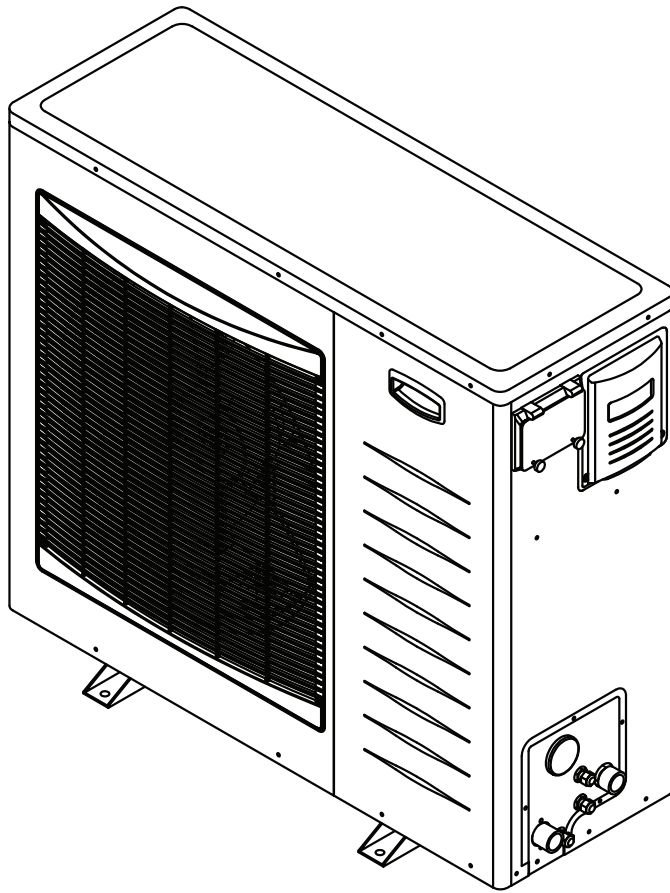


MQHD06-08-10M-10T-12-14-16-18



English



5.5
↓
18kW



5.5
↓
17.5kW



Air Cooled Water Chillers and Heat Pump



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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 heating and cooling water 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 heat pump installation and maintenance must be carried out by skilled personnel only.

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 heat pump 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%
- Units is not be used at sites where there is exposure to blast.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the appliance.

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.

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(98/37/EC), Low Voltage Directive 2006/95/EC, Pressure Vessels Directive 97/23/EC, Electromagnetic Interference Directive 2004/108/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 after 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.

QUALIFIED TECHNICIAN: means a person authorised by After-Sales Assistance centre, 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.

Safety

2.3 Access to the unit

The main switch is present on 10M/10T/12/14/16/18 kW.

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

Unit is not designed to be accessible to general public.

The unit must be placed in an area which can be accessed by (and only by) Qualified technician.

The Qualified technician 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 Qualified technician.

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

2.4 General precautions

The installer must simply use the controls of the unit: he must not open any panel, other than the one providing access to control module. He must simply work on the connection between plant and machine;

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 Qualified technician 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 indoors, connect the safety valve of the refrigeration circuit to a piping network that can channel any overflowing refrigerant outside
- remove any 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 main switch 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 R410A 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

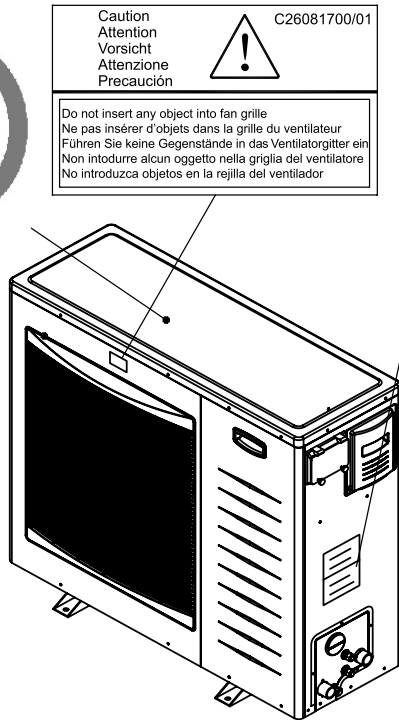
Nameplate

Prod. No: 7005196	Fuse: 20A (aM)	Rated: 2500W	Cooling: A35/W18 6.0kW	 
Type: 220-240V 1 ~50Hz	CoSp = 0.97	PI/Po: 4.2/4.2MPa	A35/W7 5.6kW	
R410A: 1550g	IP24 Rev: A	Ps/Pd: 0.8/3.8MPa	Heating: A7/W35 6.0kW	 
Pe: 1520W	Temp Class: T1	Sound Power: 63dB(A)	A7/W45 5.6kW	
	Weight: 81.8 kg			3211720652

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

Safety

Safety Label



Caution
Attention
Vorsicht
Attenzione
Precaución

C26081700/01

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

Caution
Attention
Vorsicht
Attenzione
Precaución

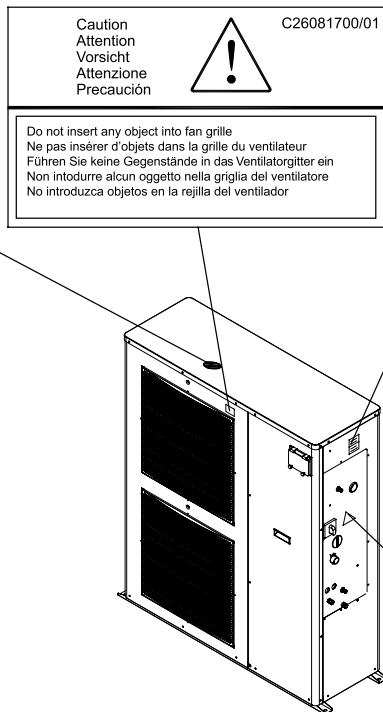
C26081800/03

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

Caution
Attention
Vorsicht
Attenzione
Precaución

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 la unidad

MQHD06/08



Caution
Attention
Vorsicht
Attenzione
Precaución

C26081700/01

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

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

Caution
Attention
Vorsicht
Attenzione
Precaución

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 la unidad



MQHD10M/10T/12/14/16/18

Transport, Lifting and Positioning

3 TRANSPORT, LIFTING AND POSITIONING

Heat pumps 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.

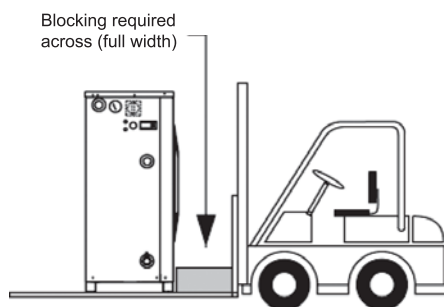
Please note that the manufacturer may not be held liable for any damage to the equipment during transportation, even though the carrier has been appointed by the factory.

3.2 Unit Handling



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

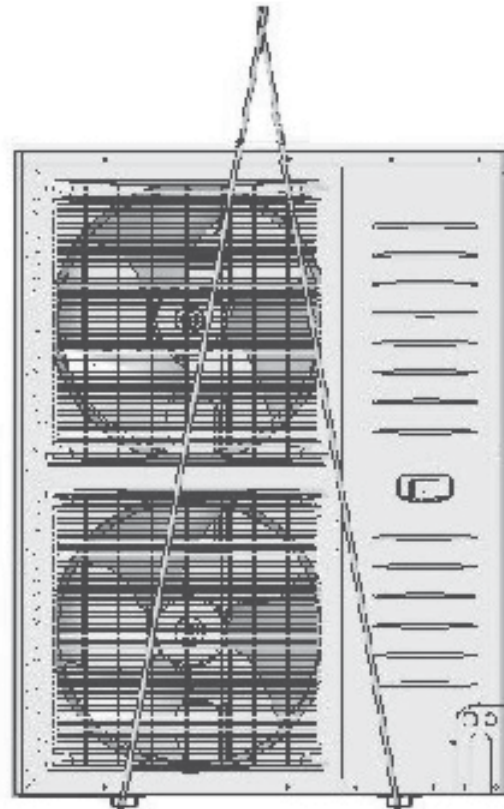
Be careful to avoid rough handling of the unit. Do not push or pull the unit anything other than the base. Block the pushing vehicle away from the unit to prevent damage to the sheet metal cabinet and end frame (see picture 1).



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.



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.

Transport, Lifting and Positioning

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

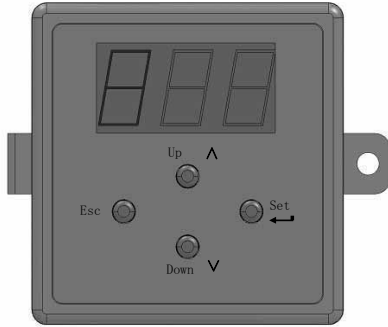
Finally, it is recommended to carry out visual inspections at regular intervals.

Control System

4 CONTROL PANEL

4.1 Operating instructions

4.1.1 Before start-up



The user interface uses three 7 segments, and 4 keys.

The 4 keys are:

Scroll - used to scroll between options (up and down)

Select - use to select an option

Escape - Will go up one level in the menu.

Active selection or status will be indicated by blinking the display (One time/second). The active selection will be appearing first in a group of selection.

There are 2 leds on HYDI board:

- one red led shows communication between HYDI and ODU board.

- one green led shows modbus communication.

If leds are on, communication is OK, if off means lack of communication.

HYDI and ODU acronymous will be used later, meaning is :

HYDI ---- Hydronic Board

ODU ---- Inverter Board

For detail information, refer to chapter 5.8 (electrical schematic)

DIA(Diagnostic)



































1° Level	Button	2° Level	Button	3° Level	Button	Description
DIA (Diagnostic)	→	ODU	→	CUR	→	Current fault (O.XX)
			←	HIS	→	Hystory fault (O.XX)
	←	HDI	→	CUR	→	Current fault (H.XX)
			←	HIS	→	Hystory fault (H.XX)

4.1.2 Using the unit

- 1) After electrical power up, the software version will be shown for 3 cycles.
- 2) The default presentation will be alternating repeatedly among the following:
the mode of the unit (C/Ht/Sb) shown for 2 sec (stands for cool/heat/Stand by)
Active fault (among ODU or HYDI), each to be shown for 2 sec.
- 3) Control has following main items:
Default → See point 2)
Diagnostic → DIA
Setup → STP
Status → STT
Using Up-Down arrows is possible to move through main items and sub-menu items
- 4) In diagnostics menu:
xx means failure code.
Maximum 5 faults are presented for each unit (HYDI/ODU) in the history section. When no faults "--" sign will be shown. Non active faults are presented according to their chronological order, starting from the latest one. Whenever a new active fault occurs, it will be presented immediately.
Active faults are blinking, where non active ones do not.
- 5) Exiting 'Status' menu and its sub-menus back to the main menu is done after continuous 60 minutes out of any press.
- 6) All the menus, except Status and its sub-menu, once selected, are automatically exited to the main menu after 10 continuous minutes out of any press.
- 7) When Alpha and numeric values are combined, they will be separated by dot.

