

Installation and maintenance manual
 Manuel d'installation et de maintenance
 Installations- und Wartungshandbuch
 Manuale di installazione e di manutenzione
 Manual de instalación y de mantenimiento

MQH 06-18



English

Français

Deutsch

Italiano

Español



5.4
↓
17.8 kW



6.1
↓
20.1 kW



Air Cooled Water Chillers and Heat Pump

Refrigeratori d'Acqua e Pompe di Calore Raffreddati ad Aria

Refrigerateurs à Eau et Pompes de Chaleur Refroidies à Air

Luftgekühlte Wasserkühler und Wärmepumpen

Refrigeradores de Agua y Bombas de Calor Refrigerados por Aire

IOM-MQH-N-1-ALL

Part number / Code / Teil Nummer / Codice / Código : **C27015900/01**

Supersedes / Annule et remplace / Annulliert und ersetzt /

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Foreword

1 FOREWORD

1.1 Introduction

The units, manufactured to state-of-the-art design and implementation standards, ensure top performance, reliability and fitness to any type of air-conditioning system.

These units are designed for cooling water* or glycoled water (and for water heating in heating mode) and are unfit for any purposes other than those specified in this manual.

This manual includes all the information required for a proper installation of the units, as well as the relevant operating and maintenance instructions.

It is therefore recommended to read this manual carefully before installation or any operation on the machine. The chiller installation and maintenance must be carried out by skilled personnel only (where possible, by Authorised Service Centers).

The manufacturer may not be held liable for any damage to people or property caused by improper installation, start-up and/or improper use of the unit and/or failure to implement the procedures and instructions included in this manual.

1.2 Warranty

These units are delivered completely tested and ready for being operated. Any form of warranty will become null and void in the event that the appliance is modified without manufacturer's prior written authorisation.

This warranty shall apply provided that the installation instructions have been complied with (either issued by the manufacturer, or deriving from the current practice).

In order for this warranty to be valid, the following conditions shall be met:

- The chiller installation and maintenance must be carried out by skilled personnel only (where possible, by Authorised Service Centers).
- Use only original manufacturer spare parts.
- Carry out all the planned maintenance provided for by this manual in a timely and proper way.
- Unit is used with relative humidity between 0-95%
- Unit is used at altitude < 1000 meter
- Units is not be used at sites where there is exposure to blast.

* **Note:** minimum leaving water temperature from evaporator: + 4°C.

Failure to comply with any of these conditions will automatically void the warranty.

1.3 Emergency stop / Normal stop

The emergency stop of the unit can be enabled using the main switch.

For a normal stop, break the relevant connection, or press the right side button > on display board for 5 seconds.

To restart the appliance, follow the procedure detailed in this manual.

1.4 An introduction to the manual

For safety reasons, it is imperative to follow the instructions given in this manual. In case of any damage caused by non-compliance with these instructions, the warranty will immediately become null and void.

Common symbols throughout the manual:



The Danger sign recalls your attention to a certain procedure or practice which, if not followed, may result in serious damage to people and property.



The Warning sign precedes those procedures that, if not followed, may result in serious damage to the appliance.



The Attention sign contain important observations.

This manual and its contents, as well as the documentation which accompanies the unit, are and remain the property of the manufacturer or its authorised distributor, which reserves any and all rights thereon. This manual may not be copied, in whole or in part, without manufacturer's written authorization.

Safety

2 SAFETY

2.1 Foreword

These units must be installed in conformity with the provisions of Machinery Directive 2006/42/EC, Low Voltage Directive 2006/95/EC, Pressure Vessels Directive 97/23/EC, Electromagnetic Interference Directive 89/336/EC, as well as with other regulations applicable in the country of installation. If these provisions are not complied with, the unit must not be operated.



The unit must be grounded, and no installation and/or maintenance operations may be carried out before deenergising the electrical panel of the unit. **Main fuse must be installed in the main power line, please refer to the technical data for sizing.**

Failure to respect the safety measures mentioned above may result in electrocution hazard and fire in the presence of any short-circuit



Inside the heat exchangers, the compressors and the refrigeration lines, this unit contains liquid and gaseous refrigerant under pressure. The release of this refrigerant may be dangerous and cause injuries.



The units are not designed to be operated with natural refrigerants, such as hydrocarbons. The manufacturer may not be held liable for any problems deriving from the replacement of original refrigerant or the introduction of hydrocarbons.

The units are designed and manufactured according to the requirements of European Standard PED 97/23/EC (pressure vessels).

- The refrigerants used are included in group II (non-hazardous fluids).
- The maximum working pressure values are mentioned on the unit's data plate.
- Suitable safety devices (pressure switches and safety valves) have been provided, to prevent any anomalous overpressure inside the plant.
- The vents of the safety valves are positioned and oriented in such a way as to reduce the risk of contact with the operator, in the event that the valve is operated. Anyway, the installer will convey the discharge of the valves far from the unit.
- Dedicated guards (removable panels with tools) avoid contacts with potential dangerous zones.



The guards of the fans must be always mounted and must never be removed before re-energising the appliance.



It is the User's responsibility to ensure that the unit is fit for the conditions of intended use and that both installation and maintenance are carried out by experienced personnel, capable of respecting all the recommendations provided by this manual. It is important that the unit is adequately supported, as detailed in this manual. Non-compliance with these recommendations may create hazardous situations for the personnel.



The unit must rest on a base which meets the characteristics specified in this manual; a base with inadequate characteristics is likely to become a source of serious injury to the personnel.



The unit has not been design to withstand loads and/or stress that may be transmitted by adjacent units, piping and/or structures. Each external load or stress transmitted to the unit may break or cause breakdowns in the unit's structure, as well as serious dangers to people. In these cases, any form of warranty will automatically become null and void.



The packaging material must not be disposed of in the surrounding environment or burnt.

2.2 Definitions

OWNER: means the legal representative of the company, body or individual who owns the plant where the unit has been installed; he/she has the responsibility of making sure that all the safety regulations specified in this manual are complied with, along with the national laws in force.

INSTALLER: means the legal representative of the company who has been given by the owner the job of positioning and performing the hydraulic, electric and other connections of the unit to the plant: he/she is responsible for handling and properly installing the appliance, as specified in this manual and according to the national regulations in force.

OPERATOR: means a person authorised by the owner to do on the unit all the regulation and control operations expressly described in this manual, that must be strictly complied with, without exceeding the scope of the tasks entrusted to him.

Safety

ENGINEER: means a person authorised directly by the agent or, in all EC countries, excluding Italy, under his full responsibility, by the distributor of the unit, to perform any routine and extraordinary maintenance operations, as well as any regulation, control, servicing operations and the replacement of pieces, as may be necessary during the life of the unit.

2.3 Access to the unit

The main switch can be used to cut off power during emergency by turning the knob to off position

The unit must be placed in an area which can be accessed by (and only by) OPERATORS and ENGINEERS; otherwise the unit must be surrounded by a fence at not less than 2 meters from the external surface of the machine.

OPERATORS and ENGINEERS must enter the fenced area only after wearing suitable clothing (safety shoes, gloves, helmet etc.). The INSTALLER personnel or any other visitor must always be accompanied by an OPERATOR.

For no reason shall any unauthorised personnel be left alone in contact with the unit.

2.4 General precautions

The OPERATOR must simply use the controls of the unit; he must not open any panel, other than the one providing access to the control module.

The INSTALLER must simply work on the connections between plant and machine; he must not open any panels of the machine and he must not enable any control.

When you approach or work on the unit, follow the precautions listed below:

- do not wear loose clothing or jewellery or any other accessory that may be caught in moving parts
- wear suitable personal protective equipment (gloves, goggles etc.) when you have to work in the presence of free flames (welding operations) or with compressed air
- if the unit is placed in a closed room, wear ear protection devices
- cut off connecting pipes, drain them in order to balance the pressure to the atmospheric value before disconnecting them, disassemble connections, filters, joints or other line items
- do not use your hands to check for any pressure drops
- use tools in a good state of maintenance; be sure to have understood the instructions before using them
- be sure to have removed all tools, electrical cables and any other objects before closing and starting the unit again

2.5 Precautions against residual risks

Prevention of residual risks caused by the control system

- be sure to have perfectly understood the operating instructions before carrying out any operation on the control panel
- when you have to work on the control panel, always keep the operating instructions within reach
- start the unit only after you have made sure that the connection to the plant is perfect.
- promptly inform the ENGINEER about any alarm involving the unit
- do not reset manual restoration alarms unless you have identified and removed their cause

Prevention of residual mechanical risks

- install the unit according to the instructions provided in this manual
- carry out all the periodical maintenance operations prescribed by this manual
- before opening any panelling of the machine, make sure that it is secured to it by hinges(if available)
- do not touch air condensation coils without wearing protective gloves
- do not remove the guards from moving elements while the unit is running
- check the correct position of the moving elements' guards before restarting the unit

Prevention of residual electrical risks

- connect the unit to the mains according to the instructions provided in this manual
- periodically carry out all the maintenance operations specified by this manual
- disconnect the unit from the mains by the external disconnecting switch before opening the electrical board
- check the proper grounding of the unit before start-up
- check all the electrical connections, the connecting cables, and in particular the insulation; replace worn or damaged cables
- periodically check the board's internal wiring
- do not use cables having an inadequate section or flying connections, even for limited periods of time or in an emergency

Safety

Prevention of other residual risks

- make sure that the connections to the unit conform to the instructions provided in this manual and on the unit's panelling
- if you have to disassemble the unit, make sure that it has been properly mounted again before restarting the unit
- do not touch the delivery pipes from the compressor, the compressor and any other piping or component inside the machine before wearing protective gloves
- keep a fire extinguisher fit for electrical appliances near the machine
- on units installed indoor, connect the safety valve of the refrigeration circuit to a piping network that can channel any overflowing refrigerant outside
- remove and leak of fluid inside and outside the unit
- collect the waste liquids and dry any oil spillage
- periodically clean the compressor compartment, to remove any fouling
- do not store flammable liquids near the unit
- do not disperse the refrigerant and the lubricating oil into the environment
- weld only empty pipes; do not approach flames or other sources of heat to refrigerant pipes
- do not bend/hit pipes containing fluids under pressure

2.6 Precautions during maintenance operations

Maintenance operations can only be carried out by authorised technicians. Before performing any maintenance operations:

- disconnect the unit from the mains with the external disconnecting switch
- place a warning sign "do not turn on - maintenance in progress" on the external disconnecting switch
- make sure that on-off remote controls are locked out with active safety lock.
- wear suitable personal protective equipment (helmet, safety gloves, goggles and shoes etc.)

To carry out any measurements or checks which require the activation of the machine:

- work with the electrical board open only for the necessary time
- close the electrical board as soon as the measurement or check has been completed

- for outdoor units, do not carry out any operations in the presence of dangerous climatic conditions (rain, snow, mist etc.)

The following precautions must be always adopted:

- do not scatter the fluids of the refrigeration circuit in the surrounding environment
- when replacing an EPROM or electronic cards, always use suitable devices (extractor, antistatic bracelet, etc.)
- to replace a compressor, the evaporator, the condensing coils or any other weighty element, make sure that the lifting equipment is consistent with the weight to be lifted
- in air units with independent compressor compartment, do not access the fan compartment unless you have disconnected the machine by the disconnecting switch on the board and you have placed a warning sign "do not turn on - maintenance in progress"
- contact authorised or manufacturer distributor for any modifications to the refrigeration, hydraulic or wiring diagram of the unit, as well as to its control logics
- contact authorised distributor if it is necessary to perform very difficult disassembly and assembly operations
- use only original spare parts purchased directly from authorised distributor or the official retailers of the companies on the recommended spare parts list
- contact authorised distributor if it is necessary to handle the unit one year after its positioning on site or if you wish to dismantle it.

Safety

2.7 Safety regulations

Refrigerant data	Safety data: R410A
Toxicity	Low
Contact with skin	R410A vapors can irritate the skin and eyes. In liquid form, it can freeze skin on contact. If contact with skin occur, flush the exposed area with lukewarm water until all of the chemical is removed. If there is evidence of frostbite, bathe in lukewarm water.
Contact with eyes	If contact with eyes occur, immediately flush with large amounts of lukewarm water for at least 15 minutes, lifting eyelids occasionally to facilitate irrigation. Seek medical attention as soon as possible.
Ingestion	Very unlikely - should something happen, it will cause frost burns. Do not induce vomiting. Only if the patient is conscious, wash out mouth with water and give some 250 ml of water to drink. Then, obtain medical attention.
Inhalation	Inhalation of the R41 0A vapor may cause irritation. Vapor inhalation at high concentrations may result in asphyxiation or the heart may become sensitized, causing cardiac arrhythmia. When concentration of R410A reach levels which reduce oxygen to 14-16% by displacement, symptoms of asphyxiation will occur. An individual exposed to high concentrations of R410A must be given medical attention immediately. Adequate ventilation must be provided at all times.
Recommendations	Semiotics or support therapy is recommended. Cardiac sensitisation has been observed that, in the presence of circulating catecholamines such as adrenalin, may cause cardiac arrhythmia and accordingly, in case of exposure to high concentrations, cardiac arrest.
Prolonged exposure	R410A: a study on the effects of exposure to 50,000 ppm during the whole life of rats has identified the development of benign testicle tumour. This situation should therefore be negligible for personnel exposed to concentrations equal to or lower than professional levels.
Professional levels	R410A: Recommended threshold: 1000 ppm v/v - 8 hours TWA.
Stability	R410A is stable under normal operating conditions.
Conditions to avoid	Do not use in the presence of high temperatures, flames, burning surfaces and excess humidity.
Hazardous reactions	Contact with certain red-hot metals may result in exothermic or explosive reactions and yield toxic and/or corrosive decomposition products. Specific materials to avoid include freshly abraded aluminum surfaces and active metals such as sodium, potassium, calcium, powdered aluminum, magnesium and zinc.
Hazardous decomposition products	R410A: Halogen acids produced by thermal decomposition and hydrolysis.

Safety




General precautions	Do not inhale concentrated vapours. Their concentration in the atmosphere should not exceed the minimum preset values and should be maintained below the professional threshold. Being more weighty than the air, the vapour concentrates on the bottom, in narrow areas. Therefore, the exhaust system must work at low level.
Respiratory system protection	If you are in doubt about the concentration in the atmosphere, it is recommended to wear a respirator approved by an accident-prevention Authority, of the independent or oxygen type.
Storage	Cylinders must be stored in a cool, dry and properly ventilated storage area away from heat, flames, corrosive chemicals, flumes, explosives and be otherwise protected from damage. Keep a temperature below 52°C.
Protective clothing	Wear overalls, protective gloves and goggles or a mask.
Accidental release measures	It is important to wear protective clothing and a respirator. Stop the source of the leak, if you can do this without danger. Negligible leaks can be left evaporating under the sun, providing that the room is well ventilated. Considerable leaks: ventilate the room. Reduce the leak with sand, earth or other absorbing substances. Make sure that the liquid does not channelled into gutters, sewers or pits where the vapours are likely to create a stuffy atmosphere.
Disposal	The best method is recovery and recycling. If this method is not practicable, dispose according to an approved procedure, that shall ensure the absorption and neutralization of acids and toxic agents.
Fire fighting information	R410A: Not flammable in the atmosphere.
Cylinders	The cylinders, if exposed to fire, shall be cooled by water jets; otherwise, if heated, they may explode.
Protective fire fighting equipment	In case of fire, wear an independent respirator and protective clothing.

