

# EW(L)(W)Q-G/L

Condenserless water cooled chillers

# Installation, maintenance & operation manual

EWQ090G → EWWQ720L Water-cooled scroll chillers

EWLQ090G → EWLQ720L Condenserless

EWHQ100G → EWHQ400G Heat pump scroll chillers

Refrigerant: R410A  
D-EIMWC01208-16EN

REV	00
Date	-
Supersedes	D-IEMWC01206-15EN-



Thank you for purchasing this chiller

This manual is an important supporting document for qualified personnel but it is not intended to replace such personnel.



READ THIS MANUAL CAREFULLY BEFORE INSTALLING AND STARTING UP THE UNIT.  
IMPROPER INSTALLATION COULD RESULT IN ELECTRIC SHOCK, SHORT-CIRCUIT, COOLANT LEAKS, FIRE OR OTHER DAMAGE TO THE EQUIPMENT OR INJURE TO PEOPLE.  
THE UNIT MUST BE INSTALLED BY A PROFESSIONAL OPERATOR/TECHNICIAN.  
UNIT STARTUP HAS TO BE PERFORMED BY AUTHORIZED AND TRAINED PROFESSIONAL.  
ALL ACTIVITIES HAVE TO BE PERFORMED ACCORDING TO LOCAL LAWS AND REGULATIONS.  
**UNIT INSTALLATION AND START UP IS ABSOLUTELY FORBIDDEN IF ALL INSTRUCTION CONTAINED IN THIS MANUAL ARE NOT CLEAR.**  
IF CASE OF DOUBT CONTACT THE MANUFACTURER REPRESENTATIVE FOR ADVICE AND INFORMATION.

### Contents

The unit purchases is a Water Chiller and/or a Heat Pump, that is a machine designed to cool/heat the water (or a water-glycol mixture) within certain limits which will be listed below. The unit operates based on the compression, condensation and evaporation of the coolant gas, according to the Carnot cycle, and is composed mainly of the following parts depending on the Mode of Operation.

#### Cooling or Conditioning Mode:

- One or more scroll compressors that increase the pressure of the refrigerant gas from evaporation to condensation pressure.
- A condenser where the refrigerant gas under high pressure condenses transferring the heat to the water.
- Expansion valve allowing to reduced the pressure of condensed liquid refrigerant from condensation pressure to evaporation pressure.
- Evaporator, where the low pressure liquid refrigerant evaporates chilling the water

#### Heating Mode or Heat Pump:

- One or more scroll compressors that increase the pressure of the refrigerant gas from evaporation to condensation pressure.
- A 4-way valve which enables the inversion of the refrigeration cycle.
- A heat exchanger in which the refrigerant condenses heating the water.
- Expansion valve allowing to reduced the pressure of condensed liquid from condensation pressure to evaporation pressure.
- A heat exchanger where the low pressure refrigerant evaporate removing the heat from the water.
- The operation of the heat exchangers can be inverted using the 4-way valve, with which the use of the heating/cooling unit can be seasonally inverted.

### General Information



All the units are delivered, together with **wiring diagrams, certified drawings, nameplate and DoC (Declaration of Conformity)**. These documents list all the technical data of the unit acquired and **CONSTITUTE AN INTEGRAL AND ESSENTIAL PART OF THIS MANUAL.**

In case of any discrepancy between this manual and the equipment's documents please refer to on board documents. In case of any doubt contact the manufacturer representative.

The purpose of this manual is to allow the installer and the qualified operator to ensure proper, commissioning, operation and maintenance, without any risk to people, animals or things.

### Receiving the unit

The unit must be inspected for any possible damage immediately upon reaching final place of installation. All components described in the delivery note must be inspected and checked.

Should there be evidence of damage, do not remove the damaged components and immediately report the extent and type of damage both to the transportation company, asking them to inspect it, and the manufacturer's representative, sending if possible photos which may be useful in identifying the responsibilities.

Damage must not be repaired before the inspection of the transportation company representative and the manufacturer's representative.

Before installing the unit, check that the model and power supply voltage shown on the nameplate are correct. Responsibility for any damage after acceptance cannot be attributed to the manufacturer.

### Storage

The unit must be protected from dust, rain, constant exposure to the sun and possible corrosive agent when being stored outside before installation.

Even though it is covered by a heat-shrinking plastic sheet, it is not intended for long-term storage and must be removed as soon as the unit is unloaded. It must in fact be protected by tarpaulins and the like which are more suitable for the long term.

Environmental conditions must be within the following limits:

Minimum ambient temperature: -20°C

Maximum ambient temperature: +42°C

Maximum relative humidity: 95% without condensation.

If the unit is stored at a temperature under the minimum ambient temperature, the components could be damaged, while at a temperature above the maximum ambient temperature, the safety valves could open and discharge the refrigerant into the atmosphere.

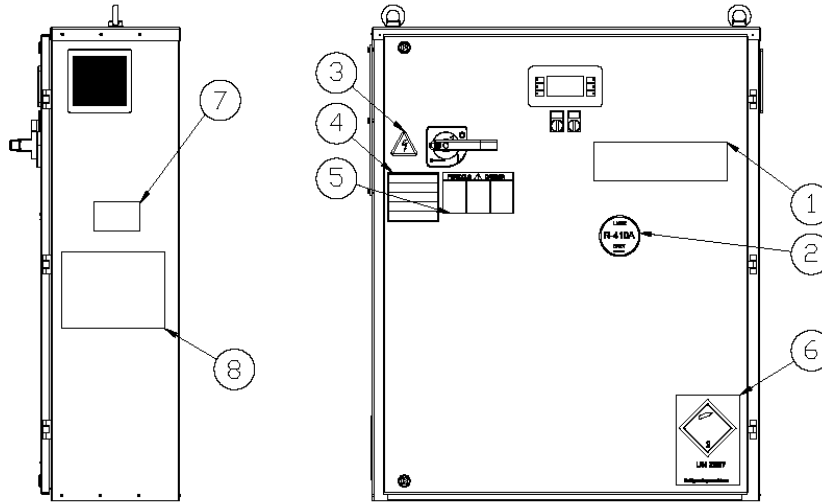
Lastly, storage in places with condensation of humidity can damage the electric components.

**Operation**

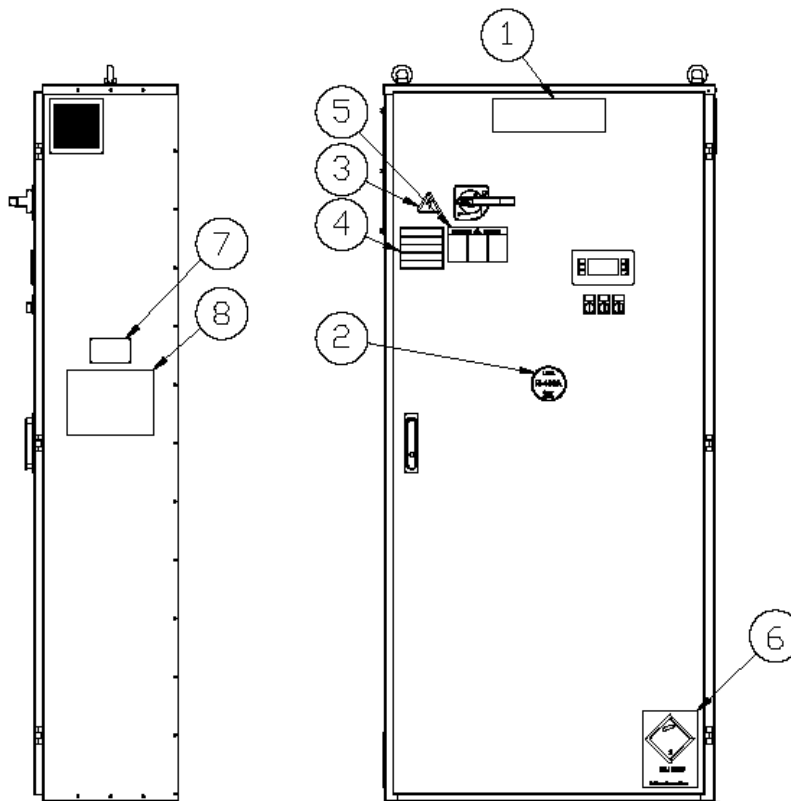
Operation out of the mentioned limits may damage the unit.