Control System

STP(Set up)

1° Level	Button	2° Level	Button	3° Level	Button	Description
STP (Set Up)		CAP		0		Not used
				1		Not used
				2		Not used
				3		Set for MQHD06
				4		Set for MQHD08-18
		dl		A		
				B		
				C		
				D		
		LoT		0		LWT set point
				1		LOAD
		SPC		5-20		Set cooling set point from 5°C to 20°C
		SPH		24-55		Set heating set point from 24°C to 55°C
		odE		Sb		Stand-by
				Ht		Heating mode
				Cl		Cooling mode
		FCD		0		Forced Mode
				1		
		br		1.2		Modbus baud rate 1200
				9.6		Modbus baud rate 9600
		Add		0-247		Modbus address
		nod		0		Night mode
				1		Domestic hot water mode

Control System

STT(Status)

1° Level	Button	2° Level	Button	3° Level	Button	Description	
STT (Status)		HDI		ICT		Indoor coil temperature	
				ET		Entering Water Temperature	
				LT		Leaving Water Temperature	
				IRT		Inlet Refrigerant Temperature	
				Opr		Operation Mode	
				Ld		NLOAD	
				CAP		Capacity code	
				dl		Model	
		ODU			Opr		Operation Mode
					OFU		Outdoor fan
					OFD		Outdoor fan
					HP		Reversing valve
					SPD		Compressor speed
					CTT		Compressor top temperature
					OMT		Outdoor medium temperature
					OCT		Outdoor coil temperature
					OAT		Outdoor ambient temperature
					HST		Heat sink temperature
					EEV		Electronic expansion valve
					Pr		Power
					aC		AC Current

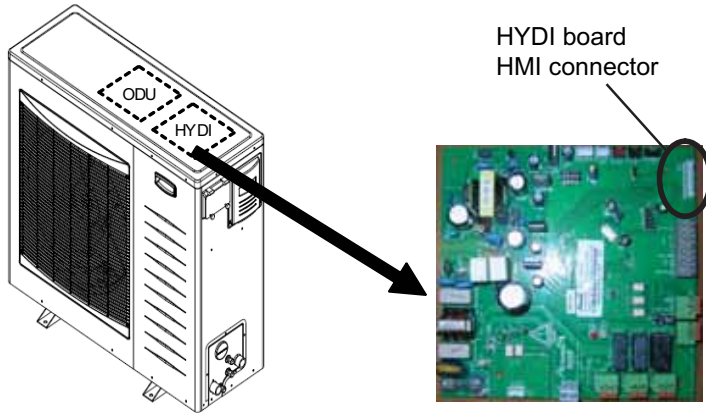
Control System

A second menu is available according to the following:

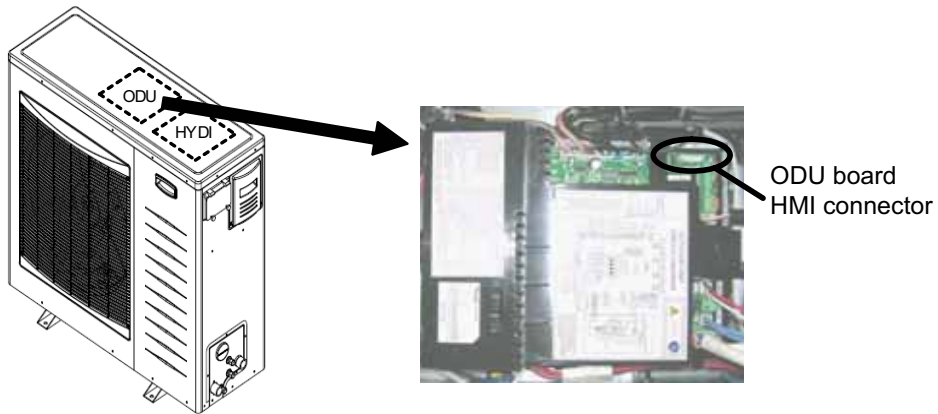
6-8kW

Connect HMI cable to ODU board connector according following instruction:

- Shutt off unit
- Disconnect mains power supply
- Remove HMI cable connection from HYDI board connector:



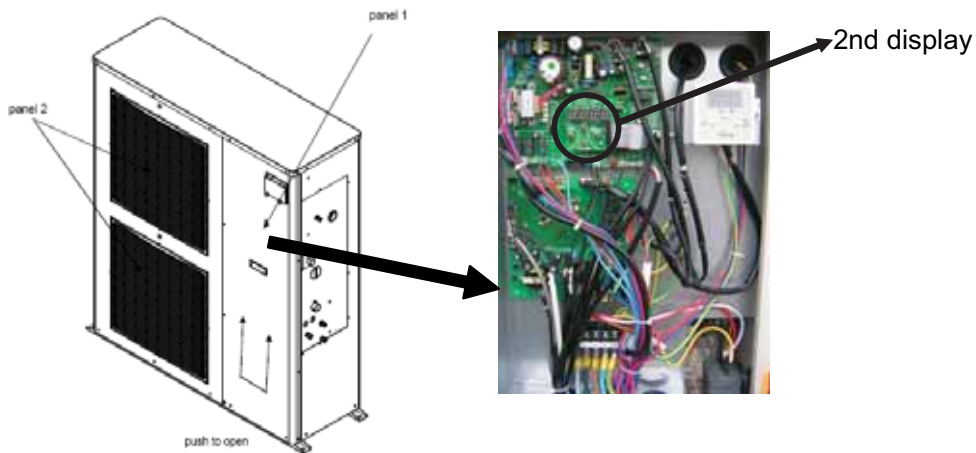
- Connect HMI cable to ODU board HMI connector:



- Connect mains power supply
- Turn ON unit

10-18kW

Opening the front panel, is available a 2nd display, fixed on ODU board



Control System

- HMI (for 6-8kW) or 2nd display (for 10-18kW) have following main items:
 - Technician test --> tt
 - Diagnostic --> DIA
 - Setup --> StP
 - Status --> Stt

Using Up-Down arrows is possible to move through main items and sub-menu items

"Technician test" sub-menu

1° Level	Button	2° Level	Button	3° Level	Button	Description		
tt (Technician Test)		PtC		0-90		Select desired compressor frequency (Hz)		
		PtH		0-90		Select desired compressor frequency (Hz)		
		CtC		0-90		Select desired compressor frequency (Hz)		
		CtH		0-90		Select desired compressor frequency (Hz)		
		AIP		0		0		Air purge cycle disabled
				1		1		Air purge cycle enabled

"Diagnostic" sub-menu

This sub-menu gives same info as "Diagnostic" sub-menu when HMI is connected to HYDI board connector.

"Set-up" sub-menu

1° Level	Button	2° Level	Button	3° Level	Button	Description
STP (Set Up)		PUP		0		Pump ON in cool, heat and deice, OFF in stand-by
				1		Pump always ON
		GLY		0-30		Select % of glycol desired (0,10,20,30%)
		AUH		0		Auxiliary electrical heater disabled
				1		Auxiliary electrical heater enabled
		HIT		0-60		Select min stand-by time before electrical heater ON (0-60min)

"Status" sub-menu

This sub-menu gives same info as "Status" sub-menu when HMI is connected to HYDI board connector.

5 INSTALLATION

5.1 Installation advices

Unit placement

The MQHD 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 MQHD 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 next page 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.



The units 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.



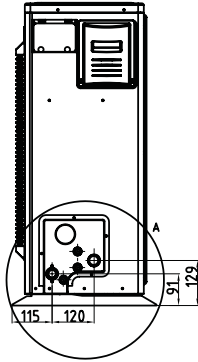
The metal grill is used to protect the operators from injury risks on heat exchanger at the time of handling and installation. However, risks of clogging by freeze or hoar frost can be occurred on the units installed in cold or mountainous regions and exposed to the elements. To prevent all risks, a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

Installation

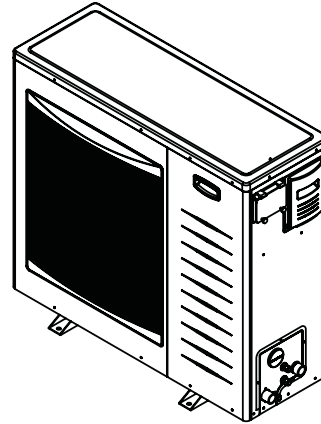
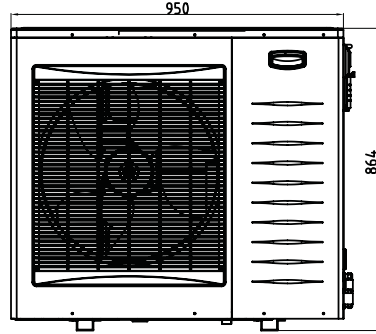
Overall dimensions

MQHD06/08

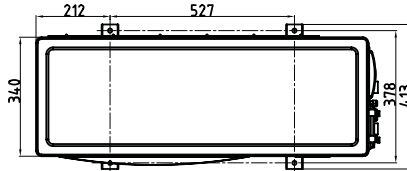
SIDE VIEW



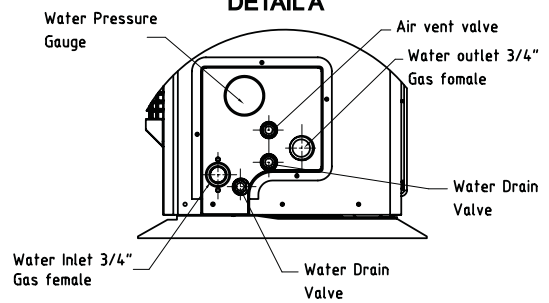
FRONT VIEW



TOP VIEW

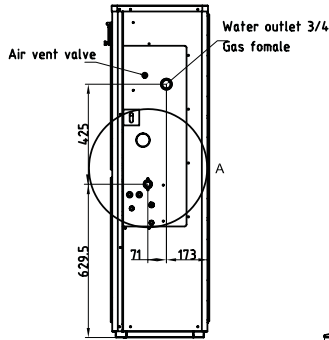


DETAIL A

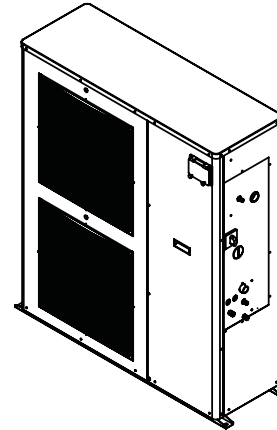
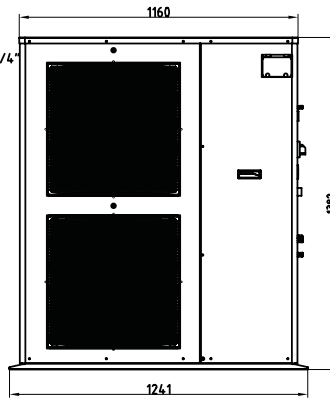