Safety

Refrigerant oil data	Safety data: Polyvinylether oil (PVE)
Classification	Not harmful
Contact with skin	May cause slight irritation. Does not require first aid measures. It is recommended to follow usual personal hygiene measures, including washing the exposed skin with soap and water several times a day. It is also recommended to wash your overalls at least once a week.
Contact with eyes	Wash thoroughly with a suitable solution or tap water.
Ingestion	Seek medical advice immediately.
Inhalation	Seek medical advice immediately.
Conditions to avoid	Strong oxidising substances, caustic or acid solutions, excess heat. May corrode some types of paint or rubber.
Protection of the respiratory system	Use in well ventilated rooms.
Protective clothing	Always wear protective goggles or a mask. Wearing protective gloves is not mandatory, but is recommended in case of prolonged exposure to refrigerant oil.
Accidental release measures	It is important to wear protective clothing and, especially, goggles. Stop the source of the leak. Reduce the leak with absorbing substances (sand, sawdust or any other absorbing material available on the market).
Disposal	The refrigerant oil and its waste will be disposed of in an approved incinerator, in conformity with the provisions and the local regulations applicable to oil waste.
Fire fighting information	In the presence of hot liquid or flames, use dry powder, carbon dioxide or foam. If the leak is not burning, use a water jet to remove any vapours and to protect the personnel responsible for stopping the leak.
Cylinders	The cylinders exposed to a fire will be cooled with water jets in case of fire.
Fire fighting protective equipment	In case of fire, wear an independent respirator.

2.8 Nameplate and Safety Label





Nameplate

PRODUCT CODE:		MODEL:	9000805	MPH 14	
SERIAL NUMBER:		MANUFACTURED YEAR:	2007		
REFRIGERANT CHARGE:	R410A/3.53kg	HIGH PRESSURE:	42		
		LOW PRESSURE:	9.8		
MAIN SUPPLY:	400/3N/50	V/PH/Hz	66		
LRA: (max)A	10.22	FLA: (max)A	6.02		
POWER INPUT:		(max)kW:			
WATER OPERATION		PRESSURE: (max)bar	1.46		
MASS: (max)kg		INGRESS PROTECTION:	IP24		
	0035	ELECTRA AIR-CONDITIONING(SHENZHEN) CO.,LTD.			
		CHINA			





Note: Please refer to the data plate on the unit for detail parameter.

Safety

Safety Label

	Caution Attention Vorsicht Attenzione Precaución	 C26081700/02	
	Do not insert any object into fan grille Ne pas insérer d'objets dans la grille du ventilateur Führen Sie keine Gegenstände in das Ventilatorgitter ein Non introdurre alcun oggetto nella griglia del ventilatore No introduzca objetos en la rejilla del ventilador		
	Installing a 60 mesh strainer at the unit inlet pipe Poser un filtre de de 60 mesh au tuyau d'admission de l'unité Montieren Sie einen 60 Netzfilter an der Einlassröhre des Geräts Installare un filtro grana 60 sul tubo d'ingresso dell'acqua Instalar un depurador de malla 60 en la tubería de entrada de unidad		
		Caution Attention Vorsicht Attenzione Precaución	 C26081800/03
		Drain all water in the water system during non-operating time in winter Vidangez toute l'eau du système d'eau en hiver, quand le système ne fonctionne pas Lassen Sie während der Winterzeit, wenn das Gerät außer Betrieb ist, alles Wasser aus dem Wassersystem ab Drenare tutta l'acqua del sistema idrico durante il periodo di inattività invernò Drene toda el agua del sistema durante los meses inactivos en invierno	
			

MQH 06/08M/08T

	Caution Attention Vorsicht Attenzione Precaución	 C26081700/02	
	Do not insert any object into fan grille Ne pas insérer d'objets dans la grille du ventilateur Führen Sie keine Gegenstände in das Ventilatorgitter ein Non introdurre alcun oggetto nella griglia del ventilatore No introduzca objetos en la rejilla del ventilador		
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		Caution Attention Vorsicht Attenzione Precaución	 C26081800/03
		Drain all water in the water system during non-operating time in winter Vidangez toute l'eau du système d'eau en hiver, quand le système ne fonctionne pas Lassen Sie während der Winterzeit, wenn das Gerät außer Betrieb ist, alles Wasser aus dem Wassersystem ab Drenare tutta l'acqua del sistema idrico durante il periodo di inattività invernò Drene toda el agua del sistema durante los meses inactivos en invierno	
			

MQH 10M/10T/12/14/16/18

Transport, Lifting and Positioning

3 TRANSPORT, LIFTING AND POSITIONING

Air conditioners are supplied assembled. The equipment are full of refrigerant and oil (except the condensing unit), in the quantity required for a proper operation. The unit cannot be transported at ambient temperature lower than -30°C .

3.1 Inspection

When the unit is delivered, it is recommended to check it carefully and to identify any damage occurred during transportation. The goods are shipped ex-factory, at the buyer's risk. Check that the delivery includes all the components listed in the order.

In case of damage, note it down on the carrier's delivery note and issue a claim according to the instructions provided in the delivery note.

In the presence of any serious damage, that does not affect the surface only, it is recommended to inform the distributor or your service provider immediately.

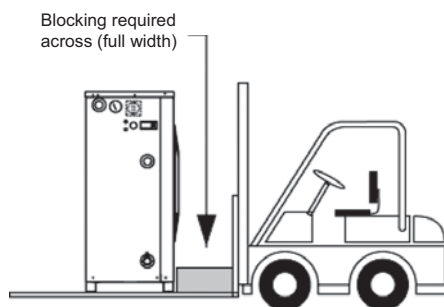
Please note that the manufacturer may not be held liable for any damage to the equipment during transportation, even though the carrier has been appointed by the factory.

3.2 Unit Handling



Sharp edges and coil surfaces are a potential hazard. Avoid contact with them.

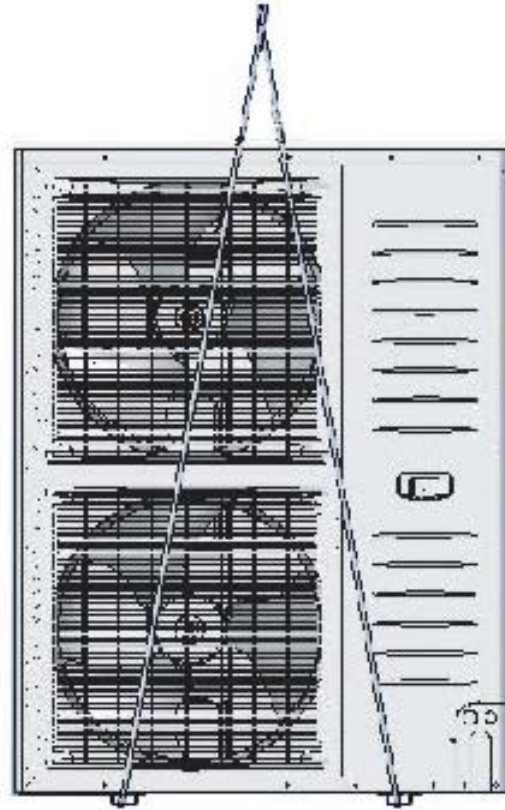
Be careful to avoid rough handling of the unit. Do not push or pull the unit anything other than the base. Block the pushing vehicle away from the unit to prevent damage to the sheet metal cabinet and end frame (see picture 1).



Picture 1

Unit lifting

In case the unit need to be lifted, it should be lifted as shown in picture 2 using belt or wire rope, keep unit balance and move at speed $<0.15\text{m/s}$ during lifting (for information)



Picture 2

3.3 Anchoring

It is not essential to secure the unit to the foundations, unless in areas where there is a serious risk of earthquake, or if the appliance is installed on steel frame.

3.4 Storage

When the unit is to be stored before installation, adopt a few precautions to prevent any damage or risk of corrosion or wear:

- plug or seal every single opening, such as water fittings
- do not store the unit in a room where the temperature will exceed 70°C and the relative humidity exceed 85%, unit with R410A, if possible, do not expose to direct sunlight
- it is recommended to store the unit in a roof where traffic is minimized, to prevent the risk of accidental damage
- the unit must not be washed with a steam jet
- take away and leave to the site manager all the keys providing access to the control board

Finally, it is recommended to carry out visual inspections at regular intervals.

4 INSTALLATION

4.1 Installation advices

Unit placement

The MQH air-to-water heat pumps must be installed in the open air, in an area where the flow of air to and from the condenser coil must not be limited. A space restriction, which reduces the air flow, will decrease the capacity, increase the power input and, in some cases, prevent the unit from operating because of an excess of condensation pressure.

The MQH air cooled heat pumps are equipped with propeller type condenser fan. Therefore, they will not operate with ductwork on the fan outlet.

In case of installation in an area subject to be hit by strong wind, direct effect of the wind on the discharge surface of the fan should be avoided.

Care should be taken, at the time of installation, to leave enough clearances around the unit for maintenance works.

The minimum clearances are shown on chapter 8.4 and must be considered, both to ensure that the unit operates correctly and to allow easy access.

The units should be installed on a flat and hard, preferably concrete base.

When fixing the unit, a slope of 1 cm/m is recommended to allow draining of rain water.



MQH06 and MQH08M/T and MQH10M/T cannot be installed with advanced inclination to 10°.

For heating mode, if the outdoor temperature is likely to fall below +1 °C, provide a system to prevent the condensates from freezing (e.g. heating cord).

For installation in difficult climates, temperatures below 0°C, snow or humidity, it is recommended to elevate the unit about 20 cm above the floor.



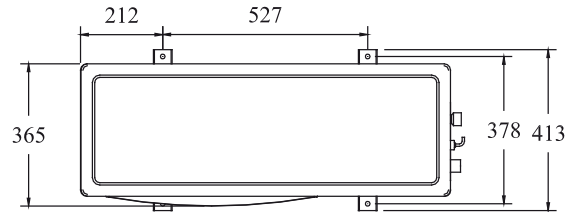
The metal grille is used to protect the operators from injury risks on heat exchanger at the time of handling and installation. However, risks of clogging by freeze or hoar frost can be occurred on the units installed in cold or mountainous regions and exposed to the elements. To prevent all risks, a shelter is to be provided or simply remove the protective grille.

Installation

Fixing dimensions

The fixing dimensions of the unit are shown on picture 3.

Vibration isolators are recommended for all roof mounted installation or wherever vibration transmission is a consideration.



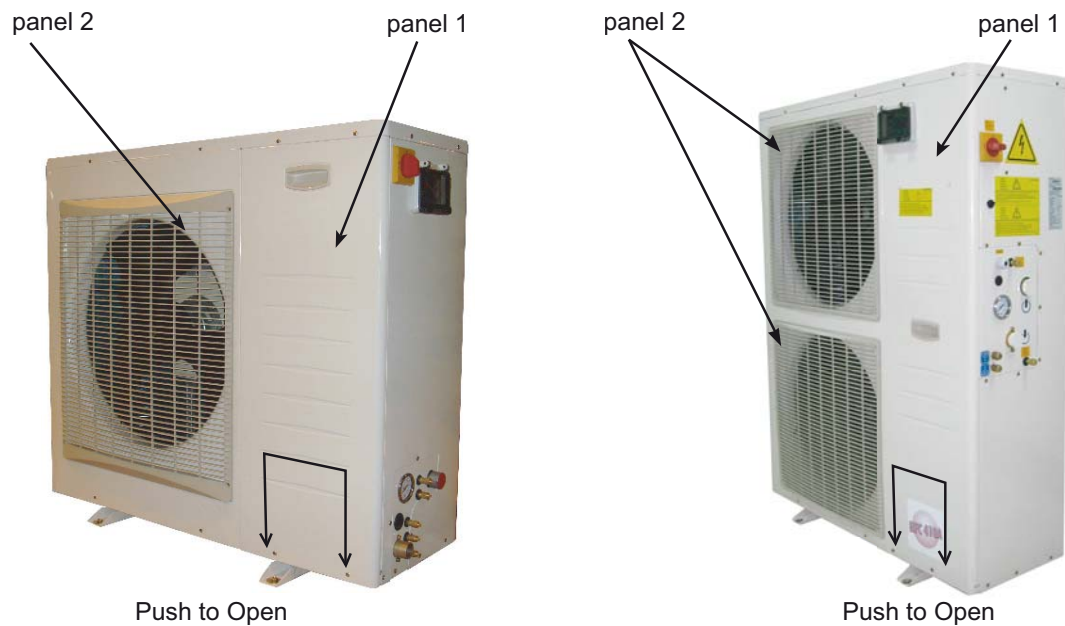
Picture 3

Maintenance access

After installation, each side of the unit must allow easy access for periodic maintenance works.

The removal of panel 1 allows access to compressor, refrigerant circuit as well as hydronic module.

The fan-motor assembly is accessible after removing the panel 2 .



Remark: The panel 1 is removable independently of other panels and allows a start-up by maintaining the operating characteristics of the unit.

Installation

4.2 Water connections

Water Piping

Local authorities can supply the installer with the proper building and safety codes required for safe and proper installation.



Install piping with minimum bends and changes in elevation to minimize pressure drop. Consider the following when installing water piping:

1. Vibration eliminators to reduce vibration and noise transmission to the building. Check the free volume expansion of the connection piping.
2. Shut-off valves to isolate the unit from the piping system during unit servicing.
3. Manual or automatic air vent valves at the highest points of the chilled water piping.
4. A means of maintaining adequate system water pressure (expansion tank or regulating valve).
5. Temperature and pressure indicators located at the unit to aid in unit servicing.
6. **To avoid all risks of penetration of foreign matters and to keep system performance up, it is mandatory to install a strainer at the inlet of the unit.**

Protection from freezing

It is recommended to protect the water system from freezing whatever the model used. The table below shows the anti-freeze concentration to be used depending on the minimum outdoor temperature.

Minimum outdoor temp. °C	0	-5	-10	-15	-25	-30
Concentration in %	10	20	30	40	50	60

Safety Differential Pressure Switch

A safety differential pressure switch is factory mounted between water inlet and outlet piping of evaporator, in order to ensure adequate water flow to evaporator before starting up the unit. It comes into operation in case of drop in water flow owing to the fact that the pump failed to operate. The safety differential pressure switch is the main protective device of the machine.



It is not our policy to make recommendations on water treatment. The general contractor or owner should contact a local water treatment company regarding water treatment. However, this is critical and care should be taken to make sure it is done properly to prevent problems related to flow. A fouled water system will lead to premature component failure.



Water connections could be damaged by an important stress when screwing them. Use a second spanner to compensate the stress of tightening.

Installation

4.3 Pressure Drop in Tubes and Accessories

To determine the appropriated pipe section, see table 1 which shows the values of pressure drop for various water flows and the diameter of standard copper pipes for hydraulic installations.

Table 1

Flow (l/h)	Pressure drop (mm WG / m)				
	Velocity (m/s)				
	Nominal diameter				
	13 x 15	16 x 18	20 x 22	26 x 28	33 x 35
400	86 0,84	32 0,55			
600	172 1,25	65 0,83	22 0,53		
800	286 1,67	108 1,11	37 0,71	10 0,42	
1000		158 1,38	55 0,88	16 0,52	5 0,32
1200		216 1,65	75 1,06	22 0,63	7 0,39
1400		284 1,93	99 1,24	28 0,73	9 0,45
1600			124 1,41	36 0,84	12 0,52
1800			133 1,59	44 0,94	14 0,58
2000			184 1,77	52 1,04	17 0,65
2200			217 1,94	62 1,15	20 0,71
2400			254 2,12	72 1,25	23 0,78

The grey area shows pressure drop in mm of water gauge/m and the velocity in m/s recommended for various flows and diameters.

