
- B Pump



**Pump / compressor start-up delays**

- A Pump
- B Compressor

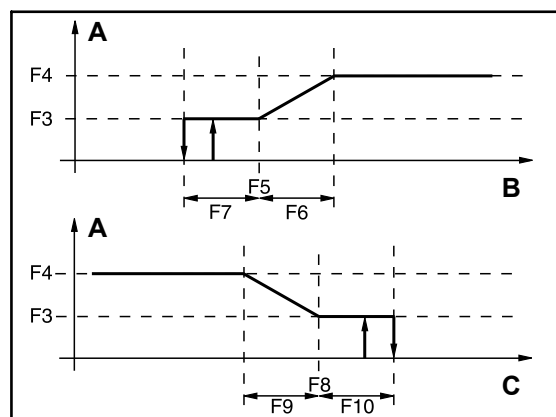


### Parameters relating to fans

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

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

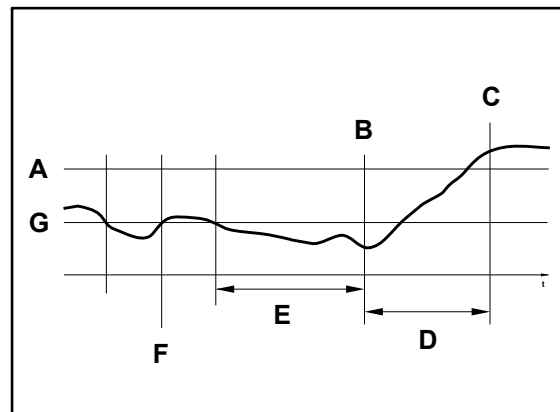
- A Fan speed
- B Condensing temperature
- C Evaporation temperature



## Parameters relating to defrost

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

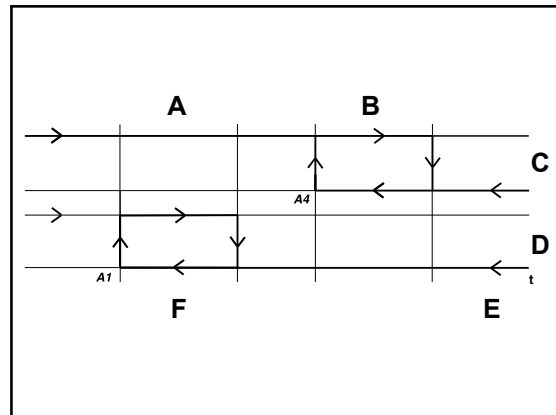
- |   |                                |   |                                  |
|---|--------------------------------|---|----------------------------------|
| A | Defrost end temperature (d04)  | E | Minimum defrost start time (d05) |
| B | Defrost start                  | F | Timer start          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



## Antifreeze control configuration parameters

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

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



## Unit configuration parameters

| Unit configuration parameters |   |       |          |      |      |      |                                 |
|-------------------------------|---|-------|----------|------|------|------|---------------------------------|
| Display                       | Description   | Level | VS       | Unit | Max. | Min. | Value                           |
| H01                           | Unit model:<br>2= Water cooling unit<br>3= Air-water heat pump  | F     | 54 (R/W) |      |      |      | 2<br>(YLCA)<br>3<br>(YLHA PLUS) |
| H02                           | Number of ventilation circuits (do not modify this parameter)   | F     | 12 (R/W) |      |      |      | 0                               |
| H03                           | No. of evaporating units present (do not modify this parameter)   | F     | 13 (R/W) |      |      |      | 0                               |
| H04                           | No. of compressors per circuit (do not modify this parameter)   | F     | 55 (R/W) |      |      |      | 0                               |
| H05                           | Pump operation:<br>0= Absent<br>1= Always ON<br>2= ON upon controller call<br>3= ON upon controller and time call | F     | 56 (R/W) |      | 3    | 0    | 1                               |
| H06                           | COOL/HEAT digital input:<br>0= Absent<br>1= Present   | U     | 14 (R/W) |      | 1    | 0    | 0                               |
| H07                           | ON/OFF digital input:<br>0= Absent<br>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:<br>0= Disabled<br>1= Enabled   | U     | 16 (R/W) |      | 1    | 0    | 1                               |
| H10                           | Serial direction for monitoring:<br>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:<br>0= Disabled<br>1= Enabled  | F     | 18 (R/W) |      | 1    | 0    | 1                               |
| H23                           | Modbus protocol setting:<br>0= Disabled<br>1= Enabled   | F     | 11       |      | 1    | 0    | 0                               |

