

# AQUA Link

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Installation, use and maintenance manual

20121205





## Index

1. GENERAL INFORMATION .....	4
1.1 TECHNICAL FEATURES .....	4
1.2 THE SERIES .....	4
1.3 ACCESSORIES .....	6
1.4 FIELD OF APPLICATION .....	6
2. INSPECTION, UNPACKING, TRANSPORT .....	7
2.1 INSPECTION .....	7
2.2 UNPACKING .....	7
2.3 LIFTING AND TRANSPORT .....	7
2.4 POSITIONING .....	9
2.5 ANTI-VIBRATION SUPPORTS (OPTION) .....	10
2.6 NON-DECLARED USES .....	10
3. INSTALLATION .....	11
3.1 SPACES FOR INSTALLATION .....	11
3.2 HYDRAULIC CONNECTIONS .....	11
3.3 WATER CONTENT OF THE SYSTEM .....	14
3.4 RECOMMENDATIONS FOR OUTDOOR UNIT INSTALLATION .....	14
3.5 ELECTRICAL CONNECTIONS .....	15
3.6 CHECKS .....	15
4. SAFETY MEASURES .....	16
4.1 DEFINITION OF A DANGEROUS AREA .....	16
4.2 SAFETY PROVISIONS .....	16
4.3 INSTALLATION IN AREAS WITH EXPLOSIVE ATMOSPHERES .....	17
4.4 PROTECTIVE DEVICES .....	17
4.5 LIGHTING .....	17
4.6 PERSONNEL QUALIFICATIONS – OBLIGATIONS .....	17
4.7 MISCELLANEOUS NOTES .....	17
5. COMMISSIONING .....	18
5.1 PRELIMINARY CHECKS .....	18
5.2 UNIT START-UP .....	18
5.3 UNIT SHUTDOWN .....	18
5.4 SEASONAL SHUTDOWN .....	18
5.5 EMERGENCY STOP .....	18
6. OPERATION .....	19
6.1 GENERAL INFORMATION .....	19
6.2 START-UP OF THE UNIT AND MANAGEMENT OF THE PUMPS .....	19
7. REGULAR MAINTENANCE AND INSPECTIONS .....	20
7.1 WARNINGS .....	20
7.2 GENERAL INFORMATION .....	20
7.3 PROTECTING THE ENVIRONMENT .....	20
8. DECOMMISSIONING THE UNIT .....	20

# 1. GENERAL INFORMATION

## 1.1 TECHNICAL FEATURES

### STRUCTURE

The supporting frame and removable panels are made of metal sheet painted with epoxy powder with an orange peel texture, and are only suitable for indoor installation. If an outdoor application is necessary, the Outdoor OD accessory is required, which involves the use of galvanized steel sheet, further coated with polyester powder at 180 °C which confers a high resistance to atmospheric agents. Stainless steel screws.

### ELECTRO-PUMPS

Monobloc centrifugal electric pumps are used with a motor and pump unit directly coupled through a chrome steel single shaft. Cast iron body and rotor, ceramic/carbon/EPDM mechanical seals suitable for use with ethylene glycol, and 2-pole, three-phase electric motor with an IP 54 electrical protection degree.

If the double pump accessory is available, the two electro-pumps will be arranged in parallel and operate alternatively: if an alarm is triggered due to the malfunction of one of the pumps, the other pump will automatically be activated.

The pumps are variable in speed by means of an inverter, and controlled with a signal from the pressure transducers in the hydraulic circuit.

The inverters are assembled on the machine, and each pump unit (primary and secondary) is adjusted by a specific inverter.

### TANK

The tank is only included by standard in the version with glycols.

Hot galvanized iron tank insulated with 13 mm thick polyurethane foam covered in PVC.

### HYDRAULIC CIRCUIT

The indoor hydraulic circuit consists of flexible rubber or steel pipes, galvanized iron pipe fittings, check valves, stop valves, valves for discharging the air found in the hydraulic circuits, an expansion tank, and a motorised 2 way valve with actuator and pressure transducers.

### ELECTRIC CONTROL BOARD (standard units)

The electric control board with IP X4 protection class includes:

- a main isolating switch
- pump magnet circuit-breaker switches
- pump contactors
- speed governor with a three-phase inverter for each hydraulic circuit pump
- magnet circuit breaker switches to protect the inverter/s
- control module (IQnomic) for the management of I/O signals coming from loads
- an isolating transformer
- a cooling fan

## 1.2 THE SERIES

### AQUA Link

The AQUA Link hydraulic equipment series for indoor or outdoor housing is available in various sizes in combination with a chiller whose total rated power varies from 90 to 300 kW.

As for the utilities side, the sizing of the unit is designed to allow it to be combined to systems providing for a subdivision in the use of the total power output of the chiller as shown in the following table

GLYCOL VERSION	
Power to UTA	Power to Chilled Beams
20%	80%
30%	70%
40%	60%

NO GLYCOL VERSION	
Power to UTA	Power to Chilled Beams
80%	20%
70%	30%
60%	40%

For specifications, available models, and technical data please refer to the AQUA Link TECHNICAL BOOKLET.

### CONFIGURATIONS

#### EXAMPLE OF A CONFIGURATION

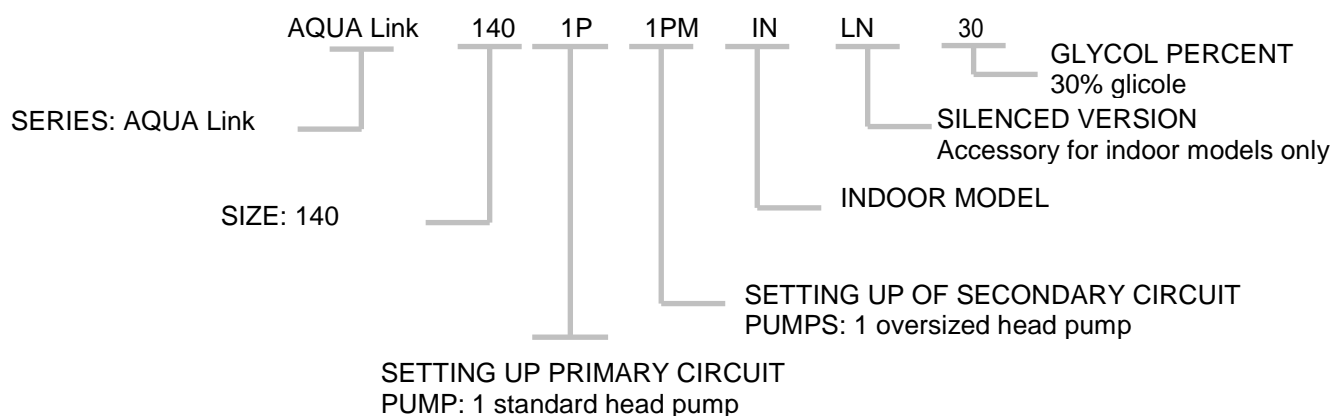
AQUA Link	140	1P	1PM	IN	LN	30
1	2	3	4	5	6	7