Intermediate values are determined through interpolation.

Values outside the grey area correspond to excessive pressure drops and should be avoided.

Table 2 shows the equivalent pipe length with the same diameter, of a few common accessories for this type of installation.

Table 2

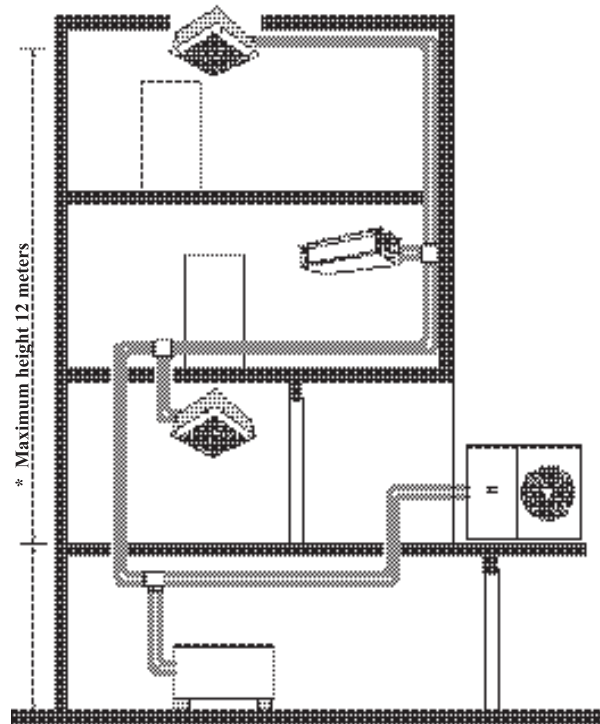
Accessories	Equivalent length (m)				
	Nominal diameter				
	13 x 15	16 x 18	20 x 22	26 x 28	33 x 35
Ball check valve	0,2	0,2	0,3	0,4	0,5
45° Bend	0,2	0,2	0,26	0,35	0,5
90° Bend	0,4	0,4	0,5	0,7	1,0
90° Curve	0,3	0,3	0,4	0,6	0,86
T-piece	0,8	0,8	1,0	0,5	2,0

1 mm WG = 9,81 Pa.

4.4 Hydraulic connection

The water inlet/outlet fittings shall conform to the instructions provided by the plates affixed neat the connection points.

4.5 Principle Diagram of Water Circuit



The MQH are to be connected with the terminal units such as fan coil units, cassettes or wall mounted units. Each terminal unit connected with the MQH heat pumps and provided with its own control is therefore completely independent of the chiller (see diagram of principle above).

* If the terminal unit is on a lower level than the MQH heat pumps, make sure the water pressure in the heat pumps unit is at least 0.5 bar.

4.6 Draining the defrosting waste water

When units work in heating mode, during defrosting cycles, they may discharge water from the base.

The heat pump units must be installed in positions where the defrosting water cannot create any damage.

Installation

4.7 Power supply



Before carrying out any operations on the electrical system, make sure that the unit is deenergised.



It is important that the appliance is grounded.



The company in charge of the installation shall conform to the standards applicable to outdoor electrical connections.

The manufacturer may not be held liable for any damage and/or injury caused by failure to comply with these precautions.

The unit conforms to EN 60204-1.

The following connections shall be provided:

- A link for the power supply and the earth connection
- The electrical distribution system shall meet the power absorbed by the appliance.
- The disconnecting and magnetothermal switches must be sized to control the starting current of the unit.
- The power supply lines and the insulation devices must be designed in such a way that every line is independent.
- The compressors are supplied through contactors controlled from the control panel.
- Each motor is provided with an internal safety thermal device .
- The power supply cables must be inserted into dedicated openings on the right side of the unit.

4.8 Electrical connections

The unit must be installed on site according to the Machinery Directive (2006/42/EC), the Low Voltage Directive (2006/95/EC), the Electromagnetic Interference Directive (89/336/EC) and the usual procedures and standards applicable in the place of installation. The unit must not be operated if its installation has not been carried out according to the instructions provided in this manual.

The power supply lines must consist of insulated copper conductors, dimensioned for the maximum absorbed current.

First of all, turn the knob to off position, then use remote switch connect to terminals according to the diagram of connections provided in this manual and according to the wiring diagram which accompanies the unit. **The remote switch can be used to select ON/OFF or COOLING/HEATING model.**

Select the suitable cable to connect to the main switch firmly according to the wire diagram.



Before connecting the power supply lines, check that the available voltage value does not exceed the range specified in the Electric Data (Chapter 8).

For 3-phase systems, check also that the unbalance between the phases does not exceed 2%. To perform this check, measure the differences between the voltage of each phase couple and their mean value during operation. The maximum % value of these differences (unbalance) must not exceed 2% of the mean voltage. If the unbalance is unacceptable, contact the Energy Distributor to solve this problem.



Supplying the unit through a line whose unbalance exceeds the permissible value will automatically void the warranty.



It's recommended to check the correct sequence of the three supply phases R-S-T- before the unit start up.

4.9 Wire Diagram

Please see Appendix A

For MQH06/08M/08T, the wiring diagrams are installed inside the top plate of the unit. For MQH10M/10T/12/14/16/18, the wiring diagrams are installed inside the right front panel of the unit. Any request for wiring diagrams shall be forwarded to the Authorised Service Centre.

Start-up

5 START-UP



On MQH heat pump unit the first start up must be done by an authorized technician. Following suggestions should be applied in order to do the operation properly.

5.1 Preliminary check

The checks listed below shall be performed before starting the unit .

- Check the section of power supply and grounding cables; make sure that terminals are tightened and check the correct operation of contactors, with the master switch open.
- Check that any voltage and phase variation in the power supply does not exceed the prefixed thresholds.
- Check that the components of the external water circuit (user equipment, filters, power supply tank and reservoir, if any) have been installed properly, and according to the manufacturer's instructions.
- Check the filling of the hydraulic circuits, and make sure that the fluid circulation is correct, without any trace of leaks and air bubbles.
- Check that the direction of rotation of the pumps is correct, and that fluids have been circulating for at least 4 hours. Then, clean the filters on the suction side of the pumps.
- Adjust the liquid distribution network in such a way that the flow rate is within the specified range.
- Check that the water quality is up to the specifications.
- Check that oil heaters, if any, have been turned on at least 4 hours before (It is mandatory if the temperature is under 15°C).

5.2 Start-up

Start-up sequence:

- Turn on the main switch disconnecter (at least 4 hours before).
- For 3 phase unit, check the phase monitor. If the green LED light is on, means that the phase connection is reverse, need to exchange any two phase connection of three. When the red LED light is on, the compressor can start up normally.
- Check that the oil in the compressor has reached the requested temperature (the minimum temperature outside the pan must be approx. 40°C) and that the auxiliary control circuit is energised.
- Check the operation of all the external equipment, and make sure that the control devices of the plant are properly calibrated.
- Start the pump and check that the water flow is correct.
- Set the desired fluid temperature on the control board.
- Start the appliance (see Chapter 6).

Start-up

5.3 Checking the operation

Check the following:

- The temperature of the water entering the evaporator.
- The temperature of the water leaving the evaporator.
- The level of the water flow rate in the evaporator, if possible.
- The current absorption upon the start of the compressor and in case of stabilised operation.
- The fan's current absorption.

Check that the condensing and evaporation temperatures, during operation at high and low pressure detected by the pressure gauges of the refrigerant, are within the following range:

(On the units not provided with HP/LP pressure gauges for the refrigerant, connect a pressure gauge to the Schrader valves on the refrigeration circuit).

HP side	Approx. 13 to 18°C above the temperature of the air entering the condenser, for R410A units.
LP side	Approx. the difference between the temperature of the leaving water and the saturated evaporating temperature must be in the 2-4°C for R410A units.

5.4 Delivery to the customer

- Train the user according to the instructions provided in Section 6.

Control System

6 MINICHILLER CONTROL

6.1 Operating instructions

6.1.1 Before start-up



Before starting the equipment:

- 1) Turn on the main switch of the power line.
- 2) For an ideal heating of the oil in the compressor's crankcase and for a proper removal of the refrigerant from the oil, the operation described in sub-paragraph 1) above should be performed several hours before the actual start-up of the equipment.

6.1.2 Starting and using the Unit

To properly use the unit in full safety, please read and understand the instructions provided below.

- 1) **To start the unit**, close the remote switch according to requirement, if display show OFF mode, press the right button on display ^ for 5 seconds, please refer to the wiredigram (see chapter 4.9). Break the connection the unit will stop.
- 2) During the normal operation, if the connection between No.6 and No. 7 terminal is closed, the unit will operate in heating mode. When the connection is opened, the unit will operate in cooling mode.
- 3) **To modify the set-points**, press both ^ and > keys at the same time for 5s, then the "OPE" message appears on the display. The parameters are scrolled using the ^ button and selected using the > button. When selected, the values can be changed by using the ^ button to scroll from the present value to max then min and can be selected by pushing the > button. After selection the menu will return to the beginning of the same parameter change menu. If no button is pressed for 10s the display reverts back to normal mode. Table 5 shows the list of standard parameters.

Table 3

Status display	
Display	Description
CI	When compressor is operating
CIH	Compressor in heat mode
DEIC	De-ice in operation
OFF	Off mode
COOL	Cool mode with no compressors on
HEAT	Heat mode with no heating on

- 4) During the normal operation the current value of entering water temperature is displayed flashing alternatively with the current status. To display other useful data, go to level I, use the ^ button to scroll the menu, and use the > button to select the display value. The display data are shown in Table 6.
- 5) If an alarm is occurred, the alarm code is displayed, but after 30', even if the alarm is still active, the display shows again the mode but "Alar" message is displayed for 2' every 10' when an alarm is active. When we enter in Alarm list, the first alarm code displayed is the last occurred.

Table 4

Alarms Table	
Fault code	Fault description
ADC	ADC error
CPE	Condensing pressure transducer failure, out of range.
EPF	Evaporating pressure transducer failure, out of range.
REF	Refrigerant leak - low pressures.
CPNC	Condensing pressure transducer failure, no change error.
EPNC	Evaporating pressure transducer failure, no change error.
EWTH	Entering water temperature sensor short circuited
EWTL	Entering water temperature sensor disconnected
LWTH	Leaving water temperature sensor short circuited
LWTL	Leaving water temperature sensor disconnected
OATH	Outdoor air temperature sensor short circuited
OATL	Outdoor air temperature sensor disconnected
OCTL	Coil temperature sensor disconnected
OCTH	Coil temperature sensor short circuited
HP	High pressure protection, automatic reset for first three times
HPC	High pressure cut-out
LP	Low pressure limit, unit cut out
LO	Leaving water temperature below allowed limits
HI	Entering water temperature is too high
FS	Flow switch opens, low water flow
CF1	CF1 input open, compressor 1 overload
OF1	OF1 input open, outdoor fan overload
PF	PF input open, pump internal overload
LOu	Low water volume
CONF	Not allowed configuration
CFC1	CP and EP no change, compressor not operating (burn out or phase change).

Control System



For 3 phase unit, check the phase monitor.
If the green LED light is on, means that the phase connection is reverse, need to exchange any two phase connection of three.
When the red LED light is on, the compressor can start up normally.

Table 5

List of standard parameters					
Display	Meaning	Min Value	Max value	Step	Default value
OPER	Cooling/Heating mode selection	COOL	HEAT	---	COOL
CSP	Cooling set-point temperature	Min cooling setpoint	23	0.5	12
HSP	Heating set point	20	47	1	40
gly	Glycol %	0	30	10	0
nigh	Night mode configuration	1	4	1	2
COAL	Cooling set point temperature compensation low limit	10	30	2	20
COAH	Cooling set point temperature compensation high limit	20	36	2	30
CDCO	Cooling set point temperature compensation cooling mode	0	8	1	6
HDCO	Heating set point temperature compensation	0	15	1	8
HOAL	Heating set point temperature compensation low limit	-10	10	1	-5
HOAH	Heating set point temperature compensation high limit	0	20	1	10
ND	Night mode differential	0	15	1	2
NFC	Night mode fan change	-4	4	1	2
ID	Identification address	0	15	1	0

Table 6

Display Data		
Level 1	Level 2	Level 3
PArA (Parameters)	Unit	CO or HP
	DE	Select to show present value Triac output value in % from 0 to 100.
	TO (triac output)	
	CSPT (cooling set point temperature)	
	HSPT (heating set point temperature)	
	tD (last deicing duration)	
	EWT (entering water temperature)	
SEnS (Sensor)	LWT (leaving water temperature)	Select to show present value (if coonected)
	CP (condensing pressure)	
	EP (evaporating pressure)	
	CPS (condensing saturated temperature)	
	EPS (evaporating saturated temperature)	
	OAT (outdoor air temperature)	
	OCT (outdoor coil temperature)	
	RT	
ALAr(Existing faults)	See alarm list below	Scrolls through all active faults (if any)
HRS (Running hours)	Cl(compressor) xIO hrs	Select to show hrs
	tC 1 (compressor timer) hrs	
Log (Alarm log)	Same choice as a alarm list	Scrolls through last 10 alarms in order
Stat	Cl (compressor)	ON or OFF
	rv(reversing valve)	ON or OFF
	TH (trace heater for frost protection)	ON or OFF
	Pump	ON or OFF
	OFAN (outdoor fan)	ON or OFF
	dEIC (de-ice)	De-ice in operation
	Mode	OFF of COOL or HEAT

General Description

7 GENERAL

7.1 Introduction

MQH units are air - cooled heat pumps with a refrigerant circuit equipped with rotary compressors for size 6 to 10 and with scroll compressors for size 12 to 18.

MQH units are designed for outdoor installation to ensure highly reliable and efficient performance. These appliances are fit for medium and small air - conditioning applications in the residential and tertiary sectors.

We can supply our ranges in 7 different sizes. Please note that sizes 8 and 10 are available with single and three -phase power supply.

All the units have water expansion tank in the hydraulic circuit, and the control allows the system to work with a water content of 3.5 l/kW. However, it is possible to buy separately the external water tank for installations with a water content lower than 3.5 l/kW. All the units are equipped with a pump with stainless steel impeller.

7.2 General Specifications

MQH units are supplied completely and equipped with all refrigerant pipings and internal electrical wirings. When the assembly is finished, each unit is subjected to a complete final test to check the proper working of all refrigeration circuits.

The structure is made of galvanized - steel elements assembled through tropicalized - steel screws. All the galvanized - steel parts are protected by RAL 9001 - white baked polyester enamel, which makes the unit corrosion - proof and weather - proof.

7.3 Compressors

Compressors are rotary type for sizes 6 to 10 and scroll type for sizes 12 to 18, with internal motor protection.

Compressors are mounted on rubber vibration isolators and packed into sound insulation jacket, in order to eliminate vibration transmissions and noise. Motors are of direct - start type, cooled by suction gas.

7.4 Refrigerant Circuit

Each unit includes: a four-way cycle valve □ capillary tubes, heat exchanger, drier filter, high pressure switch, high pressure transducer and low pressure switch, and refrigerant charge of HFC-410A. All pipes and refrigeration components are welded.