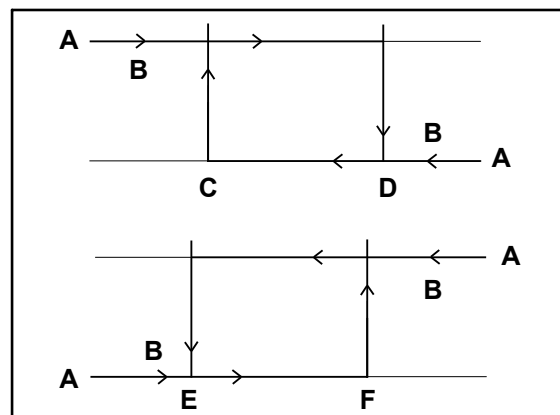
## Alarm configuration parameters

| 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<br>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:<br>1= "Sun" heat cycle, "Snowflake" cool cycle<br>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:<br>0= Inoperative with the compressor OFF<br>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:<br>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:<br>1= function enabled<br>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 regulation:<br>0= Proportional. Temperature inlet.<br>1= Proportional + neutral zone. Inlet temp.<br>2= Proportional. Outlet temperature<br>3= Proportional + neutral zone. Outlet temp.<br>4= By time + dead zone. Outlet temperature (cooling units only) | F     | 79 (R/W) |         | 4    | 0    | 0     |
| r07                                 | Neutral zone differential   | F     | 45 (R/W) | °C      | 50   | 0    | 1     |
| r08                                 | (Only if r06=4) Maximum activation time. Outlet temperature.  | F     | 80 (R/W) | Seconds | 999  | r09  | 120   |
| r09                                 | (Only if r06=4) Minimum activation time. Outlet temperature.  | F     | 81 (R/W) | Seconds | 999  | c04  | 100   |
| r10                                 | (Only if r06=4) Maximum deactivation time. Outlet temperature.  | F     | 82 (R/W) | Seconds | 999  | r11  | 120   |
| r11                                 | (Only if r06=4) Minimum deactivation time. Outlet temperature.  | F     | 83 (R/W) | Seconds | 999  | c05  | 100   |
| r12                                 | (Only if r06=4) Compressor deactivation differential.   | F     | 46 (R/W) | °C      | 50   | 0    | 1     |
| r13                                 | Cool cycle minimum set point temperature  | U     | 47 (R/W) | °C      | r14  | -40  | 6     |
| r14                                 | Cool cycle maximum set point temperature  | U     | 48 (R/W) | °C      | 80   | r13  | 20    |
| r15                                 | Heat cycle minimum set point temperature  | U     | 49 (R/W) | °C      | r16  | -40  | 25    |
| r16                                 | Heat cycle maximum set point temperature  | U     | 50 (R/W) | °C      | 80   | r15  | 45    |
| r17                                 | Summer offset constant  | U     | 51 (R/W) | -       | 5    | -5   | -0,4  |
| r18                                 | Maximum set point distance  | U     | 52 (R/W) | °K      | 20   | 0,3  | 3,2   |
| r19                                 | Summer offset start temperature   | U     | 53 (R/W) | °C      | 176  | -40  | 32    |
| r20                                 | Winter offset start temperature   | U     | 54 (R/W) | °C      | 176  | -40  | 5     |
| r27                                 | Inertia tank suppression.<br>0= No suppression.<br>1=Suppression in cold cycle<br>2=Suppression in heat cycle.<br>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 probe   | Automatic |
| E2          | B2 probe   | Automatic |
| E3          | B3 probe   | Automatic |
| E4          | B4 probe   | Automatic |
| ELS         | Low voltage power supply                           | Automatic |
| EHS         | High voltage power supply                          | Automatic |
| EPr         | Eprom Error. Unit running.                         | Automatic |
| EPb         | Eprom Error. On start-up                           | Automatic |
| ESP         | Communication failure with expansion module        | Automatic |
| EL          | Problem at fan voltage control                     | Automatic |
| FL          | Flow switch / pump protector                       | Manual    |
| Hc          | Compressor maintenance alarm                       | Automatic |
| HP          | High pressure / Fan heat switch                    | Manual    |
| Ht          | High water temperature alarm                       | Automatic |
| L           | Low charge alarm                                   | Automatic |
| LP          | Low pressure                                       | Manual    |

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

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

## Functions

### Alarm reset

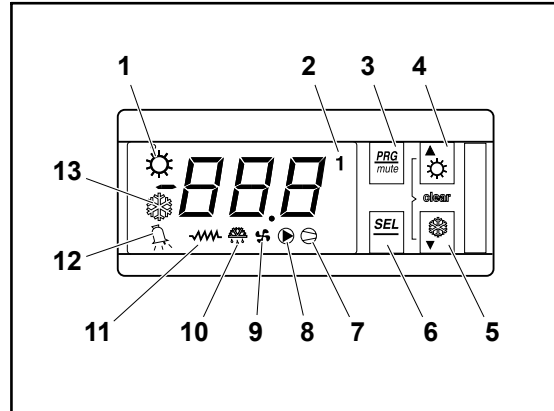
Pressing the **UP -4-** and **DOWN -5-** keys for 5 seconds cancels the alarms present in the memory. At the same time, the alarm message disappears from the display and the alarm relay is deactivated.

### Forced defrost (heat pumps)

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

### Clearing hour counters

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



### Pump operation

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

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

### Calibration of probes

If necessary, probes can be calibrated by using parameters /13, /14, /15 y /16. See Table [Parameters relating to probes](#), see on page 53.

### 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.

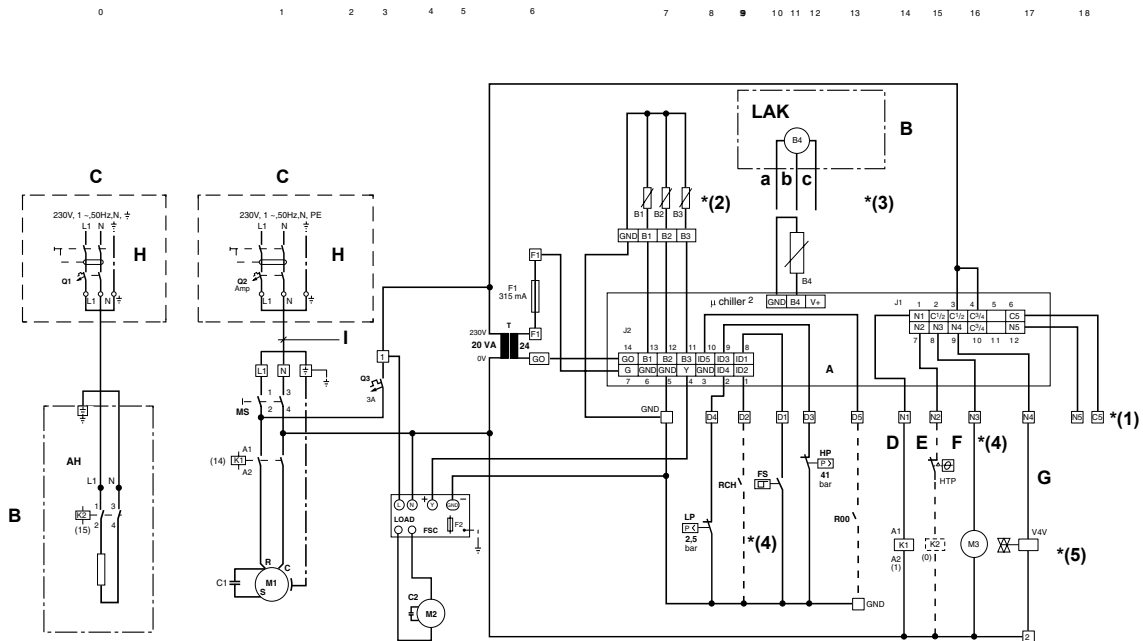
2

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## Electric circuit diagrams