- 1: series
- 2: size
- 3: pumps set-up to the primary circuit
- 4: pumps set-up to the secondary circuit
- 5: model
- 6: any silenced model
- 7: glycol percentage

The possible values for each digit of the alpha-numerical identification code of the unit can be the following:

- 1: AQUA Link
- 2: 110 / 140 / 220 / 300 (It shows the indicative power range of the combined chiller in kW)
- 3: 1P / 2P / 1PM / 2PM (number and type of primary circuit pumps; M= Oversized)
- 4: 1P / 2P / 1PM / 2PM (number and type of secondary circuit pumps; M= Oversized. The number of secondary circuit pumps, if available as accessories, must be in line with the number of the primary circuit pumps)
- 5: IN (for indoor models) / OD (for outdoor models)
- 6: blank / LN (any silenced models. If it is a standard model, the relevant field will not be filled in. Silenced models are only available for indoor installation, as it is provided with containment panelling as an accessory)
- 7: NG /digit between 20 and 40. It shows the glycol percentage expected on the primary circuit. The acronym NG stands for no glycols in the primary circuit.

#### EXAMPLE OF UNIT CLASSIFICATION



The model, serial number, features, power supply voltage, etc., are reported on the labels applied to the machine.

<b>BLUE BOX</b>		Via Enrico Mattei, 20 35028 Pieve di Sacco (PD) ITALY TEL +39 049 8716360		<b>CE</b> 1370
C R O U P				
Modello/Model Modell/Modèle				
Type refrigerante Refrigerant type Kältemitteltyp Type réfrigérant				
IP guaina elettrico IP electrical jacket IP Schutzklasse IP classe électrique				
Serial number Seriennummer Numéro				
Corrente massima assorbita Max. absorbed current Max. Stromaufnahme Courant max. absorbée				
Corrente massima di spunto Max. starting current Max. Startstrom Courant max. de démarrage				
Tensione Pres.Frequenza Voltage Pressure-Frequency Spannung-Druck-Frequenz Tension-Pression-Fréquence				
Tensione circuito ausiliario Auxiliary circuit voltage Stromversorgung Tension circuit auxiliaire				
Numero circuito refrigerante Refrigerant circuit number Anzahl der Kältemittelkreisläufe Numéro circuit réfrigérant				
Press. max. refriger. abilitato Max. Refrig. pressure allowed Max. Ref. Betriebsdruck zulässig Pression max. réf. autorisée				
Press. max. circuito idraulico Max. hydraulic circuit pressure Max. druckhydraul. System Press. Max. circuit hydraulique				
Data di produzione Date of manufacture Herstellungsjahr Date de production				
Cilindrata refrigerante per circuito Refrigerant charge per circuit Kältemittelmenge pro Kältemittelkreislauf Kältemittelmenge pro Kältemittelkreislauf				
C1 C2 C3 C4				

<b>BLUE BOX</b>		Via Enrico Mattei, 20 35028 Pieve di Sacco (PD) ITALY TEL +39 049 8716360		<b>CE</b> 1370
C R O U P				
MODELLO - MODELE - MODEL - TYP				
MATICOLA - MATRICULE - SERIAL NO. - SERIENNUMMER				
REFRIGERANTE - REFRIGERANT - KÄLTEMITTEL - REFRIGERANT				

### 1.3 ACCESSORIES

- primary circuit double standard pump
- secondary circuit standard pump (single or double in line with the primary circuit one/s)
- primary circuit high head pressure pump (single or double)
- secondary circuit high head pressure pump (single or double in line with the primary circuit one/s)
- model for outdoor installation
- panelled model for indoor installation
- hydraulic pressure gauge for the primary circuit
- rubber shock absorbers
- wooden crate packaging
- special slide for container shipment

### 1.4 FIELD OF APPLICATION

They must be used within the application limits stated in the TECHNICAL DOCUMENT.

#### Units with glycols:

##### Indoor version

Units containing glycols in the indoor version of the primary circuit are designed and built to operate at outdoor temperatures between +3°C and +45°C. They therefore do not provide the installation of heating cables to protect the internal components. For operation at temperatures outside of the aforementioned range, it is necessary to contact our Technical Office.

##### Outdoor version

Units containing glycols in the outdoor version of the primary circuit are designed and built to operate within the following limits, whose values depend on the percentage of glycol in the primary circuit.

With a 20% concentration of ethylene glycol, the minimum admissible temperature is -5°C

With a 30% concentration of ethylene glycol, the minimum admissible temperature is -10°C

With a 40% concentration of ethylene glycol, the minimum admissible temperature is -20°C

The overall maximum admissible temperature is 45°C

The plate exchanger is always protected by a protective heating cable for the secondary circuit containing water. If there are pumps installed on the secondary circuit, and it is an outdoor unit, the volutes are always protected by a heating cable as well as pre-installed pipes. The installer must protect any connecting pipe sections between the indoor system and AQUA Link. For temperatures below -15°C (i.e. for glycol percentages between 30% and 40%) a series of heating elements designed to protect the main parts (pump motors, valve bodies...) and the electrical control board must be set up. For operation at temperatures outside the aforementioned range, it is necessary to contact our Technical Office.