In case of doubts contact manufacturer representative.

**Figure 1 - Identification of the labels applied to the electric panel (Standard\*)  
Single circuit unit**



**Double circuit unit**

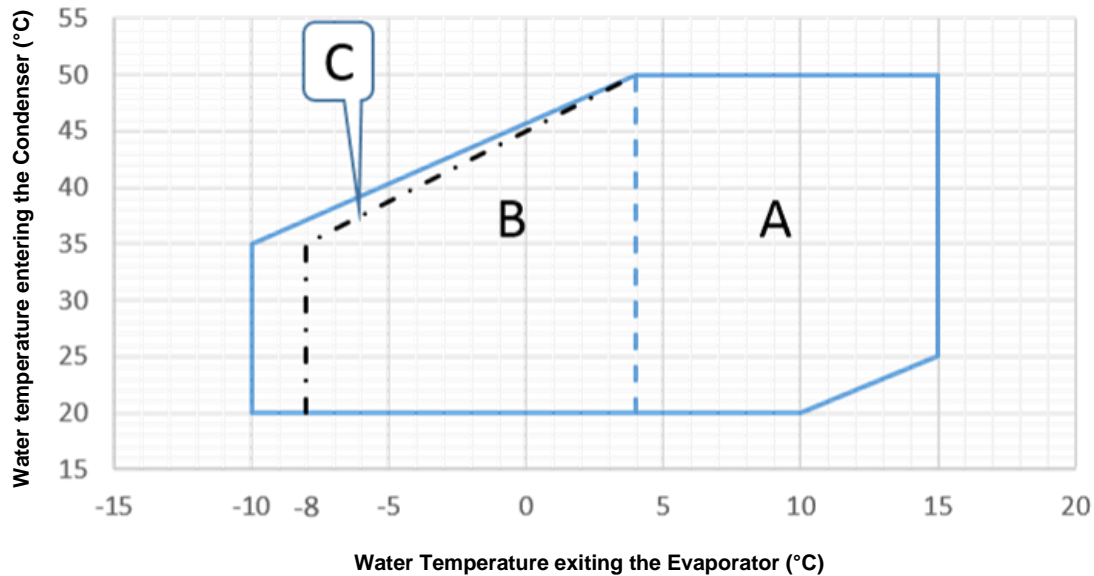


**Identification of the labels**

1 – Manufacturer's logo	5 – Hazardous voltage warning
2 – Type of coolant in the circuit/s	6 – Non flammable gas symbol
3 – Electrical hazard symbol	7 – Identification data of the unit
4 – Tighten electrical cables warning	8 - Instructions for handling / lifting

\*With the exception of the unit's name plate, which is always in the same position, the other plates may be in different positions depending on the model and options included in the unit.

Figure 2 - Operating Limits:



- A – Operation with Water
- B - Operation with Glycol + Water Solution
- C – Heat pump unit operating limit

### Safety

The unit must be firmly secured to the soil.

It is essential to observe the following instructions:

- It is forbidden to access the electrical components without having opened the main switch and switched off the power supply.
- It is forbidden to access the electrical components without using an insulating platform. Do not access the electrical components if water and/or moisture are present.
- The sharp edges can cause injuries. Avoid direct contact and use adequate protection device
- Do not insert solid object in the water pipes.
- A mechanical filter must be installed on the water pipe connected to the heat exchanger inlet.
- The unit is supplied with high pressure switches and/or safety valves, that are installed both on the high-pressure and on the low-pressure sides of the refrigerant circuit: **be careful.**

### It is absolutely forbidden to remove the protections of moving parts.

In case of a sudden stop, follow the instructions listed in the **Control Panel Instruction Manual** which is part of the on-board documentation.

It is strongly recommended that the installation and maintenance operations not be performed along but with other people.

In case of accidental injury or unease, it is necessary to:

- keep calm
- Press the alarm button, if present at the installation site, or open the main switch
- move the injured person in a warm place far from the unit and in rest position
- contact immediately emergency rescue personnel of the building or the Health Emergency Service
- wait without leaving the injured person alone until the rescue operators come

- Give all necessary information to the rescue operators.

### Positioning and assembly

The unit must be installed on a sturdy and perfectly level foundation. For the earthing, a resistant base is cement must be created with a width greater than that of the unit. This base must be able to support its weight.

Anti-vibration supports must be installed between the frame of the unit and the cement base of the steel beams; for their installation follow the dimensional drawing provided with the unit.

The frame of the unit must be perfectly levelled during installation, if necessary using shims to be inserted under the anti-vibrators.

Before the first start-up, it is mandatory that the installation be verified as being level and horizontal using a laser level or another suitable instrument.

The error in the levelness and the horizontal position must not be greater than 5 mm per unit up to 7 metres and 10mm per unit over 7 metres.

If the unit is installed in places that are easily accessible to people and animals, we recommend that protection grates be assemble all around to prevent free access.

To guarantee the best performance in the place of installation, the following precautions and instructions must be respected:

- Make sure to provide a strong and solid foundation to reduce noise and vibrations.
- Avoid installing the unit in areas that could be dangerous during maintenance operations, such as platforms without parapets, railings or areas not complying with the requirements to leave a clearance space all the way around it.

Respect the minimum access distances around the unit:

- 1500 mm in front of the electric panel;
- 1000 mm on all the other sides.

For further solutions, please consult manufacturer representative.

### Noise

The noise generated by the unit is mainly due to the rotation of compressors.

The noise level for each model size is listed in sales documentation.

If the unit is correctly installed, operated and maintained the noise emission level do not require any special protection device to operate continuously close to the unit without any risk.

In case of installation with special noise requirements it could be necessary to install additional sound attenuation devices.

### Handling and lifting

The unit must be lifted with the utmost care and attention, following the lifting instructions shows on the

label applied to the electric panel. Lift the unit very slowly, keeping it perfectly level.

Avoid bumping and/or shaking the unit during the handling and loading/unloading operations from the transportation vehicle, push or pull the unit only using the base frame. Secure the unit inside the truck to prevent it from moving and causing damages. Do not allow any part of the unit to fall during loading/unloading.

All units have lifting points marked in yellow. Only these points may be used for lifting the unit, as shown in the following figure. The handling and lifting with a fork lift is the only alternative method.


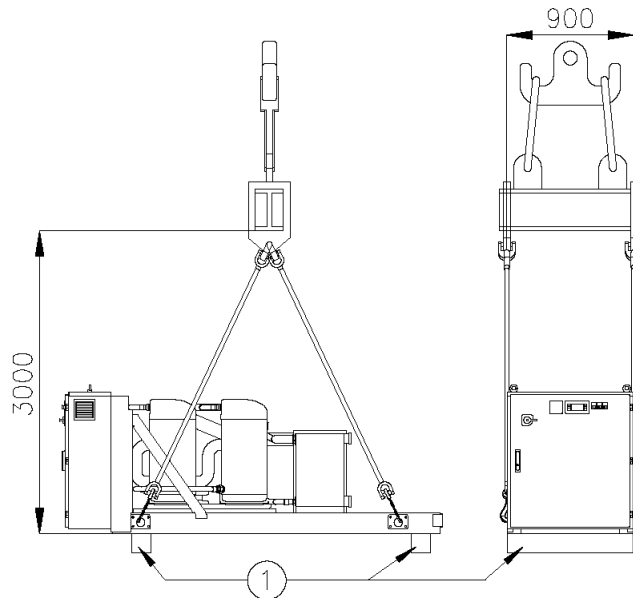
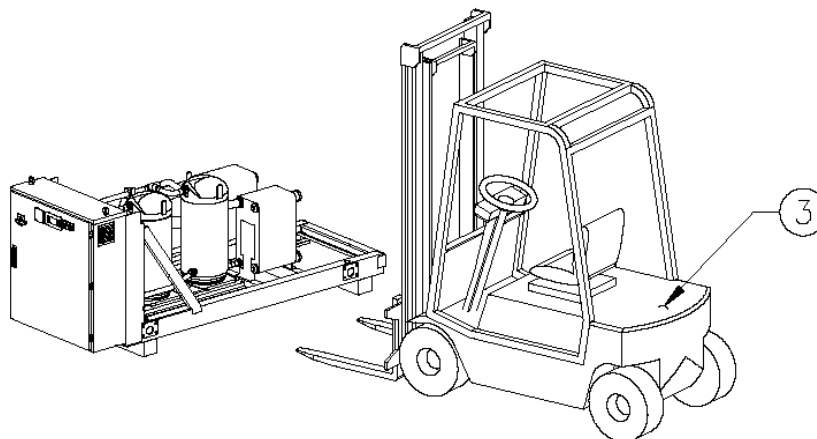
 Both the lifting ropes and the spacing bars must be strong enough to support the unit safely. Check the weight of the unit on its name plate, because the weight of the units varies depending on the accessories requested.