2.1 Electric circuit diagram YLCA/YLHA PLUS 5÷9 MC and M (230.1.50)

## 2.1 Electric circuit diagram YLCA/YLHA PLUS 5÷9 MC and M (230.1.50)



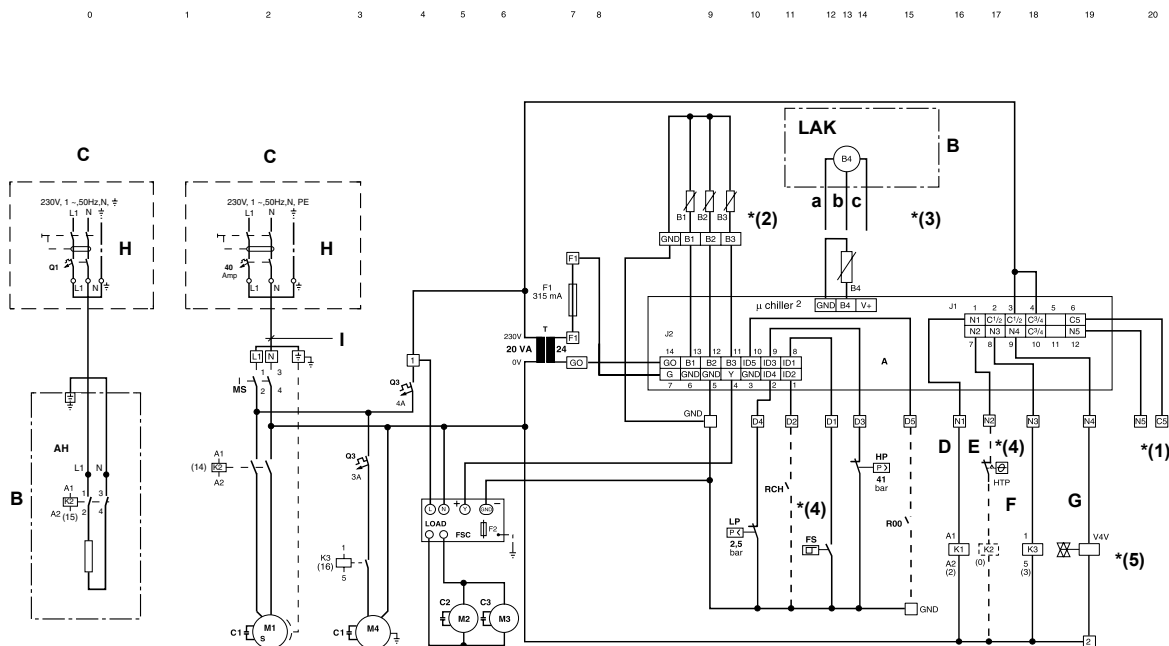
1-2531h  
YLCA/YLHA PLUS 5, 7, 9 MC and M  
230.1.50

| UNIT | Q2 | I   |
|------|----|-----|
| 5    | 20 | 2,5 |
| 7    | 25 | 4   |
| 9    | 35 | 6   |

- \* (1) Alarm. contact normally open free of voltage (maximum 3A.resistive)
- \* (2) Outdoor temperature probe in units with LAK (NTC)  
Battery temperature probe in standard units (NTC)
- \* (3) Ratiometric pressure transducer in units with LAK  
Outdoor temperature probe in standard units (NTC)
- \* (4) Only MC units
- \* (5) Only YLHA units

|       |   |        |  |
|-------|---|--------|--|
| a     | Green wire  | FS     | Water flow switch (MC units)   |
| b     | White wire  | FSC    | Fan speed controller   |
| c     | Black wire  | HTP    | Heater thermal protection  |
| A     | Electronic control  | HP     | High-pressure switch (41 bar)  |
| B     | The components in the box are standard accessories supplied by the manufacturer | K1     | Compressor contactor   |
| C     | The components in the box are not supplied by the manufacturer                  | K2     | Auxiliary heater contactor   |
| D, M1 | Compressor  | LAK    | Presostatic Low Ambient Kit accessory                                    |
| E, AH | Auxiliary heater  | LP     | Low pressure switch (2,5 bar)  |
| F, M3 | Pump (MC units)   | L1     | Line phase   |
| H     | Install on site   | M2     | Fan motor  |
| I     | "B" mm <sup>2</sup> Cu  | MS     | Main switch  |
| AH    | Auxiliary heater  | N      | Neutral  |
| B1    | Water inlet temperature probe (NTC)   | Q1     | Thermal magnetic protector   |
| B2    | Water outlet temperature probe (NTC)  | Q2     | General / compressor thermal magnetic protector                          |
| B3    | Temperature probe *(2)  | Q3     | General thermal magnetic protector, 230V / fan / pump / crankcase heater |
| B4    | *(3)  | R00    | Remote ON / OFF switch   |
| C1    | Compressor condenser  | RCH    | Remote COOL / HEAT switch  |
| C2    | Fan condenser   | T      | Transformer 230 / 24V 20 VA  |
| F1    | Electronic control protection fuse / 24 V [315 mA SLOW] switching               | V4V, G | 4-way valves (on YLHA only)  |
| F2    | Fan speed controller fuse   |        |  |