#### Units without glycols:

No glycol units in the indoor and outdoor version of the primary circuit are designed and built to operate at outdoor air temperatures between +3°C and +45°C which therefore do not subject the water in the circuit at risk of freezing. For operation at temperatures outside of the aforementioned range, it is necessary to contact our Technical Office. Heating cables are part of the standard supply of units installed outdoors, against accidental low temperatures to protect: pump volutes, mixing manifolds, pipes inside the machine. **WARNING:** it is the installer's responsibility to protect the sections of the machine's infeed and outfeed pipes that lead to the chilled beam circuit and chiller, including the inertial tank.



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Warning: Before performing any operation on the unit make sure the power supply has been disconnected.

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Any operation on the unit must be performed by qualified personnel.

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Failure to comply with the instructions in this manual and any change made to the unit without prior written consent, will immediately render the warranty null and void.

## 2. INSPECTION, UNPACKING, TRANSPORT

### 2.1 INSPECTION

After receiving the unit, check its integrity: the machine left the factory in perfect condition, so any damage must be immediately reported to the carrier and noted in the Delivery Sheet before signing it. Blue Box or your Agent should be made aware of the extent of the damage as soon as possible. The Customer must fill in a written, photographic report concerning any relevant damage.

### 2.2 UNPACKING

The packaging of the unit must be removed carefully to avoid causing damage to the machine. The packaging materials are of a different nature; wood, cardboard, nylon, etc. It is good practice to store them separately and deliver them to specialised companies for disposal (or recycling), which must be done according to standards in force in the Country in which installation is being carried out, thereby reducing environmental impact.

### 2.3 LIFTING AND TRANSPORT

Avoid any abrupt movement while unloading and positioning the unit; when transporting the equipment indoors, pay the utmost care. Do not use the machine components as anchors. The unit must be lifted using steel pipes inserted in the eyelets indicated on relevant plates (yellow arrow shaped plates): check the documentation supplied to identify proper lifting points. The unit must be lifted by harnessing it as shown in the below figure: use long enough ropes or belts, and spacer bars so as not to damage the sides and lid of the unit.

Alternatively, units can be lifted using a forklift by inserting the lifting forks into the support pallet (see figure 1)

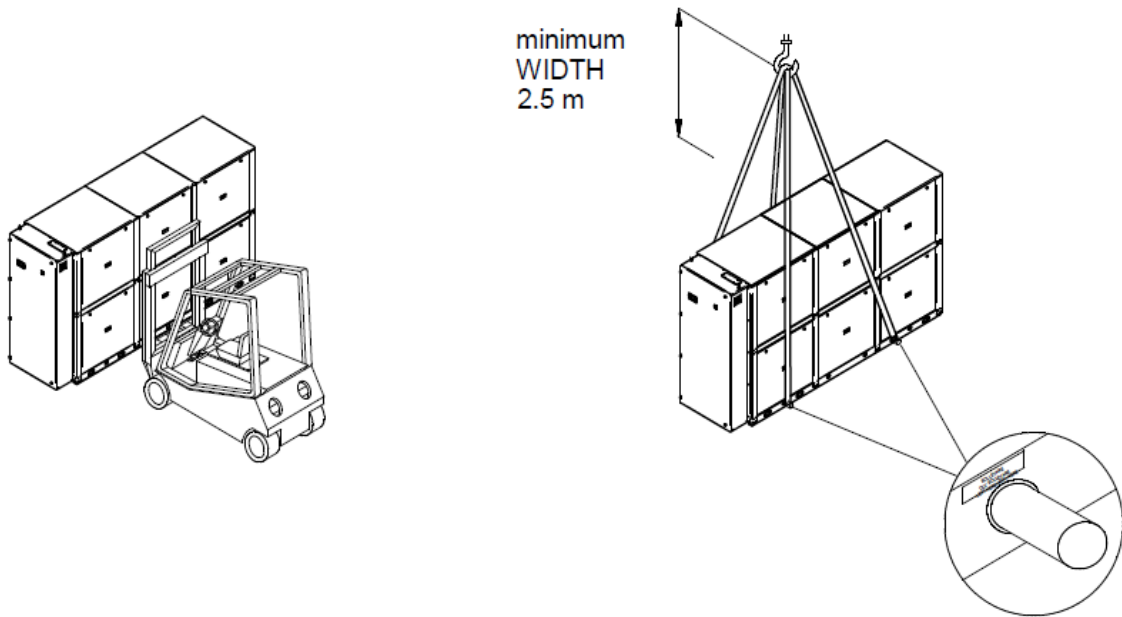


Figure 1: Unit lifting operation




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Warning: During all lifting operations, make sure the unit is firmly secured to prevent it from tipping over or falling.

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The lifting equipment, ropes and harnesses must be chosen by personnel having appropriate skills who are able to assume all responsibilities related to their use.

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The machine is balanced. However, always keep the forks low. Apply counterweights when balancing, if necessary. Do not hold protruding parts with your hands.

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Do not walk beneath or near the suspended load. Handling must be carried out by qualified staff (forklift truck operators and slingers) wearing the required personal protective equipment (overalls, safety shoes, work gloves, helmets, goggles). The Manufacturer declines all liability for any accident caused by non compliance with this warning.

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## 2.4 POSITIONING

The following must be taken into account when choosing the unit place of installation and making relevant connections:

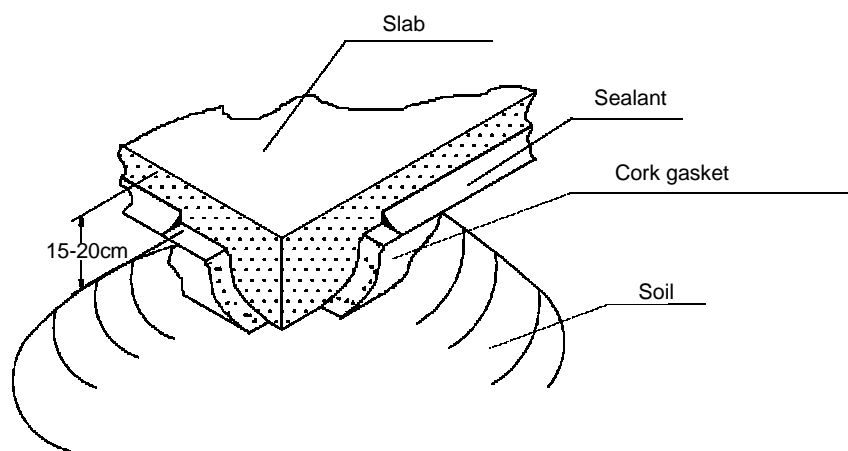
- size and origin of the hydraulic piping;
- location of the power supply;
- accessibility for maintenance or repair operations;
- strength of the supporting surface;
- possible reverberation of sound waves.