7.5 Water heat exchanger

Evaporators are stainless steel plate - type.

Their thermal insulation is ensured by a flexible closed -cell insulating coating. Anti-freeze protection during operation by flow switch and during shutdown by electric heater. Maximum working pressure on the water side is 3 bar, and 42 bar on the refrigerant side. Hydraulic connections to the evaporator are 3/4" female gas threaded type for MQH 6 and 8, 1" female gas threaded type for sizes 10 to 18.

7.6 Air heat exchanger

Coils are made of copper pipes in staggered rows and mechanically expanded in an aluminium finned pack with blue fin.

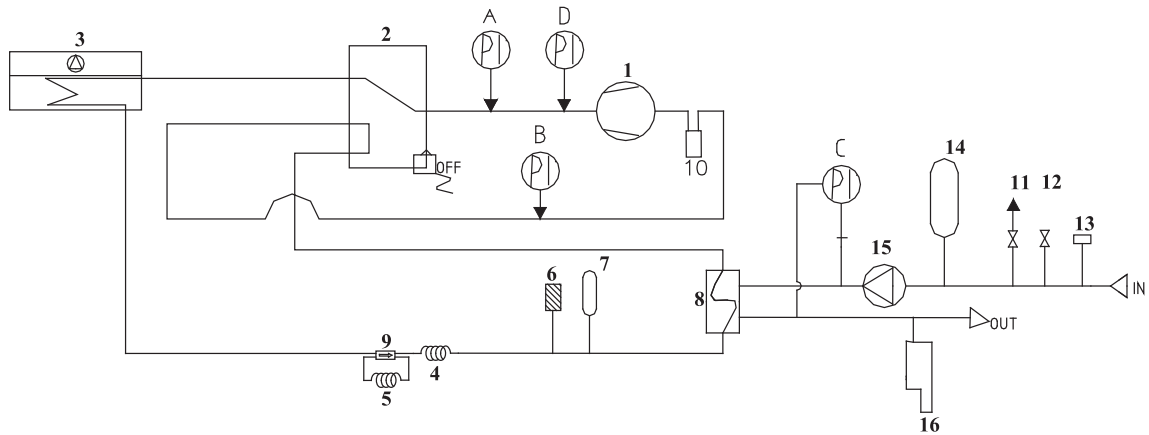
7.7 Fan

Fans are direct - coupling propeller type, equipped with plastic blades with wing - profile. Each fan is provided with a plastic safety guard.

Finally, motors are completely closed, protection class IP44, adjustable RPM, and equipped with thermal protection. Triac fan speed controller allows the unit to operate with ambient temperature from -10 to 46°C for MQH06-16, and from -10 to 43 °C for MQH18.

General Description

Refrigerant Flow Diagrams - MQH 6 /8/10/14/16



Refrigerant Circuit:

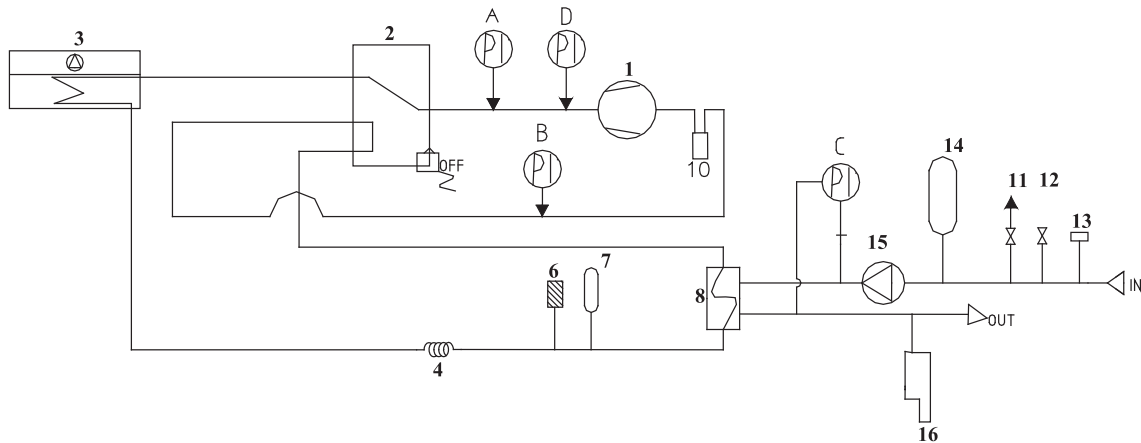
- 1 Compressor
- 2 4 Way Valve
- 3 Coil + Fan
- 4 Main Capillary
- 5 Bypass Capillary
- 6 1 Way Drier Filter
- 7 Liquid Receiver
- 8 Heat Exchanger
- 9 Check Valve
- 10 Accumulator

Hydraulic Circuit:

- 11 Drain Valve
- 12 Safety Valve
- 13 Water Manometer
- 14 Expansion Tank
- 15 Pump
- 16 Air vent

- A High Pressure Switch
- B Low Pressure Switch
- C Differential Pressure Switch
- D High Pressure Sensor

Refrigerant Flow Diagrams - MQH 12/18



Refrigerant Circuit:

- 1 Compressor
- 2 4 Way Valve
- 3 Coil + Fan
- 4 Main Capillary
- 6 1 Way Drier Filter
- 7 Liquid Receiver
- 8 Heat Exchanger
- 10 Accumulator

Hydraulic Circuit:

- 11 Drain Valve
- 12 Safety Valve
- 13 Water Manometer
- 14 Expansion Tank
- 15 Pump
- 16 Air vent

- A High Pressure Switch
- B Low Pressure Switch
- C Differential Pressure Switch
- D High Pressure Sensor

Technical data

8 TECHNICAL DATA

8.1 Technical data

MQH		6	8M	8T	10M	10T
Power supply	V/ph/Hz	230V~50Hz	230V~50Hz	400/3N~/50	230V~50Hz	400/3N~/50
Number of circuits		1	1	1	1	1
Number of steps		0-100	0-100	0-100	0-100	0-100
Refrigerant						
Type		R410A				
Charge(l)	kg	1.80	2.20	2.20	2.84	2.75
Compressors						
Type		Rotary	Rotary	Rotary	Rotary	Rotary
Number		1	1	1	1	1
Start-up type		Direct				
Evaporator						
Type		Plate				
Number		1	1	1	1	1
Condenser						
Type		Coil				
Hydraulic connections						
Type		Femab				
Inlet diameter	Inch	3/4	3/4	3/4	1	1
Outlet diameter	Inch	3/4	3/4	3/4	1	1
Weights						
Weight of shipment	Kg	102	113	113	152	152
Dimensions						
Length	mm	951	951	951	951	951
Width	mm	340	340	340	340	340
Height	mm	863	863	863	1265	1265

- (1) Indicative valvue. Always refer to the value specified on the unit's label.
- (2) Electric supply tolerance:voltage $\pm 10\%$;frequency: $\pm 1\text{Hz}$
- (3) The maximal sound power is lower than 72dB(A)

Technical data

MQH		12	14	16	18
Power supply	V/ph/Hz	400V/3N~/50Hz	400V/3N~/50Hz	400V/3N~/50Hz	400V/3N~/50Hz
Number of circuits		1	1	1	1
Number of steps		0-100	0-100	0-100	0-100
Refrigerant					
Type		R410A			
Change(l)	kg	3.60	3.53	4.63	5.65
Compressors					
Type		Scroll	Scroll	Scroll	Scroll
Number		1	1	1	1
Start-up type		Direct			
Evaporator					
Type		Plate			
Number		1	1	1	1
Condenser					
Type		Coil			
Hydraulic connections					
Type		Female			
Inlet diameter	Inch	1	1	1	1
Outlet diameter	Inch	1	1	1	1
Weights					
Weight of shipment	Kg	165	182	185	189
Dimensions					
Length	mm	951	951	951	951
Width	mm	340	340	340	340
Height	mm	1265	1365	1365	1365

(1) Indicative value. Always refer to the value specified on the unit's label.

(2) Electric supply tolerance:voltage $\pm 10\%$;frequency: $\pm 1\text{Hz}$

(3) The maximal sound power is lower than 72dB(A)

Technical data

8.2 Unit Electrical Data

MQH		6	8M	8T	10M	10T	12	14	16	18
Rated voltage	V-Ph-Hz	230V~50Hz		400V/3N~/50Hz	230V~50Hz	400V/3N~/50Hz				
Max. absorbed power	kW	2.5	3.5	3.3	4.4	4.1	5.7	6.0	7.0	8.6
Rated current	A	9.3	13.0	4.8	16.4	5.8	8.1	8.5	9.7	11.5
Max. current(FLA)	A	11.1	15.6	5.5	19.8	7.0	9.7	10.2	11.6	14.3
Max. start-up current(LRA)	A	37.0	83.0	36.0	96.0	55.0	66.0	66.0	69.0	73.0
External Fuses	A	20.0	25.0	12.0	16.0	12.0	16.0	16.0	20.0	25.0

- (1) The dimensioning of the unit's power cables is the responsibility of the installer, who shall consider: the rating, the maximum working ambient temperature, the type of insulation and the cable laying, the maximum length of the power supply line.
- (2) Electric supply tolerance :voltage $\pm 10\%$;frequency: $\pm 1\text{Hz}$

Electrical Data Compressors

Compressors MQH		6	8M	8T	10M	10T	12	14	16	18
Quantity		1	1	1	1	1	1	1	1	1
Max. absorbed power	kW	2.2	3.2	3.1	3.9	3.7	5.4	5.4	6.6	7.8
Nominal current	A	8.4	12.2	4.35	14.8	5.35	7.2	7.7	9.0	10.8
Max. current(FLA)	A	10.1	14.4	5.2	17.2	6.3	8.9	9	10.9	12.9
Max. start-up current(LRA)	A	36.8	76	33	88	53	66	66	63	73
Crankcass heater	W	70	70	70	70	70	70	70	70	70

- (1) Electric supply tolerance: voltage $\pm 10\%$;frequency: $\pm 1\text{Hz}$

Fans Electrical data

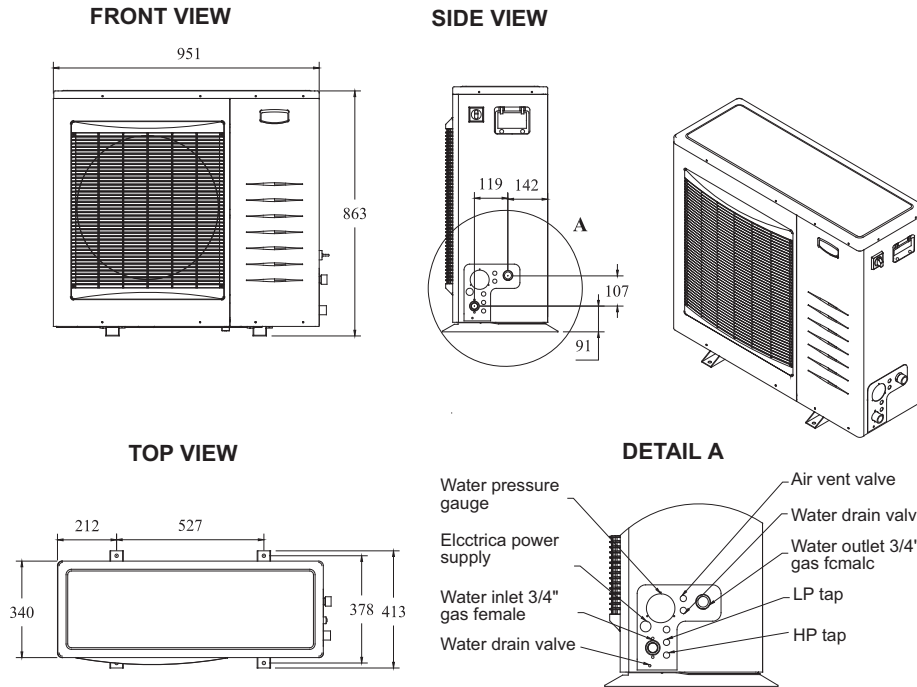
Fans MQH		6	8M	8T	10M	10T	12	14	16	18
Supply voltage	V-Ph-Hz	230-1-50								
Quantity		1	1	1	2	2	2	2	2	2
Rated power per fan	kW	0.125	0.135	0.135	0.125	0.125	0.135	0.135	0.135	0.135
Total absorbed current(FLA)	A	0.43	0.64	0.64	0.86	0.86	1.28	1.28	1.28	1.46

- (1) A11 the units are equipped with electric heater for plate heat exchanger anti-freeze,the input power is 230V/~35W.
- (2) Electric supply tolerance:voltage $\pm 10\%$;frequency: $\pm 1\text{Hz}$