## 2.2 Electric circuit diagram YLCA/YLHA PLUS 12 MC and M (230.1.50)



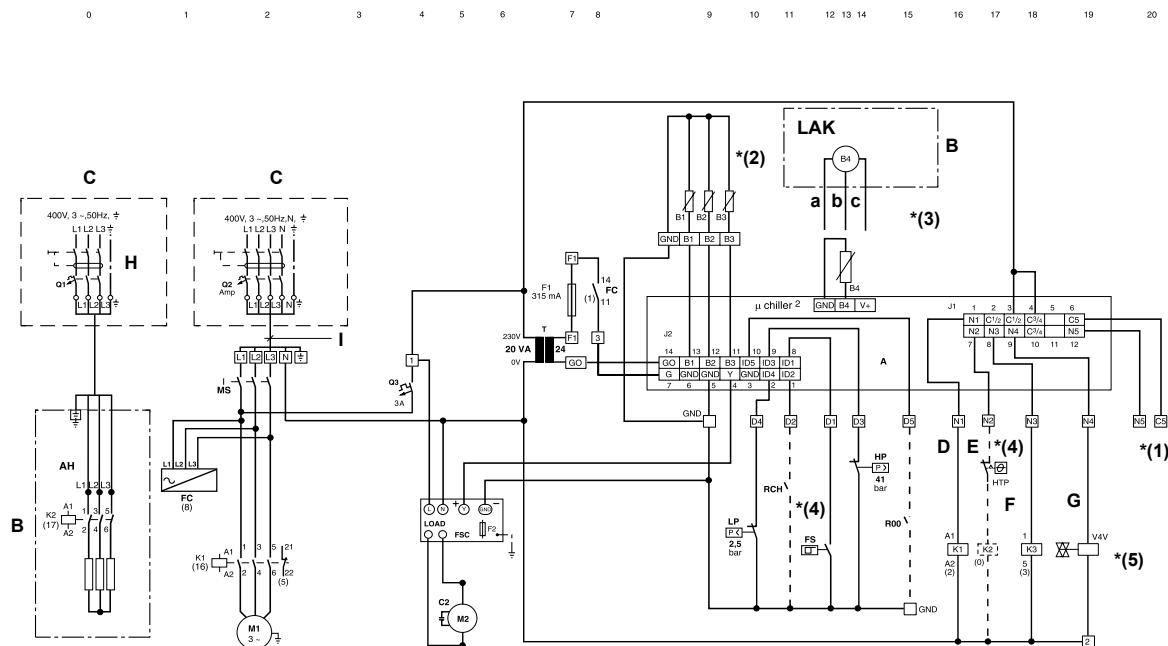
I-2584c  
YLCA/YLHA PLUS 12, 15 TC and T  
400.3.50

- \* (1) Alarm. Contact normally open free of voltage (maximum 3A.resistive)
- \* (2) Outdoor temperature probe in units with LAK (NTC)  
Battery temperature probe in standard units (NTC)
- \* (3) Ratiometric pressure transducer in units with LAK  
Outdoor temperature probe in standard units (NTC)
- \* (4) Only MC units
- \* (5) Only YLHA units

|        |   |        |  |
|--------|---|--------|--|
| a      | Green wire  | FSC    | Fan speed controller   |
| b      | White wire  | HTP    | Heater thermal protection  |
| c      | Black wire  | HP     | High-pressure switch (41 bar)  |
| 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                  | LAK    | Presostatic Low Ambient Kit accessory                                    |
| D, M1  | Compressor  | LP     | Low pressure switch (2,5 bar)  |
| E, AH  | Auxiliary heater  | L1     | Line voltage   |
| F, M4  | Pump (MC units)   | M2, M3 | Fan motors   |
| H      | Install on site   | MS     | Main switch  |
| I      | 10 mm <sup>2</sup> Cu   | N      | Phase  |
| B1     | Water inlet temperature probe (NTC)   | Q1     | Auxiliary heater thermal magnetic protector                              |
| B2     | Water outlet temperature probe (NTC)  | Q2     | General / compressor thermal magnetic protector                          |
| B3     | Temperature probe *(2)  | Q3     | General thermal magnetic protector, 230V / fan / pump / crankcase heater |
| B4     | *(3)  | Q4     | Pump thermal magnetic protector (MC units)                               |
| C1     | Compressor condenser  | R00    | Remote ON / OFF switch   |
| C2, C3 | Fan condensers  | RCH    | Remote COOL / HEAT switch  |
| F1     | Electronic control protection fuse / 24 V [315 mA SLOW] switching               | T      | Transformer 230 / 24V 20 VA  |
| F2     | Fan speed controller fuse   | V4V, G | 4-way valves (on YLHA only)  |
| FS     | Water flow switch (MC units)  |        |  |



## 2.3 Electric circuit diagram YLCA/YLHA PLUS 7 and 9 TC and T (400.3.50)



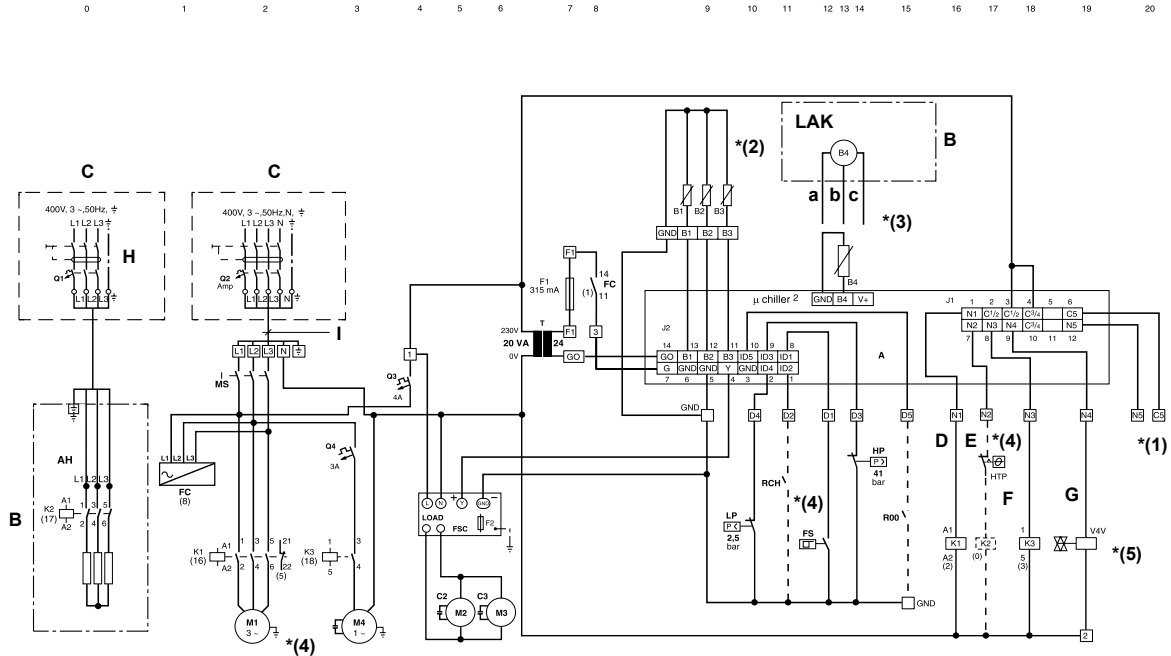
I-2545g  
YLCA/YLHA PLUS 7, 9 TC and T  
400.3.50