The units are designed for installation in indoor technical premises. An outdoor installation model must be specifically requested when ordering.

If the units are installed in indoor environments, it is necessary to ensure that the temperature of these rooms does not fall below 4°C.

Provide a solid base on which to place the unit. This support must be perfectly flat and horizontal, and its size suitable for that of the unit.

This precaution is essential when the unit is to be positioned on unstable ground (different types of soil, gardens, etc.). Figure 2 shows what has been described.



The slab must be:

- made in suitable foundation with a height of about 15-20 cm above the surrounding land,
- supplied with a cork gasket properly sealed along the perimeter,
- flat, horizontal and able to support 150% of the operating weight of the machine.
- at least 30 cm. longer and wider than the machine.

The units transmit a low level of vibrations to the ground: it is however recommended to interpose a band of rigid rubber between the base frame and the support surface.

Anti-vibration mounts are recommended whenever thorough isolation is necessary (contact our company).

## 2.5 ANTI-VIBRATION SUPPORTS (OPTION)

As the unit does not have any moving components other than circulation pumps, it ensures a low level of vibrations transmitted to the ground. Normally, the interposition of rubber strips between the ground and the base is sufficient to cancel the effects of vibrations.

When it is necessary to further reduce vibration transmitted to the supporting structure, we recommend the use of rubber shock absorbers available as optional accessories. The dimensional layout with the footprint on the ground, attached to the machine, shows the position and load of each anti-vibration mount. The fixing operation of anti-vibration mounts must be performed before placing the machine on the ground. Ensure that the lifted machine is properly secured to lifting cables.

In the event of installation on roofs or intermediate floors, the unit and the piping should be insulated from walls and ceilings. The units should not however be placed near home offices, bedrooms or areas where low noise is required. Do not install the unit in narrow or confined spaces in order to prevent excessive sound reverberation.

## 2.6 NON-DECLARED USES

The machine must not be used:

- in an explosive atmosphere;
- in inflammable atmospheres;
- in excessively dusty environments;
- by untrained personnel;
- in a manner contrary to law;
- with improper installation;
- with power supply defects;
- with total or partial non-compliance with instructions;
- with no maintenance and/or use of non-original spare parts;
- with changes or other actions not authorized by the Manufacturer;
- when the work area is not kept free of tools or objects;
- when the work area is not adequately clean;
- in the presence of abnormal vibration in the work area.

### 3. INSTALLATION

#### 3.1 SPACES FOR INSTALLATION

The unit is made grouping all connections to the outdoor hydraulic circuit on a single side. Check that the positioning of the unit allows easy access to that side and the electric control board. Comply with the clearances as shown on the dimensional drawing, and ensure they are calculated allowing easy access to internal components in case of maintenance.

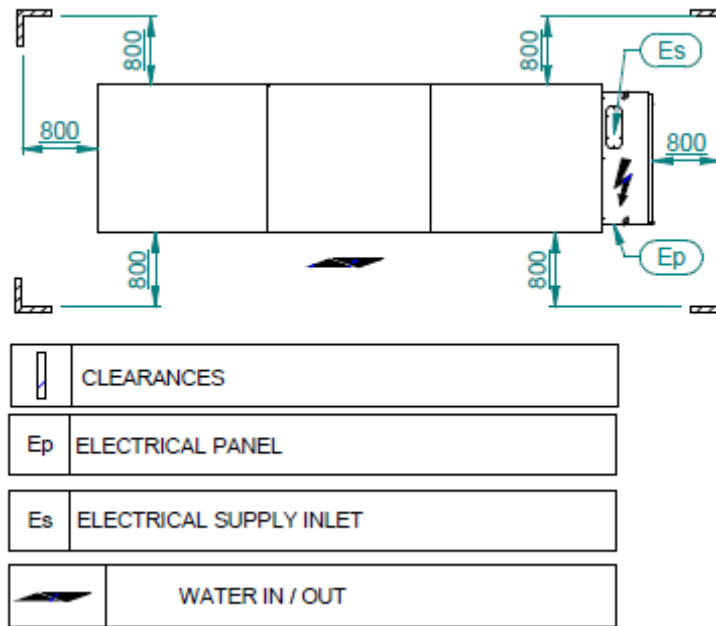


Figure 4: Unit recommended distances

#### 3.2 HYDRAULIC CONNECTIONS

It is good practice to comply with the following directions, and in all cases with national and local regulations, when setting up the hydraulic circuit (refer to the layouts included in the manual).

- fit the piping to the unit using flexible joints in order to prevent vibration transmission and compensate thermal expansion
- check that the system incoming pipes (both from the chilled beams and UTA side) are connected to their respective water inlet connections
- check that the utility supplying pipes are connected to their respective water outlet connections.
- generally, to connect the machine infeed and outfeed pipes, it is necessary to observe the instructions provided on the stickers

##### Installation of the water temperature probe on the secondary circuit

This probe is already wired and installed if the "pumps on the secondary circuit" accessory is available. This probe is supplied if the "pumps on the secondary circuit" accessory is not available. There must be a sump on the water supply pipes to the chilled beams within which to install and wire the probe in accordance with the supplied wiring diagram. The supplied probe is located inside the electric control board, and can be identified by a specific label bearing the same classification of the wiring diagram.