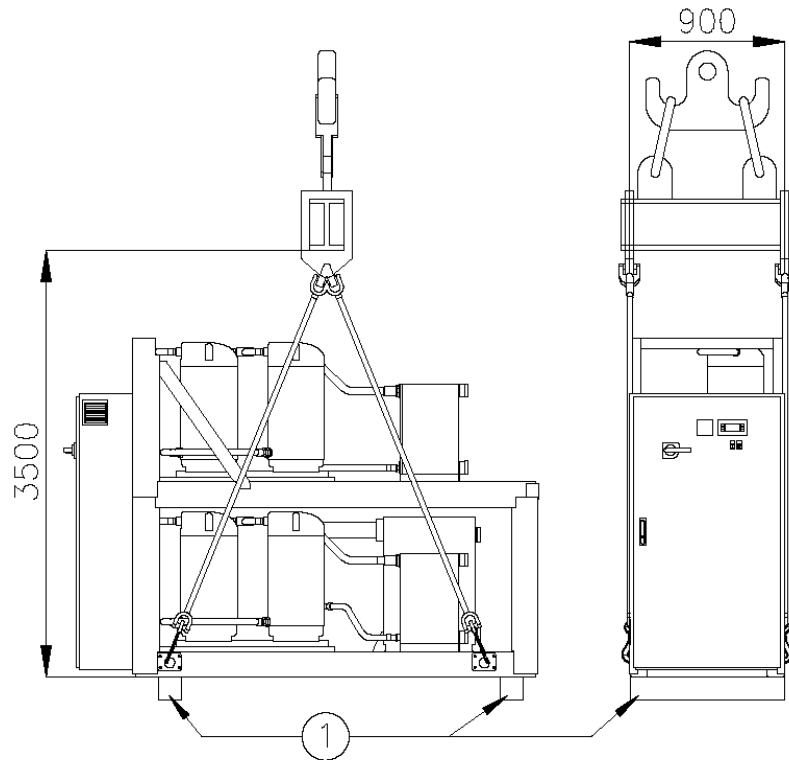
Figure 3 - Handling of the single circuit unit



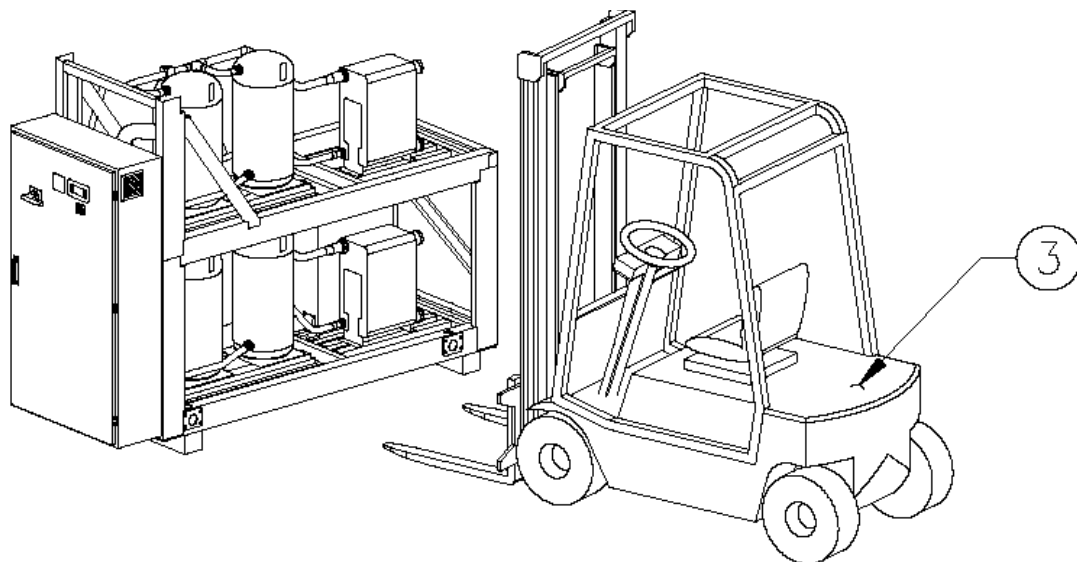
### Alternative handling method



**Figure 4 - Handling of the double circuit unit**



**Alternative handling method**



- 1 – Remove before installation
- 2 - Use lifting hooks with closing device exclusively.  
The hooks must be safely fastened before performing the handling
- 3 – Fork lift

### Sound protection

When sound levels require special control, great care must be exercised to isolate the unit from its base by appropriately applying anti-vibrating elements. Flexible joints must be installed on the water connections, as well.

### Hydraulic circuit for connection to the unit

The pipes must be designed with the lowest number of elbows and the lowest number of vertical changes of direction. In this way, installation costs are reduced considerably and system performance is improved.

The water system must have:

1. Anti-vibrating pipes which reduce the transmission of vibrations to the structures.
2. Isolating valves to isolate the unit from the water system of the installation during service operations.
3. Manual or automatic air venting device at the system's highest point.; drain device at the system's lowest point.
4. Neither the evaporator nor the heat recovery device must be positioned at the system's highest point.
5. A suitable device that can maintain the water system under pressure.
6. Water temperature and pressure indicators to assist the operator during service and maintenance.
7. A water filter or a device that can remove particles from the liquid and is mandatory at the entry of the evaporator.  
The filter can be installed at the entrance of the pump when it is placed on the input pipe of the water of the evaporator, only if the cleanliness of the water installation between the pump and the evaporator is guaranteed. Any slag in the evaporator causes the warranty of the unit to be forfeited.
8. If the unit is being replaced, empty and clean the entire water system before installing a new one and prior to starting it conduct adequate tests and chemical treatments of the water.
9. If glycol is added to the water system to provide anti-freeze protection, the performance of the unit will decrease. All unit-protection systems, such as anti-freeze, and low-pressure protection will need to be readjusted.
10. Before insulating water piping, check that there are no leaks.
11. Check that the pressure of the water does not exceed the design pressure of the water side heat exchangers and install a safety valve on the pipe of the water.
12. Install a suitable expansion.

**CAUTION:**  
**To avoid damages, install a filter that can be inspected on the water pipes at the entry to the heat exchangers.**

### Insulation of the pipes

The complete water circuit, including all the pipes, must be insulated to avoid condensate from forming and reducing the cooling capacity.

Protect the water pipes from freezing during the winter (using for example a glycol solution or a heating cable).

### Installing the flow switch

To guarantee sufficient water flow to the entire evaporator, it is mandatory that a flow switch be installed on the water circuit which can be positioned on the incoming or outgoing water pipes. The purpose of the flow switch is to stop the unit in the event of interrupted water flow, thus protecting the evaporator from freezing.

The manufacturer may offer a flow switch specially selected for this purpose.

This paddle-type flow switch is suitable for heavy-duty applications.

It has a clean contact that is electrically connected to the terminals shown in the wiring diagram, and must be calibrated so that it intervenes when the flow of the water of the evaporator drops below 80% of the nominal flow and in any case within the limits listed in the following table.

### Preparation, check and connection of the water circuit

The units have a water input and output for the connection of the chiller to water circuit of the system.

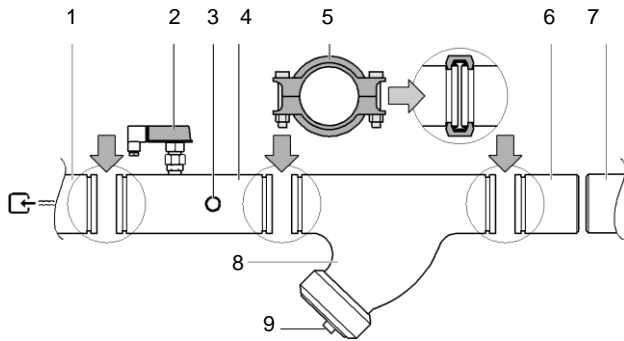
This circuit must be connected to the unit by an authorised technician and must comply with all the current national and European regulations on the subject.