MQHD10M

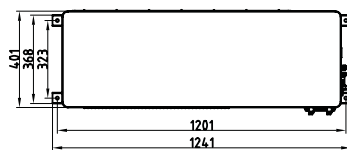
SIDE VIEW



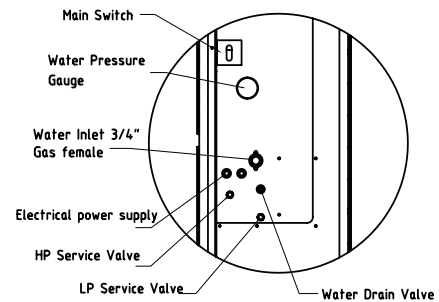
FRONT VIEW



TOP VIEW

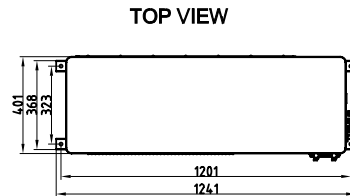
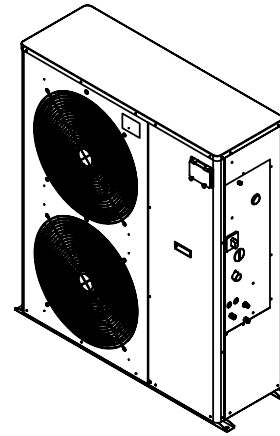
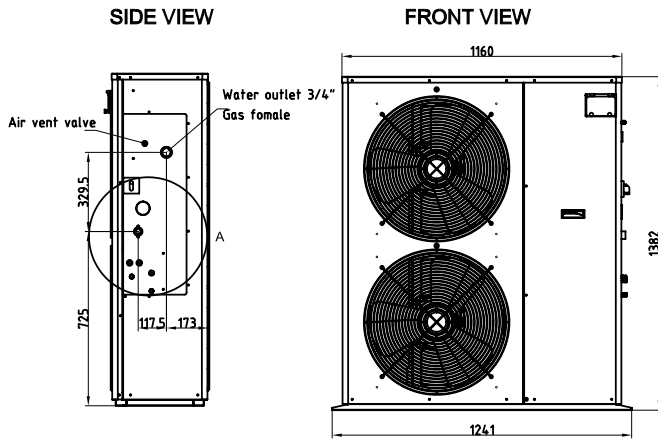


DETAIL A

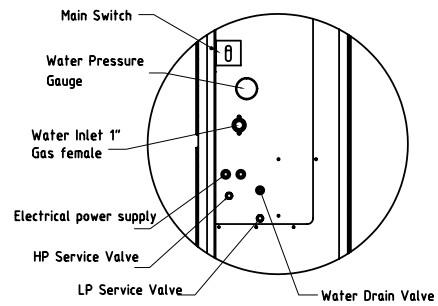


Installation

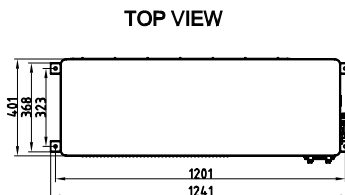
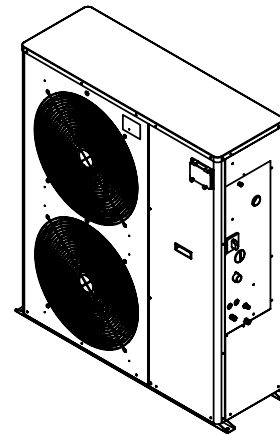
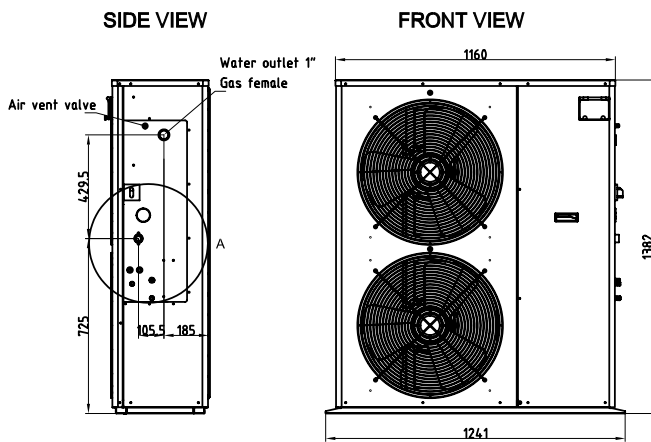
MQHD 10T/12



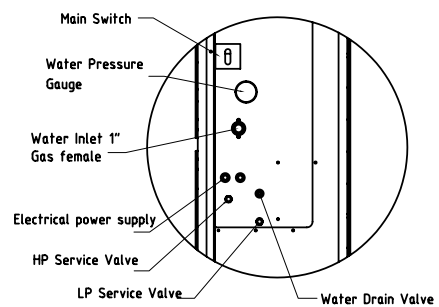
DETAIL A



MQHD 14/16/18



DETAIL A

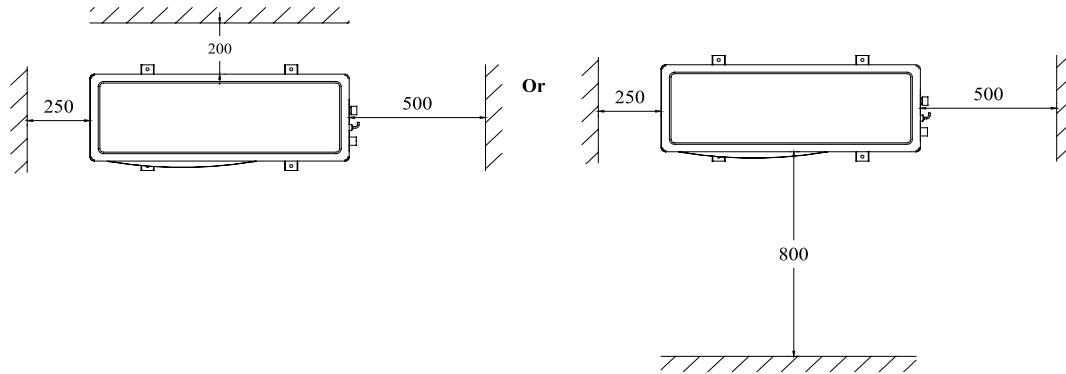


Remark: Vibration isolators are recommended for all roof mounted installation or wherever vibration transmission is a consideration.

Installation

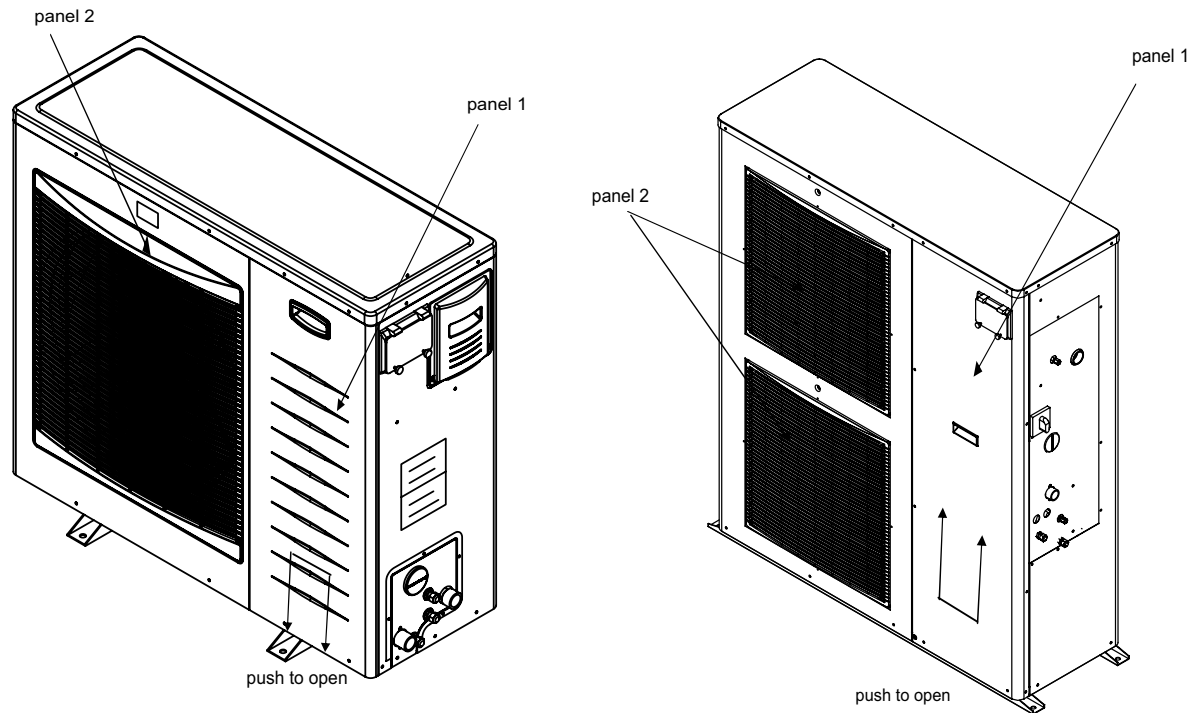
Clearences

MQHD 06/08/10M/10T/12/14/16/18



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.

Label



Low Pressure



High Pressure

Installation

5.2 Water connections

Water Piping



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. Use air separators and automatic air vents at high points of the system, fill the system slowly to improve the air vent and use the air purge cycle present on the heat pump
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

Protect the heating circuit from freezing by introducing a good quality anti-freeze liquid (specifically for heating systems), carefully following the manufacture's instructions regarding the percentage necessary with respect to the minimum temperature required for preserving the system.

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.

Important:In order not to void the warranty before making the heat pump connections, carefully clean the heating system (pipes, radiators,etc.) with special pickling or de-scaling products to remove any deposits that could compromise correct heat pump operation.The heat pump safety valves outlet must be connected to a draining funnel. Otherwise, the manufacturer declines any responsibility in case of flooding if the drain valve cuts in.

Label



Water outlet



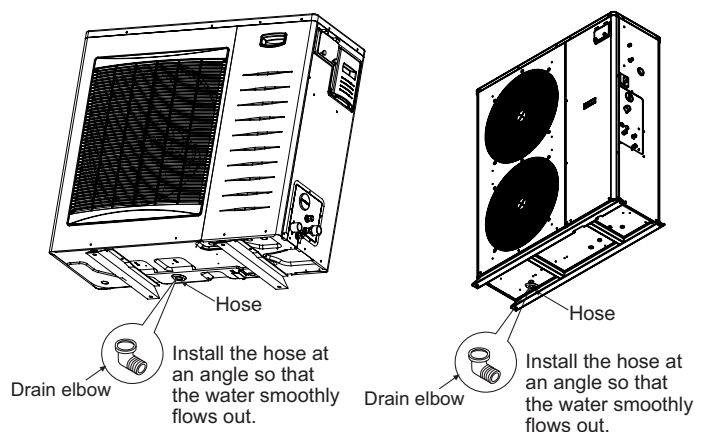
Water inlet

5.3 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.