##### Install the following components on piping:

- stop cocks, temperature and pressure indicators for routine maintenance and unit inspection
- sumps on the inlet and outlet pipes for temperature measurements, if temperature indicators are not available
- shut-off valves (gate valves) to isolate the unit from the hydraulic circuit
- metal filter (inlet pipe) with a mesh not exceeding 1 mm to protect the exchanger from debris or impurities present in the piping
- vent valves, to be placed in the highest parts of the hydraulic circuit, in order to allow venting

- expansion tank and automatic valves to keep the system pressure and compensate for thermal expansion
- check that the automatic glycol loading in the circuit is carried out with a mixture of the same concentration as that already present. Otherwise you may risk the hydraulic circuit freezing with serious damage to the parts concerned.
- a drain cock and if necessary a drain tank to empty the system for maintenance operations or seasonal breaks.
- a by-pass on the water side secondary circuit: to ensure a minimum water flow on the secondary side (chilled beams feeding); a by-pass branch must be provided for, even if all two-way valves of the chilled beams are closed, to allow the passage of a minimum amount to guarantee the cooling of the pump. It is good practice that this branch is equipped with a valve allowing its calibration.
- it is strongly recommended to install a safety valve on the hydraulic circuit (if not provided on the chiller): in the event of serious system anomalies (e.g. fire), it allows to drain the system avoiding possible outbreaks. Always connect the drain to a pipe with a diameter that is no less than that of the valve opening, and convey it to areas where the jet cannot cause harm to people.




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On the hydraulic connection to the outside it is compulsory to install a wire mesh filter, with the mesh size no larger than 1 mm, on the water inlet pipes. Failure to do so will immediately invalidate the warranty.

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Use a suitable percentage of antifreeze if the hydraulic circuit is at room temperature close to or below zero Celsius.

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It is a good rule to empty the hydraulic system in case of prolonged periods of inactivity.

To make it easier to drain the circuit there is a draining valve located on the bottom of the tank, when there is a tank, or at the lowest point of the circuit when there is no tank. There is also a relief valve on the top of this tank, or at the highest point of the circuit if there is no tank, designed to eliminate air bubbles from the circuit.

When the system is switched back on and the circuit is re-loaded, it must either be loaded with water or a mixture of water and ethylene glycols, in the percentage stated on the plate.

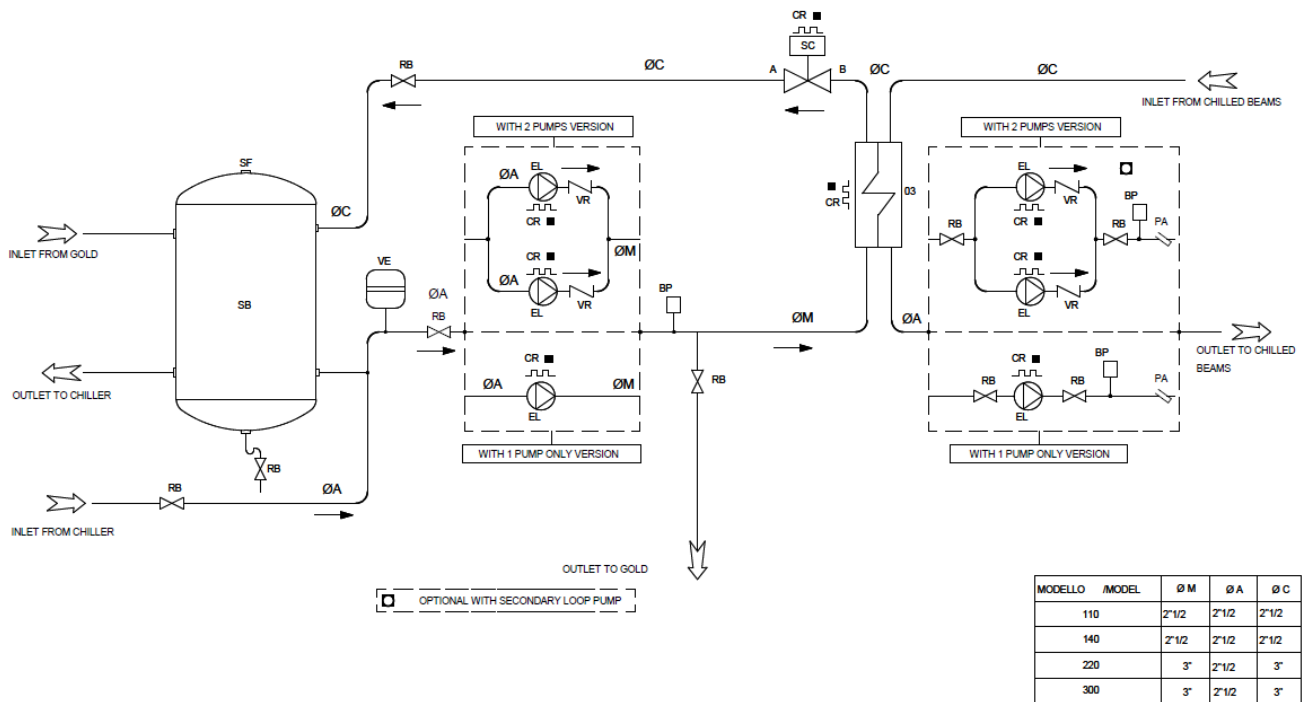


Figura 5: schema idraulico dell'unità con glicole (tank fitted as standard)

LEGENDA

- SF = Valvola di sfiato – Bleed valve
- SB = Serbatoio d'accumulo – Storage tank
- RB = Rubinetto – Shut-off valve
- SC = Servoc.valvola 2 vie – Two-way valve actuator
- PFO = Sonda di temperature (se non presente l'accessorio pompe al secondario la sonda dev'essere posizionata a cura dell'installatore)
- BP = Trasd.di pressione – Pressure transducer
- EL = Elettropompa – Electric pump
- VR = Valvola di ritegno – Check valve
- CR = Cavo riscaldante – Heating electric cable