**NOTE** - The components listed below are not included with the unit, but are supplied upon request, **also if their installation is compulsory.**



If dirt penetrates the water circuit, there could be problems. Therefore always remember the following when connecting the water circuit:

1. Only use pipes that are clean inside.
2. Keep the end of the pipe facing downward when removing the burrs.
3. Cover the end of the pipe when inserting it through a wall to avoid dust and dirt getting in.
4. Clean the pipes of the system located between the filter and the unit, with running water, before connecting it to the system.



- 1 Evaporator water entry
- 2 Flow Switch
- 3 Water entry sensor
- 4 Water entry pipe with flow switch and temperature sensor of the incoming water
- 5 Joint
- 6 Counter-pipe
- 7 In situ water pipe circuit
- 8 Filter
- 9 Filter and cup

The water in the system must be particularly clean and all traces of oil and rust must be removed. Install a mechanical filter at the entry of every heat exchanger. The failure to install a mechanical filter allows solid particles and/or welding burrs to get inside the exchanger. We recommend installing a filter with a filtering mesh with holes not larger than 1.1mm in diameter.

The manufacturer cannot be maintained responsible for any damage to the exchangers if the mechanical filters are not installed.

### Water treatment

Before putting the unit into operation, clean the water circuit. Dirt, scales, debris and other material can accumulate inside the heat exchanger and reduce both its heat exchanging capacity and the flow of the water. An adequate treatment of the water can reduce the risk of corrosion, erosion, scale formation, etc. The most suitable treatment must be selected depending on the place of installation, considering the water system and the characteristics of the water.

The manufacturer is not responsible for any damages or malfunctions of the equipment

The quality of the water must comply with the specifications listed in the following table.

	Circulating water	Water supply	Possible problems
<b>Elements to be checked</b>			
pH at 25°C	6.8~8.0	6.8~8.0	Corrosion + limescale
Electrical conductivity [mS/m] at 25°C	<40	<30	Corrosion + limescale
Chlorine ion [mg Cl <sup>-</sup> /l]	<50	<50	Corrosion
Sulfate ion [mg SO <sub>4</sub> <sup>2-</sup> /l]	<50	<50	Corrosion
Alkalinity M (pH4.8) [mg CaCO <sub>3</sub> /l]	<50	<50	Limescale
Total hardness [mg CaCO <sub>3</sub> /l]	<70	<70	Limescale
Hardness of the Calcium [mg CaCO <sub>3</sub> /l]	<50	<50	Limescale
Silicon ion [mg SiO <sub>2</sub> /l]	<30	<30	Limescale
<b>Elements of reference</b>			
Iron [mg Fe/l]	<1.0	<0.3	Corrosion + Limescale
Copper [mg Cu/l]	<1.0	<0.1	Corrosion
Sulphide ion [mg S <sup>2-</sup> /l]	Non detectable	Non detectable	Corrosion
Ammonium ion [mg NH <sub>4</sub> <sup>+</sup> /l]	<1.0	<0.1	Corrosion
Remaining Chloride [mg Cl/l]	<0.3	<0.3	Corrosion
Free Carbide [mg CO <sub>2</sub> /l]	<4.0	<4.0	Corrosion
Index of stability	-	-	Corrosion + limescale



The pressure of the water must exceed the maximum operating pressure anticipated for the unit.

**NOTE** - Plan adequate protections in the water circuit to make sure that the pressure of the water never exceeds the maximum limit allowed.

### Flow and volume of the water

EWQ Model	Minimum water flow l/s	Maximum water flow l/s
EWQ090G	2.70	5.63
EWQ100G	3.04	6.34
EWQ120G	3.42	7.13
EWQ130G	3.91	8.14
EWQ150G	4.31	8.98
EWQ170G	4.94	10.30
EWQ190G	5.57	11.60
EWQ210G	6.34	13.21
EWQ240G	7.07	14.73
EWQ300G	9.04	18.83



EWVQ360G	10.64	22.18
EWVQ180L	5.38	11.21
EWVQ205L	6.17	12.86
EWVQ230L	7.01	14.61
EWVQ260L	7.82	16.30
EWVQ290L	8.70	18.13
EWVQ330L	9.89	20.60
EWVQ380L	11.11	23.14
EWVQ430L	12.35	25.73
EWVQ480L	13.66	28.46
EWVQ540L	15.77	32.86
EWVQ600L	17.56	36.58
EWVQ660L	19.06	39.71
EWVQ720L	20.74	43.21
<b>EWLQ Model</b>	<b>Minimum water flow l/s</b>	<b>Maximum water flow l/s</b>
EWLQ090G	2.50	5.21
EWLQ100G	2.85	5.94
EWLQ120G	3.19	6.65
EWLQ130G	3.61	7.53
EWLQ150G	4.02	8.38
EWLQ170G	4.61	9.61
EWLQ190G	5.24	10.91
EWLQ210G	5.90	12.30
EWLQ240G	6.61	13.76
EWLQ300G	8.39	17.48
EWLQ360G	10.00	20.83
EWLQ180L	4.97	10.36
EWLQ205L	5.67	11.81
EWLQ230L	6.42	13.38
EWLQ260L	7.13	14.86
EWLQ290L	8.00	16.68
EWLQ330L	9.09	18.94
EWLQ380L	10.37	21.60
EWLQ430L	11.75	24.48
EWLQ480L	13.16	27.43
EWLQ540L	14.69	30.60
EWLQ600L	16.40	34.16
EWLQ660L	17.92	37.33
EWLQ720L	19.43	40.49
<b>EWHQ Model</b>	<b>Minimum water flow l/s</b>	<b>Maximum water flow l/s</b>
EWHQ100G	3.80	7.91
EWHQ120G	4.19	8.74
EWHQ130G	4.77	9.94
EWHQ150G	5.41	11.26
EWHQ160G	5.98	12.45
EWHQ190G	6.83	14.24
EWHQ210G	7.80	16.25
EWHQ240G	8.95	18.64
EWHQ270G	9.94	20.71
EWHQ340G	12.51	26.06
EWHQ400G	14.82	30.88

To ensure the correct operation of the unit, the flow of water in the evaporator must fall within the operating sphere specified in the preceding table and there must be a minimum volume of water in the system. The distribution circuits of the cold water should have a minimum content of water to avoid an excessive number of start-up and shut-downs of the compressor. In fact, every time the compressor goes into operation, an excessive amount of oil from the compressor starts circulating in the refrigerant circuit and at the same time there is an increase of the temperature of the compressor stator, generated by the inrush current of the start-up. Therefore to avoid damages to the compressors, the application of a device has been

planned to limit frequent shut-downs and start-ups: in one hour, there will only be 6 start-ups of the compressor.

The system where the unit is installed must therefore ensure that the overall content of water allows the unit to operate continuously and therefore greater environmental comfort. The minimum water content per unit must be calculated with a certain approximation using the following formula:

#### Single circuit unit:

$$M(\text{litres}) = 5 (\text{l/kW}) \times P(\text{kW})$$

#### Double circuit unit:

$$M(\text{litres}) = 2,5 (\text{l/kW}) \times P(\text{kW})$$

Where:

M = minimum content of water per unit expressed in litres

P = refrigerating capacity of the unit expressed in kW

This formula is valid with the standard parameters of the microprocessor. To determine most accurately the quantity of water, we recommend contacting the designer of the system.

#### Anti-freeze protection for evaporators and recovery exchangers

When the entire system of the cooling or heating installation is being designed, two or more of the following anti-freeze protection methods should be considered at the same time:

1. Continuous circulation of the flow of water inside the exchangers
2. Additional heat insulation and heating of exposed piping
3. Emptying and cleaning of the heat exchanger during the winter and its maintenance with anti-oxidant atmosphere (nitrogen).

As an alternative, it is possible to add an appropriate amount of glycol (antifreeze) to the water circuit.

The installer and/or the local personnel assigned to maintenance must make sure that anti-freeze protection methods are in use and ensure that the appropriate maintenance operations of the antifreeze protection devices are always carried out. Failing to follow the instructions above could result in unit damage. Damage caused by freezing is not covered by the warranty.

