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04 - 2009

Aqualis 2

MICROCONNECT

*Installation
Operation
Commissioning
Maintenance*



CONTENTS	PAGE
1) GENERAL	
1.1 Introduction	2
1.2 Unpacking the equipment	2
1.3 Identifying the equipment	2
1.4 Warranty	2
1.5 Safety recommendation	2
1.6 Declaration of conformity	2
2) INSTALLATION	
2.1 Location of the control terminal and the heat pump	3
2.1.1 Location of the control terminal	3
2.1.2 Location of the unit	4
2.1.3 Weight and handling	5
2.1.4 Dimensions	5
2.2 Hydraulic connections	6
2.2.1 Pipe connections	6
2.2.2 Installing the filter	6
2.2.3 Installing the hoses	6
2.2.4 Safety valve	6
2.2.5 Condensate water	7
2.2.6 Noise transmission	7
2.2.7 Connection diagrams	7 - 8
2.2.8 Frost protection	9 - 10
2.3 Electrical connections	10 - 12
3) COMMISSIONING	
3.1 Checks	12
3.2 Starting the unit	12
3.3 Bleeding the air	13
3.4 Differential water pressure switch	13
4) SERVICING AND MAINTENANCE	
4.1 Aqualis 2 operating readings	14
5) CONTROL	
5.1 Overview	15
5.2 The terminal unit and its display	15
5.2.1 Display on the terminal unit screen	15
5.2.2 Position of the dial (No. 14) on the terminal unit	16
5.2.3 Accessing the settings	16 - 18
5.3 Operating modes	19
5.4 Auxiliaries	19
5.4.1 Electrical auxiliary unit P6 = 1 or 2	20
5.4.2 Using a boiler as a backup	20
5.5 On/Off control inputs	21
5.5.1 Turning off (or "bypassing") your heat pump or the terminals via remote control	21
5.5.2 Turning on the frost protection via remote control: P2 = 2	21
5.5.3 Turning on cooling or heating mode remotely: P2=1	21
5.6 Control board	22
5.7 Components	23
5.7.1 External fans	23
5.7.2 Reversing valve	23
5.7.3 Condensate drain pain heater cable	23
5.7.4 Circulator	23
5.8 Functions	24
5.8.1 Automatic restart	24
5.8.2 Short-cycle protection	24
5.8.3 Automated self-regulating control	24
5.8.4 Low-noise operation	24
5.9 Options	24
5.9.1 Swimming pool control	24
5.9.2 Humidity sensor	24
5.9.3 Domestic hot water heating	24
5.9.4 Heat trace cable	24
6) FAULTS	
6.1 Temporary and permanent	25
6.2 Tables	25
6.3 Acknowledging faults	26
6.4 Sensor values	26
6.5 Compressor operating limits	26
7) SPECIFICATIONS	
7.1 Technical specifications	27
7.2 Hydraulic module schematic	27
7.3 Available pressure curves (pure water)	28
8) TEST MODE	28

1. GENERAL

1.1 Introduction

CIAT thanks you for your confidence.

This high-tech “**NF**” certified heat pump uses the latest R410A refrigerant and will provide you with many years of comfort at the lowest cost.

This manual provides you with the information needed to get the most from your installation and to perform the servicing needed to extend the life of your heat pump.

AQUALIS 2 air-to-water geothermal heat pumps are high-temperature packaged outdoor units. Each comes equipped as standard with:

- Low-noise scroll compressor.
- Brazed-plate heat exchanger.
- Air-cooled condenser.
- Variable-speed axial fans (cooling and heating).
- Hydraulic accessories.
- Complete electronic control.

They are factory tested and checked and are delivered charged with R410A refrigerant.

1.2 Unpacking the equipment

Check the unit for any damage or missing components upon delivery.

Make mention of any damaged or missing parts on the delivery slip.

NOTE: you must notify the carrier of any damage and/or missing parts by registered letter within three days of the delivery date.

1.3 Identifying the equipment

A legible and indelible data plate listing the specifications of the unit is affixed in a visible location on the unit.

The information on the plate (**particularly the description and the serial number**) must be quoted in all correspondence.

1.4 Warranty

For information on obtaining service under the CIAT warranty, please refer to the general terms and conditions of sale.

1.5 Safety recommendation

To protect against accidents while installing, commissioning and adjusting the unit, the following parameters must be kept in mind:

- pressurised refrigeration circuit
- presence of refrigerant
- presence of voltage
- location
- surface temperature as high as 150°C

Only experienced and qualified persons may work on this equipment. The recommendations and instructions given in the maintenance instructions and the special instructions on the labels must be followed.

Always comply with applicable standards and regulations.

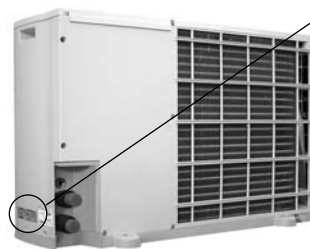
IMPORTANT: make sure the power supply has been cut off before working on the unit.



Ref. Product/Item Nbr.	Designation/Description
2005... (00560786.0007)	AQUALIS 28H 1X230V R410A
Refrigerant	R410A
Refrigerant kg	1.8
BP.L.P Min/ PSM.MOP	1.8/2.3
HP Max. PSM.MOP	41.5 BAR
Int. No. Elect.	21
No. CE	43
Int. No. Elect.	21
No. CE	43

CIAT 30 av Jean Falconnier 01350 CULOZ tel: 33 (0)4 79 42 42 42 www.ciat.com

CE NF Heat Pump Application 38°C



1.6 Declaration of conformity

ENGLISH DECLARATION OF CONFORMITY

The manufacturer: CIAT
Avenue Jean Falconnier
Boite Postale N°14
01350 CULOZ - FRANCE
hereby certifies that the following machine:

AQUALIS 2

conforms to the requirements of following Directives
(EMC Directive 2004/108/EC)
(LV Directive 2006/95/EC)
(PE Directive 97/23/EC)
and the national laws transposing them.

30/10/07

Frédéric Bruyère
Cooling Department Manager.

2. INSTALLATION

2.1 Location of the control terminal and the heat pump

2-1-1 Location of the control terminal

On delivery, the control terminal can be found inside the machine, near the electrical box (open top to access it).

Specifications



- Settings stored in memory for two hours following a power cut
- Blue backlit digital display
- Maximum dimensions: 128 x 85 x 31 mm
- Wall mounting plate
- Protection rating: IP 30
- Operating temperature limits: -15°C to +50°C
- Power supply: 12 V DC +/- 0.5 V
- Maximum consumption: 25 mA
- Class II insulation

Installation

Selecting a location

In most cases, the control terminal should be placed in **the room in which the atmosphere is to be controlled**.

The terminal also works as a room thermostat and thus plays an active role in controlling the unit.

However, special applications (e.g. industrial, process) may require water temperature control. If so, the terminal may be located anywhere without affecting control (see paragraph under table on page 21).

Location in room

The terminal should be installed at a recommended height of 1.5 m and at an accessible location away from sources of heat (e.g. chimney, sunlight) and draughts (windows, doors) (Fig. 1)

Mounting

First detach the terminal from its mounting plate, as shown in Fig. 2).

Then attach the mounting plate to a wall using the screws and anchor bolts or a flush-mount box (60 mm centre distance) using the holes ❶ (Fig. 2).

To do so, loosen the screw ❷ (Fig. 3) and remove the terminal block cover ❸.

If necessary, remove the knockouts ❸ (Fig. 3) to route through the connection cable.

Connection

- Attach the two wires to the terminal (Fig. 4).

- Replace the terminal cover ❸ and fasten it in place with the screw ❷ (Fig. 3).

- Place the thermostat on its mounting plate. To do so, first insert the tabs ❹ (Fig. 3) then push down on the thermostat until it snaps into place.

- Connect the two wires between the thermostat and the control board on terminal block J2 on the unit's control board (Fig. 5).

- Cable length < 50 m maximum — cable cross-section: AWG 16 to 28;
or $0.2 \text{ mm}^2 < S < 1.5 \text{ mm}^2$.

Fig. 1

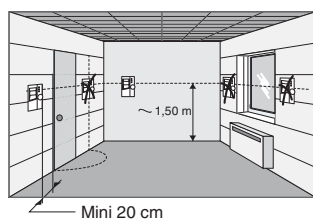


Fig. 2

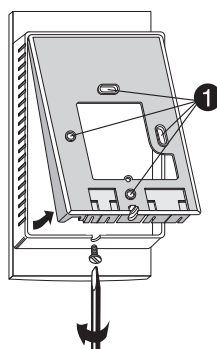


Fig. 3

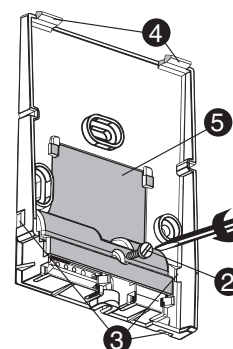


Fig. 4

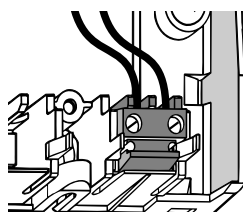
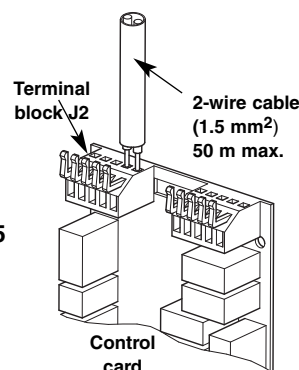


Fig. 5



2-1-2 Location of the heat pump

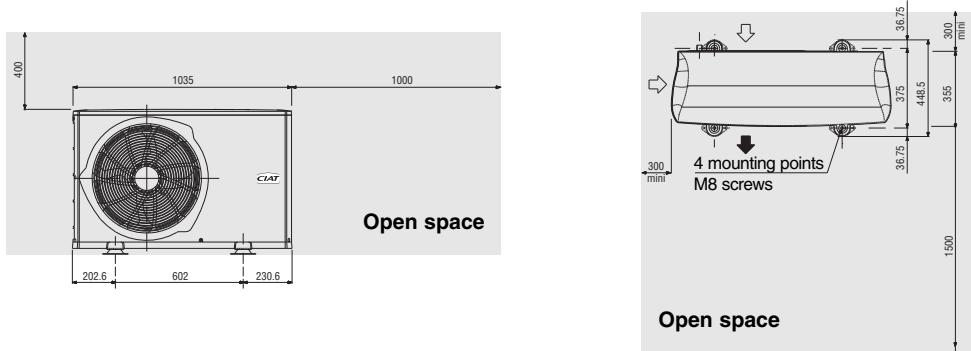
The installer must check the following points before handling, placing or connecting the unit:

- The unit is intended for use outdoors, near a building, on a deck/patio or in a garden.

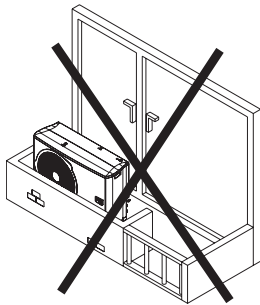
Although it is rain resistant, it may be installed under a shelter with adequate ventilation on all four sides.

If you plan on heating more than cooling, place the unit in a sunny location. If you plan on heating only a little, face the unit northwards.

- The ground or surface on which the unit is placed must be strong enough to support the weight of the unit.
- Position the unit above the average snow depth for the region where the unit is installed.
- The unit must be perfectly level.
- Leave sufficient room around the unit to allow easy access for servicing and maintenance.

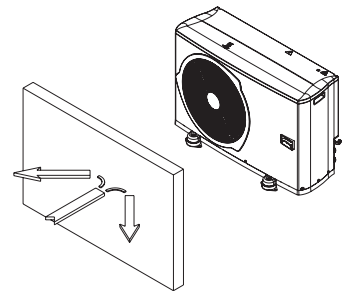


Nothing should obstruct the free flow of air over the air-cooled heat exchanger (suction and discharge).



Nothing should obstruct
the free flow of air over the air-cooled heat exchanger
(suction and discharge).

Protect from prevailing winds



2-1-2-1 Rules for preventing the transmission of noise

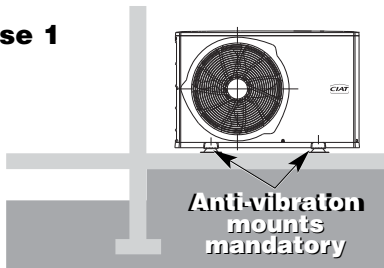
Our units are designed to be quiet in operation. However, before you install your heat pump you need to determine which assembly method will best reduce the amount of structure-borne (vibrations) and airborne noise.

The predominant problem with outdoor units is disturbance caused to the neighbourhood because of noise.

- Use natural barriers wherever possible (e.g. mound of earth, opaque wall) to separate the equipment as much as possible from your neighbours.
- Avoid placing the equipment adjacent to walls as they can considerably reflect noise in various directions. For your own comfort, avoid locating the equipment too close to sensitive areas (such as bedroom windows).