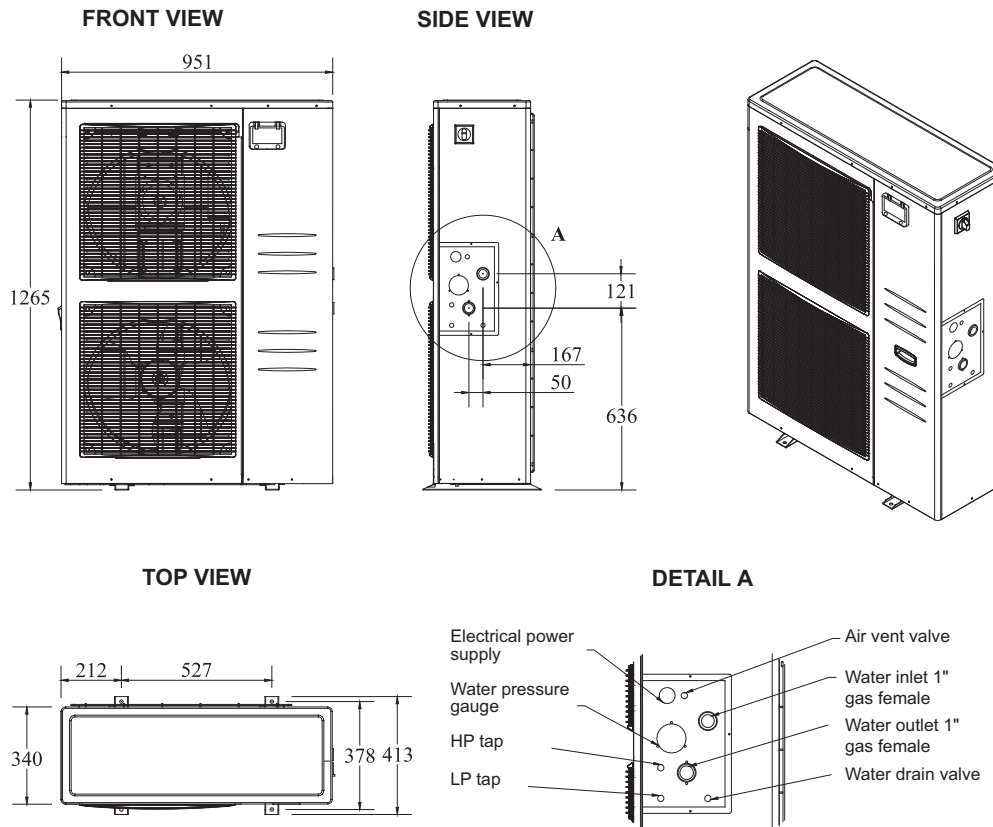
Technical data

8.3 Overall dimensions

MQH 06/08M/08T



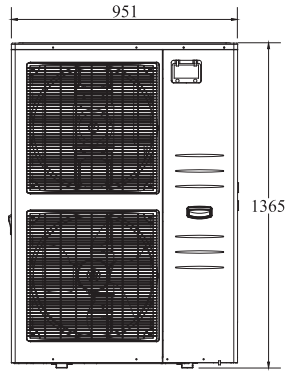
MQH 10M/10T/12



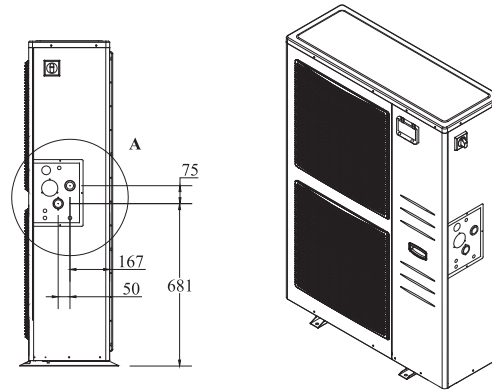
Technical data

MQH 14/16/18

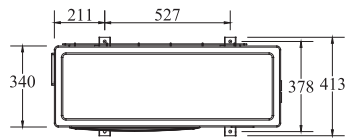
FRONT VIEW



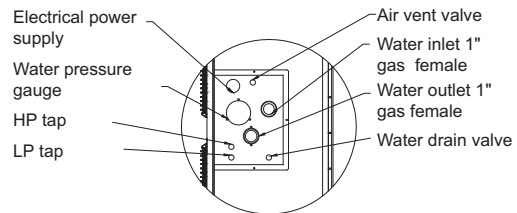
SIDE VIEW



TOP VIEW

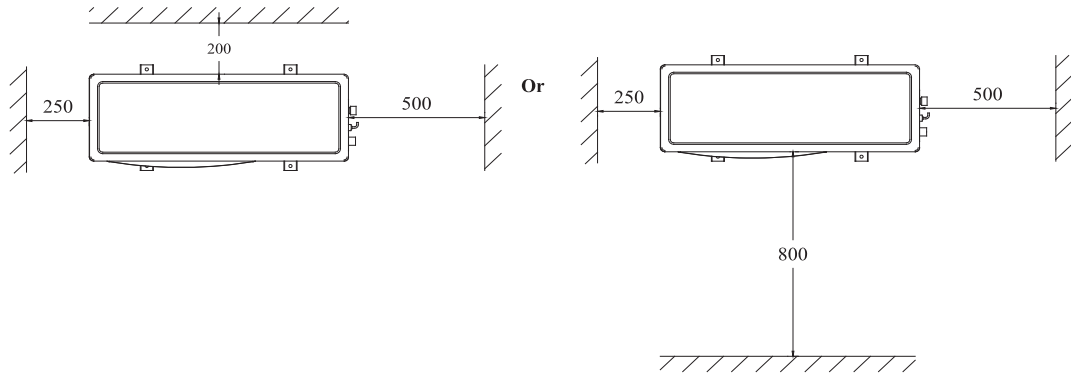


DETAIL A



8.4 Clearences

MQH 06 to 18



Maintenance

9 MAINTENANCE

Carefully read the "Safety" section of this manual before carrying out any maintenance operations.



Do not discharge the refrigerant into the atmosphere while the refrigeration circuits are being drained. Use appropriate recovery equipment. When the recovered refrigerant cannot be re-used, return it to the manufacturer.



Do not throw away the waste oil of the compressor, because it contains refrigerant in solution. The waste oil must be returned to the manufacturer.

Unless otherwise specified, the operations described below may be carried out only by a trained maintenance operator.

9.1 General requirement

The units have been designed for continuous operation, providing that they are subjected to regular maintenance, within the limits specified in this manual. Each unit must be serviced according to the programme by the User/ Customer, and must be inspected at regular intervals by the personnel of one of the authorised Service Centers.

It is the responsibility of the User to meet these maintenance requirements and/or to enter into an agreement with one of the Authorised Service Centers, so as to properly safeguard the operation of the appliance.

During the warranty period, in case of damage or failures caused by improper maintenance the manufacturer will not refund the costs incurred to repair the appliance to its original state.

The provisions of this section apply only to standard units; according to the order requirements, other documentation may be added, concerning any modifications or supplementary accessories.

9.2 Planned maintenance

Maintenance inspections must be carried out according to the program below, by a qualified person. As a general rule, units cannot be repaired directly by the user, who shall not try to service or repair any failures or anomalies identified during daily inspections. If you are in doubt, please contact the authorised Service Centre.

Planned maintenance

Operations	Daily	Weekly	Monthly	Beginning of season	End of season
Check the temperature of the leaving fluid	•				
Check the pressure drops in the heat exchanger		•			
Check for electric absorption		•			
Check suction pressure and temperature		•			
Check delivery pressure and temperature		•			
Check that the fins of the external coil are clean (if any)			•		
Check the operation of the oil heaters (if any)			•		
Check the remote control switches			•		
Check the operation of the LP pressure switch				•	
Check the operation of the HP pressure switch				•	
Check the insulation of the heat exchanger				•	
Check that terminals are tightened				•	
Check that the terminals' screws are tightened				•	
Clean the exterior of the unit with water and soap				•	
Check the density of the antifreeze (if any)				•	•

Maintenance

9.3 Refrigerant charge



Do not inject refrigerant liquid into the LP side of the circuit. Be very careful, and charge the circuit properly. If the charge is insufficient, the efficiency of the unit will be lower than expected. In the worst of cases the LP pressure switch may be activated, resulting in the halting of the unit. In the presence of an excess charge, the condensing pressure will rise (in the worst of cases, the HP pressure switch may be activated, resulting in the stop of the equipment), and the consumption will increase as well.



It is strictly forbidden to use the compressor as a vacuum pump to drain the plant.

Fill the refrigeration circuit after it has been drained for maintenance purposes (leaks, replacement of the compressor etc.). The amount of the charge is indicated on the plate affixed to the unit.

Before refilling, it is important to drain and de-hydrate the circuit, thus obtaining a minimum abs. pressure value of 50 Pa.

Inject the refrigerant fluid before removing the vacuum, then fill the circuit up to 90% of the total gas requirement (in liquid form).

It is recommended to connect the refrigerant cylinder to the filling valve, and to arrange it in such a way as to inject only liquid refrigerant.

Then start the compressor and let the gas flow from the cylinder, until charging operation is done.

9.4 Compressor

Compressors are delivered with the necessary charge of lubricating oil. During normal operation, this charge is sufficient for the whole life of the unit, providing that the efficiency of the refrigeration circuit is satisfactory and if it has not been overhauled.

If the compressor needs to be replaced (following a mechanical failure or if burnt), contact one of the Authorised Service Centers.



Compressors use PVE oil. During maintenance operations on the compressor, or if you have to open the refrigerant circuit in any point, remember that this type of oil is highly hygroscopic, and accordingly it is important that it is not left exposed to the weather for prolonged periods, as this would require the replacement of the oil.

9.5 Condenser

The condenser's coils consist of copper pipes and aluminium fins. To ensure the effective and correct operation of the condenser coils, it is important to keep the condenser's surface perfectly clean, and to check that there is no foreign matter, such as leaves, wires, insects, waste etc. If the coil becomes dirty, there is an increase in the absorption of electric energy. Furthermore, the maximum pressure alarm may be activated and may halt the unit.



Be careful not to damage the aluminium fins during cleaning.

The condenser must be cleaned with a LP compressed air jet, parallel to the aluminium fins, in the direction opposite to the air circulation.

To clean the coil you can use also a vacuum cleaner, or a jet of water and soap.

9.6 Fan

The fans of the condenser, of axial type, are complete with impeller with aerodynamic profile blades and a cylindrical nozzle. The motor's bearings are lubricated forever.

9.7 Filter drier

The refrigeration circuits are provided with filter drier. The filter stoppage is marked by the difference between the temperatures measured downstream from and upstream of the filter drier. If after the cartridge has been cleaned, the problems persist, it means that the appliances has lost part of the refrigerant charge in one or more points, that must be identified and serviced.

9.8 Evaporator

Check at regular intervals that the water side of the heat exchanger is perfectly clean. To do this, measure the pressure drop, water side (see Section 8) or measure the temperature of the liquid leaving and entering the heat exchanger, and compare it to the evaporation temperature.

To obtain an effective heat exchange, the difference between the temperature of the leaving water and the saturated evaporating temperature must be in the 2 - 4°C range. A greater difference would indicate a low efficiency of the heat exchanger (i.e. the heat exchanger is dirty).

In this case, the heat exchanger must be subjected to chemical cleaning, an operation that shall be carried out by authorised engineers.

For other maintenance operations (extraordinary overhauling, replacement of the heat exchanger etc.), contact an authorised Service Centre.

Troubleshooting

10 TROUBLESHOOTING

The table below lists the anomalies of operation of the unit, the relevant causes and the corrective measures.
For anomalies of any other type or not listed, contact one of the Authorised Service Centre for technical assistance.

Abnormality	Cause	Operation
The unit continues to work, but without cooling	Insufficient charge of refrigerant	Refill.
	The dehydrating filter is clogged	Replace
Ice on the suction line	Wrong calibration of overheating	Increase overheating
		Check the charge or capillary
Excessive noise	Vibration of lines	Check the clamping brackets
	Noisy compressor	Seized bearings; replace the compressor
		Check that the compressor's lock-nuts are tightened
Low oil level in the compressor	One or more gas or oil leaks in the circuit	Identify and remove leaks
	Mechanical failure of the compressor	Request the intervention of a Service Centre
	Anomaly of the oil heater of the compressor's base	Check the electric circuit and the resistor of the heater of the motor base, and replace defective components
Compressors is not working.	Breaking of the electric circuit.	ground dispersions and short circuits. Check fuses.
	Intervention of the HP pressure switch.	Reset the pressure switch and the control panel and restart the appliance. Identify and remove the cause that enabled the pressure switch.
	The fuse of the control circuit is broken.	Check for ground dispersions and short circuits. Replace fuses.
	Loosened terminals.	Check and tighten.
	Halt caused by thermal overload of the electric circuit.	Check the operation of check and safety devices. Identify and remove the cause.
	Wrong wiring.	Check wiring of check and safety devices.
	The line voltage is too low.	Check voltage. If problems regard the system, solve them. If they are caused by the distribution network, inform the Energy Distributor. check the cable limitation.
	Short-circuit of the compressor's motor.	Check the continuity of the winding.
	Seized compressor.	Replace the compressor.

Troubleshooting

Anomaly	Cause	Operation
Activation of the LP alarm, stop of the unit	Gas leak	Identify and remove the leak
	Insufficient charge	Refill
	Failure of the pressure switch	Replace the pressure switch
Activation of the HP alarm, stop of the unit	Failure of the pressure switch	Check the operation of the pressure switch, replace it if defective
	The delivery valve is partially closed	Open the valve and replace it, if faulty
	Substances with condensable gases in the circuit	Drain the circuit
	The fan of the condenser is stopped	Check cables and motor. If defective, repair or replace
The liquid line is too hot	Insufficient charge	Identify and remove the cause of the loss of charge and refill

Spare parts

11 SPARE PARTS

11.1 Spare part list

Exploded view please see appendix B.

SPL for MQH 06/08							
No.	Description	MQH 06		MQH 08M		MQH 08T	
		P/N	QTY	P/N	QTY	P/N	QTY
1	top plate	C60080300	1	C60080300	1	C60080300	1
2	condenser assembly	462300002	1	462300002	1	462300002	1
3	fan motor	C02018200	1	C02018200	1	C02018200	1
4	fan	452960400	1	452960400	1	452960400	1
5	base plate	C60078000	1	C60077700	1	C60077700	1
6	left front plate	C60080400	1	C60080400	1	C60080400	1
7	compressor	452975900	1	460050009R	1	460050010R	1
8	right front plate	C60080900	1	C60080900	1	C60080900	1
9	compressor crank heater	452988900	1	452892100	1	452892100	1
10	4-way reversing valve	4526522	1	4526522	1	4526522	1
11	air outlet grill	465100000	1	465100000	1	465100000	1
12	right side plate 1	C60077800	1	C60077800	1	C60077800	1
13	safety valve	C200009	1	C200009	1	C200009	1
14	partition plate	C60074100	1	C60070300	1	C60070300	1
15	water pump	C04001100	1	C04001100	1	C04001100	1
16	heater exchanger	C05028200	1	C05028100	1	C05028100	1
17	differential pressure swith	C03528700	1	C03528700	1	C03528700	1
18	OAT	232283	1	232283	1	232283	1
19	OCT	232299	1	232299	1	232299	1
20	water inlet temperature	232299	1	232299	1	232299	1
21	water outlet temperature	232299	1	232299	1	232299	1
22	main controller	467300119R	1	467300119R	1	467300119R	1
23	display panel	C03523600	1	C03523600	1	C03523600	1
24	transformer	C035044	1	C035044	1	C035044	1
25	fan motor capacitor	455000102	1	455000102	1	455000102	1
26	phase protector	N/A	1	N/A	1	4519695R	1
27	compressor capacitor	455000507	1	455000301	1	N/A	1
28	guard net assembly	C60080500	1	C60080500	1	C60080500	1
29	dry filter	C10002400	1	C10002400	1	C10002400	1
30	LP switch	C03528600	1	C03528600	1	C03528600	1
31	HP transducer	467400019	1	467400019	1	467400019	1
32	HP switch	C03528500	1	C03528500	1	C03528500	1
33	capillary assembly	C61081800	1	C61081700	1	C61081700	1

11.2 Oil for compressors

The compressors are lubricated with Polyvinglether (PVE)