#### Electrical system General Specifications

The units must be connected to a TN power supply system.

If the units must be connected to a different type of power system, for example the IT system, please contact the factory.



All the electrical connections to the unit must be carried out in compliance with national laws and European directives and regulations in force.

All installation, management and maintenance activities must be carried out by qualified personnel.

Refer to the specific wiring diagram for the unit purchased. Should the wiring diagram not be on the unit or should it have been lost, please contact the manufacturer representative who will send you a copy. In case of discrepancy between the wiring diagram and the visual check of the electric wires of the command and control panel, contact the manufacturer representative.

Use only copper conductors to avoid overheating or corrosion in the connection points, with resulting risk of damage to the unit.

To avoid interference, all the command and control cables must be connected separately from the power ones, using several raceways for this purpose.

Before performing service operations on the unit, open the general disconnection switch located on the main power supply.

**CAUTION:** If the unit is off but the disconnection switch is in the closed position, the circuits not being used will still be active.

Never open the terminal board of the compressors without having disconnected the main switch of the machine.

Simultaneous mono and three-phase loads and imbalance between the phases can cause leakage towards earth up to 150mA during the normal operation of the unit.

The protections for the power supply system must be designed based on the values mentioned above.

#### Wiring at the installation location



The operations of wiring at the installation location and possibly other components must be performed by an authorized technician and must comply with the current national and European laws on the subject.

The on-site wiring must be done in conformity with the wiring diagram supplied with the machine and the instructions listed below.

Make sure to use a dedicated electric circuit. Never use a power supply shared with other equipment.

**NOTE** - Verify on the wiring diagram all the operations listed below in order to better understand how the equipment operates.

Components table:

F1, 2	Main fuses of the equipment
L1, 2, 3	Main power supply terminals
PE	Main earth terminal
FS	Switch
Q10	Main insulator switch
---	On-site wiring

#### Electric circuit and wiring requirements

1. The power supply to the unit must be prepared so that it can be turned on and off independently from that of other components of the system or other appliances in general.
2. Plan an electrical circuit for the connection of the unit. This circuit must be protected with the necessary safety devices, that is a main switch, an SB fuse on each phase and a

leakage towards earth detector. The recommended fuses are listed in the wiring diagram provided with the unit.



Turn off the switch of the main insulator before performing any connection (turn off the switch, remove or disable the fuses).

#### Connection of the power supply of the unit

Using the suitable wire, connect the power circuit to the terminals L1, L2 and L3 of the electric panel.

**CAUTION:** Never twist, pull or apply weight to the terminals of the main switch. The wires of the power supply line must be supported by adequate systems. The wires connected to the switch must respect the elevated insulation distance and the distance of surface insulation between the active conductors and the mass, in accordance with IEC 61439-1, Table 1 and 2 and local national laws. The wires connected to the main switch must be tightening using a wrench torque and complying with the unified tightening values relative to the quality of the screws of the washers and the nuts used.

2. Connect the earthing conductor (yellow/green) to the PE earthing terminal.

#### Interconnecting wires



Usually the appliance does not work without flow, thanks to the flow meter installed standard, however, to be doubly safe, it is compulsory that a status contact of the water pump be installed in order to prevent the unit from operating if the pump has not started.

If the unit starts operating without flow, very serious damage occurs (freezing of the evaporator).

- Clean contacts  
The controller has some clean contacts to indicate the status of the unit. These contacts can be wired as shown in the wiring diagram. The maximum current allowed is 2 A.
- Remote inputs  
In addition to the clean contacts, it is also possible to install remote inputs. For installation check the wiring diagram.

#### Before start-up



The unit must be started for the first time ONLY by DAIKIN authorised personnel. The unit must absolutely not be started, even for a very short period of time, without having checked it in minute detail filling out the following list at the same time.

	Checks to be performed before starting the unit
<input type="checkbox"/> 1	Check for exterior damage
<input type="checkbox"/> 2	Open all the <b>closing valves</b>

□ 3	Make sure that all the parts of the unit are pressurized with refrigerant (evaporator, condenser, compressors) before connecting it to the hydraulic circuit.
□ 4	Install the <b>main fuses, earthing leakage detector and main switch</b> . Fuses recommended: aM compliant with the IEC 269-2 standard. <i>For the dimensions, check the wiring diagram.</i>
□ 5	Connect the main voltage and check that it falls within the limits allowed of $\pm 10\%$ compared to the classification listed on the name plate. <b>The main power supply</b> must be arranged so that it can be turned on or off independently from that of other parts of the system or other appliances in general. <i>Check the wiring diagram, terminals L1, L2 and L3.</i>
□ 6	Install the <b>water filter kit/s</b> (also when not supplied) at the entrance of the exchangers.
□ 7	Supply water to the exchangers and make sure that the <b>flow</b> falls within the limits shown in the table in the "Load, flow and quality of the water" paragraph.
□ 8	The pipes must be completely <b>flushed out</b> . See the chapter "Preparation, check and connection of the water circuit".
□ 9	Connect the <b>contact/s of the pump</b> in series with the contact of the flow meter/s so that the unit can only be activated when the water pumps are operating and the flow of water is sufficient.
□ 10	Check the <b>level of the oil</b> in the compressors.
□ 11	Check that all the <b>water sensors</b> are fastened correctly in the heat exchanger (see also sticker applied on the heat exchanger).

**NOTE** - Before starting the unit, read the operating manual provided with it. It will help you to better understand the operation of the equipment and the relative electronic controller, and close the doors of the electric panel.

#### Open the isolation and/or shut off valves

Before start-up, make sure that all the isolation and/or switch off valves are completely open.

#### Responsibility of the user

It is essential that the user is appropriately trained and becomes familiar with the system before operating the unit. In addition to reading this manual, the user must study the microprocessor operating manual and the wiring diagram in order to understand start-up

sequence, operation, shutdown sequence and operation of all the safety devices.  
The user must keep a log (system booklet) of the operating data of the unit installed and of all the periodic maintenance and service activities.

If the operator notes abnormal or unusual operating conditions, he is advised to consult the authorized technical service of the manufacturer.

#### Periodic maintenance

The periodic maintenance activities (minimum), are listed in the specific table of this manual


#### Version with remote condenser

##### Connection of the refrigerant circuit

#### This version is charged at the factory with Nitrogen.


The units are equipped for the refrigerant circuit with an output pipe (delivery side) and an input pipe (liquid side) which must both be connected to a remote condenser. This circuit must be operationally created by an authorized technician and must comply with all the national and European laws, directives and regulations.

#### Precautions when handling the pipes

 If air or dirt penetrate the refrigerant circuit, there could be problems. Therefore always remember the following when connecting the circuit:

1. Only use clean pipes.
2. Ensure the absolute cleanliness of the pipes after the operations have been performed.
3. Keep the end of the pipe facing downward when removing the processing burrs. Cover the end of the pipe when inserting it through a wall to avoid dust and dirt getting in.

To perform the connection, the delivery and liquid pipes must be soldered directly to pipes of the remote condenser. In order to use the correct pipe diameter, please refer to the dimensions drawing supplied with the unit.


 Make sure that the pipes are discharged of Nitrogen during the soldering / welding, to protect them from soot.

#### Seal and vacuum test

The moto-evaporating units have already been checked at the factory guaranteeing that there are no leaks.


Once the pipes have been connected, a leak test must be performed once again.

The air in the refrigerant circuit must be evacuated at a value of 4 mbar absolute, using the vacuum pumps.

 Do not clean out the air with the refrigerants. Use a vacuum pump to eliminate the air from the system.

#### Refrigerant charge

Perform a full inspection before user, as explained in the paragraph **Before start-up**.

 Carefully perform the procedure required and the methods explain the paragraph **Before start-up**, but do not start the unit.

### **Pre-charging the refrigerant when the unit is not running**

Pre-charge the equipment with the quantity of refrigerant anticipated using the Flare SAE 1/4" stop valve on the filter of the liquid.

CAUTION: To avoid damage to the compressor, do not start it to speed up the pre-charge.

Once the pre-charge has been completed, ask your manufacturer representative to perform the first start-up.

### **Adjustment of the refrigerant charge with the unit running.**

CAUTION: Only for the personnel authorized to perform the first start up.