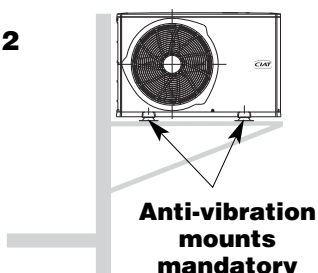
2-1-2-2 Mounting possibilities

Case 1

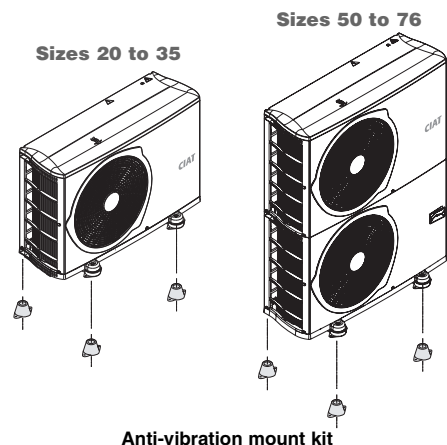


Case 1: if the heat pump is placed on a concrete pad touching the foundation of your home, you must use anti-vibration mounts to prevent the transmission of noise indoors.

Case 2



Case 2: if the heat pump is mounted on a wall bracket, you must use anti-vibration mounts to reduce the amount of noise transmitted indoors. However, this is not the best acoustic solution.



2-1-2-3 Pipe and hose recommendations

To avoid transmitting noise indoors, make sure that hoses and flexible connections passing through walls are not in direct contact with any masonry and are fitted with pipe supports lined with vibration-damping material.

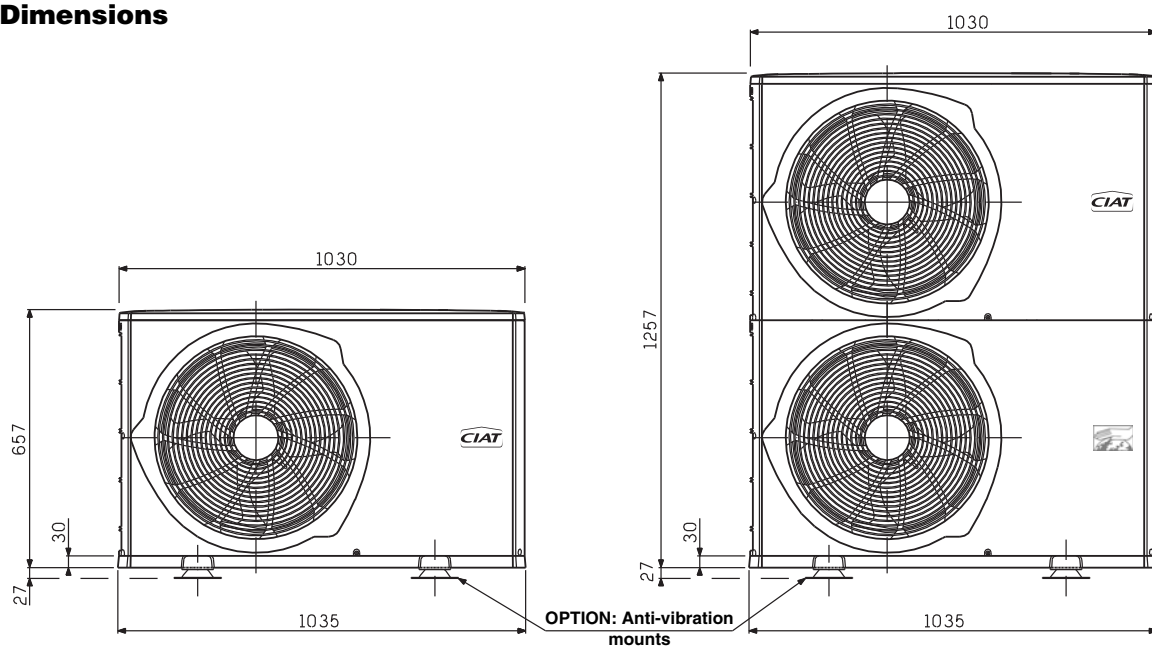
2-1-3 Weight and handling

Now that you have chosen a location for your unit, you may begin installing it. Bear in mind the weight and dimensions given in this section.

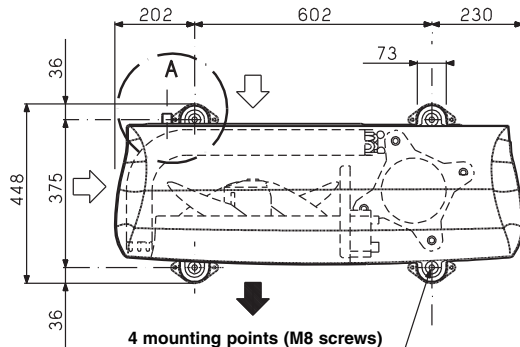
Caution: raise the unit carefully and keep it vertical.

Model	20/20 H(T)	28/28 H(T)	35 / 35H	35T / 35HT	50H	50T / 50HT	65T / 65HT	75T / 75HT
Weight without charge (kg)	73	79	82	82	120	120	139	142
Weight with charge (kg)	82	88	91	91	135	135	150	153

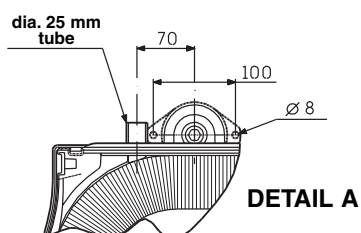
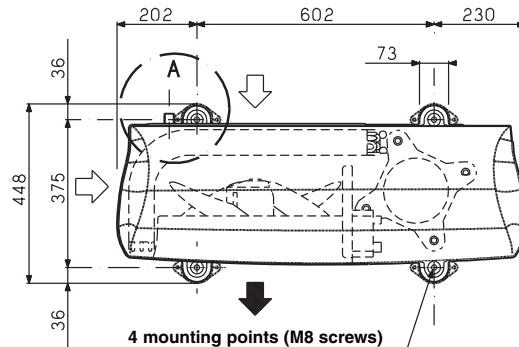
2-1-4 Dimensions



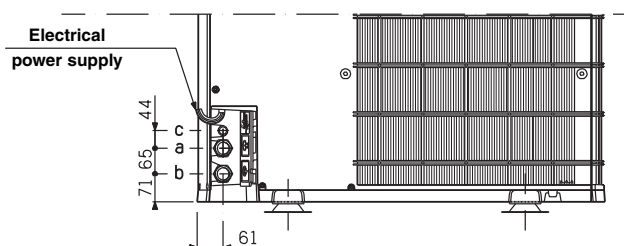
MODELS : 20 / 28 / 35



MODELS : 50 / 65 / 75



REAR VIEW

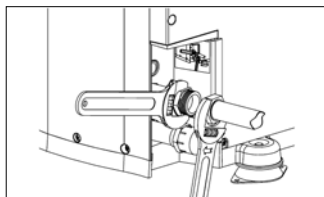


2.2 Hydraulic connections

In order to meet the operating conditions (*flow rates, pressure losses*), a sizing calculation must be performed.

The diameters of the tubes are not necessarily the same as those of the unit.

2-2-1 Pipe connections



Supply pipe connections:

Use two spanners to tighten the couplings

Diameters of water connections		
MODEL	20 / 28 / 35	50 / 65 / 75
dias. of water connections (male, gas)	1	1 1/4"

Water flow rates and connections

Aqualis 2	Minimum flow rate (m ³ /h)	Nominal flow rate (m ³ /h) <i>During cold water production</i>	Nominal flow rate (m ³ /h) <i>During hot water production</i>	Hydraulic connection Copper tube	Hydraulic connection Steel tube	Hydraulic connection PE tube (polythene)
20	0.7	0.9	1	28 x 1 DN26	26 x 34 DN25 1"	32 x 2.9
28	0.9	1.2	1.4	28 x 1 DN26	26 x 34 DN25 1"	32 x 2.9
35	1.1	1.46	1.72	32 x 1 DN30	33 x 42 DN32 1 1/4"	32 x 2.9
50	1.5	1.98	2.27	36 x 1 DN34	40 x 49 DN40 1 1/2"	40 x 3.7
65	2	2.7	2.8	38 x 1 DN36	40 x 49 DN40 1 1/2"	40 x 3.7
75	2.45	3.04	3.5	42 x 1 DN40	40 x 49 DN40 1 1/2"	50 x 4.6

Minimum diameters calculated for a water connection for your machine 15 m away from its connection to the system.

2-2-2 Installing the filter

Filter installation mandatory

Install in the direction of flow.

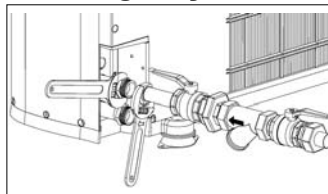
Insulate the filter or install it indoors (*protect from freezing temperatures*).

Connect the kit and filter to the return water line.

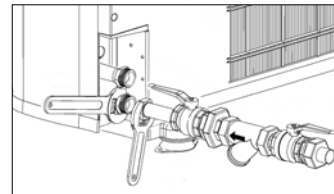
Filter mesh: 600 µm maximum



Cooling only models



Reversible models



2-2-3 Installing the hoses

The pipes and tubes should not transmit any forces. **Hoses must be used** to connect the water pipes to limit as far as possible the amount of vibrations transmitted to the building. They are obligatory if the unit is installed on anti-vibration mounts

Insulate the pipes and hoses carefully to prevent heat loss and condensation.

Always comply with the appropriate bend radius.

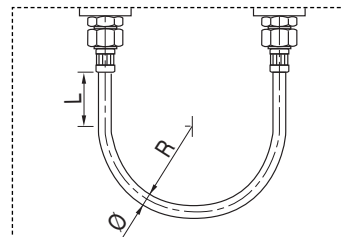
R min. > 6 x dia.

L min. < 6 x dia.

Hoses:

1": R 140 mm

1 1/4": R 172 mm



Precautions: bend the hoses at sufficiently wide angles to avoid pinching the inner tube and restricting the flow of water.

2-2-4 Safety valve

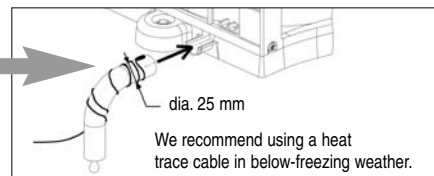
If your system is fitted with an optional electric heater a **4 bar safety valve must be placed on the water loop**. It must be installed near the heater without a shut-off valve between the two.

Important: to protect against damage and injury, keep all shut-off valves open and cut off the valve on the heating equipment (Aqualis 2, electric heater, boiler, domestic hot-water tank) when the equipment is in use.

2-2-5 Condensate water

Drainage of condensate water in heating mode

Caution: if this connection is used when the outdoor temperature drops below 0°C, necessary precautions must be taken to protect the water in the drain pipe from freezing.



2-2-6 Noise transmission

2-2-6.1 Noise transmitted by solid materials

To avoid transmitting noise throughout your interior, make sure that hoses and pipes passing through walls are not in direct contact with any masonry and use vibration-absorbing pipe supports.

2-2-6.2 Location

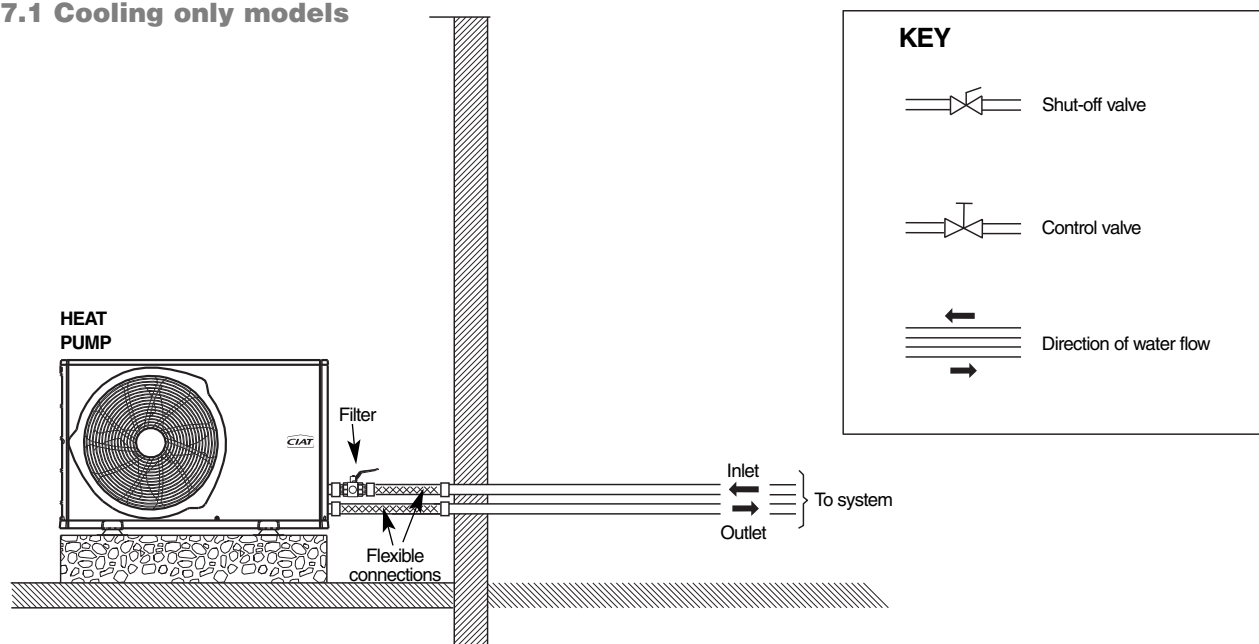
The predominant problem with outdoor units is disturbance caused to the neighbourhood because of noise.