| UNIT | Q2 | I   |
|------|----|-----|
| 7    | 10 | 2,5 |
| 9    | 10 | 2,5 |

- \* (1) Alarm. Contact normally open free of voltage (maximum 3A.resistive)
- \* (2) Outdoor temperature probe in units with LAK (NTC)  
Battery temperature probe in standard units (NTC)
- \* (3) Ratiometric pressure transducer in units with LAK  
Outdoor temperature probe in standard units (NTC)
- \* (4) Only TC units
- \* (5) Only YLHA units

|       |   |            |  |
|-------|---|------------|--|
| a     | Green wire  | FS         | Water flow switch (TC units)   |
| b     | White wire  | FSC        | Fan speed controller   |
| c     | Black wire  | HTP        | Heater thermal protection  |
| A     | Electronic control  | HP         | High-pressure switch (41 bar)  |
| B     | The components in the box are standard accessories supplied by the manufacturer | K1         | Compressor contactor   |
| C     | The components in the box are not supplied by the manufacturer                  | K2         | Auxiliary heater contactor   |
| D, M1 | Compressor  | LAK        | Presostatic Low Ambient Kit accessory                                    |
| E, AH | Auxiliary heater  | LP         | Low pressure switch (2,5 bar)  |
| F, M3 | Pump (TC units)   | L1, L2, L3 | Line phases  |
| H     | Install on site   | M2         | Fan motor  |
| I     | "B" mm <sup>2</sup> Cu  | MS         | Main switch  |
| AH    | Auxiliary heater  | N          | Neutral  |
| B1    | Water inlet temperature probe (NTC)   | Q1         | Auxiliary heater thermal magnetic protector                              |
| B2    | Water outlet temperature probe (NTC)  | Q2         | General / compressor thermal magnetic protector                          |
| B3    | Temperature probe *(2)  | Q3         | General thermal magnetic protector, 230V / fan / pump / crankcase heater |
| B4    | *(3)  | R00        | Remote ON / OFF switch   |
| C2    | Fan condenser   | RCH        | Remote COOL / HEAT switch  |
| F1    | Electronic control protection fuse / 24 V [315 mA SLOW] switching               | T          | Transformer 230 / 24V 20 VA  |
| F2    | Fan speed controller fuse   | V4V, G     | 4-way valves (on YLHA only)  |
| FC    | Phase control   |            |  |

## 2.4 Electric circuit diagram YLCA/YLHA PLUS 12 and 15 TC and T (400.3.50)



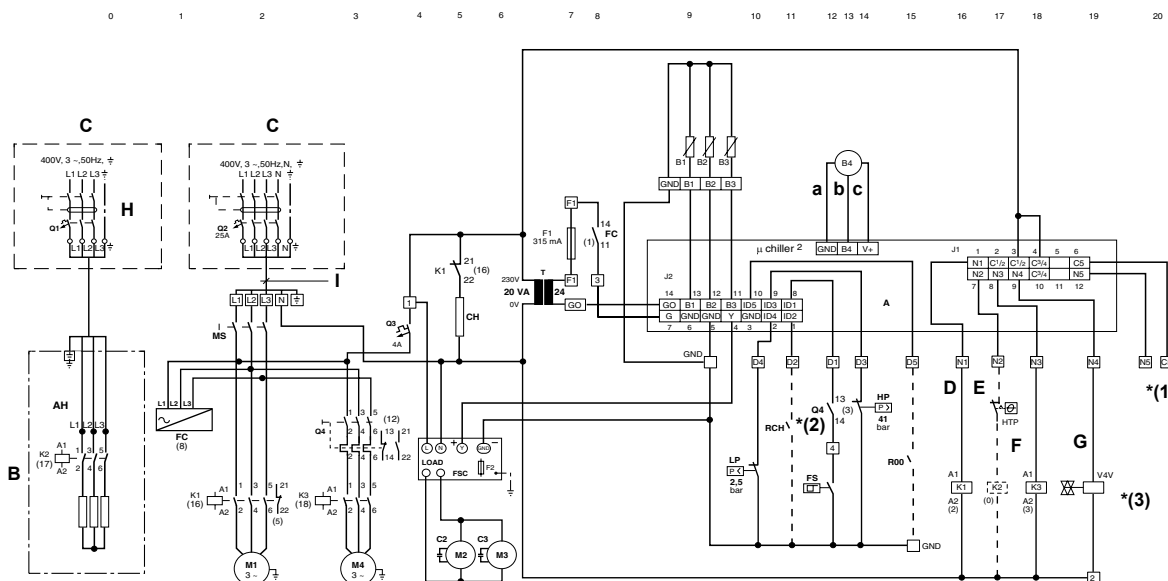
I-2533  
YLCA/YLHA PLUS 12, 15 TC and T  
400.3.50