To adjust the charge of the refrigerant, use the 1/4" Flare SAW valve on the pipe of the liquid and make sure to load the refrigerant in its liquid state.

To adjust the charge of the refrigerant, the compressor must be operating at full load (100%).

Verify:

The overheating which must be between 3 and 8 °Kelvin

The sub-cooling which must be between 4 and 8 °Kelvin

The inspection glass of the oil. The level must be within the glass.

The see-through window of the pipe of the liquid which must be full and not show humidity in the refrigerant. If the see-through window of the pipe of the liquid is not full, gradually add refrigerant and wait for the operation of the unit to stabilize.

Add refrigerant until all the verification parameters are within the limits.

The unit must have time to stabilize, which means that the charge must be done gradually and steadily.

Note the overheating and sub-cooling values for future reference.

CAUTION: Note on the specific label the total charge of refrigerant put into the circuit.

**NOTE** - Pay attention to a possible contamination of the remote condenser to avoid blocking the system.

The manufacturer cannot check the contamination of the "outside" condenser of the installer. The unit has a precise level of contamination.

**In accordance with the Directive 2006/42/EC**

**APPENDIX II B the units, named EWLQ090 → EWLQ720 are defined as "quasi-machines".**

**The aforementioned products cannot be put into operation until the final machine in which it must be incorporate meet the legal standards.**

### **Service and limited warranty**

All the units are tested at the factory and guaranteed for a specific period of time.

These units have been developed and constructed according to high quality standards ensuring years of failure-free operation. However, it is important to ensure proper and periodical maintenance in accordance with all the procedures listed in this manual and with good practice of machines maintenance.

We strongly recommend stipulating a maintenance contract with a service authorized by the manufacturer. The experience and skill of the personnel, in fact, can ensure an efficient operation without problems over time.

The unit must be covered by a suitable maintenance program from the time it is installed and not just from the start-up date.

Keep in mind that operating the unit in an inappropriate manner, beyond its operating limits or not performing proper maintenance according to this manual will void the warranty.

Observe the following points in particular, in order to conform to warranty limits:

1. The unit cannot function beyond the specified limits
2. The electrical power supply must be within the voltage limits and without voltage harmonics or sudden changes.
3. The three-phase power supply voltage must not have an imbalance between the phases greater than 2% in accordance with EN 60204-1:2006 (Chapter 4-Par.4.3.2).
4. In case of electrical problems, the unit must remain
5. off until the problem has been solved.
6. Do not disable or cancel the safety devices,
7. whether mechanical, electrical or electronic.
8. The water used for filling the water circuit must be clean and suitably treated. A mechanical filter must be installed at the point closest to the evaporator inlet.
9. Unless specifically agreed at the time of the order, the flow of water of the evaporator must never exceed 120% or be below 80% of the nominal capacity and in any case within the limits provided in this manual.

### **Periodic obligatory checks and starting up of the Groups (units)**

These Groups (units) are included in category III of the classification established by the European Directive PED 2014/68/EU.

For Groups belonging to this category, some national laws require a periodic check by an authorized organization. Please verify and contact these organizations to also request authorization to start it up.

**Table 1 - Periodic maintenance programme**

List of Activities	Weekly	Monthly (Note 1)	Annually / Seasonally (Note 2)
<b>General:</b>			
Reading of operating data (Note 3)	X		
Visual inspection of machine for any damage and/or loosening		X	
Verification of thermal insulation integrity			X
Clean and paint where necessary (Note 4)			X
Analysis of water			X
Check of flow switch operation		X	
<b>Electrical:</b>			
Verification of start-up sequence			X
Verify the wear of the contactors – If necessary replace them			X
Verify the that all the electrical terminals are tight – Tighten if necessary			X
Clean inside the electrical board (Note 4)		X	
Clean the aeration filters of the electrical board (Note 4)		X	
Visual inspection of components for any signs of overheating		X	
Verify operation of compressor and electrical resistance		X	
Measure with the Megger the insulation of the compressor motor			X
<b>Refrigerant Circuit:</b>			
Check for any refrigerant leakage		X	
Verify using the liquid see-through window, the flow of refrigerant - See-through window full	X		
Check on filter dryer pressure drop (if present)		X	
Perform the analysis of the vibrations of the compressor			X
Verify safety valve (Note 5)		X	
<b>Heat exchangers:</b>			
Verify the cleanliness of the heat exchangers (Note 6)			X

**Notes:**

- 1) The monthly activities include all the weekly ones
- 2) The annual activities (or start of season) include all the weekly and monthly activities
- 3) The operating values of the machine should be noted daily for a high level of control.
- 4) If the unit is installed in an aggressive environment, perform this activity monthly.

The following are considered aggressive environments:

- place with high concentration of industrial exhaust gas in the air;
- Place close to the sea (salt air);
- Place close to a desert where there is a risk of sand storms;
- Other aggressive environments.

5) Safety valve

Check that the cap and seal have not been tampered with.

Check that the safety valve discharge connection has not been accidentally clogged by extraneous objects, rust or ice.

Check the manufacture date located on the safety valve and replace it in conformity with current national laws.

6) Clean the heat exchangers. Particles and fibres could clog the heat exchanger. An increase in the flow of water or a drop in heat efficiency indicates that the heat exchangers are clogged.

**Discharge of the refrigerant from the safety valves**

Avoid discharging refrigerant from the safety valves at the installation site. If necessary, it is possible to connect them to discharge pipes, the transversal section and length of which must comply with the national laws and the European directives.

**Important information regarding the refrigerant used**

This product contains fluorinated greenhouse gases.  
Do not disperse the refrigerant gas into the atmosphere.

Refrigerant type: R410A

GWP value: 2087.5

(1)GWP = Global Warming Potential

The refrigerant quantity necessary for standard operation is indicated on the unit name plate.  
The actual quantity of refrigerant charged in the unit is listed on a silver plate inside the electrical panel.  
Based on the provisions of the national or European legislations, periodic inspections may be necessary to identify potential leaks of refrigerant.  
Please contact your local dealer for more information.

## Factory and Field charged units instructions

(Important information regarding the refrigerant used)

The refrigerant system will be charged with fluorinated greenhouse gases.  
Do not vent gases into the atmosphere.

1 Fill in with indelible ink the refrigerant charge label supplied with the product as following instructions:

- the refrigerant charge for each circuit (1; 2; 3)
- the total refrigerant charge (1 + 2 + 3)
- **calculate the greenhouse gas emission with the following formula:**  
GWP value of the refrigerant x Total refrigerant charge (in kg) / 1000

	a		b	c		p	
	Contains fluorinated greenhouse gases					CH-XXXXXXXX-KKKKXX	
m	<b>R410A</b>	1	=	[ ]	+	[ ]	kg
n	GWP: 2087,5	2	=	[ ]	+	[ ]	kg
		3	=	[ ]	+	[ ]	kg
		1 + 2 + 3	=	[ ]	+	[ ]	kg
	Total refrigerant charge Factory + Field			[ ]		[ ]	kg
	GWP x kg/1000			[ ]		[ ]	tCO <sub>2</sub> eq

- a Contains fluorinated greenhouse gases
- b Circuit number
- c Factory charge
- d Field charge
- e Refrigerant charge for each circuit (according to the number of circuits)
- f Total refrigerant charge
- g Total refrigerant charge (Factory + Field)
- h **Greenhouse gas emission** of the total refrigerant charge expressed as tonnes of CO<sub>2</sub> equivalent
- m Refrigerant type
- n GWP = Global Warming Potential
- p Unit serial number

2 The filled out label must be adhered inside the electrical panel.

Periodical inspections for refrigerant leaks may be required depending on European or local legislation. Please contact your local dealer for more information.



### NOTICE

In Europe, the **greenhouse gas emission** of the total refrigerant charge in the system (expressed as tonnes CO<sub>2</sub> equivalent) is used to determine the maintenance intervals. Follow the applicable legislation.

### Formula to calculate the greenhouse gas emission:

GWP value of the refrigerant x Total refrigerant charge (in kg) / 1000

Use the GWP value mentioned on the greenhouse gases label. This GWP value is based on the 4th IPCC Assessment Report. The GWP value mentioned in the manual might be outdated (i.e. based on the 3rd IPCC Assessment Report)





**Life of the product**

The life of our products is 10 (ten) years.