This can be minimised by following two rules:

- Use natural barriers wherever possible (e.g. mound of earth, opaque wall) to separate the equipment as far as possible from your neighbours.
- Wherever possible, avoid placing equipment adjacent to walls. Walls can increase noise levels considerably and reflect noise in various directions. For your own comfort, avoid locating the equipment too close to sensitive areas (such as bedroom windows).

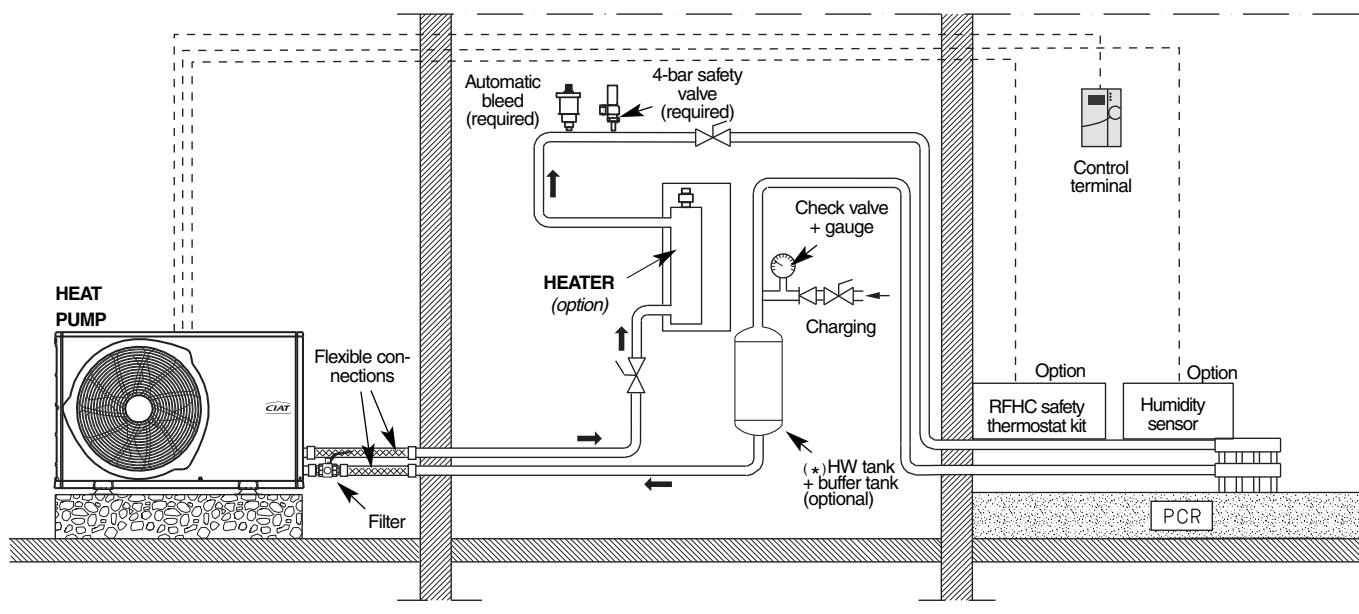
2-2-7 Connection diagrams (schematic diagrams)

2-2-7.1 Cooling only models



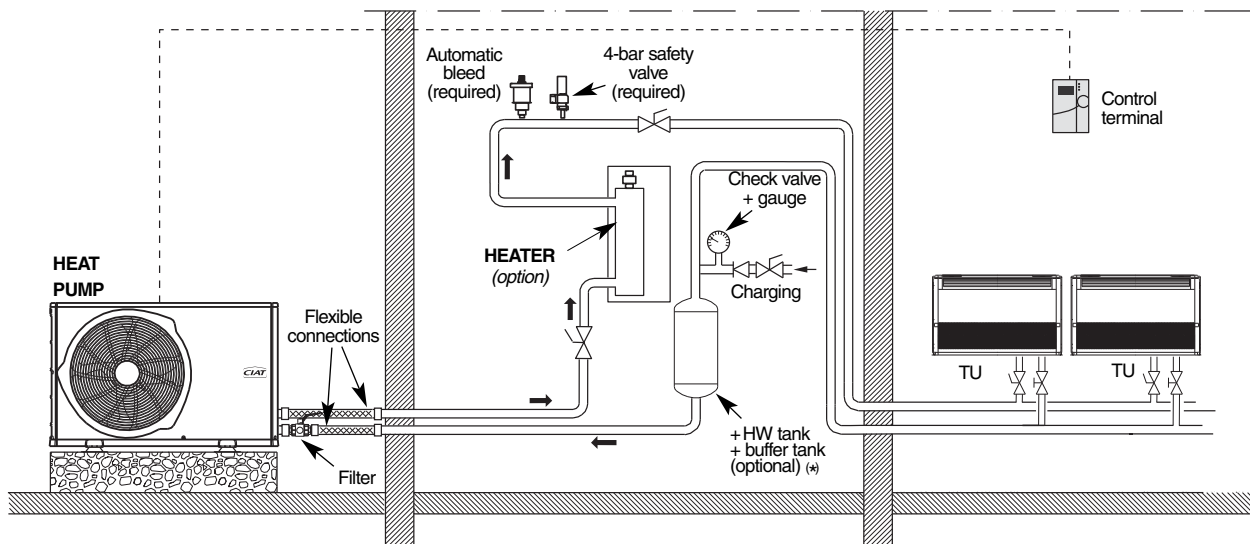
2-2-7.2 Reversible models

a - Connection to an RFHC (radiant floor heating and cooling system)



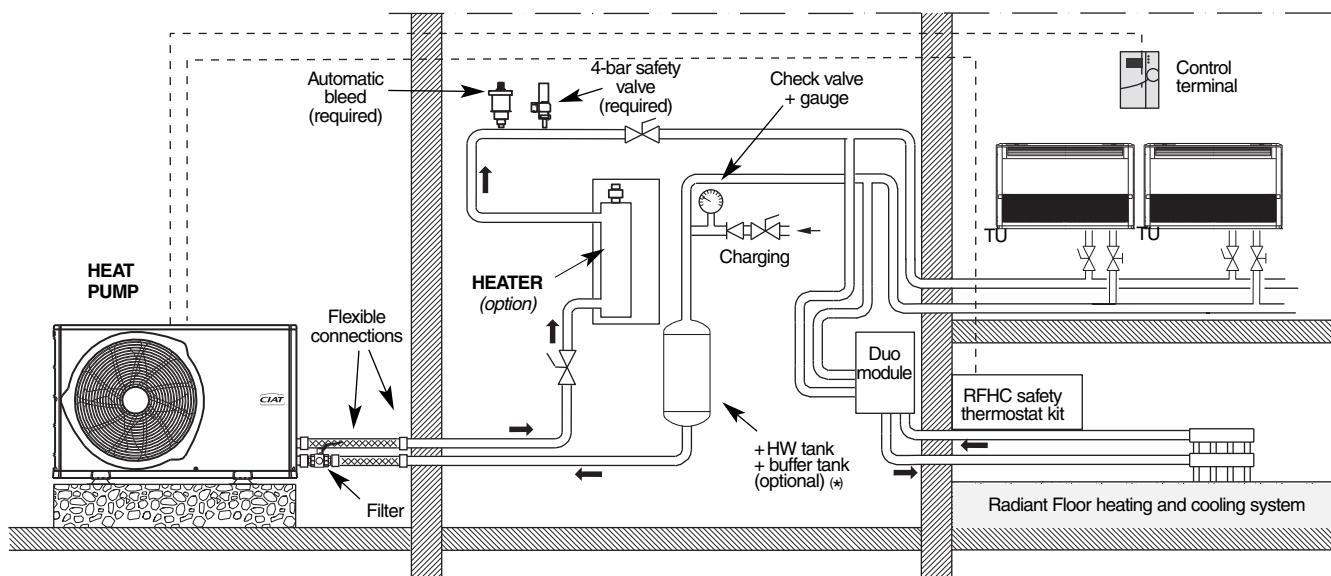
(*)An expansion vessel is necessary if the water capacity of the system is higher than that given in the **table of technical specifications in section 7.1**.

b - Connection to TUs



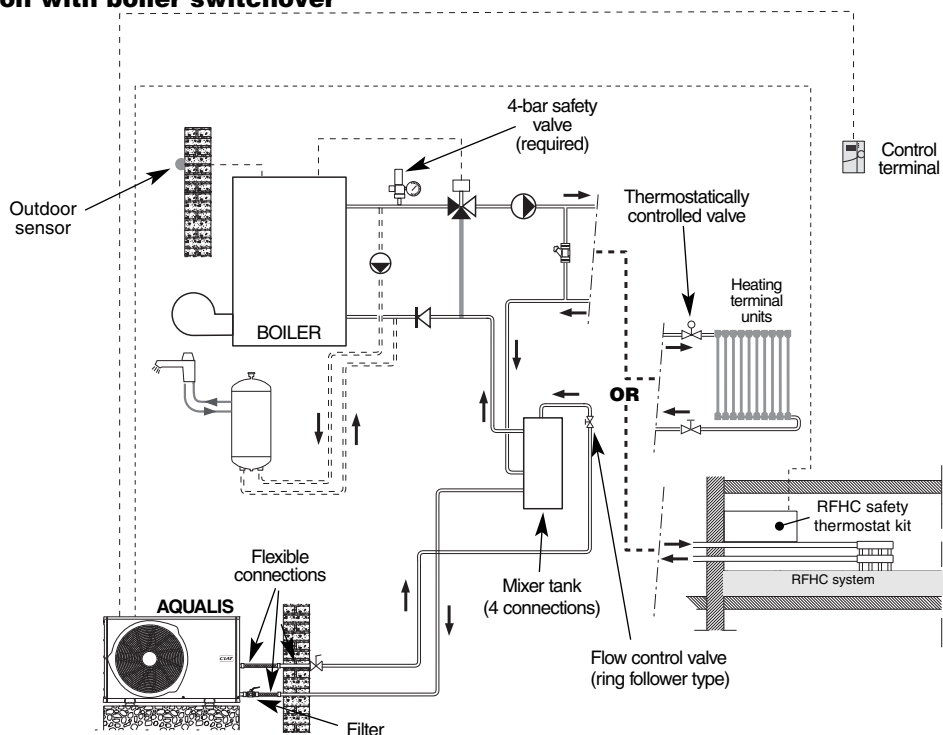
(*) An expansion vessel is necessary if the water capacity of the system is higher than that given in the **table of technical specifications in section 7.1**.

c - Connection to an RFHC and TUs



(*) An expansion vessel is necessary if the water capacity of the system is higher than that given in the **table of technical specifications in section 7.1**.

d - Connection with boiler switchover



2-2-8 Frost protection (for the account of installer)

If your Aqualis 2 system is located in an area subjected to below-freezing temperatures, you must add glycol to the water in it.

2-2-8.1 Protecting your system

To protect your heating system and avoid all risks of it freezing in case it is intentionally or accidentally turned off, we strongly advise that you:

- Either drain the water circuit by disconnecting the unit inlet and outlet),
- Or take the following precautions:



Protect your indoor water circuit with a mix of water, antifreeze and corrosion inhibitor (and, possibly, a biocide). Using a corrosion inhibitor will also prevent the formation of sludge caused primarily by corrosion.

You may use refrigerants made with monopropylene glycol or a natural compound containing one or more corrosion inhibitors (never use monopropylene glycol by itself; always mix it with corrosion inhibitors).

☞ **Do not use products made with monoethylene glycol, which is toxic.**

You may use:

- ready-to-use solutions
- dilutable products

If you use a concentrated dilutable solution, following the instructions below:

- Always dilute the antifreeze with water before adding it to the system. Never add them separately.
- Always mix the correct amounts of water, antifreeze and corrosion inhibitor in a container before adding them to the system.

2-2-8.2 Procedure

1- Rinse and drain the system

- Always flush the system completely and blow it out to remove any remaining water.
- Washing the system with a suitable cleaner is recommended (the type of cleaner depends on the system's materials).
- Follow up the final rinse with a complete drain of the system.

ⓘ If you have a radiant floor heating system, only use pressurised neutral gas (compressed air, nitrogen) to blow out the water remaining in the water loops.

2- Add the water, antifreeze, corrosion inhibitor and pressurise with the hydraulic pump

- Drain the system thoroughly.
- Allow the mixture to run through the entire system for at least 2 hours before starting the heat pump.
- Use a hydrometer or a refractometer to check the final proportion obtained.

3- Using litmus paper or a pH meter, check the pH obtained.

4- Affix, in a visible location, a label stating:

- that the system contains antifreeze,
- the name of the product and its supplier,
- the proportion and the pH at commissioning.

ⓘ Always top up with the same type of mix initially used.

ⓘ Annual maintenance: check the proportion and the pH.

2-2-8.3 Adjusting settings P1 and P93 based on the glycol content

Table of correspondences among the: base outdoor temperature for the system location
Monopropylene glycol (MPG) content
adjustment values for settings P1 and P93

Base outdoor temperature (*)	MPG content to be used	Freezing temperature	Setting P1 adjustment	Setting P93 adjustment
-5°C	20%	-8°C	1	0
-10°C	30%	-15°C	1	-5
-15°C	40%	-25°C	1	-10

* Base outdoor temperature: minimum daily temperature recorded at least five times over the course of the year.