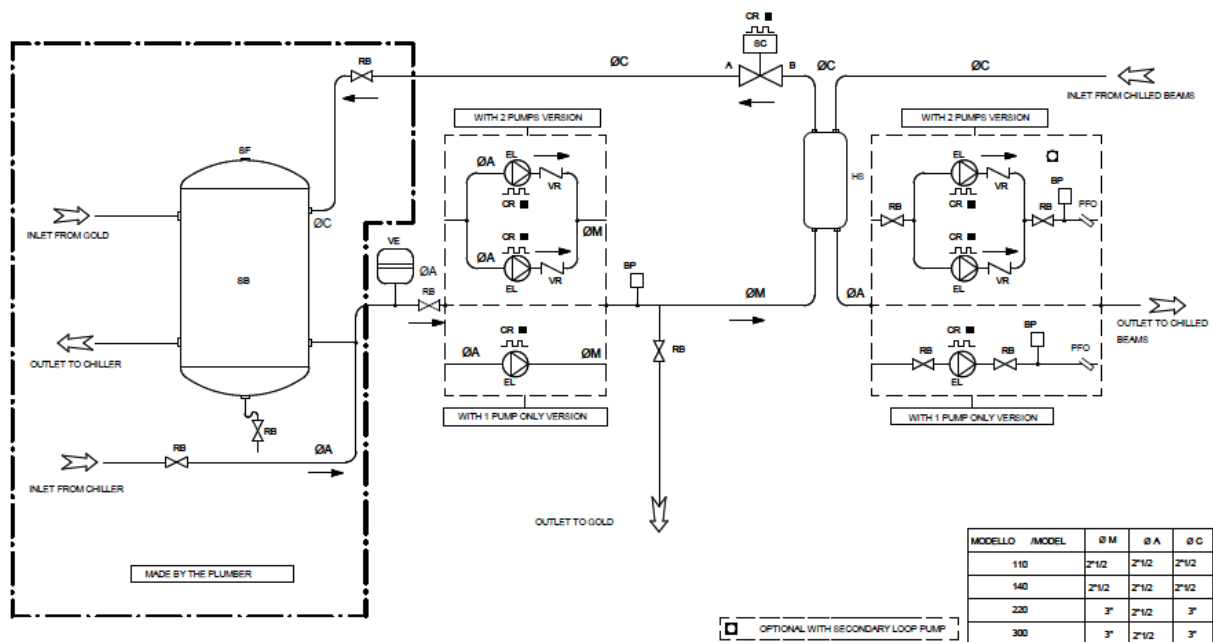


Figure 6: hydraulic diagram of the no glycol unit (outdoor tank provided by the installer)

LEGENDA

- SF = Valvola di sfiato – Bleed valve
- BP = Trasd. di pressione – Pressure transducer
- HS = Serbatoio d'accumulo – Storage tank (non compreso, a cura dell'installatore – not included, added by the plumber)
- EL = Elettropompa – Electric pump
- RB = Rubinetto – Shut-off valve
- VR = Valvola di ritegno – Check valve
- SC = Servoc. Valvola 2 vie – Two-way valve actuator
- CR = Cavo riscaldante – Heating electric cable
- PFO = Sonda di temperature (se non presente l'accessorio pompe al secondario la sonda dev'essere posizionata a cura dell'installatore)

### 3.3 WATER CONTENT OF THE SYSTEM

The compressors often work intermittently as the user cooling request does not generally coincide with that supplied by the compressor. A compressor start-up or shutdown delay can generate a carrier fluid temperature drift from the storage ideal temperature. The system must be built in such a way that this drift does not cause damage to the hydraulic circuit. There is a substantial difference between units that operate on pure water and water with a glycol content.

#### NO GLYCOL UNITS:

These units do not have an on-board tank and the system must be built to guarantee a minimum amount of water in the primary circuit. The amount in question can be identified by following the requirements provided in the documentation for the associated chiller, as it depends directly on the power of the chiller unit, on the type of installed compressors and on the number of envisioned power steps. The associated chiller can be selected with or without an on-board tank, as long as the required minimum amount of water is observed. The associated chiller must be selected with at least one on-board pump.

#### GLYCOL UNITS

An on-board AQUA Link tank is always included as part of the standard supply of these units. The associated chiller must, in turn, be selected with an on-board tank. This choice is based on the possibility of exploiting a complete system that is not dependent on external accessory elements. The sum of the water-glycol content from the two tanks is, in fact, enough to avoid damage to the circuit due to possible fluctuations in temperature.

The Chiller series, with or without glycols, that AQUA Link can be associated with are:

- Teal
- Teal FC (Basic – Custom – Extra)
- Teal A
- Teal A FC (Basic – Custom – Extra)
- Teal SLN
- Teal SLN FC (Basic – Custom – Extra)
- Teal A SLN
- Teal A SLN FC (Basic – Custom – Extra)
- Teal A+
- Teal A+ FC (Basic – Custom – Extra)
- Teal W
- Oxford
- Oxford FC
- Oxford A
- Oxford SLN
- Cyan
- Cyan SLN
- Kappa V EVO
- Kappa V EVO SLN
- Kappa V Evo A
- Kappa V Evo A HT
- Kappa V Evo A SLN
- Kappa V Evo A HT SLN
- Omega V Echos
- Omega V Echos A

TABLE 1 - FREEZING POINT FOR WATER-ETHYLENE GLYCOL MIXTURES

AMBIENT MINIMUM TEMPERATURE (°C)	+0°	-5°	-10°	-15°	-20°	-25°	-30°	-35°	-40°
FREEZING POINT (°C)	-5°	-10°	-15°	-20°	-25°	-30°	-35°	-40°	-45°
ANTI-FREEZE	% IN WEIGHT								
ETHYLENE GLYCOL	6	22	30	36	41	46	50	53	56

### 3.4 RECOMMENDATIONS FOR OUTDOOR UNIT INSTALLATION

Units with glycols for outdoor installation are always accessorised by an electrical heating element to protect the heat exchanger, otherwise the chilled beams circuit will not be protected from frost. The heating element switches on when the critical temperatures are reached.

The installer is responsible for protecting any pipe sections that connect the secondary hydraulic circuit (chilled beams) to the plate exchanger.

Heating cables are part of the standard supply of outdoor-installation no-glycol units, to protect: pump volutes, mixing manifolds, pipes inside the machine. **WARNING:** it is the installer's responsibility to protect the sections of machine infeed and outfeed pipes that lead to the chilled beam circuit and chiller, including the inertial tank.



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Equip the section of connection piping between the plate heat exchanger and the secondary circuit with protections against low temperatures.

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### 3.5 ELECTRICAL CONNECTIONS

- The electrical connections must comply with the information provided in the wiring diagram attached to the unit, and the regulations in force in the place of installation.
- The ground connection is required by law. The installer must connect the earth cable using the relevant PE clamp on the earth bar located in the electric control board.
- Check that the power supply voltage corresponds to the rated data of the unit (voltage, number of phases, frequency) specified on the plate on the machine.
- The power supply voltage must not vary more than  $\pm 5\%$  and the imbalance between phases must always be less than 2%. If this does not happen, contact our technical department in order to select the relevant protections.
- Check that the line is connected with the correct sequence of phases.