**Disposal**

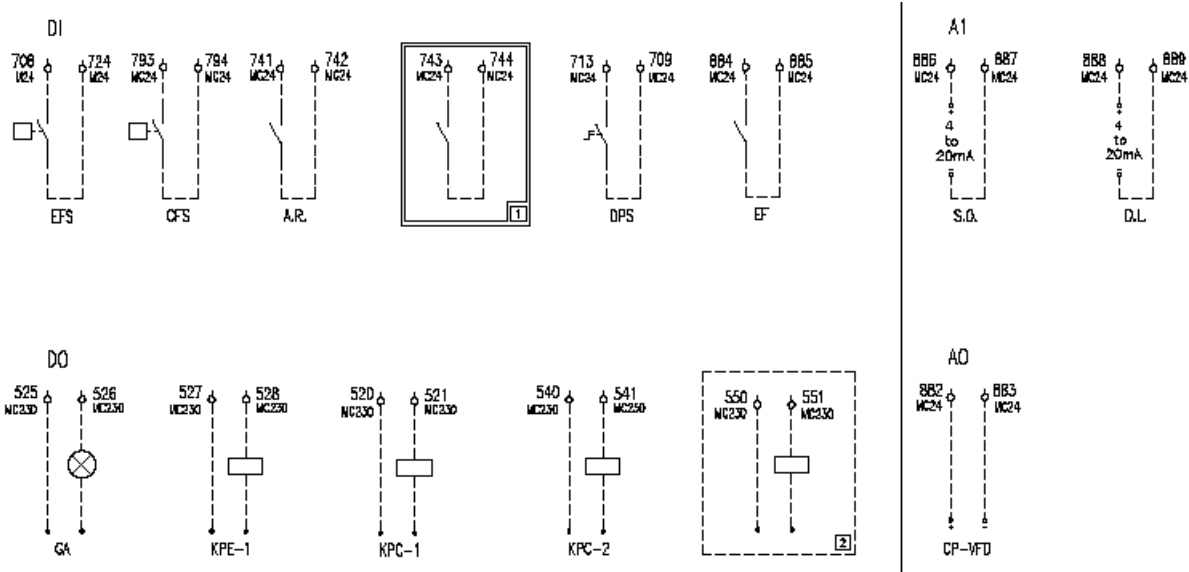
The unit is made of metal, plastic and electronic parts. All these parts must be disposed of in accordance with the national and European laws in effect relative to this substance.

Lead batteries must be collected and sent to specific refuse collection centres.

Oil must be collected and sent to specific refuse collection centres.



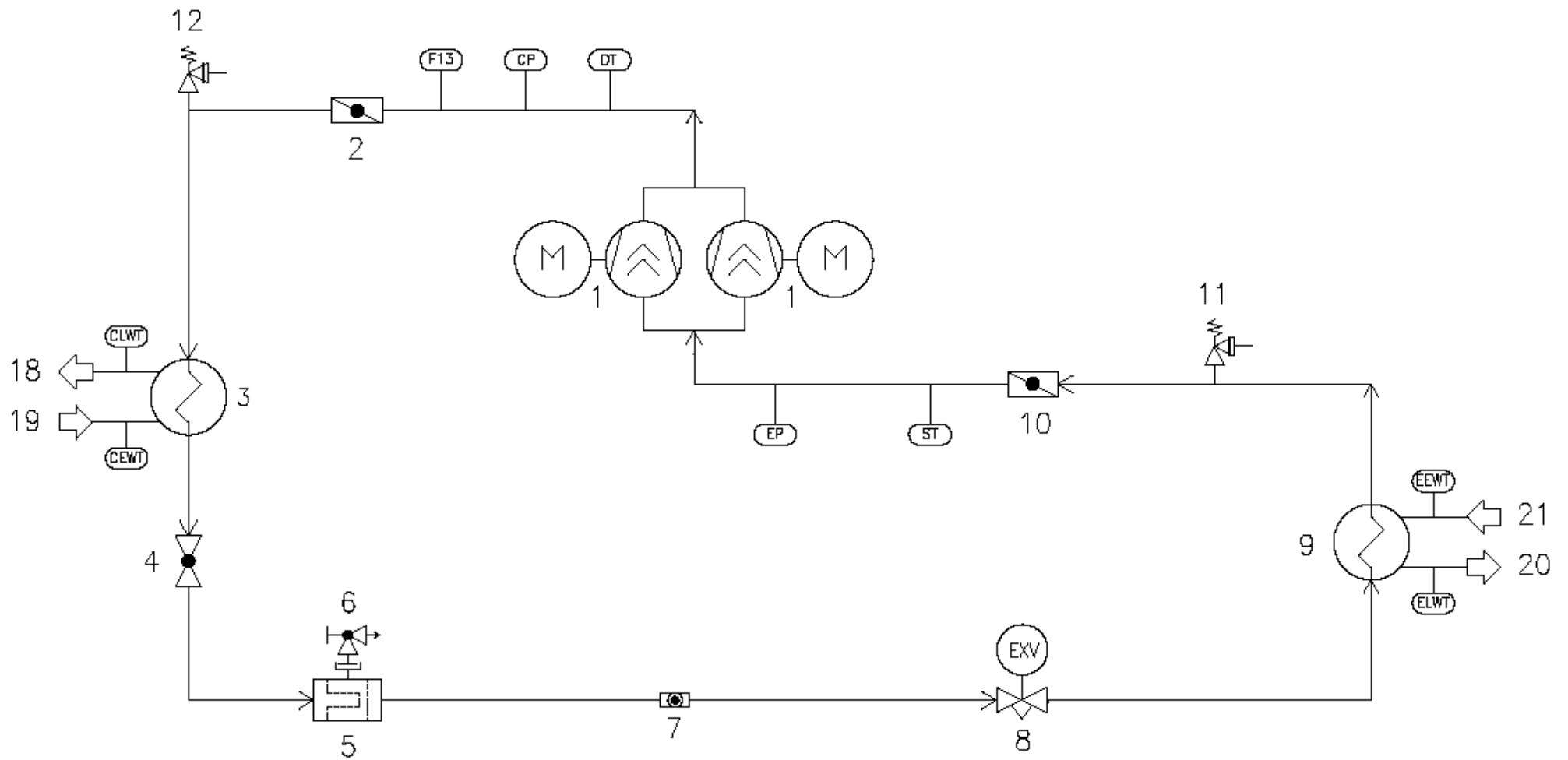
Figure 5 - Wiring for connecting the unit at the place of installation



Legend		Conditioning Version	Heat Pump Version	Moto-Evaporating Version
AI	Analog Inputs			
A.R.	ON / OFF remote			
AO	Analog Output			
CFS	Condenser Flow Switch			
CP-VFD	VFD (Variable Frequency Drive) condenser pump	VFD 3 Way Valve	VFD 3 Way Valve	VFD Fans
D.L.	Limit of charge			
DI	Digital Inputs			
DO	Digital Outputs			
DPS	Digital Setpoint			
EF	External Fault			
EFS	Evaporator Flow Switch			
GA	General Alarm			
KPC-1	Pump 1 condenser water			
KPC-2	Pump 2 condenser water			
KPE-1	Pump 1 evaporator water			
S.O.	Exclusion of the set point			
1	HP Version only (Cooling-Heating Remote)			
2	VFD # 2 ON-OFF (Moto-Evaporating Version only)	Tower Fans ON/OFF	Tower Fans ON/OFF	Fans ON/OFF