If a drain elbow is used, the unit should be placed on a stand which is taller 3cm than the horizon. the two rubber stopers are used to seal the other holes in the base plate. (the rubber ring must be added in the drain elbow)



Installation

5.4 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

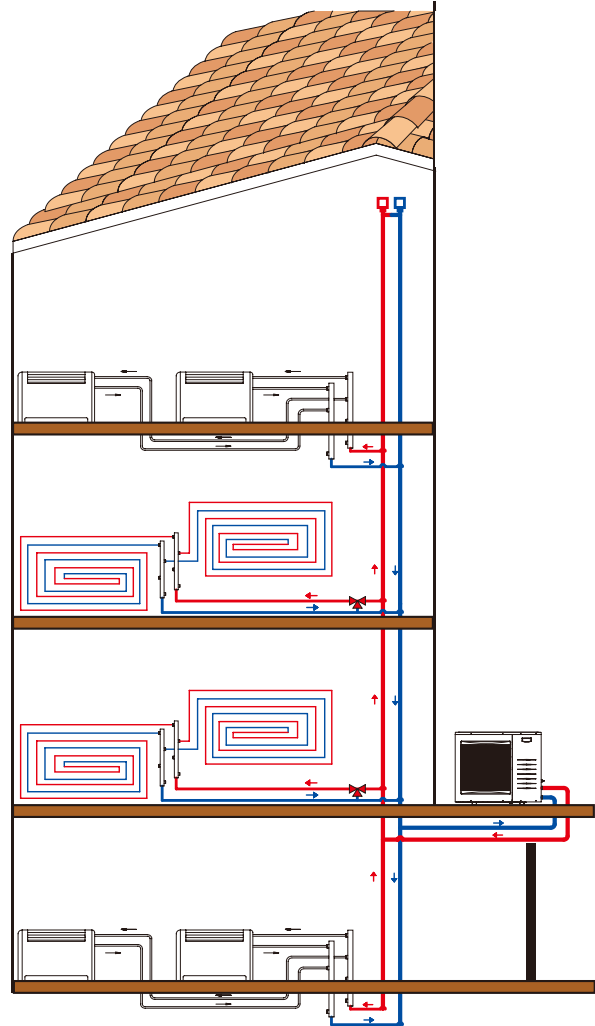
Accessories	Equivalent length (m)				
	Nominal diameter				
	13 x 15	16 x 18	20 x 22	26 x 28	33 x 35
Ball check valve	0,2	0,2	0,3	0,4	0,5
45° Bend	0,2	0,2	0,26	0,35	0,5
90° Bend	0,4	0,4	0,5	0,7	1,0
90° Curve	0,3	0,3	0,4	0,6	0,86
T-piece	0,8	0,8	1,0	0,5	2,0

1 mm WG = 9,81 Pa.

5.5 Hydraulic connection

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

5.6 Principle Diagram of Water Circuit



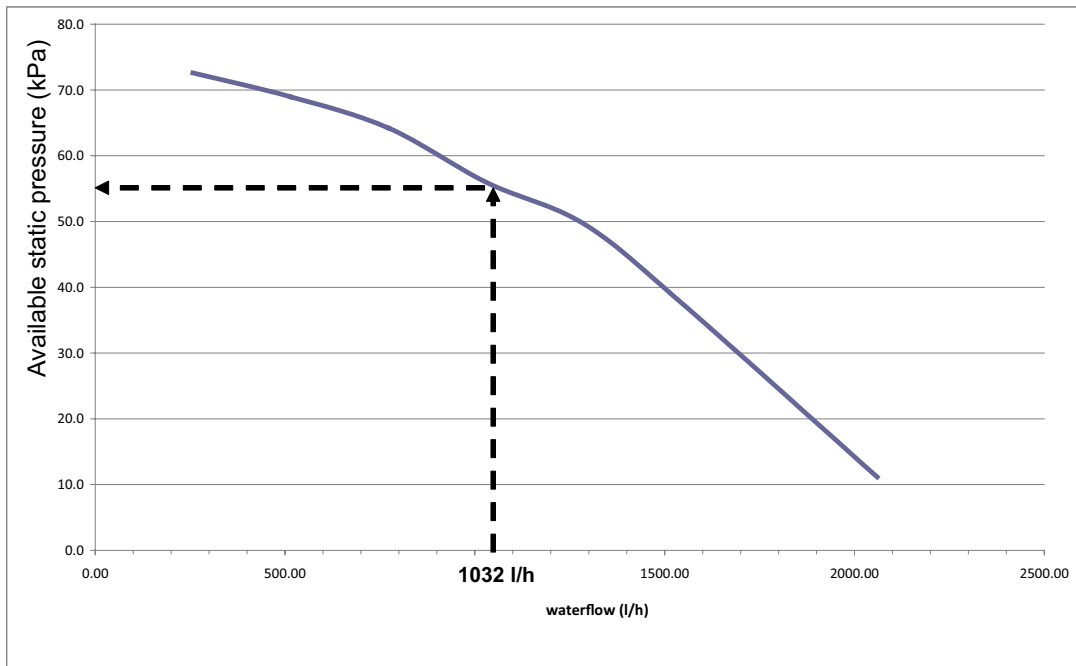
The MQHD are to be connected with the terminal units such as fan coil units or floor plant. Each terminal unit connected with the MQHD heat pumps and provided with its own control is therefore completely independent of the heat pump (see diagram of principle above).