The power cables should be connected to the unit through a hole provided on the upper part of the electric control board (comply with the directions given in the dimensional diagram).

The control circuit power supply is derived from the power line via a transformer located in the electric control board. The control circuit is protected by specific automatic switches.

The unit is equipped with devices (condensers) on the inverters that remain powered even after the electric power supply has been disconnected from the unit. It is necessary to wait until they are discharged to prevent electric shocks.



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Before performing any maintenance, disconnect the power supply and control circuitry with a specific isolating switch, then wait at least 5 minutes before removing the wires.

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Make sure that the motors of the pumps have completely stopped: motors in free rotation can result in hazardous voltages for the inverter terminals even when not powered.

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The section of the cable and the line protections must comply with that specified in the wiring diagram and the relevant table attached to the unit.

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The electric power supply must take place within the above mentioned values: otherwise, the warranty is immediately rendered null and void.

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To attach the power cord: Use user cable fastening systems that resist to traction and torsion.

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Make sure there is no voltage before performing any operation on electric parts.

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### 3.6 CHECKS

AQUA Link is not equipped with a completely independent control but is provided with a control module (IQ-nomic) controlled by a signal from the module (IQ-nomic) connected to the Gold and from the (All Year Comfort) module that manages the secondary distribution circuit to the chilled beams.

The connection between different units is created by connecting control modules (IQ-nomic) together as shown in wiring diagrams.

The AQUA Link hydraulic module is equipped with inverter technology to adjust the rotation speed of the pumps contained in it.

## 4. SAFETY MEASURES

The machine complies with Directives 2006/42/EC, 2004/108/EC, 2006/95/EC, 97/23/EC and applicable Technical Standards as specified in the Declaration of Conformity which is an integral part of this manual.

### 4.1 DEFINITION OF A DANGEROUS AREA

The machine must be accessed only by authorised operators.

- The outdoor danger area is identified by a space of about 2 metres around the machine. Access to this area should be forbidden by a special protection if the unit is placed in an unprotected place, easily accessible by unqualified staff.
- The indoor danger area can be accessed through the machine. Under no circumstances should access inside the machine be allowed to unqualified personnel and before cutting power.

### 4.2 SAFETY PROVISIONS

All units are designed and built to comply with the Pressure Equipment Directive (97/23CE) to ensure the maximum level of safety. Comply with the provisions below to prevent possible risks:

This product contains pressurised containers, live components, moving mechanical parts, hot and cold surfaces that could pose a hazard in certain situations: any operation must be performed by qualified personnel who have the necessary qualifications according to current regulations. Make sure that the appointed personnel fully understand the documentation supplied with the unit before carrying out any operation;

- The operations described in this manual must be supplemented with the procedures included in the user instruction manuals of other systems and devices incorporated in the machine. The manuals contain all the information to safely manage devices and operating modes;
- Use proper protection (gloves, helmet, goggles, safety shoes, etc.) for any maintenance or control operation performed on the unit;
- Do not wear loose clothing, ties, necklaces, watches, etc., that can get caught in the machine moving parts;
- Always use tools and protective equipment in excellent condition;
- Do not operate in the exhaust path of the safety valves;
- The system user must consult the installation and use manuals of the systems incorporated and attached to this manual;
- There may be potential risks that are not evident. Warnings and instructions are therefore provided in the machine.

It is forbidden to remove warnings.

The unit must be loaded with a mixture of water and ethylene glycol. The glycol percentage must be consistent with that envisaged in the order, and may vary between 20% and 40%. For the safety data sheet of this product, please refer to the one supplied by the glycol manufacturer

It is forbidden to:

- remove or make safety guards ineffective;
- tamper with and/or change, even partially, the safety devices installed on the machine.
- In case of alarm and consequent operation of safety devices, the operator must require the immediate intervention of qualified maintenance technicians. Any accident can lead to serious injury or death.
- Safety devices must be checked according to the directions given in the attached instruction manuals. Inspections must be performed by personnel authorized by the employer through a written document of assignment. A copy of the results of the checks should be left on the machine or near it. Any accident can lead to serious injury or death.

The manufacturer assumes no liability for damage/injury to people, pets or property resulting from the re-use of single parts of the machine for assembly situations or functions different from the original ones. It is forbidden to tamper with/replace one or more parts of the machine without authorisation.

The use of accessories, tools or consumables other than those recommended by the Manufacturer relieves the latter from civil and criminal liability.

The machine decommissioning and demolition should be entrusted only to properly trained and equipped personnel.



## 4.3 INSTALLATION IN AREAS WITH EXPLOSIVE ATMOSPHERES

The units do not fall within the scope of the 94/9/EC directive – Presidential Decree n. 126 dated 23/3/98 no. 126, therefore they are not designed for installation in potentially explosive atmospheres. Contact the manufacturer for any adjustments/solutions.

## 4.4 PROTECTIVE DEVICES

The machine is equipped with appropriate technical means to protect people from the hazards that cannot be reasonably eliminated or adequately reduced through design.

It is forbidden to:

- remove or make safety guards ineffective;
- tamper with and/or modify, even partially, the safety devices installed on the machine.

## 4.5 LIGHTING

Lighting must allow performing operations without causing hazards due to shadow zones (for example, when servicing the unit).

## 4.6 PERSONNEL QUALIFICATIONS – OBLIGATIONS

Users must be acquainted with and apply the provisions on workplace safety contained in Directives 89/391/EC and 1999/92/EC.

Knowledge and understanding of the manual are an essential tool for risk reduction, safety and workers health.

The operator must have a proper degree of knowledge to perform the various activities during the phases of the machine service life.



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Operators must be trained to face the occurrence of possible anomalies, malfunctions or hazardous situations to protect themselves or others and, in any case, must comply with the instructions below:

- stop the unit immediately
  - refrain from taking any actions lying beyond their work tasks and technical knowledge
  - immediately inform their supervisors, avoiding taking personal initiatives.
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## 4.7 MISCELLANEOUS NOTES

When using the machine, make use of the protection devices under the law, which may be built-in or separate.