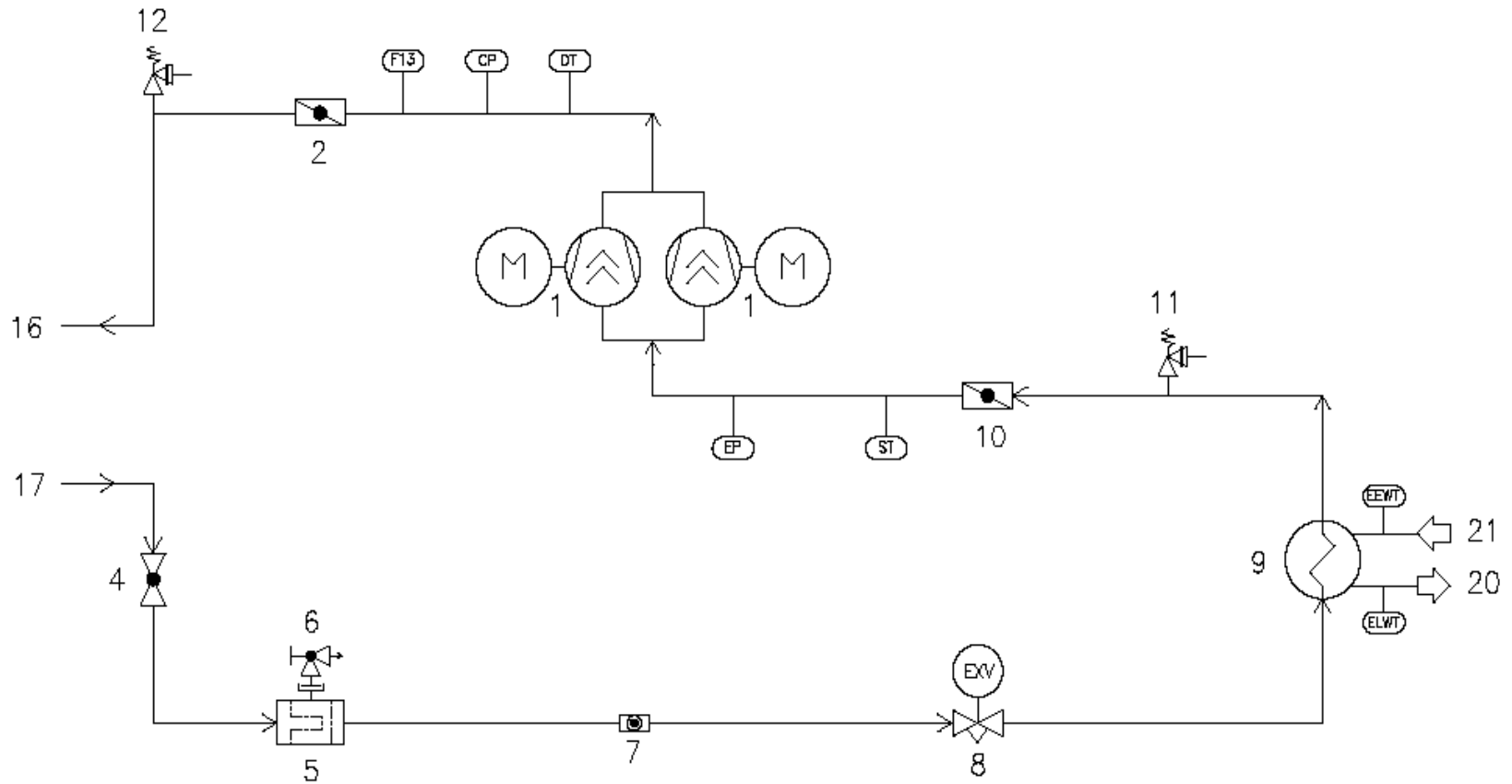
**Figure A - Typical single refrigerant circuit**

The input and output of the water of the condenser and the evaporator are approximate. Consult the dimensional drawings of the unit for the exact hydraulic connections.



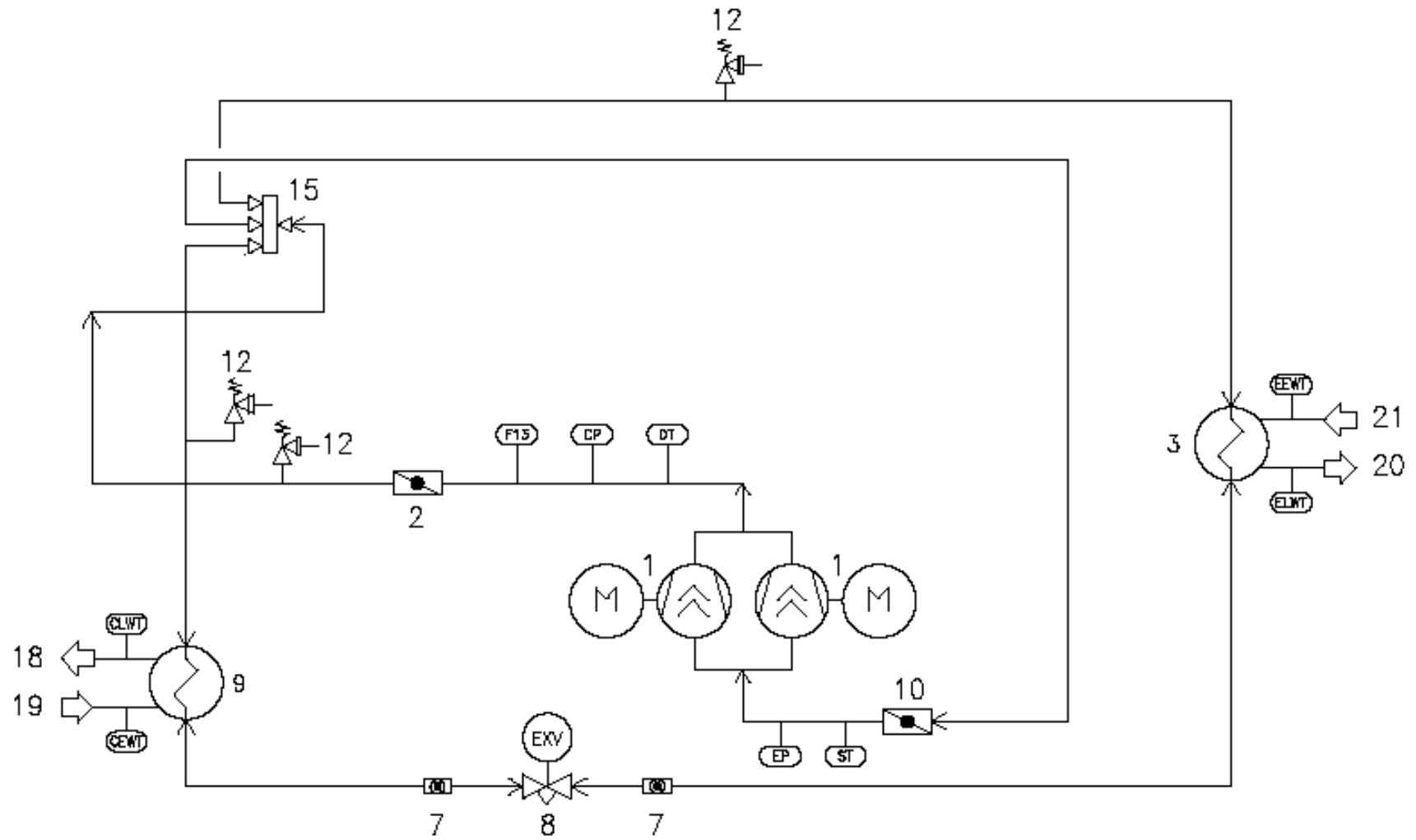
**Figure B - Typical single refrigerant circuit of the moto-evaporating version**

The input and output of the water of the evaporator are approximate. Consult the dimensional drawings of the unit for the exact hydraulic connections.



**Figure C - Typical single refrigerant circuit for Heat Pump**

The input and output of the water of the condenser and the evaporator are approximate. Consult the dimensional drawings of the unit for the exact hydraulic connections.



<b>Legend</b>	
1	Compressor
2	Discharge shut off valve
3	Condenser
4	Liquid line isolating valve
5	Drier filter
6	Shut off valve (charge valve)
7	Liquid and humidity indicator
8	Electronic expansion valve
9	Evaporator
10	Suction shut off valve (optional)
11	Low-pressure safety valve
12	High-pressure safety valve
13	Heat recovery
14	Liquid receiver
15	4 Way valve
16	Refrigerant outlet connection (to the remote condenser)
17	Refrigerant inlet connection (from the remote condenser)
18	Condenser leaving water connection
19	Condenser entering water connection
20	Evaporator leaving water connection
21	Evaporator entering water connection
22	Heat recovery leaving water connection
23	Heat recovery entering water connection
DT	Discharge temperature control
CP	High pressure transducer
F13	High-pressure switch
ST	Temperature sensor
EP	Low pressure transducer
CLWT	Condenser leaving water temperature sensor
CEWT	Condenser entering water temperature sensor
ELWT	Evaporator leaving water temperature sensor
EEWT	Evaporator entering water temperature sensor



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