Spare parts

No.	Description	SPL for MQH 10/12/14/16/18											
		MQH 10M		MQH 10T		MQH 12		MQH 14		MQH 16		MQH 18	
		P/N	QTY	P/N	QTY	P/N	QTY	P/N	QTY	P/N	QTY	P/N	QTY
1	condenser assembly	C62069000	1	C62069000	1	C62069000	1	C62069500	1	C62069800	1	C62069800	1
2	air outlet grill	465100017	2	465100017	2	465100017	2	465100017	2	465100017	2	465100017	2
3	left front plate	C60081100	1	C60081100	1	C60081100	1	C60080100	1	C60080100	1	C60080100	1
4	base plate	C60077700	1	C60077700	1	C60077200	1	C60077200	1	C60077200	1	C60077200	1
5	right front plate	C60081300	1	C60081300	1	C60081300	1	C60081000	1	C60081000	1	C60081000	1
6	partition plate	C60070900	1	C60070900	1	C60070900	1	C60070800	1	C60070800	1	C60070800	1
7	HP switch	C03528500	1	C03528500	1	C03528500	1	C03528500	1	C03528500	1	C03528500	1
8	LP switch	C03528600	1	C03528600	1	C03528600	1	C03528600	1	C03528600	1	C03528600	1
9	compressor	460050011R	1	460050012R	1	C00005600	1	C00006200	1	C00006100	1	C00006000	1
10	4-way reversing valve	C13004000	1	C13004000	1	C13004000	1	C13004000	1	C13004000	1	C13004000	1
11	compressor crank heater	452892100	1	452892100	1	C030014	1	C030014	1	C030014	1	C030014	1
12	safety valve	C200009	1	C200009	1	C200009	1	C200009	1	C200009	1	C200009	1
13	water pump	C04001200	1	C04001200	1	C04001200	1	C04001200	1	C04001200	1	C04001200	1
14	right side plate1	C60077500	1	C60077500	1	C60077500	1	C60077300	1	C60077300	1	C60077300	1
15	heater exchanger	C05028000	1	C05028000	1	C05027900	1	C05027800	1	C05027700	1	C05027600	1
16	right side plate 2	C60077600	1	C60077600	1	C60077600	1	C60077400	1	C60077400	1	C60077400	1
17	dry filter	C10002300	1	C10002300	1	C10002300	1	C10002300	1	C10002300	1	C10002300	1
18	OAT	232283	1	232283	1	232283	1	232283	1	232283	1	232283	1
19	OCT	232299	1	232299	1	232299	1	232299	1	232299	1	232299	1
20	water inlet temperature	232299	1	232299	1	232299	1	232299	1	232299	1	232299	1
21	water outlet temperature	232299	1	232299	1	232299	1	232299	1	232299	1	232299	1
22	differential pressure switch	C03528800	1	C03528800	1	C03528800	1	C03528800	1	C03528800	1	C03528800	1
23	display panel	C03523600	1	C03523600	1	C03523600	1	C03523600	1	C03523600	1	C03523600	1
24	transformer	C035044	1	C035044	1	C035044	1	C035044	1	C035044	1	C035044	1
25	fan motor capacitor	455000102	2	455000102	2	455000102	2	455000102	2	455000102	2	455000102	2
26	phase protector	N/A	1	4519695	1	4519695	1	4519695	1	4519695	1	4519695	1
27	compressor capacitor	455000302	1	N/A	1	N/A	1	N/A	1	N/A	1	N/A	1
28	controller	467300119R	1	467300119R	1	467300119R	1	467300119R	1	467300119R	1	467300119R	1
29	HP transducer	467400019	1	467400019	1	467400019	1	467400019	1	467400019	1	467400019	1
30	capillary assembly	C61081600	1	C61081600	1	C61081500	1	C61081400	1	C61081200	1	C61081300	1
31	guard net assembly	C60081200	1	C60081200	1	C60081200	1	C60080200	1	C60080200	1	C60080200	1
32	fan	452960400	2	452960400	2	452960400	2	452960400	2	452960400	2	452960400	2
33	fan motor	C02018200	2	C02018200	2	C02018200	2	C02018200	2	C02018200	2	C02018200	2
34	top plate	C60080300	1	C60080300	1	C60080300	1	C60080300	1	C60080300	1	C60080300	1

Dismantling, Demolition and Scrapping

12 DISMANTLING, DEMOLITION AND SCRAPPING



During the draining of the refrigeration circuits, do not let the refrigerant overflow in the surrounding atmosphere.

The circuit must be drained using suitable recovery equipment.



Do not disperse the waste oil of the compressors in the environment, since it contains some dissolved refrigerant.

For the disposal, contact the competent authority for information.

Unless otherwise specified, the maintenance operations listed below may be carried out by any trained maintenance operator.

12.1 Generalities

Open each line that supplies the unit, including the ones of control circuits. Make sure that all disconnecting switches are secured in the off position. The power cables can be disconnected and disassembled. Refer to Chapter 4 for the position of connection points.

Remove all the refrigerant from the refrigeration circuits of the unit and store it in suitable containers, using a recovery unit. If its characteristics have remained the same, the refrigerant can be used again. Contact the competent authority to obtain information about disposal. In **NO** event shall the refrigerant be discharged into the atmosphere. The oil in each refrigeration circuit must be drained and collected into a suitable container; then it shall be disposed of in conformity with local regulations that apply to the disposal of waste lubricants. Any oil spillage must be recovered and disposed of in like manner.

Isolate the unit's heat exchangers from the external hydraulic circuits and drain the heat exchange sections of the plant.



If no shutoff valves have been provided, it may be necessary to drain the whole plant. If a glycoled solution or a similar fluid has been used in the hydraulic circuits, or if chemical additives have been added to the circulating water, the circulating fluid MUST be drained in a proper way. For NO reason shall a circuit containing glycoled water or a similar solution be discharged directly into the drains or surface waters.

After draining operations, the piping of the hydraulic networks can be disconnected and disassembled.

Once they have been disconnected as specified, the packaged units can be disassembled in a single piece. First of all, disassemble the anchoring screws and then lift the unit from the position of installation, and hook it to the lifting points provided, using suitable lifting equipment.

To this end, refer to Chapter 4 for the installation of these appliances, to Chapter 8 for their weights and Chapter 3 for handling. The units that, once disconnected, cannot be removed in a single piece, must be dismantled on site; in this case, be very careful with the weight and handling of every single component.

It is always advisable to dismantle the units following the installation steps, but in reverse.



Some residues of oil, glycoled water or similar solutions may remain in certain parts of the unit. These residues must be recovered and disposed of according to the procedures specified above.

It is very important to ensure that, while a component of the unit is being removed, all the others are properly supported.

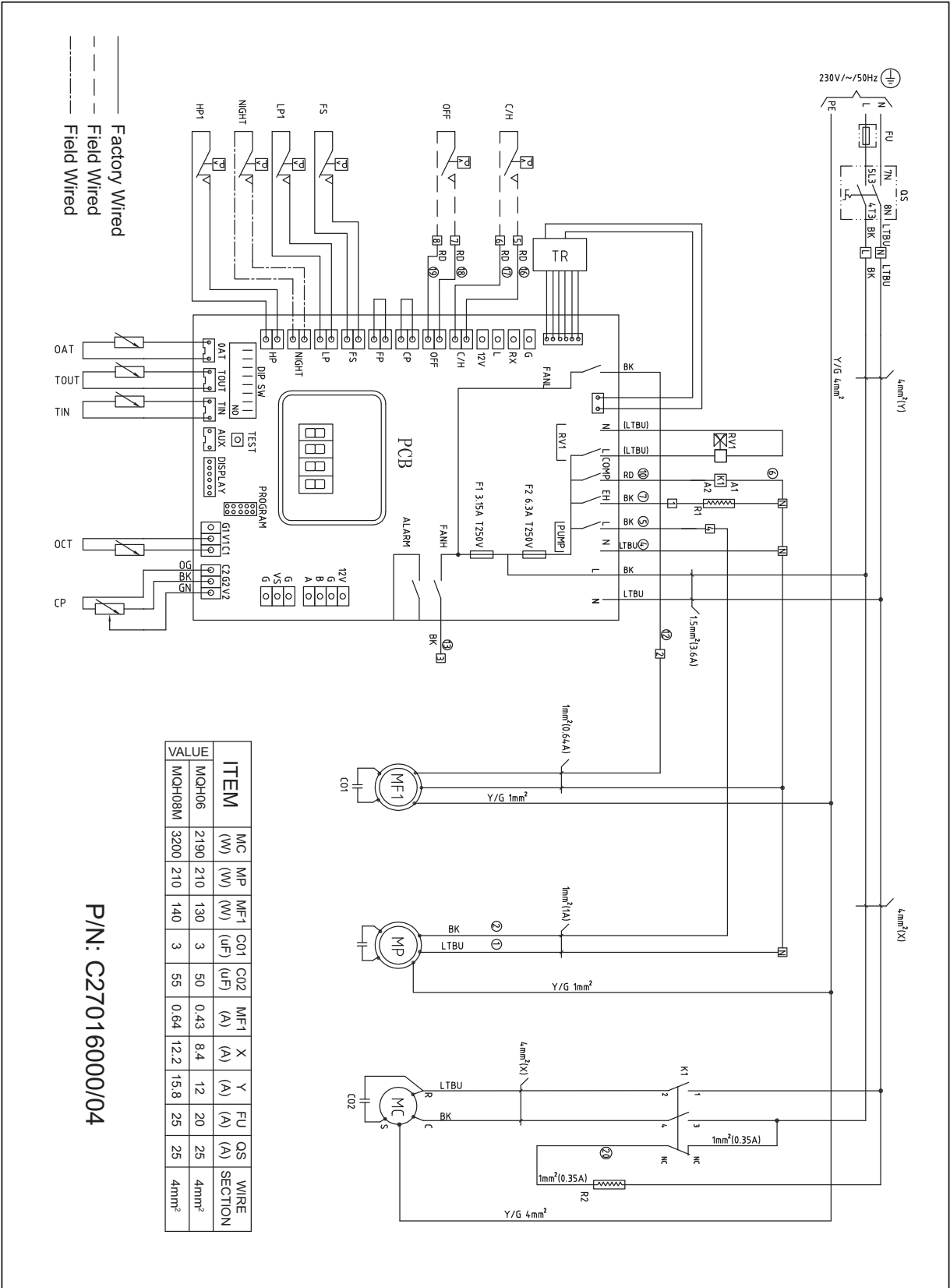


Use only lifting means of adequate capacity.

Once disassembled, the components of the unit can be disposed of in conformity with current regulations.

Appendix A

Wiring Diagram



——— Factory Wired
 - - - Field Wired
 ····· Field Wired

ITEM	MC (W)	MP (W)	MF1 (W)	CO1 (uF)	CO2 (uF)	MF1 (A)	X (A)	Y (A)	FU (A)	OS (A)	WIRE SECTION
MC	2190	210	130	3	50	0.43	8.4	12	20	25	4mm²
MP	2190	210	130	3	50	0.43	8.4	12	20	25	4mm²
MF1	2190	210	130	3	50	0.43	8.4	12	20	25	4mm²
CO1	2190	210	130	3	50	0.43	8.4	12	20	25	4mm²
CO2	2190	210	130	3	50	0.43	8.4	12	20	25	4mm²
MF1	2190	210	130	3	50	0.43	8.4	12	20	25	4mm²
X	2190	210	130	3	50	0.43	8.4	12	20	25	4mm²
Y	2190	210	130	3	50	0.43	8.4	12	20	25	4mm²
FU	2190	210	130	3	50	0.43	8.4	12	20	25	4mm²
OS	2190	210	130	3	50	0.43	8.4	12	20	25	4mm²
WIRE SECTION	2190	210	130	3	50	0.43	8.4	12	20	25	4mm²

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Appendix A

Sign	English	Italiano	Français	Deutsch	Español
C01	fan capacitor 1	condensatore ventilatore 1	condensateur ventilateur 1	kondensator ventilator 1	condensador ventilador 1
C02	compressor capacitor	condensatore compressore	condensateur compresseur	kondensator kompressor	condensador compresor
CP	condensing pressure	pressione condensante	pression de condensation	kondensierender Druck	presión que condensa
C/H	summer/winter switch	comando estate/inverno	commande été/hiver	femsteuerung sommer/winter	control verano/invierno
FS	differential water pressure switch	pressostato differenziale acqua	pressostat différentiel d'eau	differentialer druckwächter wasser	presostato diferencial agua
FU	protection fuse	fusibile di protezione	fusibles de protection	schutzsicherung	fusible de protección
HP1	high pressure switch	pressostato di alta pressione	pressostat haute pression	hochdruckwächter	presostato de alta presión
K1	compressor contactor	contattore compressore	contacteur compresseur	kontaktgeber kompressor	contactor compresor
LP1	low pressure switch	pressostato di bassa pressione	pressostat basse pression	niederdruckwächter	presostato de baja presión
MC	compressor motor	motore compressore	moteur compresseur	motor kompressor	motor compresor
MP	water pump motor	motore pompa acqua	moteur pompe (circuit) eau	motor wasserpumpe	motor bomba agua
MF1	fan motor 1	motore ventilatore 1	moteur ventilateur 1	motor ventilator 1	motor ventilador 1
NIGHT	night model(optional)	modalitànotturna(optional)	mode nuit (option)	nachmodus (option)	modalidad nocturna (opción)
OAT	ambient temperature probe	sonda temperatura ambientale	sonde de température de ambient	temperaturfühler umgebend	sonda temperatura ambiente
OCT	coil temperature probe	sonda temperatura batteria	sonde de température de batteria	temperaturfühler batterie	sonda temperatura bateri a
OFF	start/stop switch	comando start/stop	commande marche/arrêt	start-/stop- fernsteuerung	control start/stop
PCB	control board	scheda di controllo	platine de commande	steuerkarte	ficha de control
QS	general circuit breaker	interruttore sezionatore generale	interrupteur-sectionneur général	haupttrenner	interruptor seccionador general
R1	evaporator electrical heater	riscaldatore elettrico scambiatore	réchauffeur électrique évaporateur	elektrisches heizgerät austauscher	calefactor eléctrico cambiador
R2	compressor electrical heater	riscaldatore elettrico compressore	réchauffeur électrique compresseur	elektrisches heizgerät kompressor	calefactor eléctrico compresor
RV1	reverse valve	valvola di inversione ciclo	electrovanne d'inversion de cycle	ventil zur zyklusumkehrung	válvula de inversión ciclo
TIN	return water temperature probe	sonda temperatura acqua in ingresso	sonde de température entrée d'eau	wassertemperaturfühler am eingang	sonda temperatura agua en entrada
TOUT	leaving water temperature probe	sonda temperatura acqua in uscita	sonde de température sortie d'eau	wassertemperaturfühler am ausgang	sonda temperatura agua en salida
TR	transformer	trasformatore	transformateur	transformator	transformador