2-2-8.4 Effect of the glycol content on system performance

Glycol/water mixture factors

	30% concentration by weight of monopropylene glycol	40% concentration by weight of monopropylene glycol
COOLING MODE		
Corrected refrigerant pressure	0.98 x pure water refrigerant pressure	1 x pure water refrigerant pressure
Corrected water flow	1.03 x pure water flow	1.05 x pure water flow
System pressure drop	1.35 x pure water delta P	1.55 x pure water delta P
HEATING MODE		
Corrected refrigerant pressure	1 x pure water refrigerant pressure	1 x pure water refrigerant pressure
Corrected water flow	1.04 x pure water flow	1.07 x pure water flow
System pressure drop	1.30 x pure water delta P	1.40 x pure water delta P



The water used must be analysed and, if necessary, treated (*we recommend contacting a qualified water treatment specialist*). The analysis will reveal whether the water is suitable for use with the various materials it will come into contact with and prevent the formation of electrolytic couples:

- 99.9% copper tubes brazed with copper and silver
- threaded bronze couplings or flat steel flanges, depending on the unit model
- plate heat exchangers and AISI 316/DIN 1.4401 stainless steel connections brazed with copper and silver.

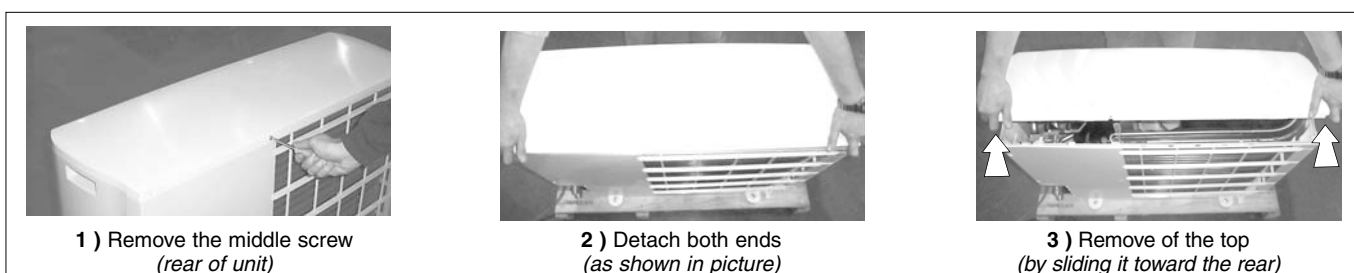
Electrolyte couplings may be obtained from specialist distributors in the case of major corrosion problems.

2.3 Electrical connections

Aqualis 2 complies with the requirements of the European Low Voltage Directive and, more specifically, with those of international standards EN 60335-1, EN 60335-2-40, EN 61000-6-1, EN 61000-6-2, EN 61000-6-3 and EN 61000-6-4.

Always disconnect the unit before attempting to wire connections. Remove the top as shown in Figure 1 and make a connection to terminal block J1 on the PSU board (*the one with the contactor*). Make sure the terminals are securely tightened.

Fig. 1



- The characteristics of the mains supply must be identical to those on the data plate.

- The electrical power supply must meet the following requirements:

230 V	+6%	50 Hz for models 20 to 35 single-phase + neutral + earth.
and	-10%	
400 V	+6%	50 Hz for models 35 to 75 three-phase + neutral + earth.
	-10%	

- All connections must be wired in compliance with the codes and regulations that apply to the location where the system is installed (*e.g. NF C 15100 in France*) and are under the responsibility of the installer.

Failure to comply with the requirements of the above standards will void the CIAT warranty.

It is your responsibility to protect the unit from mains voltage spikes and voltage spikes caused by lightning. Depending on the geographic location and the type of mains network (buried or overhead), you may have to install a lightning rod. Check your local electrical codes and regulations.

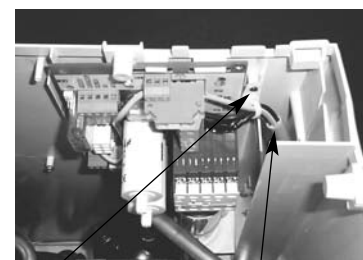
IMPORTANT:

- Connect the unit to earth before making any other electrical connections.
- A neutral wire must be placed on all three-phase models.
- A main cut-off switch must be installed on the unit (*see electrical specifications table on page 14*).

Note:
a conduit and cable clamp
are provided to ease the
installation of the power
cable.



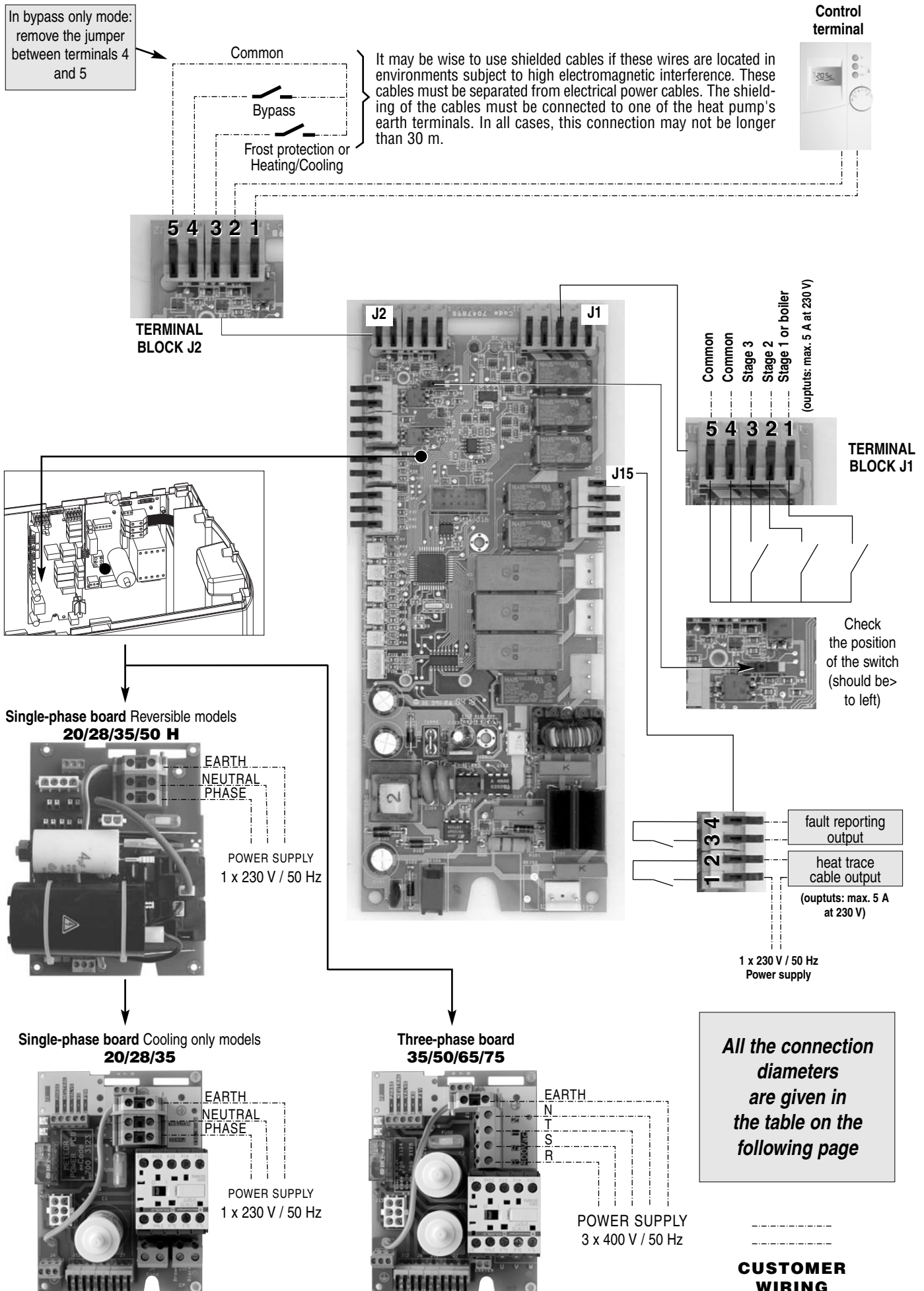
Conduit



Cable clamp

Conduit

Connections to be made before commissioning the unit



Wire cross-sections and electrical specifications

The cross-section of the cable must be selected with care based on:

- the maximum current rating of the unit (*see electrical specifications table below*),
- the distance between the electrical box and **Aqualis 2**,
- the ambient temperature.

AQUALIS 2			20/20 H	28/28 H	35/35 H	50/50 H	35T/35 HT	50T/50 HT	65T/65 HT	75T/75 HT
Rated voltage of unit			230 V / 50 Hz 1-ph + N + E				400 V / 50 Hz 3-ph + N + E			
Compressors	Maximum operating current	A	12.9	17.5	22.2	29.8	7.6	10.3	11.2	14.3
Fans	Maximum operating current	A	0.47	0.74		0.47 x 2	0.74	0.47 x 2	0.74 x 2	0.74 x 2
Circulator	Output power	W	Min.: 50 - Max.: 140		Min.: 115 Max.: 205	Min.: 120 Max.: 210	Min.: 115 Max.: 205	Min.: 120 Max.: 210	Min.: 180 - Max.: 400	
	Rated current	A	Min.: 0.32 - Max.: 0.61		Min.: 0.6 Max.: 1	Min.: 0.65 Max.: 1.10	Min.: 0.6 Max.: 1	Min.: 0.65 Max.: 1	Min.: 0.91 - Max.: 2.02	
Current of entire unit		A	14	19	24	31.8	9.3	13.3	14.7	17.8
Starting current		A	22	29	39	43	48	64	74	101
Electrical wiring (not supplied) (1)		mm²	3G4		3G6	3G10 (2)	5G4			
C or D curve thermal-magnetic circuit breaker (not supplied)		aM	16	20	25	32	16			20
Thermostat, pool sensor On/Off input connections		mm²	0.2 - 1.5							
Control circuit, kit connections		mm²	1.5							

(1) Cable with 2 or 3 charged PVC conductors for temperatures below 50°C and for a maximum length of 30 m.

Note: For other conditions, refer to French standard NF C 15-100.

(2) A 3G6 cable with PVC/V2-K (high temperature) conductors may be used for the 50/50H model.

3. COMMISSIONING

It is advisable not to connect gauges to the refrigeration circuit when starting up the unit (*except in the case of incidents*). Taking temperature readings is sufficient in most cases.

3.1 Checks

- Check for any refrigerant leaks.
- Open the valves on the water circuits and make sure water is flowing through the heat pump.
- Bleed all the air out of the water circuits.
- Check for loose electrical connections.
- Make sure that the power supply voltage is the same as the unit voltage and that it remains within the allowable limits (compared to the nominal voltages).

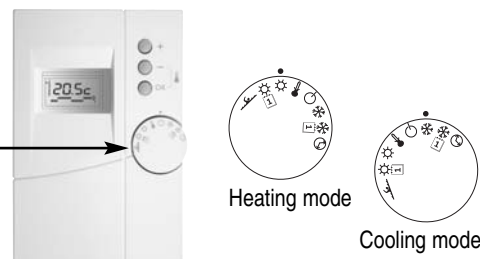
3.2 Starting the unit

1 - Turn on the unit.

2 - Turn the dial on the terminal unit to the desired operating mode.

3 - Using the + and - keys, adjust the setpoint temperature to well above room temperature in heating mode and well below it in cooling mode.

The compressor will start up after a few seconds.



Particularity of three-phase models:

4 - Check the direction of rotation of the compressor in three-phase mode.

If the direction of rotation is wrong: fault **d1.1** appears (low input current, hot crankcase, unusual noise: see Faults table in section 6.2). • To solve the problem, swap two power supply phases.

Particularity of single-phase models:

In order to meet the requirements of standard CF15000 on startup current limits, your unit features a smart system that monitors this current. In order to enable the electronics to self-configure and thus adjust to your system, it may not occur instantaneously when started for the first time (or after a power cut). The unit may attempt to start, acquire some values and then restart under the best possible conditions.

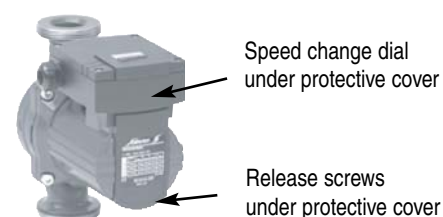
5 - Adjust the circulator speed:

- The circulator on every unit, regardless of size, is fitted with release screws. It may be necessary to use them when starting the unit or when turning it off for extended periods of time.

- The circulator on every model has three speeds.

Determine the right speed for the circulator based on the system's pressure losses and the available pressure curves for the heat pump.

The protective covers may be removed in order to change the circulator speed or reach the release screws.



3.3 Bleeding the air



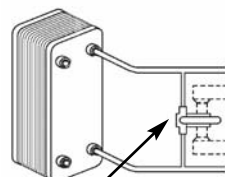
Commissioning:

To keep your system running smoothly and, more specifically, if your **Aqualis 2** is installed at a high point, you must bleed the air contained inside it at the time of commissioning. This can be done by opening the manual bleed valve (located under the unit cover) when turning the unit on or by installing a section of the water line and an automatic bleed valve over the unit.

3.4 Differential water pressure switch

Air in the differential water pressure switch could cause malfunctions to occur.