| UNIT | Q2 | I   |
|------|----|-----|
| 12   | 16 | 2,5 |
| 15   | 16 | 2,5 |

- \* (1) Alarm. Contact normally open free of voltage (maximum 3A.resistive)
- \* (2) Outdoor temperature probe in units with LAK (NTC)  
Battery temperature probe in standard units (NTC)
- \* (3) Ratiometric pressure transducer in units with LAK  
Outdoor temperature probe in standard units (NTC)
- \* (4) Only TC units
- \* (5) Only YLHA units

|        |   |            |  |
|--------|---|------------|--|
| a      | Green wire  | FSC        | Fan speed controller   |
| b      | White wire  | HTP        | Heater thermal protection  |
| c      | Black wire  | HP         | High-pressure switch (41 bar)  |
| 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, M1  | Compressor  | LAK        | Presostatic Low Ambient Kit accessory                                    |
| E, AH  | Auxiliary heater  | LP         | Low pressure switch (2,5 bar)  |
| F, M4  | Pump (TC units)   | L1, L2, L3 | Line phases  |
| H      | Install on site   | M2, M3     | Fan motor 1 and 2  |
| I      | "B" mm <sup>2</sup> Cu  | MS         | Main switch  |
| AH     | Auxiliary heater  | N          | Neutral  |
| B1     | Water inlet temperature probe (NTC)   | Q1         | Auxiliary heater thermal magnetic protector                              |
| B2     | Water outlet temperature probe (NTC)  | Q2         | General / compressor thermal magnetic protector                          |
| B3     | Temperature probe *(2)  | Q3         | General thermal magnetic protector, 230V / fan / pump / crankcase heater |
| B4     | *(3)  | Q4         | Pump magneto-thermal protector (TC units)                                |
| C2, C3 | Fan condenser   | R00        | Remote ON / OFF switch   |
| F1     | Electronic control protection fuse / 24 V [315 mA SLOW] switching               | RCH        | Remote COOL / HEAT switch  |
| F2     | Fan speed controller fuse   | T          | Transformer 230 / 24V 20 VA  |
| FC     | Phase control   | V4V, G     | 4-way valves (on YLHA only)  |
| FS     | Water flow switch (TC units)  |            |  |

## 2.5 Electric circuit diagram YLCA/YLHA PLUS 20 TC and T (400.3.50)

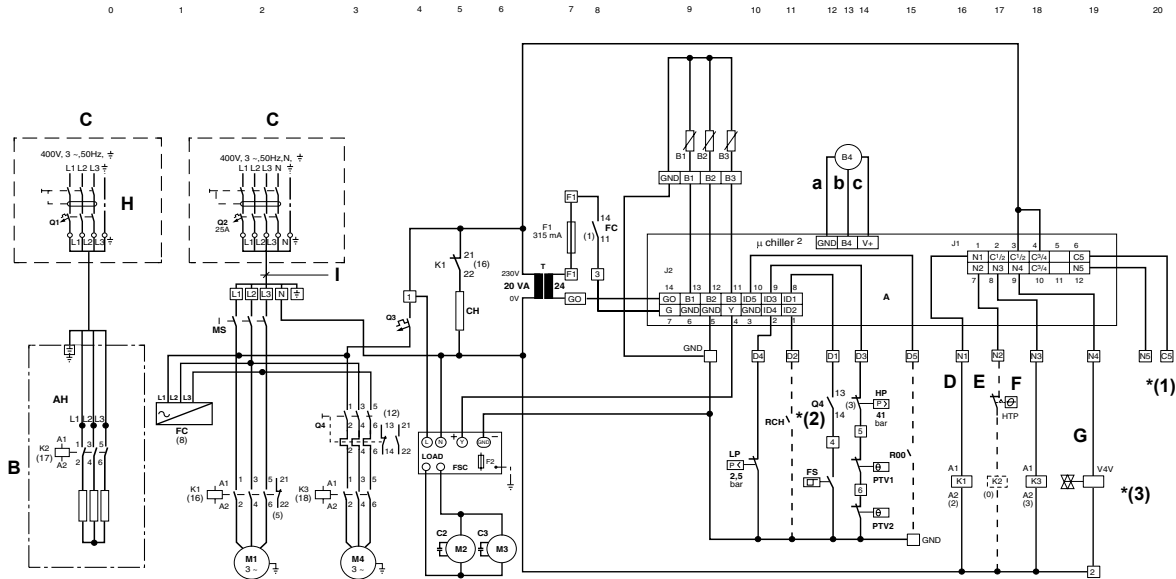


I-2534g  
YLCA/YLHA PLUS 20 TC and T  
400.3.50

- \* (1) Alarm. Contact normally open free of voltage (maximum 3A.resistive)
- \* (2) Only TC units
- \* (3) Only YLHA units

|        |   |            |  |
|--------|---|------------|--|
| a      | Green wire  | FS         | Water flow switch (TC units)   |
| b      | White wire  | FSC        | Fan speed controller   |
| c      | Black wire  | HTP        | Heater thermal protection  |
| A      | Electronic control  | HP         | High-pressure switch (41 bar)  |
| B      | The components in the box are standard accessories supplied by the manufacturer | K1         | Compressor contactor   |
| C      | The components in the box are not supplied by the manufacturer                  | K2         | Auxiliary heater contactor   |
| D, M1  | Compressor  | K3         | Pump contactor (TC units)  |
| E, AH  | Auxiliary heater  | LAK        | Presostatic Low Ambient Kit accessory                                    |
| F, M4  | Pump (TC units)   | LP         | Low pressure switch (2,5 bar)  |
| H      | Install on site   | L1, L2, L3 | Line phases  |
| I      | 4 mm <sup>2</sup> Cu  | M2, M3     | Fan motor 1 and 2  |
| AH     | Auxiliary heater  | MS         | Main switch  |
| B1     | Water inlet temperature probe (NTC)   | N          | Neutral  |
| B2     | Water outlet temperature probe (NTC)  | Q1         | Auxiliary heater thermal magnetic protector                              |
| B3     | Outdoor temperature probe (NTC)   | Q2         | General / compressor thermal magnetic protector                          |
| B4     | Fan / defrost speed control ratiometric pressure probe                          | Q3         | General thermal magnetic protector, 230V / fan / pump / crankcase heater |
| C2, C3 | Fan condenser   | Q4         | Pump magneto-thermal protector (TC units)                                |
| CH     | Compressor crankcase heater   | R00        | Remote ON / OFF switch   |
| F1     | Electronic control protection fuse / 24 V [315 mA SLOW] switching               | RCH        | Remote COOL / HEAT switch  |
| F2     | Fan speed controller fuse   | T          | Transformer 230 / 24V 20 VA  |
| FC     | Phase control   | V4V, G     | 4-way valves (on YLHA only)  |