The Technical File is stored with the machine manufacturer.

The manufacturer assumes no liability for any damage/injury to people, pets or property resulting from failure to comply with the safety rules and recommendations contained in the supplied documentation. This manual is integrated with the information contained in other documents. Refer to this documents if necessary.

## 5. COMMISSIONING

### 5.1 PRELIMINARY CHECKS

- Check that the electric connection has been performed correctly and that all clamps are tightly fastened.
- Check that the voltage of line terminals meets specifications. If voltage is subject to frequent changes, contact our technical department to select appropriate protections.
- Check that all shut-off valves in the hydraulic circuit are open.
- Check that hydraulic connections have been properly made, in line with the directions reported on the input/output plates on the machine.
- Check that the hydraulic system has been vented, eliminating any excess air. Then load it gradually, opening the vent devices in the upper part, which the installer will have taken care to prepare, together with an expansion tank of adequate capacity.

### 5.2 UNIT START-UP

The start-up of the unit occurs by acting on the main switch on the electric control board bringing it to the on position marked with "I". Now the unit is ready to operate and will power heating resistors, if available, until the minimum start-up temperature is reached (for outdoor models only).

### 5.3 UNIT SHUTDOWN

The shutdown of the unit occurs by acting on the main switch on the electric control board by bringing it to the off position marked with "0". Now the unit is no longer able to power any heating resistor available (for outdoor models only).

### 5.4 SEASONAL SHUTDOWN

Seasonal shutdown is made bringing the machine to the off position marked with "0" by acting on the main switch on the electric control board. It is not necessary to empty the hydraulic circuit unless the percentage of eventual glycol is deemed insufficient to protect against the risk of ice forming in the hydraulic circuit.

The circuit recharge upon reactivation of the system must be carried out with a mixture of water and ethylene glycol according to the percentage specified on the data plate.

### 5.5 EMERGENCY STOP

Rotate the main switch on the electric control board to the off position marked with "0".



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If the unit does not start: never change the internal electrical connections as this will immediately render the warranty null and void.

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## 6. OPERATION

### 6.1 GENERAL INFORMATION

The unit is not provided with an independent control for the start-up and shutdown of internal parts. However, the relevant signals come from the outside via specific connections provided in the electric control board.

A check on the pressure value, generated by the pump to the primary circuit that is measured by the pressure probe available in the circuit, is automatically performed.

If secondary circuit pumps are available, they will be equipped with pressure probes too.

The speed of the pumps is adjusted by the inverters so as to keep the value of the increase in pressure generated by the pumps steady, as the flow rate varies.

The operation rotation logic of the pumps is also managed independently if backup pumps are available as accessories.

### 6.2 START-UP OF THE UNIT AND MANAGEMENT OF THE PUMPS

The unit can be provided with one or two pump units; one to the primary circuit (always present, and operating with glycol in variable percentages between 20% and 40%), and the other to the secondary circuit (supplied as optional and operated with water).

The authorization to operate the unit and to start the primary circuit pump (the only ever present, even in "basic" model) is subject to the simultaneous occurrence of two conditions, namely: 1) UTA in operation; 2) achieving the minimum threshold of opening level of one of the two valves available. Once started, the pump will switch off when one of the two following conditions occurs: 1) UTA shutdown; 2) complete closing of both two-way modulating valves.

The secondary circuit pump (optional) is started at the same time as the GOLD treatment unit, and is switched off only when the Gold unit goes off (fans stop). For this reason it is necessary to equip the secondary circuit with a by-pass calibration valve that allows a minimum water flow even when the beams are not completely powered.

If there are 2 pumps in parallel (one as a back-up pump), the exchange between the two will occur in case of failure, or at least periodically to ensure uniformity of operation time.

The speed of the pumps is always adjusted by an inverter that receives a signal from a pressure probe installed on the related circuit. The aim is to maintain a constant pressure level in the circuit at different pump speed with any degree of opening of the available two-way valves.

The two-way valve internal to AQUA Link has the aim to adjust the temperature of the water sent to the circuit of the chilled beams, a value established by the All Year Comfort control. The 0-10 V signal that drives this valve must come from a temperature probe installed on the flow of the secondary circuit (see par. 3.1).

A second two-way valve (not installed internally to AQUA Link but provided on the UTA), controls the water flow to the UTA battery. The adjustment of this valve is completely entrusted to the control installed on Gold.

## 7. REGULAR MAINTENANCE AND INSPECTIONS

### 7.1 WARNINGS



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All operations described in this chapter **MUST ALWAYS BE CARRIED OUT BY QUALIFIED PERSONNEL.**

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Before performing any operation on the unit or accessing internal parts, make sure the power supply has been disconnected.

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### 7.2 GENERAL INFORMATION

It is important to carry out regular inspections to check for the unit proper operation.

OPERATION	RECOMMENDED FREQUENCY
Check the operation of all control and safety equipment	Monthly
Check the tightness of the electric terminals inside the electrical panel and in the terminal boards of the pumps. The contactors moving and fixed contacts must be regularly cleaned and replaced if they deteriorate	Monthly
Check there are no water leaks on the hydraulic circuit joints	Monthly
Check the filling of the hydraulic circuit	Monthly
Clean the Y filter on the hydraulic circuit located outside the AQUA Link module (not supplied as standard)	Monthly
Ensure that the noise emitted by the machine is regular	Every 4 months

### 7.3 PROTECTING THE ENVIRONMENT

Under the law, it is forbidden to release toxic substances into the environment. Holders are obliged to recover and return them to dealers or special collection centres at the end of their service life.

Ethylene glycol is mentioned among the substances subject to a special monitoring system provided for by law, and must therefore comply with the requirements listed above.



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Special attention is therefore recommended during maintenance operations in order to minimize reduce glycol leakage.

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## 8. DECOMMISSIONING THE UNIT

When the unit has reached the end of its life and needs to be removed and replaced, the structure and various components, if unusable, are to be dismantled and divided according to their general product category: this is particularly true for electronic and iron carpentry components present in small amounts in the machine.

This is to help collection, disposal and recycling centres, and minimize environmental impact.

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