It may be wise to bleed this air. To do so, simply loosen the nut measure on the bottom of the pressure switch (approx. one-half turn until the air vents out) and retighten it. Then check for any leaks.



Nut at bottom



The differential water pressure switch is a safety component.

It is strictly prohibited to bypass it; doing so will create a safety hazard to property and people.

4. SERVICING AND MAINTENANCE

Unit maintenance

Before attempting to service the unit, **disconnect it from its main power source.**

Fans

The fans are fastened to the panel by four plastic M6x20 screws.

Caution: Do not tighten these screws to a torque of greater than 1 Nm.

If you do not have a torque wrench, tighten them until they are snug then tighten a further quarter turn.

Compressor

The compressor is fastened to the platform by four 8 mm dia. screws.

Caution: Do not tighten these screws to a torque of greater than 13 Nm.

If you do not have a torque wrench, tighten them until they are snug then tighten a further three-quarters of a turn.

Circulator

The circulator on every unit, regardless of size, is fitted with release screws. It may be necessary to use them when starting the unit or when turning it off for extended periods of time.

Recommendations

Take the operating readings and perform the checks listed in the table (Section 4.1) at least once a year.

Pressure or temperature measurements requiring the use of gauges should be taken only if the unit malfunctions and doing so is recommended by CIAT's **After-Sales Service**.

To keep your unit running smoothly and to benefit from the warranty, take out a maintenance contract with your installer or an approved maintenance company.

With the unit running, check it thoroughly for any abnormal visual signs or noises.

Check for any water or oil leaks around the unit and make sure the condensate water drains correctly.

Specificities and mandatory checks relating to the use of refrigerant fluid

In accordance with Regulation (EC) No. 842/2006 on certain greenhouse gases.

R410A refrigerant is a gas that has the following impacts on the environment:

- 1) **No impact on the ozone layer:** ODP (Ozone Depletion Potential) of 0.
- 2) **Impact on the greenhouse effect:** GWP (Global Warming Potential) of 1975.

- Users must have units containing over 3 kg of refrigerant periodically checked for leaks by qualified personnel. Regardless of the refrigerant charge in your system, CIAT requires that this check be carried out in order to keep your system in good working order.

- Users of any system containing over 3 kg of refrigerant are required to keep a log of the quantities and types of refrigerants used, added or recovered, and to include the dates and results of leak tests, the name of the technician and of the technician's company. CIAT strongly recommends keeping such a log even if the refrigerant load of your system does not require one.

- A leak test must be carried out one month following any leak repairs.

- System users are responsible for collecting used refrigerant and having it recycled, regenerated or destroyed.

Mandatory annual checks

Leaks on the refrigeration circuit. Check the glycol content (if used). Check the water filters for dirt.

Clean the coil:

- Take the cover off the unit (see Figure 1, Section 2.3).

- Using a vacuum cleaner, carefully clean the coil and the entire blower compartment.

- Put the cover back in place.

Clean the drain pan.

Check for any loose electrical connections.

Clean the water filter.

4.1 Aqualis 2 operating readings

Date/Time						
Compressor	Suction pressure	bar				
	Suction temperature	°C				
	Condensation pressure	bar				
	Condensation temperature	°C				
Heat exchange coil	Gas/liquid inlet temperature	°C				
	Gas/liquid outlet temperature	°C				
	Air inlet temperature	°C				
	Air outlet temperature	°C				
Plate heat exchanger	Water inlet temperature	°C				
	Water outlet temperature	°C				
	Gas/liquid inlet temperature	°C				
	Gas/liquid outlet temperature	°C				
Rated voltage		V				
Terminal voltage		V				
Compressor input current		A				
Fan motor input current		A				
Frost protection triggering temperature (protection of plate exchanger on water side)		°C				
Mechanical inspection: tubes, hardware, etc.						
Electrical connection tightness check						
Outdoor coil cleaning						
Control check						
Differential water pressure switch						
Leak detection						

5. CONTROL

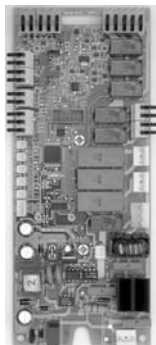
5.1 Overview

The unit is controlled by the following components:

Control terminal with display



Electronic control board



Single-phase PSU board
Reversible model



Three-phase PSU board



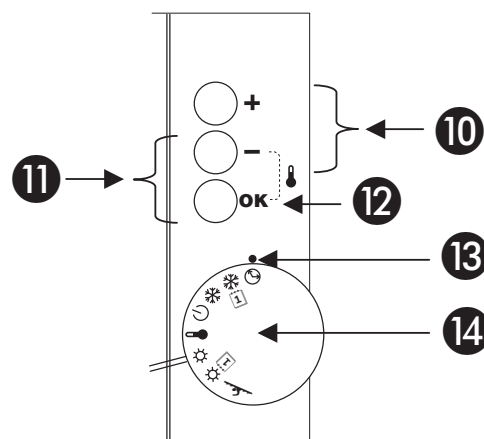
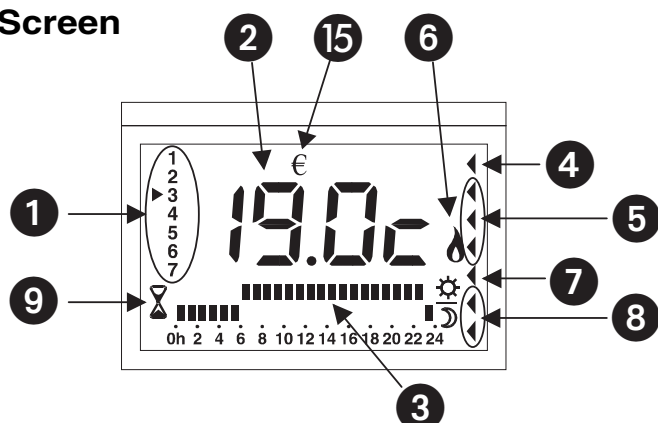
Single-phase PSU board
Cooling only model



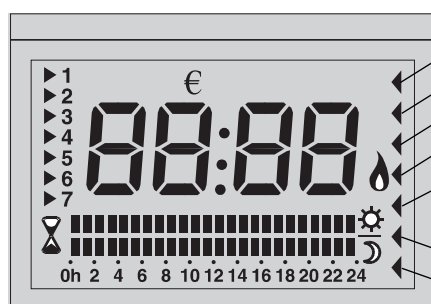
5.2 The terminal unit and its display

5-2-1 Display on the terminal unit screen

Screen



1 **Current** day **2** Display of desired temperature, time or fault code. **3** Daily program bar (: *Comfort*, : *Economy*)
4 Compressor operation status indicator **5** Operation status indicator for electric auxiliary units (*option*) **6** Boiler operation status indicator (*option*) **7** Pool heating operation status indicator (*option*) **8** Settings access mode status indicator (*see terminal manual*) **9** Test mode operation symbol **10** Up/down buttons **11** Room temperature display, when buttons **10** and **12** are pressed together **12** Change modes (*comfort, economy, programmed*), confirm selection or cancel faults. **13** Dial selection dot **14** 8-position operation mode dial. **15** Bypass indicator.



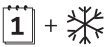


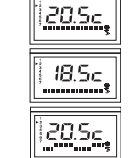

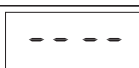



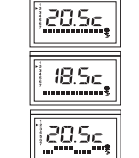
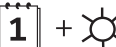


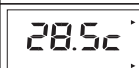


Indicator 6: Compressor operation
 Indicator 5: Stage-1 electric auxiliary unit operation
 Indicator 4: Stage-2 electric auxiliary unit operation
 Indicator 3: Stage-3 electric auxiliary unit operation (replaces compressor)
 Indicator 2: Pool heating:
 - Steady = pool heating on
 - Flashing = off, waiting for synchronised operation with filter pump
 Indicator 1: Access to level-1 (customer) *settings*
 Indicator 0: Access to level-2 (installer) *settings*



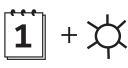
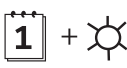
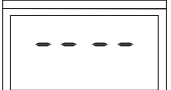
For further information on reading and programming the terminal, refer to the manual provided with it.

5-2-2 Position of the dial (No. 14) on the terminal unit

A - Reversible units

Dial position	Buttons			Mode	Display
	+	-	OK		
 Clock	Advance the minutes. Minutes advance quickly when pressed and held.	Reverse the minutes. Minutes reverse quickly when pressed and held.	Go to following day	Time and day adjustment, unit off	
 Cooling programming	Place cursor on comfort = sun	Place cursor on economy = moon	Go to following day	Weekly programming in cooling mode	
 Cooling mode	Raise the cooling setpoint	Lower the cooling setpoint	Go to Comfort mode, Economy mode then Programmed mode.	Cooling mode, unit authorised to operate	
 On/off	Four-cursor display	Four-cursor display	_____	Off and reset mode permanent fault	
 Frost protection mode	Raise the frost protection setpoint	Lower the frost protection setpoint	_____	Frost protection mode	
 Heating mode	Raise the heating setpoint	Lower the heating setpoint	Go to Comfort mode, Economy mode then Programmed mode.	Heating mode Unit authorised to produce hot water	
 Heating programming	Place cursor on comfort = sun	Place cursor on economy = moon	Go to following day	Weekly programming in heating mode Unit authorised to produce hot water at programmed setpoint	
 Pool	Raise the setpoint	Lower the setpoint	Display the pool temperature	Pool heating Unit authorised to produce hot water	

B - If you have a non-reversible unit






Dial position				Display
 Frost protection mode	 Heating mode	 Heating programming	 Pool	


5-2-3 Accessing the settings

You will have to adjust a number of settings to suit your particular system and requirements.

These settings (identified by the letter 'P' followed by a digit) will help you to keep your unit operating at peak performance. The complete table of settings is given on the following page.

To access the settings, do as follows:

Turn the terminal dial to one of the following positions:     

- Access customer settings : press **OK** and **+** simultaneously for 3 seconds
- Access installer settings: press **OK** and **+** simultaneously for 5 seconds.


























Only qualified personnel may access the settings.

Changing the settings

- Press **+** and **-** to display the desired setting
- Press **OK** to display the value of the setting
- Press **+** and **-** to change the value of the setting
- Press **OK** to confirm the change and go back to the settings numbers

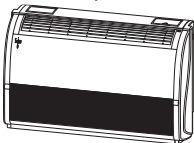
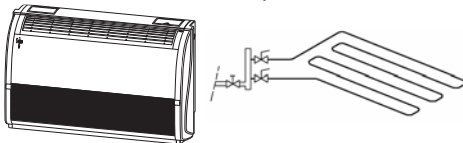
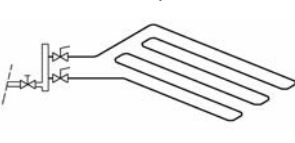

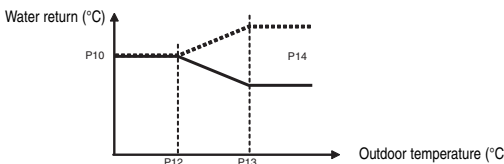



Exiting settings mode: press and hold **OK** for 3 seconds or wait 1 hour.

Setting No.	Description	Setting value		Factory setting	
00 	Unit version	1 = AQUALIS 2 = AQUALIS 2		2	
01	Glycol content	0 = pure water 1 = glycol/water mix		0	
02	On/Off input on J2, terminals 3-5	0 = input used for Domestic Hot Water if P60 = 3 1 = input used to force heating and cooling modes 2 = input used to place unit in frost protection mode by remote control		0	
03	Heating terminal units	0 = radiators/fan coil units or combined with floor (TU) 1 = radiant floor heating and cooling system (RFHC)		1	
04	Ambient temperature compensation factor	0 to 5		2	
05	Low-noise operation	0 = Standard 1 = Low noise in cooling mode 2 = Low noise in heating mode 3 = Low noise in cooling and heating modes		2	
06	Auxiliaries and bypass possibilities	0 = heat pump only (bypassing of heat pump possible) 1 = heat pump + electric auxiliary units (bypassing of auxiliaries possible) 2 = heat pump + electric auxiliary units (bypassing of heat pump and terminals possible) 3 = heat pump or boiler backup (bypassing of heat pump possible) 4 = heat pump or boiler backup (bypassing of heat pump and boiler possible) 5 = heat pump + boiler backup (bypassing of heat pump possible)		0	
07	Outdoor temperature for auxiliary authorisation	P9 at 24°C		5°C	
08	Compressor confirmation	0 = compressor not authorised to run 1 = compressor authorised		1	
09	Heating low limit (air)	-15°C to 24°C		-15°C	
		TU	RFHC	TU	RFHC
10 	Water comfort setpoint in cooling mode	10°C to 28°C if P1 = 0 -6°C to 28°C if P1 = 1		20°C to 25°C if P22 = 0 or 1 18°C to 25°C if P22 = 2 or 3	
11 	Water economy setpoint in cooling mode	10°C to 28°C if P1 = 0 -6°C to 28°C if P1 = 1		20°C to 25°C if P22 = 0 or 1 18°C to 25°C if P22 = 2 or 3	
12 	Outdoor air temperature at start of drift in cooling mode	10°C to 40°C		25°C	empty
13 	Outdoor air temperature at end of drift in cooling mode	P12+5°C to 45°C		35°C	
14 	Maximum setpoint at end of drift in cooling mode	10°C to 28°C if P1 = 0 -6°C to 28°C if P1 = 1		15°C	
15 	Water comfort setpoint in heating mode	20°C at P19		30°C	20°C
16 	Water economy setpoint in heating mode	20°C at P19		30°C	20°C
17 	Outdoor air temperature at start of drift in heating mode	-10°C to 30°C		17°C to 25°C	20°C
18 	Outdoor air temperature at end of drift in heating mode	-15°C to P17-5°C		-15°C to 8°C	-7°C
19 	Maximum setpoint at end of drift in heating mode	20°C to 49°C if P06 = 0, 20°C to 55°C if P6 = 1 or 2 20°C to 70°C if P6 = 3, 4 or 5		20°C to 40°C	40°C
20	Stage differential	0.5°C to 10°C		2°C	
21	Interstage differential	0.5°C to 10°C		2°C	