## 2.6 Electric circuit diagram YLCA 27 TC, YLHA PLUS 27 (400.3.50)



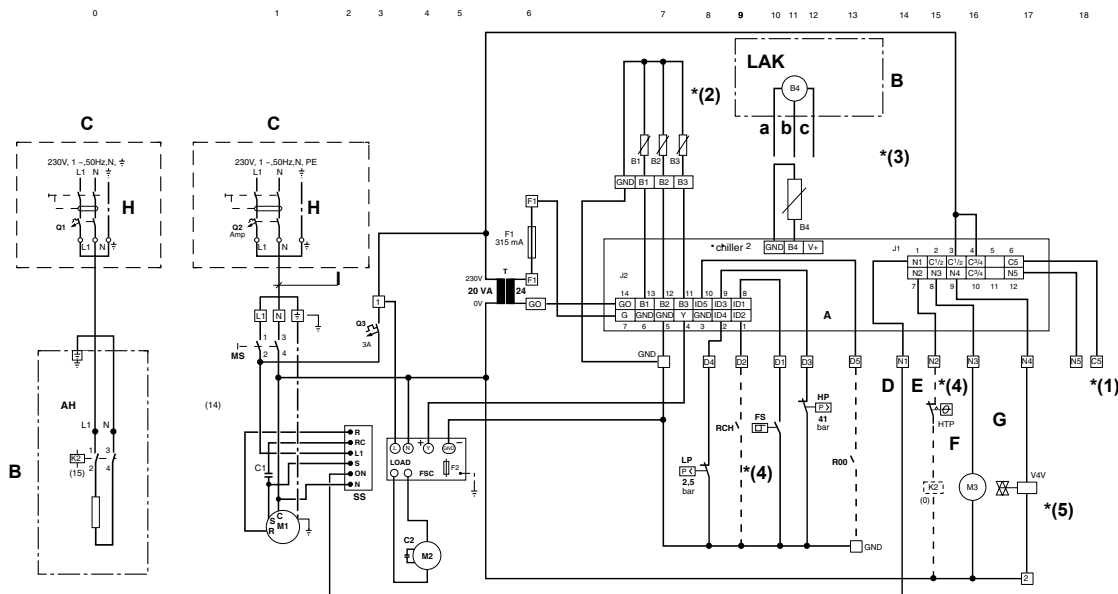
I-25651  
YLCA 27 TC  
YLHA PLUS 27  
400.3.50

- \* (1) Alarm. Contact normally open free of voltage (maximum 3A.resistive)
- \* (2) Only TC units
- \* (3) Only YLHA units

|        |   |            |  |
|--------|---|------------|--|
| a      | Green wire  | FSC        | Fan speed controller   |
| b      | White wire  | HTP        | Heater thermal protection  |
| c      | Black wire  | HP         | High pressure switch (41 bar)  |
| 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, M1  | Compressor  | LAK        | Presostatic Low Ambient Kit accessory                                    |
| E, AH  | Auxiliary heater  | LP         | Low pressure switch (2,5 bar)  |
| F, M4  | Pump (TC units)   | L1, L2, L3 | Line phases  |
| H      | Install on site   | M2, M3     | Fan motor 1 and 2  |
| I      | 8 mm <sup>2</sup> Cu  | MS         | Main switch  |
| AH     | Auxiliary heater  | N          | Neutral  |
| B1     | Water inlet temperature probe (NTC)   | PTV1, PTV2 | Fan heat switch  |
| B2     | Water outlet temperature probe (NTC)  | Q1         | Auxiliary heater thermal magnetic protector                              |
| B3     | Outdoor temperature probe (NTC)   | Q2         | General / compressor thermal magnetic protector                          |
| B4     | Fan / defrost speed control ratiometric pressure probe                          | Q3         | General thermal magnetic protector, 230V / fan / pump / crankcase heater |
| C2, C3 | Fan condenser   | Q4         | Pump magneto-thermal protector (TC units)                                |
| CH     | Compressor crankcase heater   | R00        | Remote ON / OFF switch   |
| F1     | Electronic control protection fuse / 24 V [315 mA SLOW] switching               | RCH        | Remote COOL / HEAT switch  |
| F2     | Fan speed controller fuse   | T          | Transformer 230 / 24V 20 VA  |
| FC     | Phase control   | V4V, G     | 4-way valves (on YLHA only)  |
| FS     | Water flow switch (TC units)  |            |  |