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MQH 06/08M

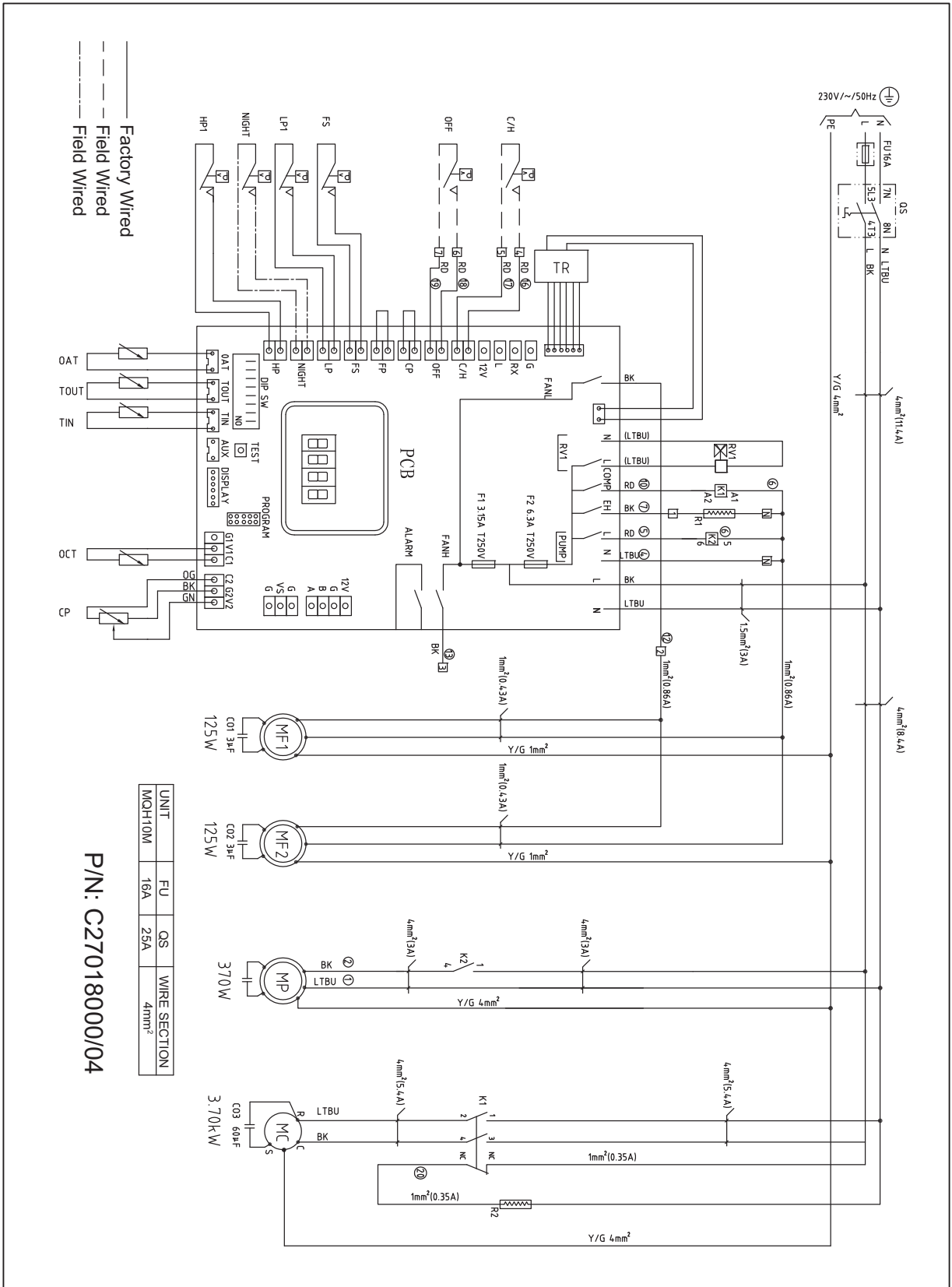
Appendix A

Sign	English	Italiano	Français	Deutsch	Español
C01	fan capacitor 1	condensatore ventilatore 1	condensateur ventilateur 1	kondensator ventilator 1	condensador ventilador 1
CP	condensing pressure	pressione condensante	pression de condensation	kondensierender Druck	presión que condensa
C/H	summer/winter switch	comando estate/inverno	commande été/hiver	femsteuerung sommer/winter	control verano/invierno
FS	differential water pressure switch	pressostato differenziale acqua	pressostat différentiel d'eau	differenzieller druckwächter wasser	presostato diferencial agua
FU	protection fuse	fusibile di protezione	fusibles de protection	schutzsicherung	fusible de protección
HP1	high pressure switch	pressostato di alta pressione	pressostat haute pression	hochdruckwächter	presostato de alta presión
K1	compressor contactor	contattore compressore	contacteur compresseur	kontaktgeber kompressor	contactor compresor
LP1	low pressure switch	pressostato di bassa pressione	pressostat basse pression	niederdruckwächter	presostato de baja presión
MC	compressor motor	motore compressore	moteur compresseur	motor kompressor	motor compresor
MP	water pump motor	motore pompa acqua	moteur pompe (circuit) eau	motor wasserpumpe	motor bomba agua
MF1	fan motor 1	motore ventilatore 1	moteur ventilateur 1	motor ventilator 1	motor ventilador 1
NIGHT	night mode(optional)	modalitànotturna(optional)	mode nuit (option)	nachmodus (option)	modalidad nocturna (opción)
OAT	ambient temperature probe	sonda temperatura ambientale	sonde de température de ambiant	temperaturfühler umgebend	sonda temperatura ambiente
OCT	coil temperature probe	sonda temperatura batteria	sonde de température de batterie	temperaturfühler batterie	sonda temperatura bateri a
OFF	start/stop switch	comando start/stop	commande marche/arrêt	start-/stop- femsteuerung	control start/stop
PCB	control board	scheda di controllo	platine de commande	steuerkarte	ficha de control
QS	general circuit breaker	interruttore sezionatore generale	interrupteur-sectionneur général	haupttrenner	interruptor seccionador general
R1	evaporator electrical heater	riscaldatore elettrico scambiatore	réchauffeur électrique évaporateur	elektrisches heizgerät austauscher	calefactor eléctrico cambiador
R2	compressor electrical heater	riscaldatore elettrico compressore	réchauffeur électrique compresseur	elektrisches heizgerät kompressor	calefactor eléctrico compresor
RV1	reverse valve	valvola di inversione ciclo	electrovanne d'inversion de cycle	ventil zur zyklusumkehrung	válvula de inversión ciclo
TIN	return water temperature probe	sonda temperatura acqua in ingresso	sonde de température entrée d'eau	wassertemperaturfühler am eingang	sonda temperatura agua en entrada
TOUT	leaving water temperature probe	sonda temperatura acqua in uscita	sonde de température sortie d'eau	wassertemperaturfühler am ausgang	sonda temperatura agua en salida
TR	transformer	trasformatore	transformateur	transformator	transformador

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MQH 08T

Appendix A



MQH 10M

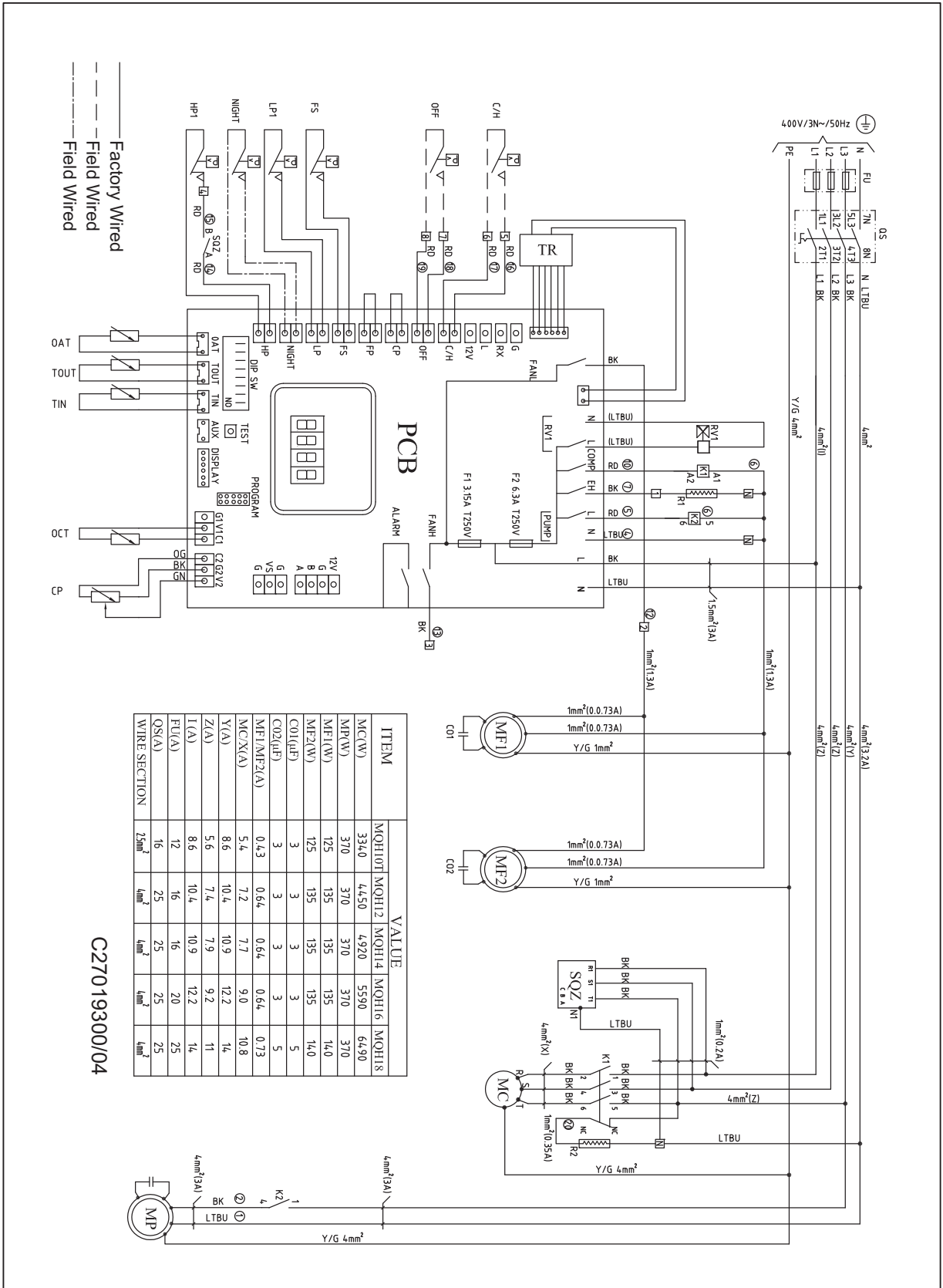
Appendix A

Sign	English	Italiano	Français	Deutsch	Español
C01	fan capacitor 1	condensatore ventilatore 1	condensateur ventilateur 1	kondensator ventilator 1	condensador ventilador 1
C02	fan capacitor 2	condensatore ventilatore 2	condensateur ventilateur 2	kondensator ventilator 2	condensador ventilador 2
C03	compressor capacitor	condensatore compressore	condensateur compresseur	kondensator kompressor	condensador compresor
CP	condensing pressure	pressione condensante	pression de condensation	kondensierender Druck	presión que condensa
C/H	summer/winter switch	comando estate/inverno	commande été/hiver	fernsteuerung sommer/winter	control verano/invierno
FS	differential water pressure switch	pressostato differenziale acqua	pressostat différentiel d'eau	differenzieller druckwächter wasser	presostato diferencial agua
FU	protection fuse	fusibile di protezione	fusibles de protection	schutzsicherung	fusible de protección
HP1	high pressure switch	pressostato di alta pressione	pressostat haute pression	hochdruckwächter	presostato de alta presión
K1	compressor contactor	contattore compressore	contacteur compresseur	kontaktgeber kompressor	contactor compresor
K2	water pump relay	relèpompa acqua	relais pompe à eau	relais wasserpumpe	relais bomba agua
LP1	low pressure switch	pressostato di bassa pressione	pressostat basse pression	niederdruckwächter	presostato de baja presión
MC	compressor motor	motore compressore	moteur compresseur	motor kompressor	motor compresor
MP	water pump motor	motore pompa acqua	moteur pompe (circuit) eau	motor wasserpumpe	motor bomba agua
MF1	fan motor 1	motore ventilatore 1	moteur ventilateur 1	motor ventilator 1	motor ventilador 1
MF2	fan motor 2	motore ventilatore 2	moteur ventilateur 2	motor ventilator 2	motor ventilador 2
NIGHT	night mode(optional)	modalitànotturna(optional)	mode nuit (option)	nachmodus (option)	modalidad nocturna (opción)
OAT	ambient temperature probe	sonda temperatura ambientale	sonde de température de ambiant	temperaturfühler umgebend	sonda temperatura ambiente
OCT	coil temperature probe	sonda temperatura batteria	sonde de température de batterie	temperaturfühler batterie	sonda temperatura bateri a
OFF	start/stop switch	comando start/stop	commande marche/arrêt	start-/stop- fernsteuerung	control start/stop
PCB	control board	scheda di controllo	platine de commande	steuerkarte	ficha de control
QS	general circuit breaker	interruttore sezionatore generale	interrupteur-sectionneur général	haupttrenner	interruptor seccionador general
R1	evaporator electrical heater	riscaldatore elettrico scambiatore	réchauffeur électrique évaporateur	elektrisches heizgerät austauscher	calefactor eléctrico cambiador
R2	compressor electrical heater	riscaldatore elettrico compressore	réchauffeur électrique compresseur	elektrisches heizgerät kompressor	calefactor eléctrico compresor
RV1	reverse valve	valvola di inversione ciclo	electrovanne d'inversion de cycle	ventil zur zyklusumkehrung	válvula de inversión ciclo
TIN	return water temperature probe	sonda temperatura acqua in ingresso	sonde de température entrée d'eau	wassertemperaturfühler am eingang	sonda temperatura agua en entrada
TOUT	leaving water temperature probe	sonda temperatura acqua in uscita	sonde de température sortie d'eau	wassertemperaturfühler am ausgang	sonda temperatura agua en salida
TR	transformer	trasformatore	transformateur	transformator	transformador