Setting No.	Description	Setting value		Factory setting
22 	Pool and humidity sensor options configuration	0 = no pool or humidity sensor options 1 = pool management 2 = humidity sensor management 3 = pool + humidity sensor management		0
23 	Pool water setpoint	20°C to 35°C		28°C
24	Self-regulating frosting time	0 = No 1 = Yes		0
25	Temperature of time-delay coil before defrosting	-5 to 0°C		-2°C
26	Minimum water return defrosting authorisation	TU 25°C if P1=0 10°C if P1 = 1	RFHC 20°C if P1=0 5°C if P1 = 1	20°C
27	Defrosting end temperature	10 to 45°C		35°C
28	Frosting time	10 to 90 min.		30 min.
29	Compressor stopped at defrost inlet and outlet	0 = not stopped 1 = 3-minute stop 2 = 1-minute stop		0
30	Test mode	0 = No / 1 = Yes		0
31 	Frost protection mode setpoint	8 to 15°C air setpoint		10°C
32	Maximum freon temperature change Exchanger for frost protection	0°C to 5°C		1 °C
33	Maximum temperature change Water outlet for frost protection	0°C to 1°C		0.3 °C
34	Circulator operation control	0 = stopped if boiler on 1 = continuous operation		1
36	Cooling mode authorisation	0 = Cooling mode inhibited 1 = Cooling mode authorised		1
40 	Water return temperature	Value read		
41 	Water supply temperature	Value read		
42 	Calculated water setpoint	Value read		
43	Corrected stage differential	Value read		
44 	Freon temperature in outdoor coil	Value read		
45 	Freon temperature in exchanger	Value read		
46	Short-cycle protection time delay	Value read		
47	Remaining frosting time	Value read		
48 	Outdoor temperature	Value read		
49	Fault reset number counter	Value read		
50 	Pool temperature	Value read		
60	Domestic hot water production option	0 = heating/cooling output 1 = heating of domestic hot-water tank with one cycle per day 2 = heating of domestic hot-water tank with two cycles per day 3 = domestic hot water tank heated when contact J2 (3-5) closed		0
61	Cycle 1 start time domestic hot water	Adjustable to between 0:00 and 23:30		1:30
62	Cycle 2 start time domestic hot water	Adjustable from P61 + 6 hours to 23:30		12:30
63	Maximum duration of DHW when heat pump operating in heating mode	30 min. to 2 hours (adjustable)		2 hours
80 	Control card version number	Value read		
81 	Terminal version number	Value read		
93	Exchanger frost protection limit on water supply	Fixed at +3°C for pure water: P1 = 0 Adjustable between -10°C to and +3°C for glycol/water mix: P1 = 1		+3°C if P1 = 0 0°C if P1 = 1
94	Freon exchanger frost protection limit	empty		P93 - 5°C
95	High limit, exchanger water return in cooling mode	empty		40°C
96	High limit, exchanger water return in heating mode	empty		10°C if P1 = 0 5°C if P1 = 1
98	Refrigerant used	1 = R410A		1
99	Cooling only/reversible version	0 = Cooling only 1 = Reversible		Depending on your Aqualis 2

5.3 Operating modes

Adjust setting **P3** as shown in the table below depending on your system and the desired operating mode.

		TU system	TU + RFHC system	RFHC system	
					
		P03 = 0	P03 = 0	P03 = 1	
You want to cool your home	COOLING mode This mode is enabled if P36 = 1 and disabled if P36 = 0 	<p>The room temperature setpoint is displayed on the terminal unit /</p> <p>The unit will adjust the temperature based on the room temperature setpoint and the outdoor temperature. Slope adjustment:</p> 			<p>The unit will begin cooling once the room temperature is higher than the room temperature setpoint. Comment: given the limitations of radiant floor systems, this is a type of cooling (no more than 3/4°C than a home without a radiant floor system).</p>
You want to heat your home	HEATING mode 	<p>The room temperature setpoint is displayed on the terminal unit /</p> 			
		<p>The maximum water return setpoint is limited to 49°C without auxiliary heating, 55°C with electric auxiliary units and 70°C with an auxiliary boiler</p>			<p>The maximum water return setpoint is limited to 40°C</p>
You want to heat during freezing weather only	FROST PROTECTION mode 	<p>This mode is activated when the outdoor temperature drops below 10°C. Heating is maintained until the frost protection setpoint is reached.</p> <p>Heating provided primarily by the heat pump (auxiliaries may however be used)</p>			<p>Heating provided by auxiliaries. If no auxiliaries are used, heating is provided by the heat pump with a minimum water return temperature of 21°C and using the economy setpoint if P1 = 0</p>

TU = terminal units such as fan coil units and radiators

RFHC = radiant floor heating and cooling system

In the case of special applications (industrial, process) or to disable adjusting the system based on the ambient temperature, adjust setting P4 to '0'. In a TU or TU+RFH configuration (P3 = 0) the setpoint displayed will therefore be a **water return setpoint**.

Note: changing modes will cause the compressor to turn off first.

5.4 Auxiliaries

Setting P6 is used to configure the type of auxiliary installed. It also is used to define the type of *bypass* (see "Bypass via On/Off input" section).

Adjusting setting P6

P6	Auxiliary configuration	Bypass type (by opening of contact on terminal block J2 - terminals 4 and 5)
0	No auxiliary units	Heat pump turned off
1	Electric auxiliary units	Only electric auxiliary units turned off
2	Electric auxiliary units	Heat pump and electric auxiliary units turned off
3	Boiler auxiliary controlled by its own control system	Heat pump turned off and boiler turned on (e.g. offsetting of peak days scheme in France)
4	Boiler auxiliary controlled by its own control system	Heat pump and boiler turned off (e.g. turning off entire heating system by remote control)
5	Boiler auxiliary controlled by the Microconnect unit	Heat pump turned off and boiler turned on in control stage 1 (e.g. offsetting of peak days scheme in France)

Note:

Auxiliaries are not allowed:

- 1 - if P06 = 0 or if P99 = 0
- 2 - if the unit is stopped by a water flow rate fault (d3)
- 3 - if there is a water inlet sensor fault (d4.2)

Auxiliaries are allowed:

- 1 - 80 seconds after the compressor starts
- 2 - if the compressor is not available (above cases excluded)

5-4-1 Electrical auxiliary unit: P6 = 1 or 2

a - Operating limits

Auxiliaries may be used if the outdoor temperature is below < P7 (trigger threshold).

Control is carried out on interstage differential P21.

Example: P21 = 2°C and water setpoint P42 = 40°C

- The compressor starts at 38°C
- Electric stage 1 starts at 36°C
- Electric stage 2 starts at 34°C

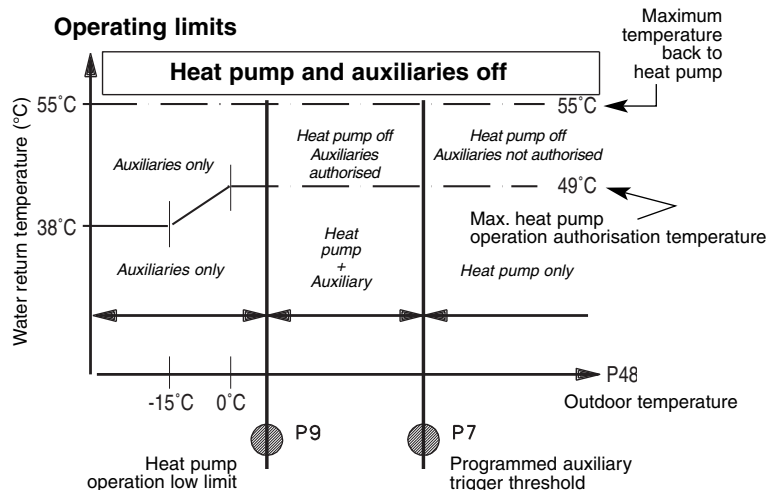
Microconnect can also manage a third electric stage (usually not wired). This third stage is enabled only when the compressor is not available.

b - Terminal unit display



- Electric stage 1 on indicator
- Electric stage 2 on indicator
- Electric stage 3 on indicator (takes over from compressor)

Terminal display



5-4-2 Using a boiler as a backup

Foreword

Corrosion of heating sources

Heating sources, such as those made of steel, are susceptible to corrosion. Please contact your boiler manufacturer to establish whether the heating source is compatible with Microconnect control.

A few recommendations

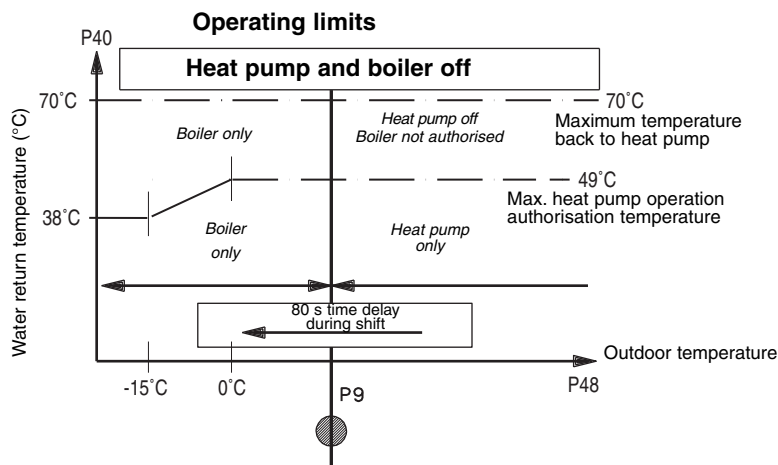
- Do not run the burner and the heat pump at the same time when the water temperature is below 40°C. If P6 = 5 and you are in doubt, adjust P7 and P9 to the same value.
- Do not short-circuit the boiler corrosion protection systems (e.g. heating circulator kept off until the burner raises the heating source temperature to over 40°C).

a - Boiler operated by its own control system: P6 = 3 or 4

Application type: boiler with an advanced electronic control system.

When P6 is set to 3 or 4, the Microconnect controller only provides a 'boiler On' contact. This contact (terminal block J1 - terminals 1 and 5) remains closed once the outdoor temperature drops below the value of P9 or a fault occurs on the heat pump. The boiler burner is then controlled by the boiler's control system.

Heat pump and boiler operating ranges:



Note: the boiler and heat pump are turned off if the outdoor temperature is greater than P9 and the water return temperature is above 49°C.

Miscellaneous:

- Setting P34 may be used to turn off the circulator.

P34 = 0: circulator off if boiler on.

Moreover, a d3 fault (water flow rate fault) must not prevent the boiler from operating. Accordingly, the boiler is still authorised to come on even if this fault appears.

P34 = 1: default value - continuous circulator operation.

- Maximum water return for boiler backup: 70°C.
- If P6 = 3 or 4 and if the outdoor temperature is less than P9.

Terminal display when the outdoor temperature is less than P9 and only the boiler is authorised.
The control setpoint is displayed in all other cases.



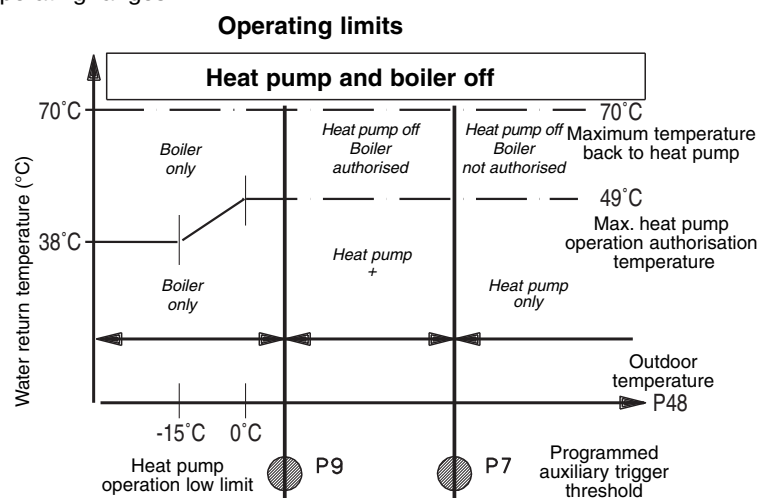
Boiler operation authorised symbol

b - Boiler controlled by the Microconnect microprocessor: P6 = 5

Application: boiler with basic control

When P6 is set to '5', the burner and the heat pump are controlled by the Microconnect microprocessor using the water formula entered in the terminal unit (settings P15 to P19). The room temperature is managed by the Microconnect terminal.