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

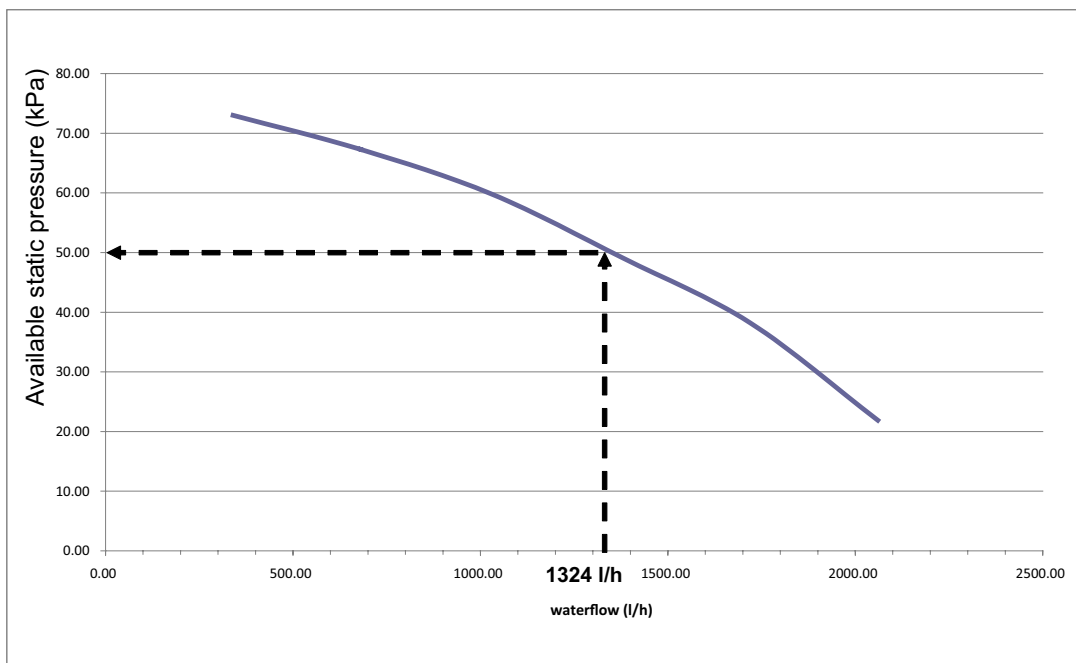
Installation

5.7 Available static pressure curve

5.7.1 Available static pressure curve (6kW)

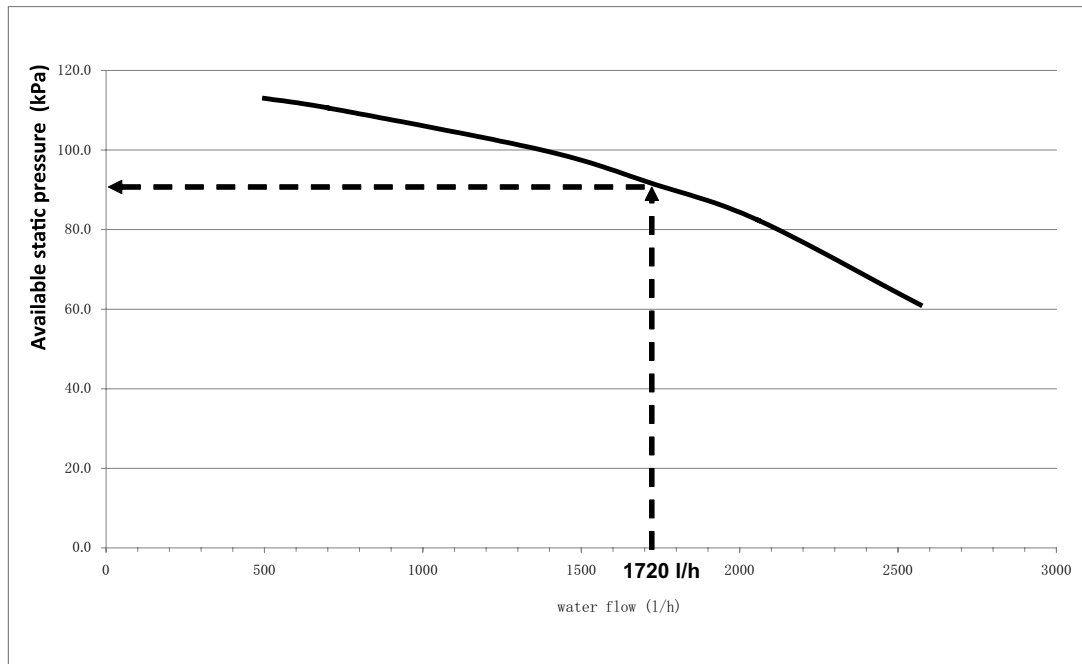


5.7.2 Available static pressure curve (8kW)

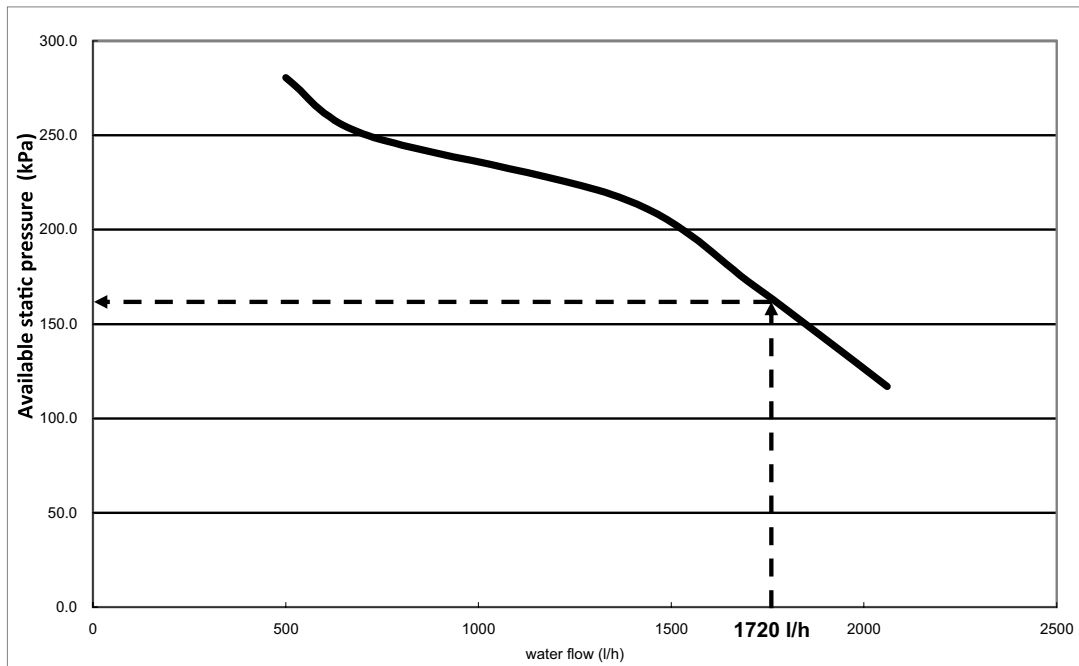


Installation

5.7.3 Available static pressure curve (10M kW)

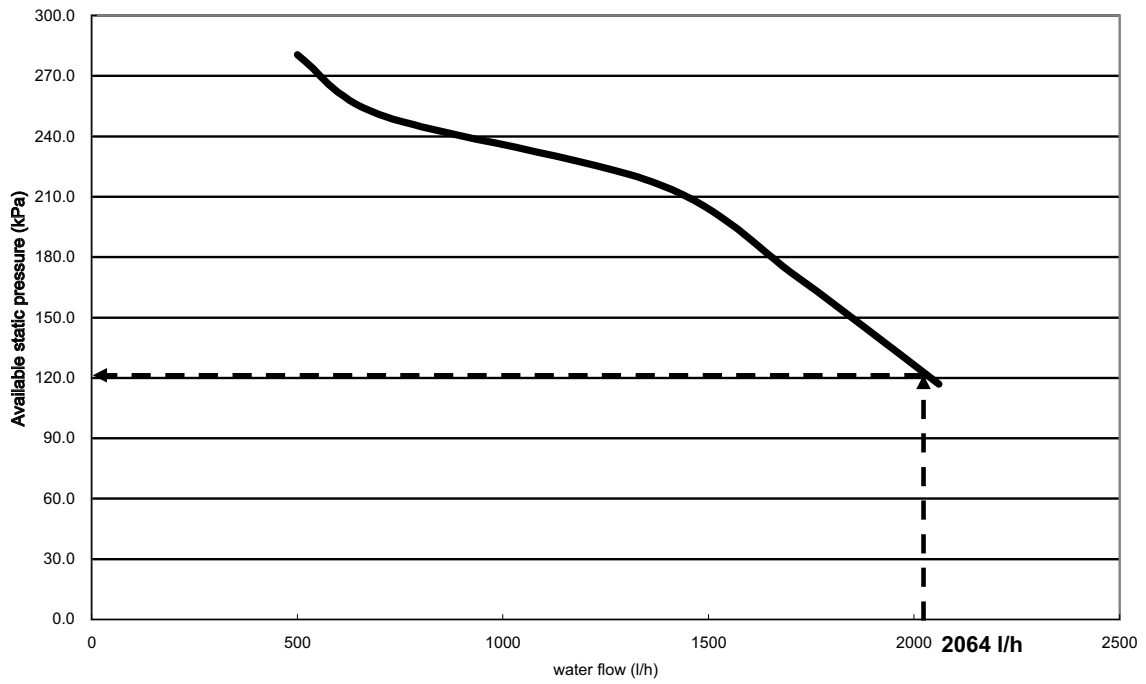


5.7.4 Available static pressure curve (10T kW)

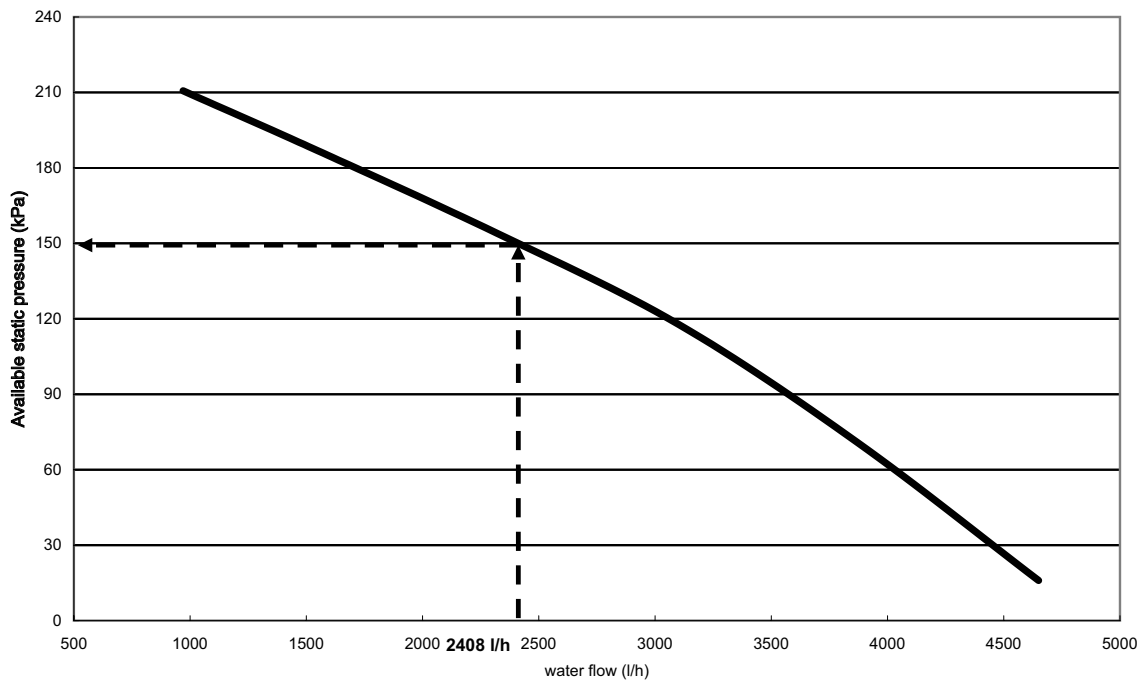


Installation

5.7.5 Available static pressure curve (12 kW)

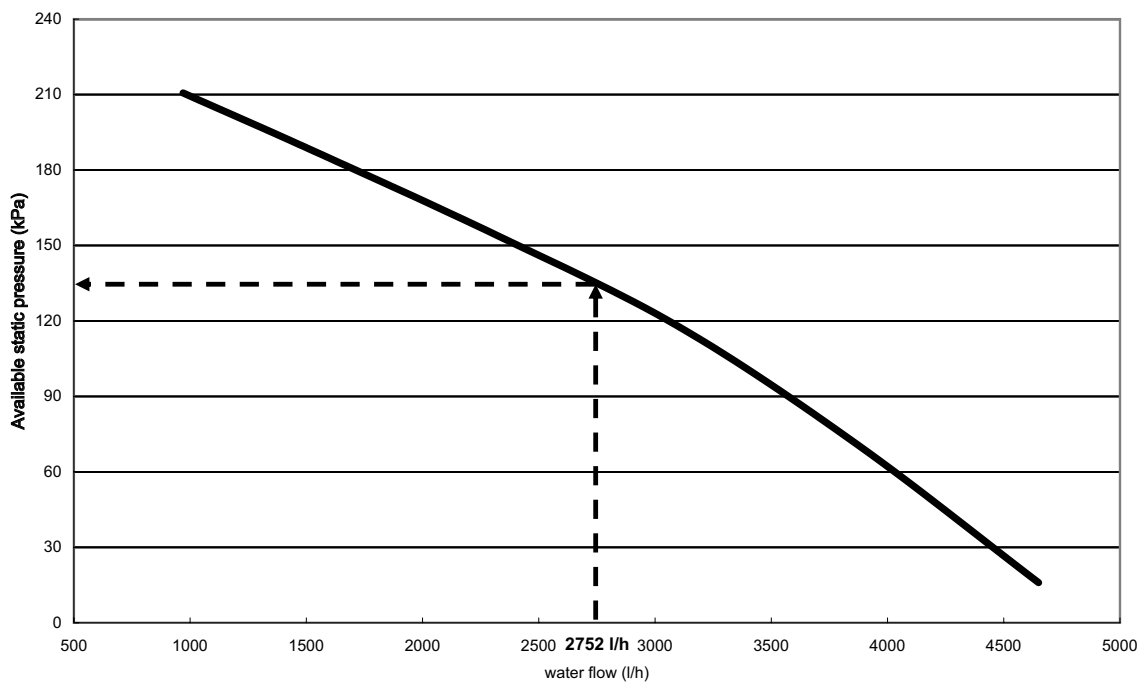


5.7.6 Available static pressure curve (14 kW)

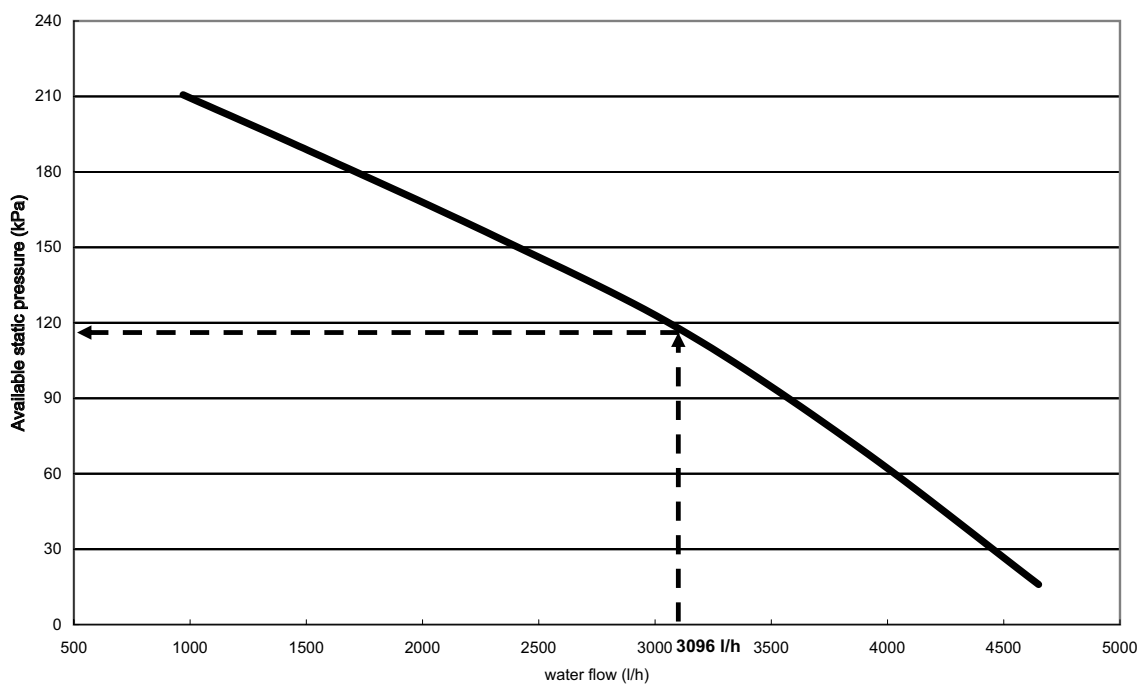


Installation

5.7.7 Available static pressure curve (16 kW)



5.7.8 Available static pressure curve (18 kW)



Installation

5.8 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 power supply lines and the insulation devices must be designed in such a way that every line is independent.
- 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.

5.9 Electrical connections

The unit must be installed on site according to the Machinery Directive 2006/42/EC(98/37/EC), the Low Voltage Directive (2006/95/EC), the Electromagnetic Interference Directive (2004/108/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, external disconnecting switch, 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 control can be used to select ON/OFF or COOLING/HEATING mode.**

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).