P/N:C27018000/04

MQH 10M

Appendix A



MQH 10T/12/14/16/18

Appendix A

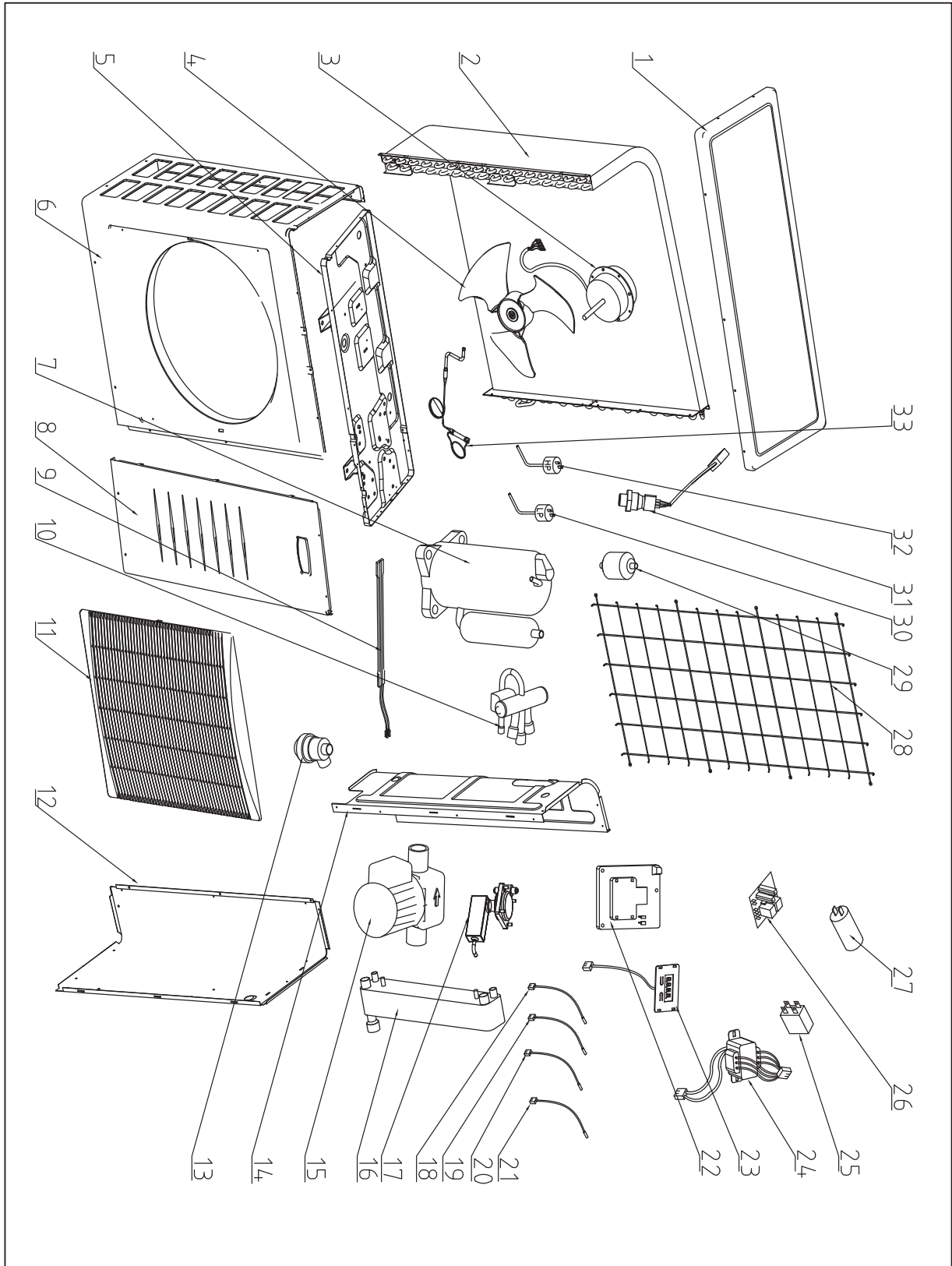
Sign	English	Italiano	Français	Deutsch	Español
C01	fan capacitor 1	condensatore ventilatore 1	condensateur ventilateur 1	kondensator ventilator 1	condensador ventilador 1
C02	fan capacitor 2	condensatore ventilatore 2	condensateur ventilateur 2	kondensator ventilator 2	condensador ventilador 2
CP	condensing pressure	pressione condensante	pression de condensation	kondensierender Druck	presión que condensa
C/H	summer/winter switch	comando estate/inverno	commande été/hiver	fensteuerung sommer/winter	control verano/invierno
FS	differential water pressure switch	pressostato differenziale acqua	pressostat différentiel d'eau	differenzieller druckwächter wasser	presostato diferencial agua
FU	protection fuse	fusibile di protezione	fusibles de protection	schutzsicherung	fusible de protección
HP1	high pressure switch	pressostato di alta pressione	pressostat haute pression	hochdruckwächter	presostato de alta presión
K1	compressor contactor	contattore compressore	contacteur compresseur	kontaktgeber kompressor	contactor compresor
K2	water pump relay	relèpompa acqua	relais pompe à eau	relais wasserpumpe	relais bomba agua
LP1	low pressure switch	pressostato di bassa pressione	pressostat basse pression	niederdruckwächter	presostato de baja presión
MC	compressor motor	motore compressore	moteur compresseur	motor kompressor	motor compresor
MP	water pump motor	motore pompa acqua	moteur pompe (circuit) eau	motor wasserpumpe	motor bomba agua
MF1	fan motor 1	motore ventilatore 1	moteur ventilateur 1	motor ventilator 1	motor ventilador 1
MF2	fan motor 2	motore ventilatore 2	moteur ventilateur 2	motor ventilator 2	motor ventilador 2
NIGHT	night mode(optional)	modalitànotturna(optional)	mode nuit (option)	nachmodus (option)	modalidad nocturna (opcion)
OAT	ambient temperature probe	sonda temperatura ambientale	sonde de température de ambiant	temperaturfühler umgebend	sonda temperatura ambiente
OCT	coil temperature probe	sonda temperatura batteria	sonde de température de batterie	temperaturfühler batterie	sonda temperatura bateri a
OFF	start/stop switch	comando start/stop	commande marche/arrêt	start-/stop- fensteuerung	control start/stop
PCB	control board	scheda di controllo	platine de commande	steuerkarte	ficha de control
QS	general circuit breaker	interruttore sezionatore generale	interrupteur-sectionneur général	haupttrenner	interruptor seccionador general
R1	evaporator electrical heater	riscaldatore elettrico scambiatore	réchauffeur électrique évaporateur	elektrisches heizgerät austauscher	caldefactor eléctrico cambiador
R2	compressor electrical heater	riscaldatore elettrico compressore	réchauffeur électrique compresseur	elektrisches heizgerät kompressor	caldefactor eléctrico compresor
RV1	reverse valve	valvola di inversione ciclo	electrovanne d'inversion de cycle	ventil zur zyklusumkehrung	válvula de inversión ciclo
SQZ	phase voltage control	relè controllo fasi e sequenza	controlleur d'ordre des phase	steuerungsrelais für phasen und reihenfolgen	relécontrol fases y secuencia
TIN	return water temperature probe	sonda temperatura acqua in ingresso	sonde de température entrée d'eau	wassertemperaturfühler am eingang	sonda temperatura agua en entrada
TOUT	leaving water temperature probe	sonda temperatura acqua in uscita	sonde de température sortie d'eau	wassertemperaturfühler am ausgang	sonda temperatura agua en salida
TR	transformer	trasformatore	transformateur	transformator	transformador

P/N:C27019000/04

MQH 10T/12/14/16/18

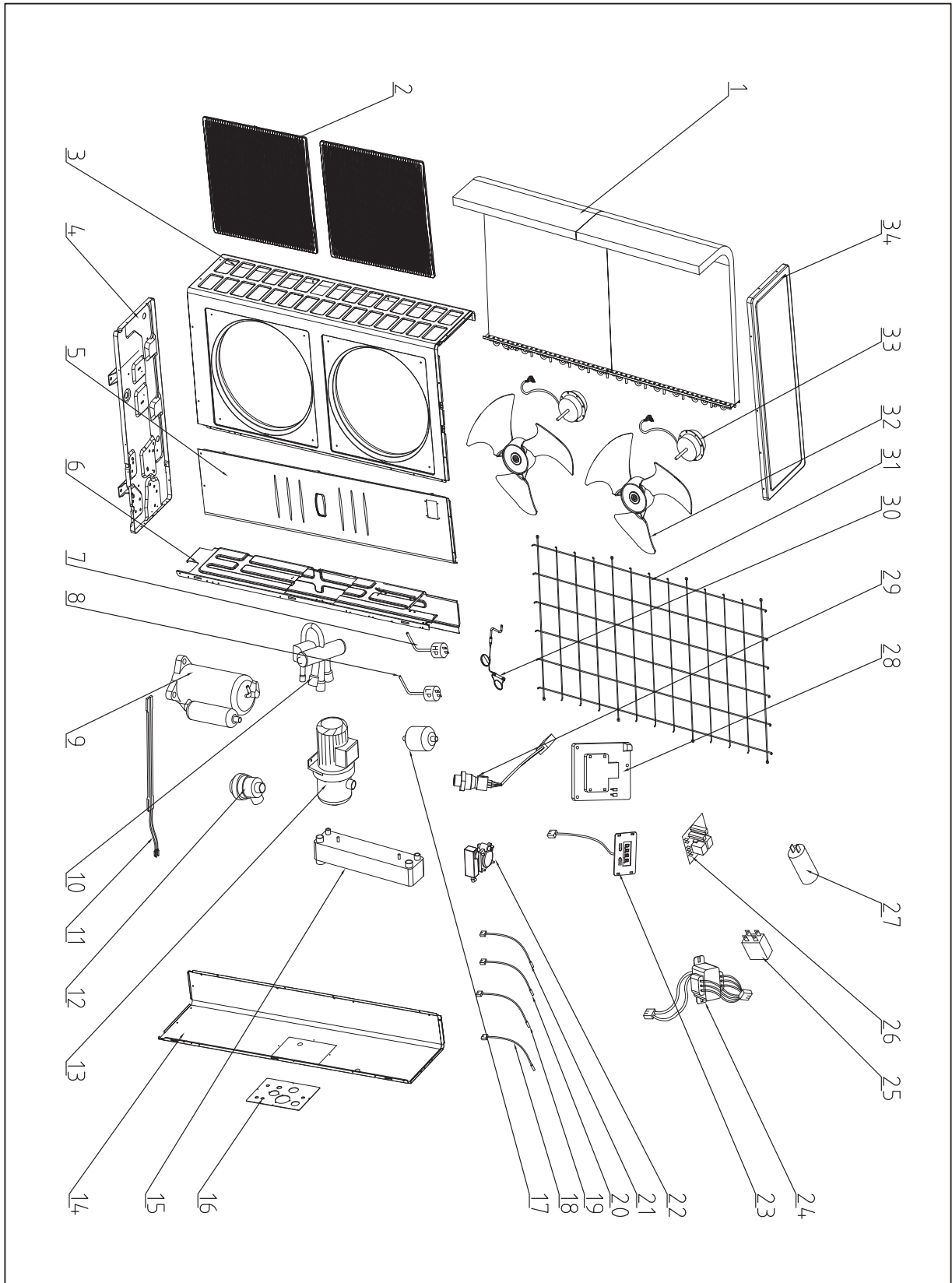
Appendix B

Exploded View




MQH 06/08M/08T

Appendix B



MQH 10M/10T/12/14/16/18

CONFORMITY DECLARATION 
IN COMPLIANCE WITH DIRECTIVE 98/37/EC ANNEX II A
DICHIARAZIONE DI CONFORMITA'
AI SENSI DELLA DIRETTIVA 98/37/CE ALLEGATO II A
DECLARATION DE CONFORMITE
AUX TERMES DE LA DIRECTIVE 98/37/CE PIECE JOINTE II A
KONFORMITÄTSEKRÄRUNG
GEMÄß DER RICHTLINIE 98/37/EG ANLAGE II A
DECLARACIÓN DE CONFORMIDAD
SEGÚN LA DIRECTIVA 98/37/CE ANEXO II A

WE / NOI / NOUS / SHENZHEN ELECTRA AIR-CONDINTIONING CO.,LTD
WIR / NOSOTROS / 2 WUHE AVENUE S., BANTIAN, BUJI, SHENZHEN, 518129 ,CHINA

DECLARE UNDER OUR OWN RESPONSIBILITY THAT THE MACHINE

*DICHIARIAMO SOTTO LA NOSTRA SOLA RESPONSABILITÀ CHE LA MACCHINA
DECLARONS SEULEMENT SOUS NOTRE COUVERT QUE LA MACHINE
ERKLÄREN AUSSCHLIEßLICH AUF UNSERE EIGENE VERANTWORTUNG, DAß DIE MASCHINE
DECLARAMOS BAJO NUESTRA SOLA RESPONSABILIDAD QUE LA MÁQUINA*

NAME / DESIGNAZIONE / DENOMINATION / BEZECHEVAN / DESIGNACIÓN: MQH06, MQH08M, MQH08T, MQH10M, MQH10T,
MQH12, MQH14, MQH16, MQH18

TYPE / TIPO / TYPE / MODELL / TIPO : Air Cooled chiller heatpump

SERIAL NUMBER / PRODUCTION LOTS:

N°SERIE / LOTTO DI PRODUZIONE

NUMERO SERIEL / LOT DE PRODUCTION

SERIALNUMBER / HERSTELLUNGSLÖS

N° SERIE / LOTE DE PRODUCCIÓN

YEAR OF MANUFACTURE :

ANNO DI COSTRUZIONE / ANNEE DE CONSTRUCTION

HERSTELLUNGSJAHR / AÑO DE CONSTRUCCIÓN

IS IN COMPLIANCE WITH THE FOLLOWING REQUIREMENTS :

*E' CONFORME A QUANTO PRESCRITTO DALLA
EST CONFORME AUX CONDITIONS REQUISES SUIVANTES
ERFÜLLT DIE FOLGENDEN ANFORDERUNGEN
ES CONFORME A LO PRESCRITO POR LA*

- **MACHINERY DIRECTIVE 98/37/EC**
*(DIRETTIVA MACCHINE 98/37/CE)
(DIRECTIVE DES MACHINES 98/37/CE)
(MASCHINENRICHTLINIE 98/37/EG)
(DIRECTIVA MÁQUINAS 98/37/EC)*
- **LOW VOLTAGE DIRECTIVE EEC 2006/95**
*(DIRETTIVA BASSA TENSIONE CEE 2006/95)
(DIRECTIVE TENSION BASSE CEE 2006/95)
(NIEDERSPANNUNGSRICHTLINIE EWG 2006/95)
(DIRECTIVA BAJA TENSÓN CEE 2006/95)*
- **ELECTROMAGNETIC COMPATIBILITY DIRECTIVE 2004/108/EC**
*(DIRETTIVA COMPATIBILITÀ ELETTROMAGNETICA CEE 2004/108)
(DIRECTIVE COMPATIBILITE ELECTROMAGNETIQUE CEE 2004/108)
(RICHTLINIE ÜBER DIE ELEKTROMAGNETISCHE VERTRÄGLICHKEIT EWG 2004/108)
(DIRECTIVA COMPATIBILIDAD ELECTROMAGNETICA CEE 2004/108)*

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• **PRESSURE EQUIPMENT DIRECTIVE 97/23/EC**

*(DIRETTIVA ATTREZZATURE A PRESSIONE 97/23/CE)
(DIRECTIVE EQUIPEMENT A PRESSION 97/23/CE)
(RICHTLINIE ÜBER DRUCKEINRICHTUNGEN 97/23/EG)
(DIRECTIVA EQUIPOS A PRESIÓN 97/23/CE)*

TYPE OF APPROVAL IN COMPLIANCE WITH FORMS A1 (CAT. I)
*TIPO DI APPROVAZIONE IN ACCORDO AI MODULI A1 (CAT. I)
TYPE D'APPROBATION EN CONFORMITE AVEC LES FORMULES A1 (CAT. I)
GENEHMIGUNGSART GEMÄß DEN FORMULAREN A1 (CAT. I)
EL TIPO DE APROBACIÓN ES CONFORME A LOS MÓDULOS A1 (CAT. I)*

NOTIFIED BODY NO. 0035 (TUV)
ORGANISMO NOTIFICATO N° 0035 (TUV)
ORGANISME NOTIFIE NO. 0035 (TUV)
NOTIFIZIERTE ANSTALT NR. 0035 (TUV)
ORGANISMO NOTIFICADO N° 0035 (TUV)

AND IN ACCORDANCE WITH THE FOLLOWING HARMONIZED STANDARDS:

*E DA QUANTO PRESCRITTO NELLE SEGUENTI NORME ARMONIZZATE:
ET EN CONFORMITE AVEC LES NORMES HARMONISES SUIVANTES:
UND GEMÄß DEN FOLGENDEN HARMONISIERTEN VORSCHRIFTEN:
Y POR LO PRESCRITO EN LAS SIGUIENTES NORMAS ARMONIZADAS*

- **EN 12100-1, EN 12100-2, EN 249, EN1050 ,EN 60204-1, EN 61000-6-2, EN 61000-6-3**

NAME / NOME / PRENOM / VORNAME/NOMBRE : Zelig
SURNAME / COGNOME / NOM / NACHNAME/APELLIDO : Zhou
POSITION / POSIZIONE / POSITION / STELLUNG/POSICIÓN : QUALITY DIRECTOR

SIGNATURE / FIRMA / SIGNATURE/UNTERSCHRIFT/FIRMA :



IN CASE OF LEGAL DISPUTES REFER TO THE ENGLISH LANGUAGE
*IN CASO DI CONTROVERSIE LEGALI OCCORRE FARE RIFERIMENTO ALLA LINGUA INGLESE
EN CAS DE CONFLITS JURIDIQUES VOUS VOUS PRIONS DE VOUS REFERER A LA LANGUE ANGLAISE
BEI GESETZLICHEN STREITIGKEITEN BEZIEHEN SICH BITTE AUF DIE ENGLISCH SPRACHE
EN CASO DE PLEITOS LEGALES, HACER REFERENCIA A LA LEY INGLÉS*

SHENZHEN ELECTRA AIR-CONDINTIONING CO.,LTD. 2 WUHE AVENUE S., BANTIAN, BUJI, SHENZHEN, 518129 ,CHINA

Page 2 of 2

Electra Air-Conditioning(shenzhen)Co., Ltd.
2 Wuhe Avenue S., Bantian,Buji shenzhen, China

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