Heat pump and boiler operating ranges



Miscellaneous:

- The circulator will operate continuously: P34 forced to '1' if P6 = 5

The control setpoint and, where applicable, the boiler operation authorisation symbol are displayed



Boiler operation authorised symbol

5.5 On/Off control inputs

5-5-1 Turning off or "bypassing" your heat pump or the terminals via remote control

To turn off the heat pump and/or terminals remotely, remove the jumper on **connector J2 terminals 4 and 5** from the Microconnect board. Connect your contact between these two terminals.

Contact quality: compatible with a 10 mA current at 24 V.

1: contact closed: normal operation

2: contact open: € symbol appears and bypass as indicated below.

HEATING MODE: the bypass depends on setting P6 (see the "Auxiliaries" section above").

COOLING MODE: the unit turns off when the contact opens.

FROST PROTECTION MODE: no bypass

5-5-2 Turning on the frost protection via remote control: P2 = 2

To place your system in frost protection mode by remote control, adjust setting P2 to '2'. Connect a contact to connector **J2 terminals 3 and 5** on your unit's Microconnect board.

Contact quality: compatible with a 10 mA current at 24 V.

1: contact closed: operation determined by position of terminal dial

2: contact open: system forced to frost protection mode and the following is displayed:



5-5-3 Turning on cooling or heating mode remotely: P2=1

To activate heating or cooling mode remotely, adjust setting P2 to '1'. Connect a contact to connector **J2 terminals 3 and 5** on your unit's Microconnect board.

Contact quality: compatible with a 10 mA current at 24 V.

1: contact closed: operation forced to heating mode and the following is displayed:



2: contact open: operation forced to cooling mode and the following is displayed:



5-5-4 Remote triggering of Domestic Hot Water cycle: P60 = 3

To turn on the **Domestic Hot Water** cycle remotely, set parameter P60 to 3. Connect a contact to connector **J2 terminals 3 and 5** on your unit's Microconnect board.

Contact quality: compatible with a 10 mA current at 24 V.

1: contact closed: Domestic Hot Water cycle forced on and the following is displayed:

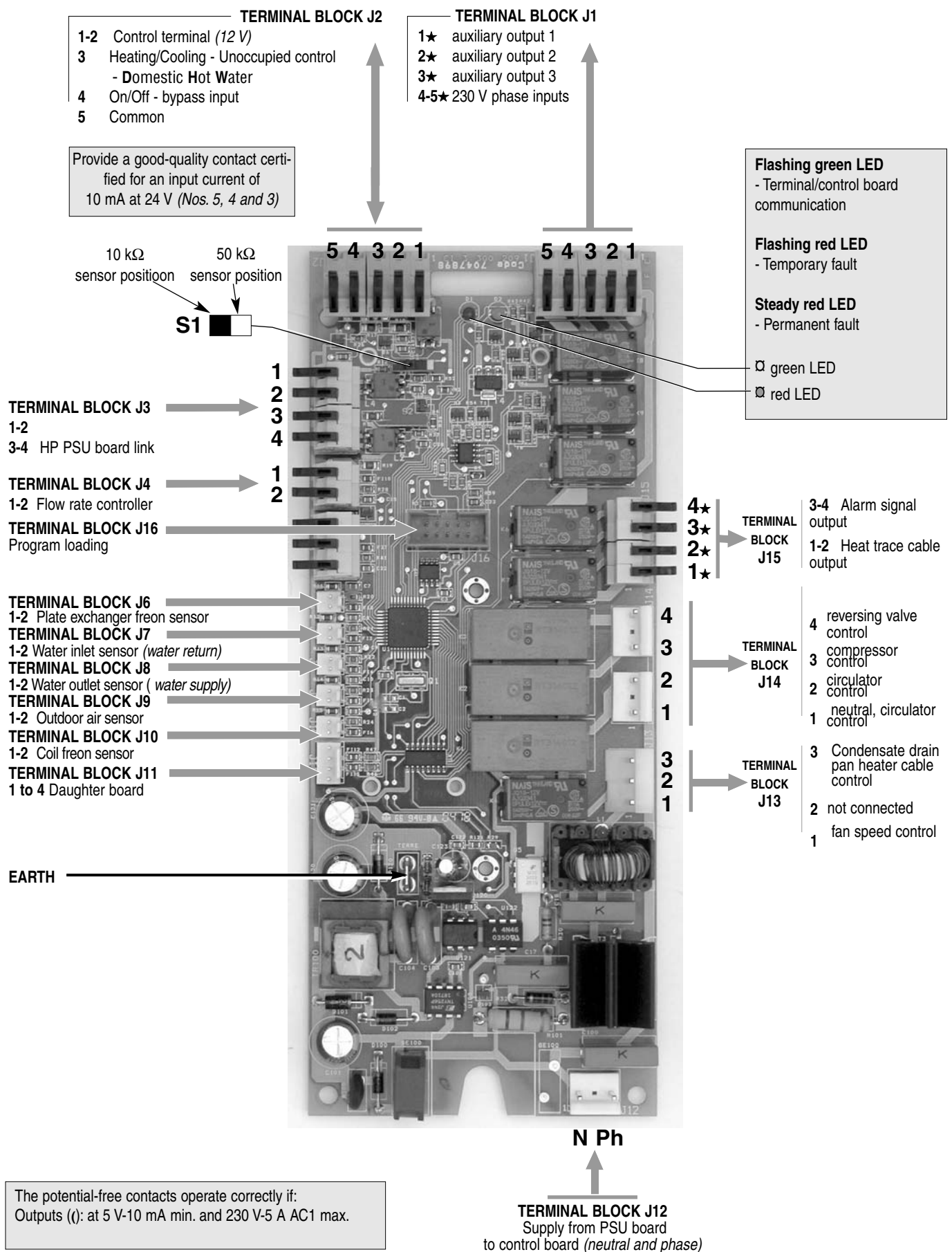


2: contact open: unit operates normally as selected with the dial.

5.6 Control board

CPU board description

Location of connector and terminal blocks



5.7 Components

5-7-1 External fans

Cooling mode

- 1 - Fan starts at high speed 5 seconds before the compressor starts.
- 2 - Fan speed adjusted based on the outdoor air temperature then the freon temperature.
- 3 - Fan continues running for *30 seconds* after the compressor stops.

Heating mode

- 1 - Fan starts at high speed 5 seconds before the compressor starts.
- 2 - Fan speed controlled at low noise level configuration
(P5 = 2 or 3) for pool heating or domestic hot water production.

5-7-2 Reversing valve *(reversible models only: P99 = 1)*

- 1 - Supplied in heating mode as soon as the compressor is running.
- 2 - The valve supply is shut off 30 minutes after the compressor is stopped.

5-7-3 Condensate drain pain heater cable *(reversible models only: P99 = 1)*

Powered if: the compressor is on **and** the outdoor temperature is below 0°C **and** the coil freon temperature is less than P25 **and** heating mode is on.

5-7-4 Circulator




Automatic seizure protection:

To prevent the circulator seizing while it is off, the control system turns it on for one minute once every week.

Circulator:

Operates continuously in most cases.

Turned off in the following three cases:

- When the unit is off 
- In frost protection mode  when the outdoor temperature is above +10°C
- In heating mode  with the boiler if P34 is set to '0'

In all three cases, the circulator can be started back up to protect the exchanger from freezing temperatures. It will start up if the outdoor temperature is less than P93 and the water supply temperature is below 30°C.

5.8 Functions

5-8-1 Automatic restart

In the event of a power cut, the unit automatically resumes the mode it was in after a period of 3 minutes.

5-8-2 Short-cycle protection

The unit is authorised to start back up if the compressor is turned off for at least 3 minutes.

5-8-3 Automated self-regulating control

This function adjusts the compressor running time or the stage differential to best adapt the operation of the unit to the type of installation.

5-8-4 Low-noise operation

If you find that unit is too noisy, adjust the rotation speed of the fans. To do so, and depending on the operating mode, change setting P5.

Caution:

under certain temperature conditions, this operating mode may lower the performance of your unit.

5.9 Options



An auxiliary board must be wired for the options described below.

5-9-1 Swimming pool control

This option allows you to heat your swimming pool.

Kit contents:

- Pool kit installation instructions (with adjustment values for settings and an electrical wiring diagram).
- Three-way valve
- 10 kW sensor
- A table listing the recommended types of exchanger to install (exchanger for the customer's account).

5-9-2 Humidity sensor

This humidity sensor allows you to:

- limit the risks of condensation forming on under-floor cooling systems
- lower the water setpoint value even further.

Kit contents:

- Specific installation instructions (with adjustment values for settings).
- Humidity sensor.

5-9-3 Domestic hot water heating

This option allows you to produce domestic hot water with a hot-water tank with coil.

Kit contents:

- Specific installation instructions (with adjustment values for settings)
- 300 litre hot-water tank with coil and 3 kW auxiliary
- Three-way valve



An auxiliary board is not needed for the following option.

5-9-4 Heat trace cable

Connect your heat trace cable (not supplied) to the special output on the Microconnect control board (see Section 5.6) - terminals 1 and 2 on terminal block J15. Once the outdoor temperature drops below P93, the heat trace cable will be controlled based on the water return and outdoor temperatures.



Caution:

When operating the unit in cooling mode while the outdoor temperature is less than P93, the heat trace cable may warm the water when it switches on. The heat gain may be significant with a long heat trace cable.

6. FAULTS

6.1 Temporary and permanent

There are two types of fault: **temporary and permanent**

- Temporary faults cause the unit to enter fault-tolerant mode and the fault type flashes on the terminal LCD. Temporary faults are not stored in memory and the fault relay is not stuck in a particular position (exceptions: terminal link fault and fault d4.9).
- Permanent faults shut down the unit and, depending on the settings, activate the auxiliaries. The fault type appears on the terminal LCD. Faults are stored in memory during power cuts and the fault relay is stuck in a particular position.

Fault management remains on during test mode.

6.2 Tables

Fault No.	Fault description	Fault type	Possible causes of fault
No display	Terminal link	Temporary	Cut terminal wire, Microconnect control board fault
d1.1	Compressor rotation or water flow rate fault	Permanent	Wires on three-phase compressor reversed or water flow rate on indoor circuit too high
d1.2	High-pressure switch or starter board	Temporary	Less than 5 cuts at high pressure (41.5 bar) in 24 hours or problem on starter board (single-phase units)
		Permanent	More than 5 cuts at high pressure (41.5 bar) in 24 hours (dirty condenser, overcharge) or problem on starter board (single-phase units)
d2	Four-way valve	Permanent	Four-way valve blocked open or closed.
d3	Differential pressure switch open	Temporary then permanent	Low flow rate in water circuit caused by a dirty filter or air in the circuit, or the circulator is either not working or power is not supplied
d4.1	Outdoor temperature sensor	Temporary	Outdoor temperature sensor opened or short-circuited
d4.2	Water inlet temperature sensor		Exchanger water inlet temperature sensor opened or short-circuited
d4.3	Water outlet temperature sensor		Exchanger water outlet temperature sensor opened or short-circuited
d4.4	Coil freon temperature sensor		Coil freon inlet temperature sensor opened or short-circuited
d4.5	Exchanger freon temperature sensor		Exchanger freon inlet temperature sensor opened or short-circuited
d4.6	Terminal sensor		Terminal sensor opened or short-circuited
d4.7	Pool temperature sensor		Pool temperature sensor opened or short-circuited
d4.8	Outdoor exchanger water outlet temperature sensor or floor thermostat	Permanent	Outdoor exchanger water outlet temperature sensor opened or short-circuited or floor inlet temperature above 60°C (control problem)
d5	Unit outside limits of use	Temporary	cooling: condenser water return = 40°C (P95) heating: condenser water return = P96 heating: outdoor temperature = P09
		Permanent	Unit without auxiliaries (P6 = 0) with water return < P26 inhibiting defrosting
d6	Exchanger frost protection set to water	Temporary/ Permanent	Exchanger water supply temperature ≤ P93 Permanent fault if 3 faults in 24 hours
d7	Exchanger frost protection set to freon	Temporary/ Permanent	Freon temperature in exchanger = P94 Permanent fault if 3 faults in 24h
d8	Exchanger frost protection set to difference	Permanent	Difference between exchanger freon and water supply temperatures in cooling mode
d9.1	Terminal fault	Temporary	Terminal fault
d9.2	EEPROM fault	Temporary	Control board EEPROM fault
dx.xS	Temporary fault during DHW cycle	Temporary	See above Example: d3.S = low water flow during DHW cycle

6.3 Acknowledging faults

After diagnosing and eliminating the cause of a fault, acknowledge it by pressing **OK** on the terminal for 3 seconds with the dial turned to Off.