An all-pole disconnection switch having a contact separation of at least 3mm in all poles should be connected in fixed wiring.



the appliance shall be installed in accordance with national wiring regulations



The temperature of refrigerant circuit will be high, please keep the interconnection cable away from the copper tube.



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



For models 10T-12-14-16-18 verify the correct phase rotation, otherwise the heat pump will not start and the display do not shows abnormality

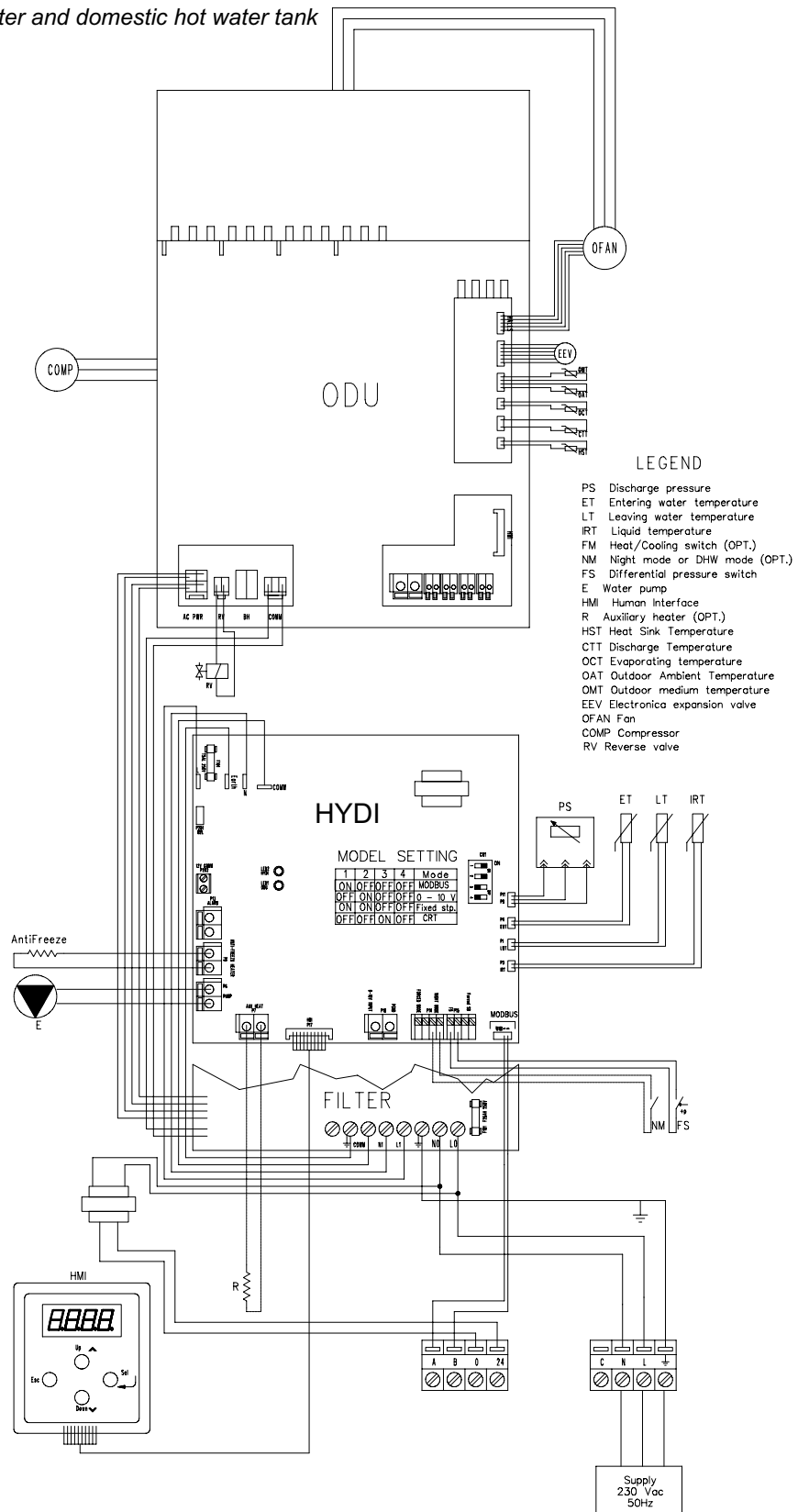
Installation

Electrical schematic

There can be different type of installation. Here following some examples:

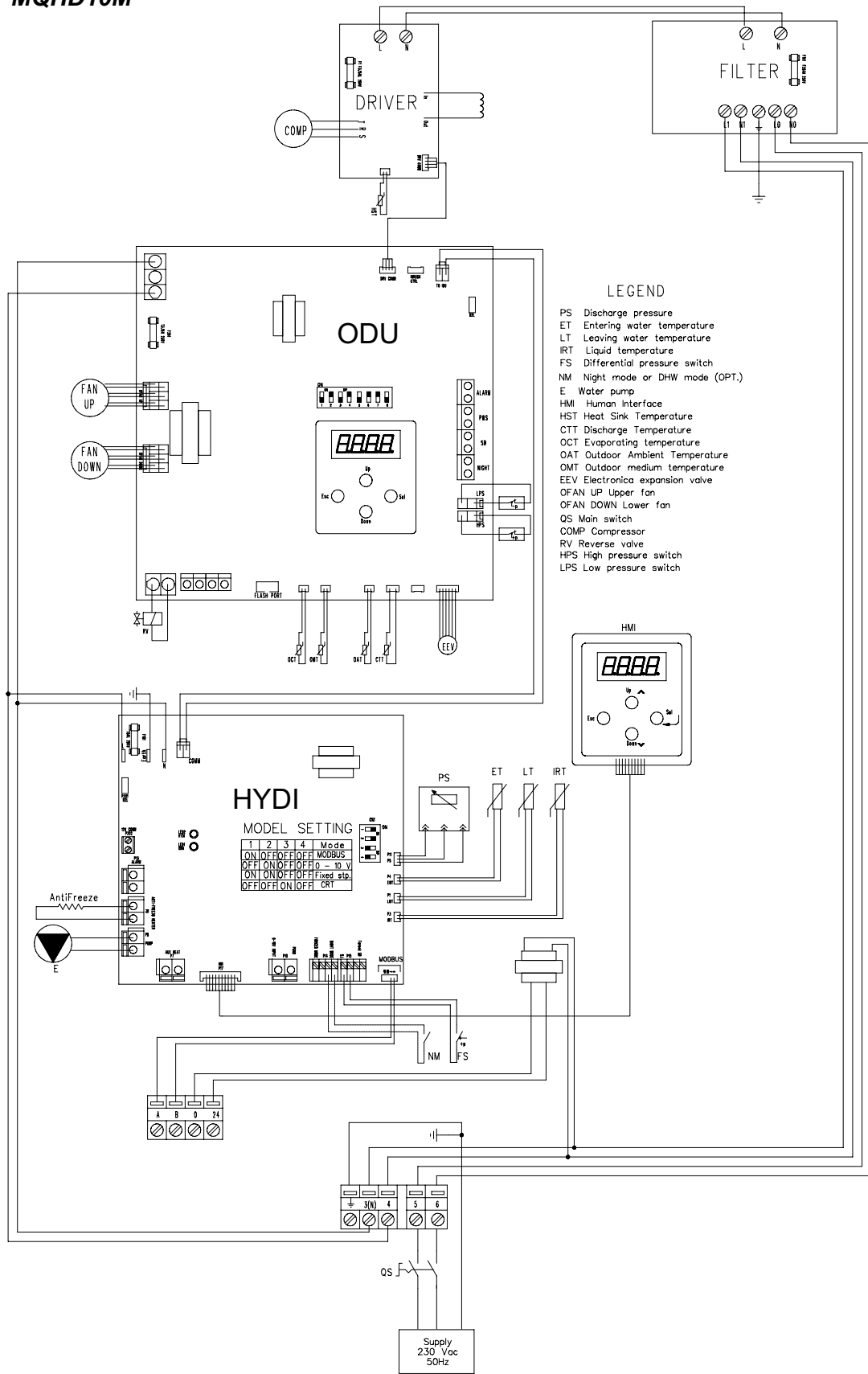
Unit with electrical heater and domestic hot water tank