## 2.7 Electric circuit diagram YLCA PLUS 5 ÷ 9 MCS (230.1.50) SOFT START



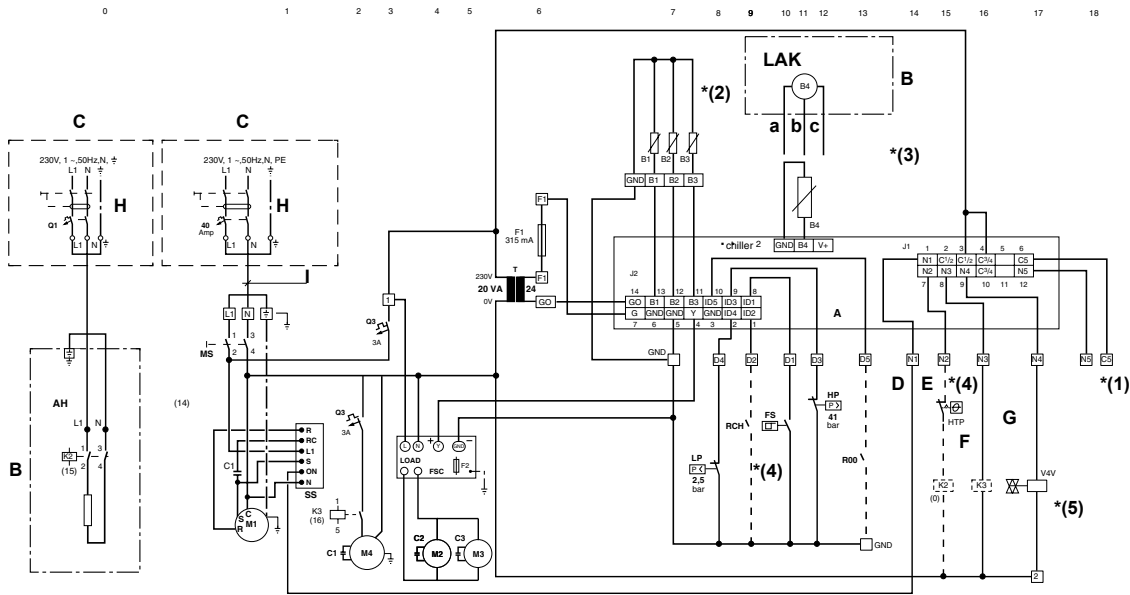
I-2582b  
YLCA PLUS 5, 7, 9 MCS  
230.1.50

| UNIT | Q2 | I   |
|------|----|-----|
| 5    | 20 | 2,5 |
| 7    | 25 | 4   |
| 9    | 32 | 6   |

- \* (1) Alarm. contact normally open free of voltage (maximum 3A.resistive)
- \* (2) Outdoor temperature probe in units with LAK (NTC)  
Battery temperature probe in standard units (NTC)
- \* (3) Ratiometric pressure transducer in units with LAK  
Outdoor temperature probe in standard units (NTC)
- \* (4) Only MC units
- \* (5) Only YLHA units

|       |   |        |  |
|-------|---|--------|--|
| a     | Green wire  | F2     | Fan speed controller fuse  |
| b     | White wire  | FS     | Water flow switch (MC units)   |
| c     | Black wire  | FSC    | Fan speed controller   |
| A     | Electronic control  | HTP    | Heater thermal protection  |
| B     | The components in the box are standard accessories supplied by the manufacturer | HP     | High-pressure switch (41 bar)  |
| C     | The components in the box are not supplied by the manufacturer                  | K2     | Auxiliary heater contactor   |
| D, M1 | Compressor  | LAK    | Presostatic Low Ambient Kit accessory                                    |
| E, AH | Auxiliary heater  | LP     | Low pressure switch (2,5 bar)  |
| F, M3 | Pump (MC units)   | L1     | Line phase   |
| H     | Install on site   | M2     | Fan motor  |
| I     | "B" mm <sup>2</sup> Cu  | MS     | Main switch  |
| AH    | Auxiliary heater  | N      | Neutral  |
| B1    | Water inlet temperature probe (NTC)   | Q1     | Thermal magnetic protector   |
| B2    | Water outlet temperature probe (NTC)  | Q2     | General / compressor thermal magnetic protector                          |
| B3    | Temperature probe *(2)  | Q3     | General thermal magnetic protector, 230V / fan / pump / crankcase heater |
| B4    | *(3)  | R00    | Remote ON / OFF switch   |
| C1    | Compressor condenser  | RCH    | Remote COOL / HEAT switch  |
| C2    | Fan condenser   | T      | Transformer 230 / 24V 20 VA  |
| F1    | Electronic control protection fuse / 24 V [315 mA SLOW] switching               | V4V, G | 4-way valves (on YLHA only)  |

# 2.8 Electric circuit diagram YLCA PLUS 12 MCS (230.1.50) SOFT START



I-2583d  
YLCA PLUS 12 MCS  
230.1.50

- \* (1) Alarm. contact normally open free of voltage (maximum 3A.resistive)
- \* (2) Outdoor temperature probe in units with LAK (NTC)  
Battery temperature probe in standard units (NTC)
- \* (3) Ratiometric pressure transducer in units with LAK  
Outdoor temperature probe in standard units (NTC)
- \* (4) Only MC units
- \* (5) Only YLHA units

|        |   |        |  |
|--------|---|--------|--|
| a      | Green wire  | FSC    | Fan speed controller   |
| b      | White wire  | HTP    | Heater thermal protection  |
| c      | Black wire  | HP     | High-pressure switch (41 bar)  |
| A      | Electronic control  | K2     | Auxiliary heater contactor   |
| B      | The components in the box are standard accessories supplied by the manufacturer | K3     | Pump contactor (TC units)  |
| C      | The components in the box are not supplied by the manufacturer                  | LAK    | Presostatic Low Ambient Kit accessory                                    |
| D, M1  | Compressor  | LP     | Low pressure switch (2,5 bar)  |
| E, AH  | Auxiliary heater  | L1     | Line phase   |
| F, M4  | Pump (MC units)   | M2, M3 | Fan motor  |
| H      | Install on site   | MS     | Main switch  |
| I      | 10 mm <sup>2</sup> Cu   | N      | Neutral  |
| AH     | Auxiliary heater  | Q1     | Auxiliary heater thermal magnetic protector                              |
| B1     | Water inlet temperature probe (NTC)   | Q2     | General / compressor thermal magnetic protector                          |
| B2     | Water outlet temperature probe (NTC)  | Q3     | General thermal magnetic protector, 230V / fan / pump / crankcase heater |
| B3     | Temperature probe *(2)  | R00    | Remote ON / OFF switch   |
| B4     | *(3)  | RCH    | Remote COOL / HEAT switch  |
| C2, C3 | Fan condenser   | SS     | Gentle starter   |
| F1     | Electronic control protection fuse / 24 V [315 mA SLOW] switching               | T      | Transformer 230 / 24V 20 VA  |
| F2     | Fan speed controller fuse   | V4V, G | 4-way valves (on YLHA only)  |
| FS     | Water flow switch (MC units)  |        |  |