6.4 Sensor values

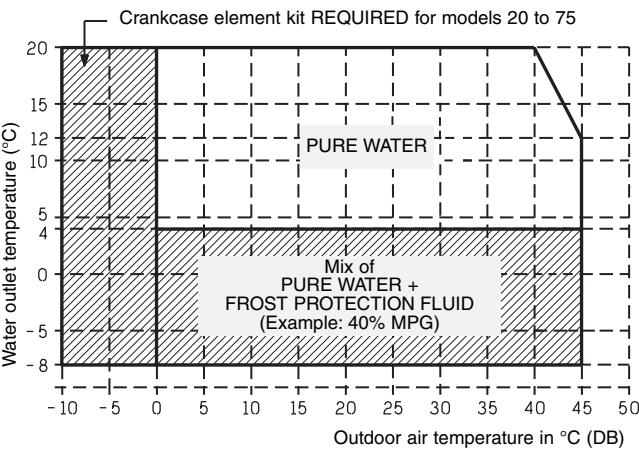
CTN sensors,
10 kW at 25°C

Temperature (°C)	Sensor resistance (kΩ)	Temperature (°C)	Sensor resistance (kΩ)	Temperature (°C)	Sensor resistance (kΩ)
-40	345.3	15	15.58	70	1.724
-35	247.6	20	12.37	75	1.456
-30	179.6	25	10	80	1.236
-25	131.8	30	7.958	85	1.053
-20	97.78	35	6.446	90	0.901
-15	73.27	40	5.252	95	0.774
-10	55.44	45	4.305	100	0.667
-5	42.33	50	3.548	105	0.577
0	32.6	55	2.94	110	0.501
5	25.29	60	2.449	115	0.436
10	19.77	65	2.05	120	0.381

6.5 Compressor operating limits

CHILLED WATER PRODUCTION

Minimum water return temperature during operation: +40°C

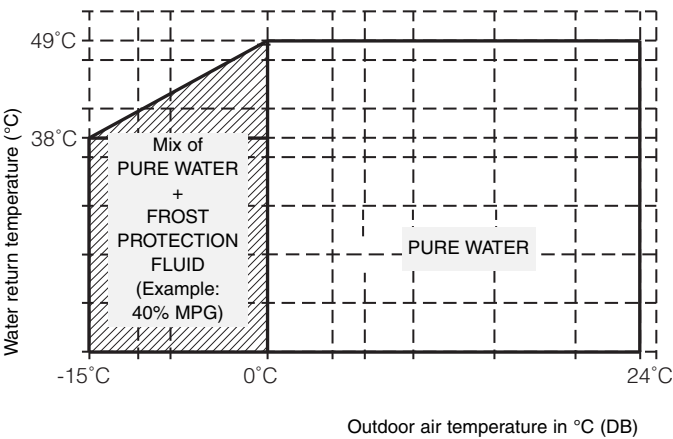


HOT WATER PRODUCTION

Minimum water return temperature during operation: +5°C

Frost protection fluid: +5°C / Pure water: +10°C

Maximum water inlet temperature: +70°C



7. SPECIFICATIONS

7.1 Technical specifications

AQUALIS 2			20 / 20 H	28 / 28 H	35 / 35 H	50 H	35T / 35 HT	50T / 50 HT	65T / 65 HT	75T / 75 HT
Compressor	Quantity		1							
	Type		SCROLL							
	Oil capacity	L	1.1	1.25	1.66	1.25	1.95	1.66	1.77	
Refrigerant			Kow R410A							
Refrigerant weight	Cooling	kg	1.25	1.45	1.42	2.4	1.42	2.4	3.1	3.0
	Reversible		1.37	1.6	1.62	2.67	1.62	2.67	3.2	2.85
Crankcase element current and power		W/A	45 W/0.2 A optional*							
Coil type			Grooved copper tubes with aluminium fins							
Water heat exchanger	Water capacity	L	1.04	1.24	1.62	2.38	1.62	2.38	2.76	3.7
Fan	Type		Axial							
	Number of fans		1			2	1	2		
	rpm		718	897	718	897	718	897	897	
Hydraulic module	Circulator		3 speeds							
	Expansion vessel	L	5			8	5	8		
	Expansion vessel pre-charge pressure	bar	1.5							
	Maximum service pressure	bar	4							
	Maximum volume of system with RFHC ** maximum water temperature of 40°C pure water/40% MPG	L	294 / 150			471 / 240	294 / 150	471 / 240		
	Maximum volume of system with radiators** maximum water temperature of 70°C/90°C pure water/40% MPG		88 / 54			141 / 87	88 / 54	141 / 87		
	Minimum system capacity with pure water, for smooth running of your unit	L	35	48	61	75	61	82	95	123
Weight	Empty	kg	73	79	82	120	82	120	139	142
	Charged		82	88	91	135	91	135	150	153

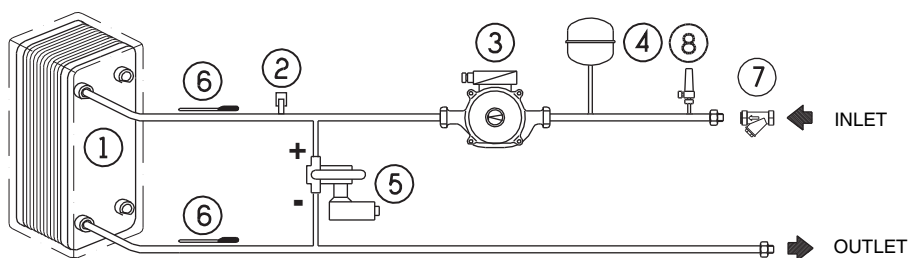
* Required in cooling mode when outdoor temperatures are below 0°C

** A higher capacity expansion vessel is needed for larger volumes

7.2 Hydraulic module schematic

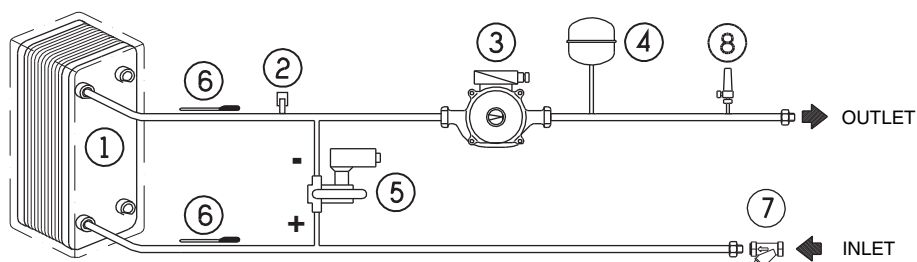
COOLING ONLY MODELS

- ① Brazed-plate heat exchanger
- ② Manual air bleed valve
- ③ Circulator
- ④ Expansion vessel
- ⑤ Differential pressure switch
- ⑥ Temperature sensors
- ⑦ Screen filter
- ⑧ 4 bar safety valve



REVERSIBLE MODELS

- ① Brazed-plate heat exchanger
- ② Manual air bleed valve
- ③ Circulator
- ④ Expansion vessel
- ⑤ Differential pressure switch
- ⑥ Temperature sensors
- ⑦ Screen filter
- ⑧ 4 bar safety valve

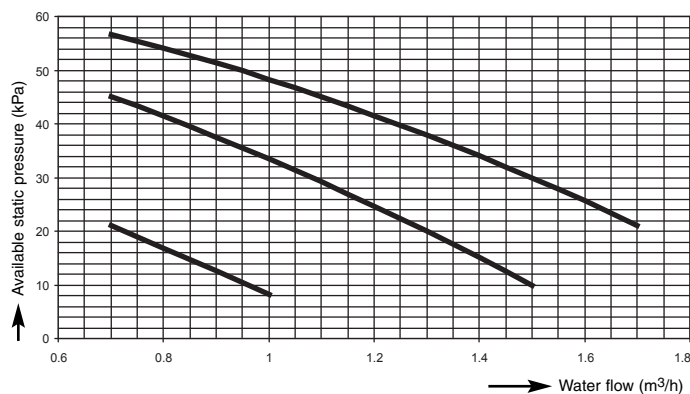


7.3 Available pressure curves (pure water)

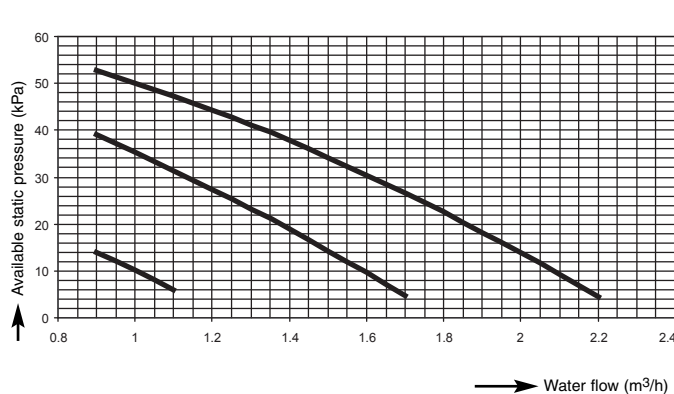
The available pressure curves are given for pure water.

Subtract 5 kPa from the available pressures in the case of systems using 40% monopropylene glycol (heating mode).

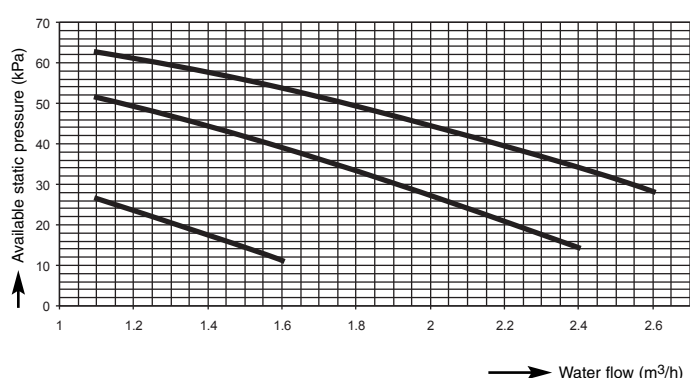
AQUALIS 2 20 - 20H



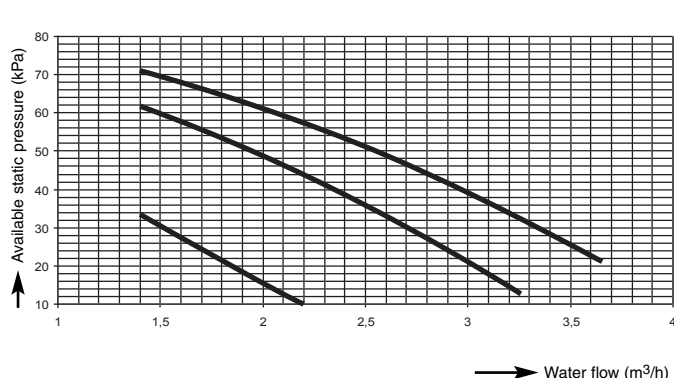
AQUALIS 2 28 - 28H



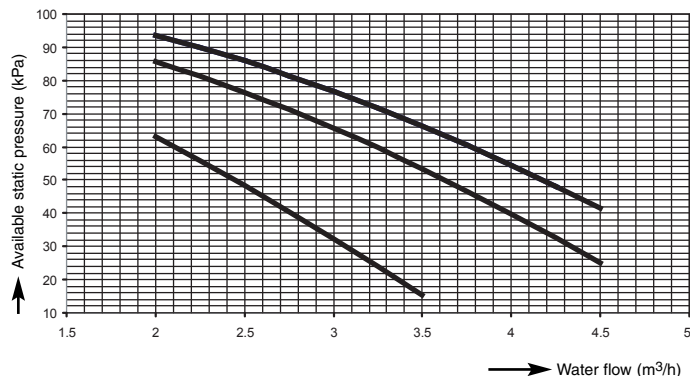
AQUALIS 2 35 - 35 H / 35T - 35 HT



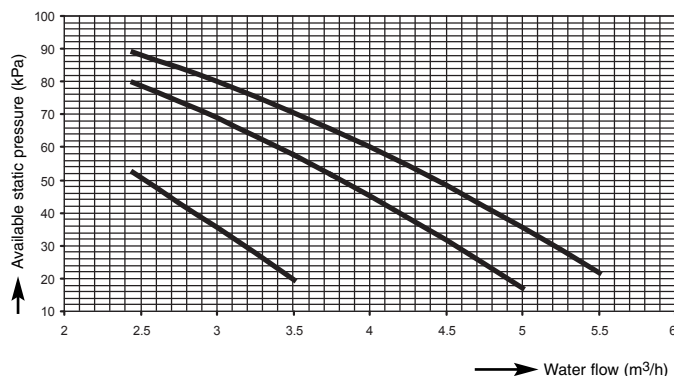
AQUALIS 2 50 H / 50T - 50 HT



AQUALIS 2 65T - 65HT



AQUALIS 2 75T - 75HT

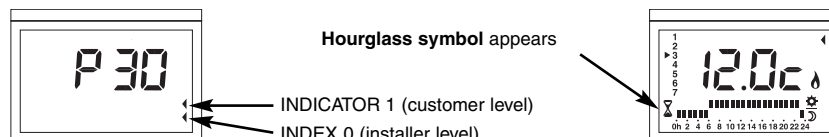


8. TEST MODE

This mode allows you to test the system by reducing the time the safety devices are activated.

Display setting P30 (see the "Accessing the settings" section)

Mode activated when P30 = 1 (cancels after one hour - P30 reverts to 0).



In this case:

- P7 and P9 are cancelled.
- The compressor short-cycle protection is lowered to 30 seconds.
- The 30-minute waiting time following an HP fault (or coil freon sensor fault) is reduced to 30 seconds.
- The auxiliary trigger time delay is reduced from 80 seconds to 5 seconds.
- The frosting time delay is in seconds.
- The time delay for restarting the compressor after a d1.1 fault is reduced from 2 minutes to 30 seconds.



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CERTIFIED ISO 9001 QUALITY SYSTEM

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