MQHD06-08



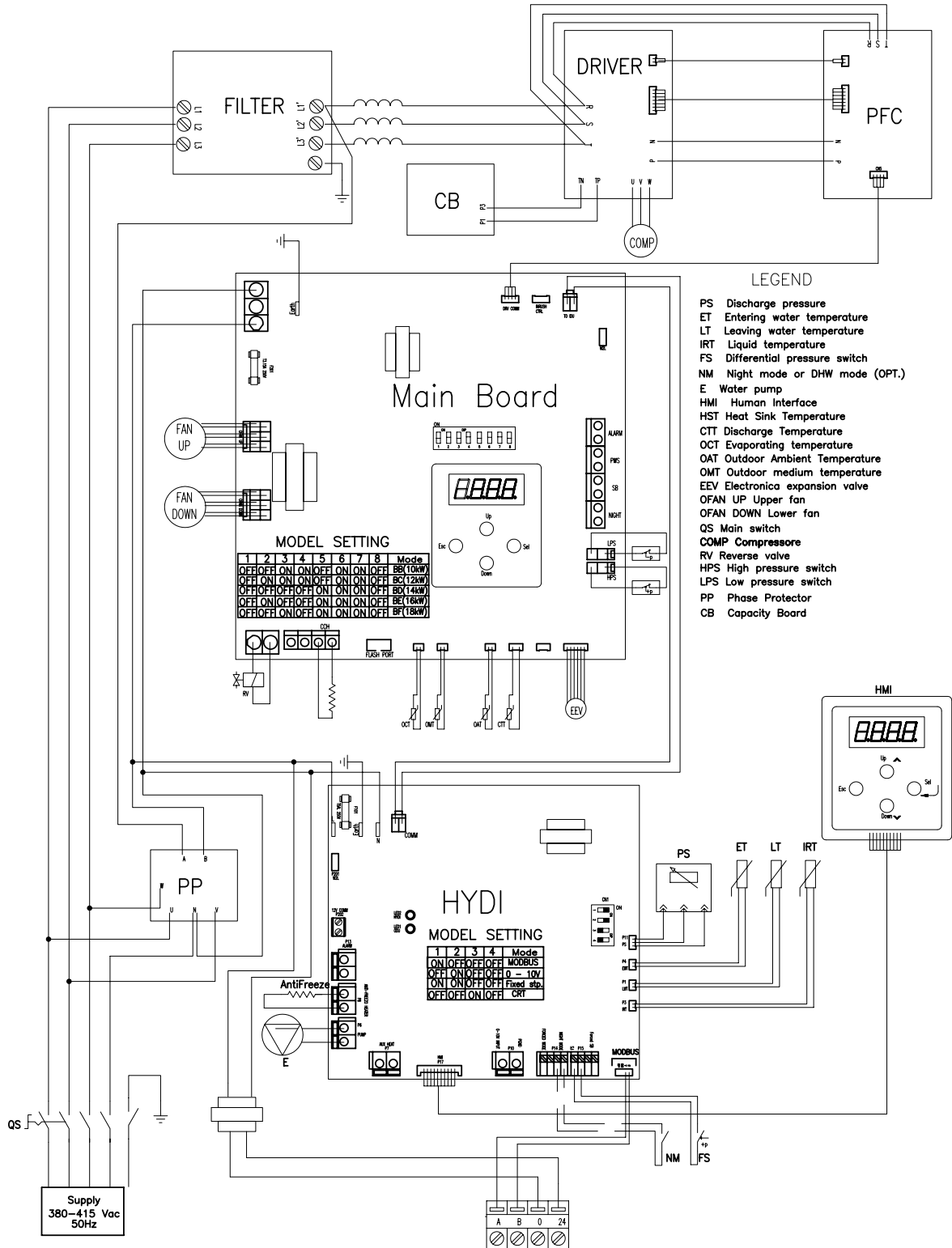
Installation

MQHD10M



Installation

MQHD 10T/12/14/16/18

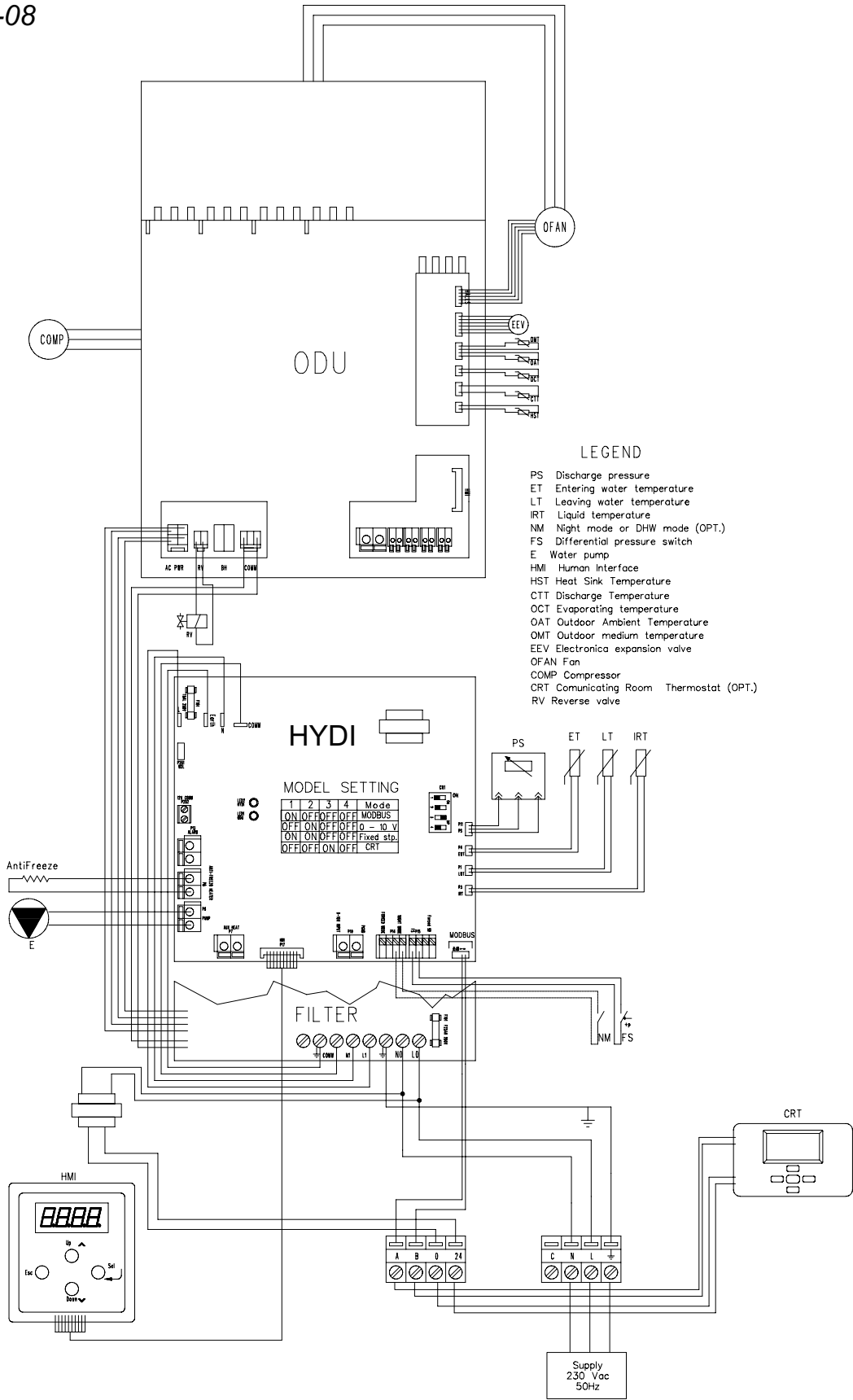


Installation

#	Name	Default Values	Possible Values	New value
	<i>Capacity_Group (CAP)</i>	0	0 – 4	Depending on size
	<i>Model (dl)</i>	A	A/B/C/D	
	<i>Load_Or_LWT_SPT (LoT)</i>	0	0/1	
	<i>SPT_Cool (SPC)</i>	7	5 – 20	Depending on plant
	<i>SPT_Heat (SPH)</i>	45	24 – 55	Depending on plant
	<i>System_Mode (odE)</i>	Sb	Sb/C/H	
	<i>Forced_Mode (FCD)</i>	0	0/1	
	<i>Mod_Bus_Baud_Rate (br)</i>	9600	1200/9600	
	<i>Mod_Bus_Address (Add)</i>	1	1-247	
	<i>Night_Or_Domestic_Hot_Water(nod)</i>	0	0/1	1
	<i>Pump logic (PUP)</i>	0	0/1	
	<i>Glycol level (Gly)</i>	0	0/1	
	<i>Auxiliary heater (AUH)</i>	0	0/1	1
	<i>DIP SWITCH on HYDI board</i>	ON-ON-OFF-OFF		

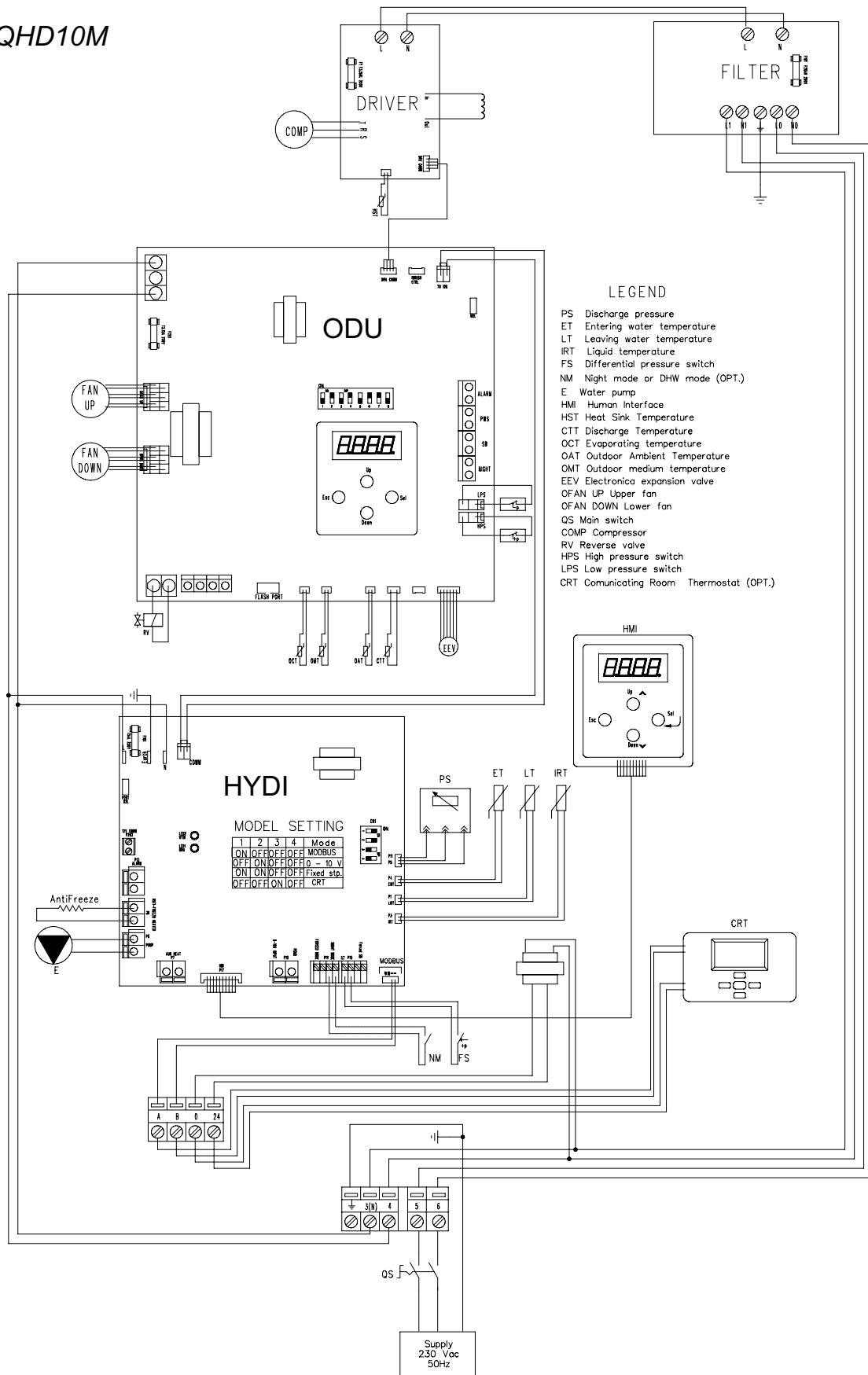
Installation

Unit with room thermostat and domestic hot water tank
MQHD06-08



Installation

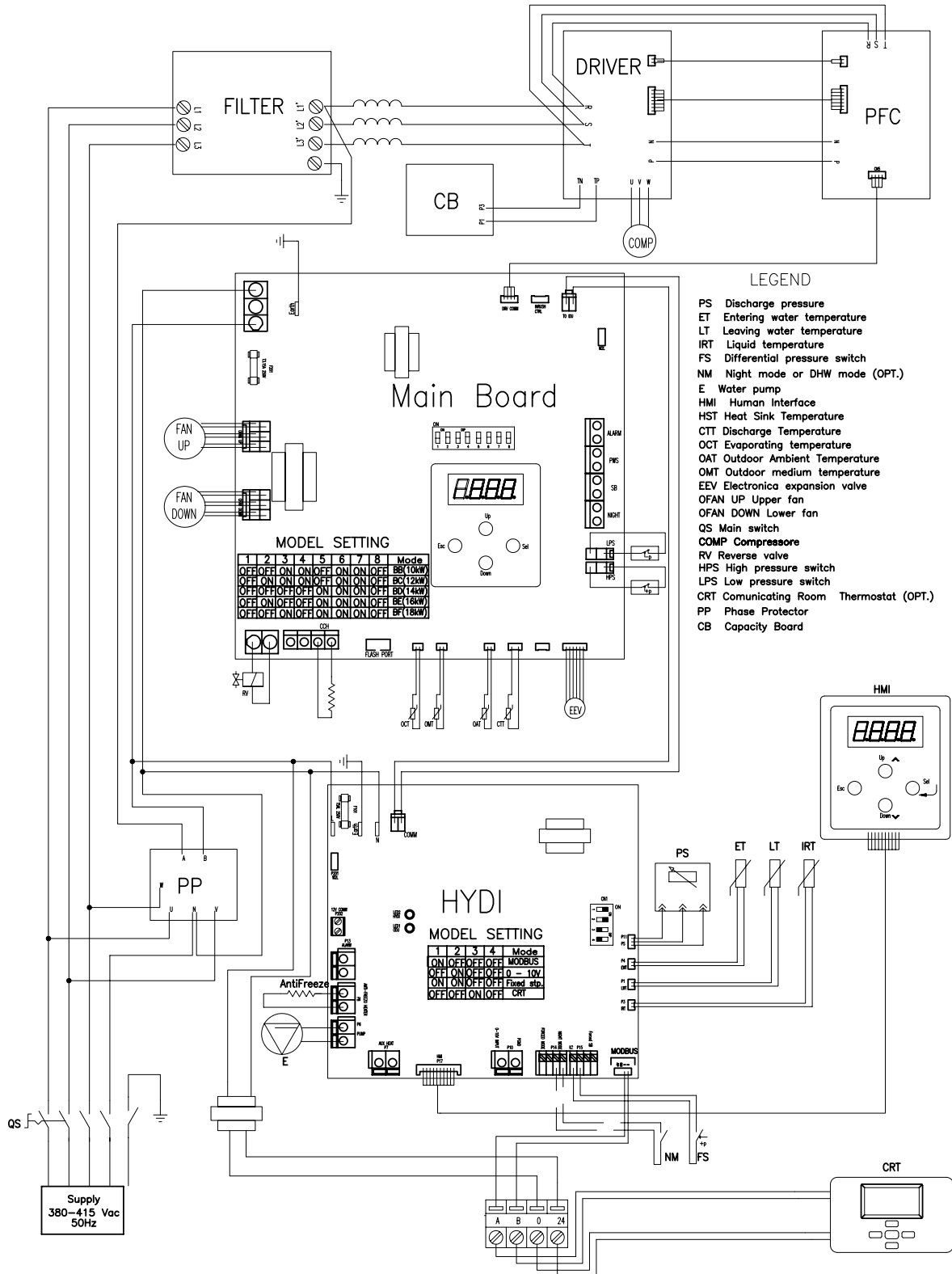
MQHD10M



English

Installation

MQHD 10T/12/14/16/18

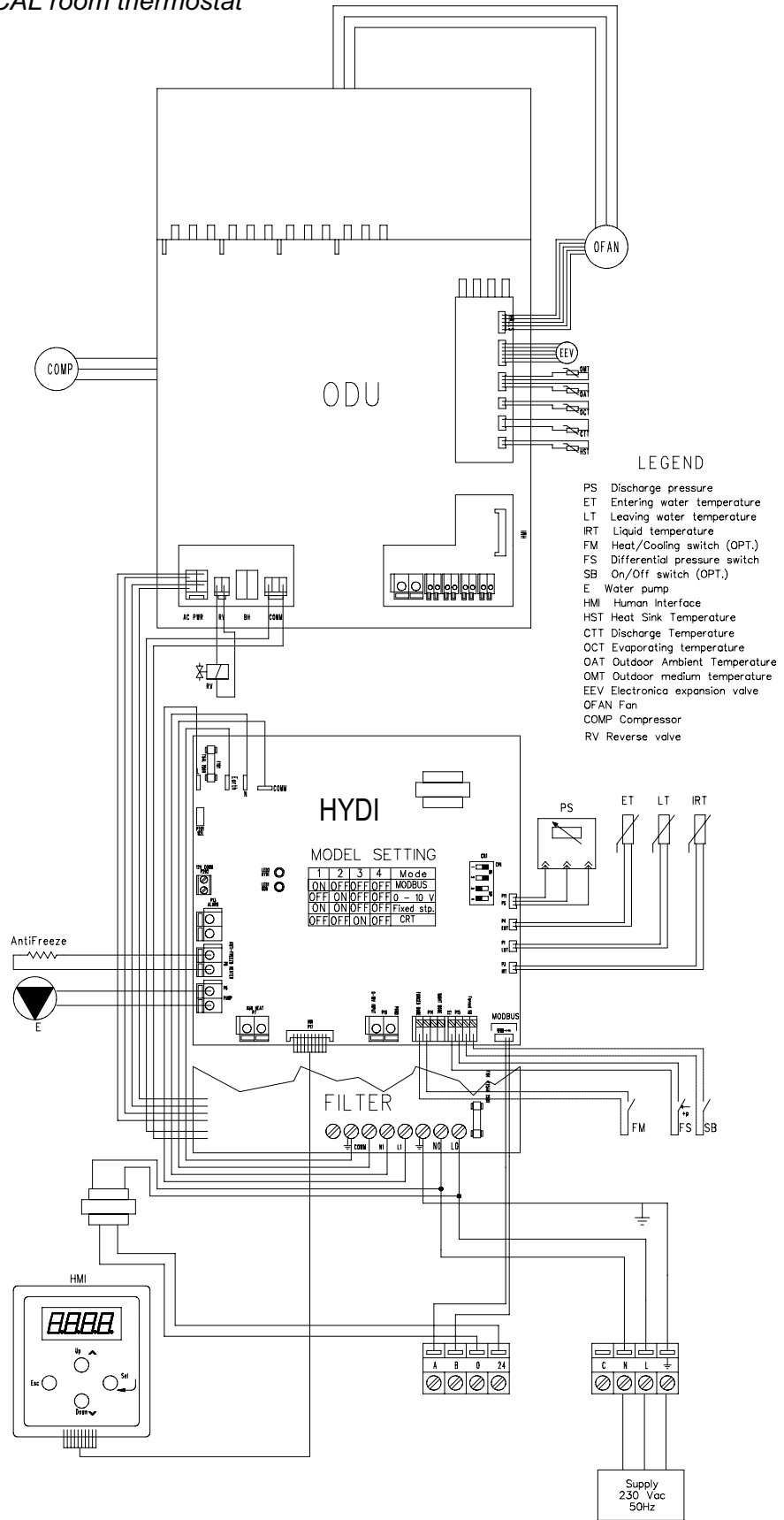


Installation

#	Name	Default Values	Possible Values	New value
	<i>Capacity_Group (CAP)</i>	0	0 – 4	Depending on size
	<i>Model (dl)</i>	A	A/B/C/D	
	<i>Load_Or_LWT_SPT (LoT)</i>	0	0/1	
	<i>SPT_Cool (SPC)</i>	7	5 – 20	Depending on plant
	<i>SPT_Heat (SPH)</i>	45	24 – 55	Depending on plant
	<i>System_Mode (odE)</i>	Sb	Sb/C/H	
	<i>Forced_Mode (FCD)</i>	0	0/1	
	<i>Mod_Bus_Baud_Rate (br)</i>	9600	1200/9600	
	<i>Mod_Bus_Address (Add)</i>	1	1-247	
	<i>Night_Or_Domestic_Hot_Water(nod)</i>	0	0/1	1
	<i>Pump logic (PUP)</i>	0	0/1	
	<i>Glycol level (Gly)</i>	0	0/1	
	<i>Auxiliary heater (AUH)</i>	0	0/1	
	<i>DIP SWITCH on HYDI board</i>	ON-ON-OFF-OFF		OFF-OFF-ON-OFF

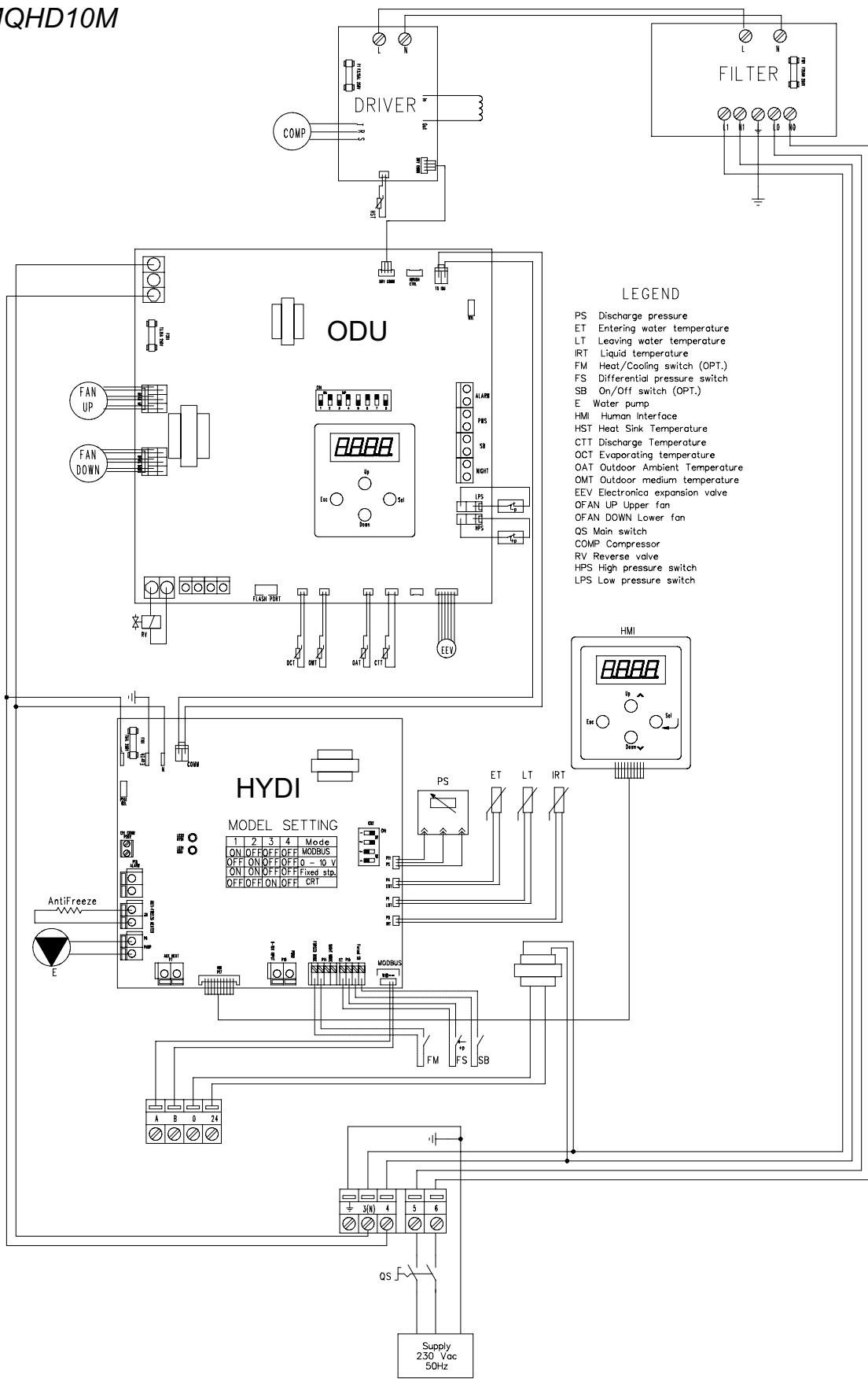
Installation

Unit with MECHANICAL room thermostat
MQHD 06-08



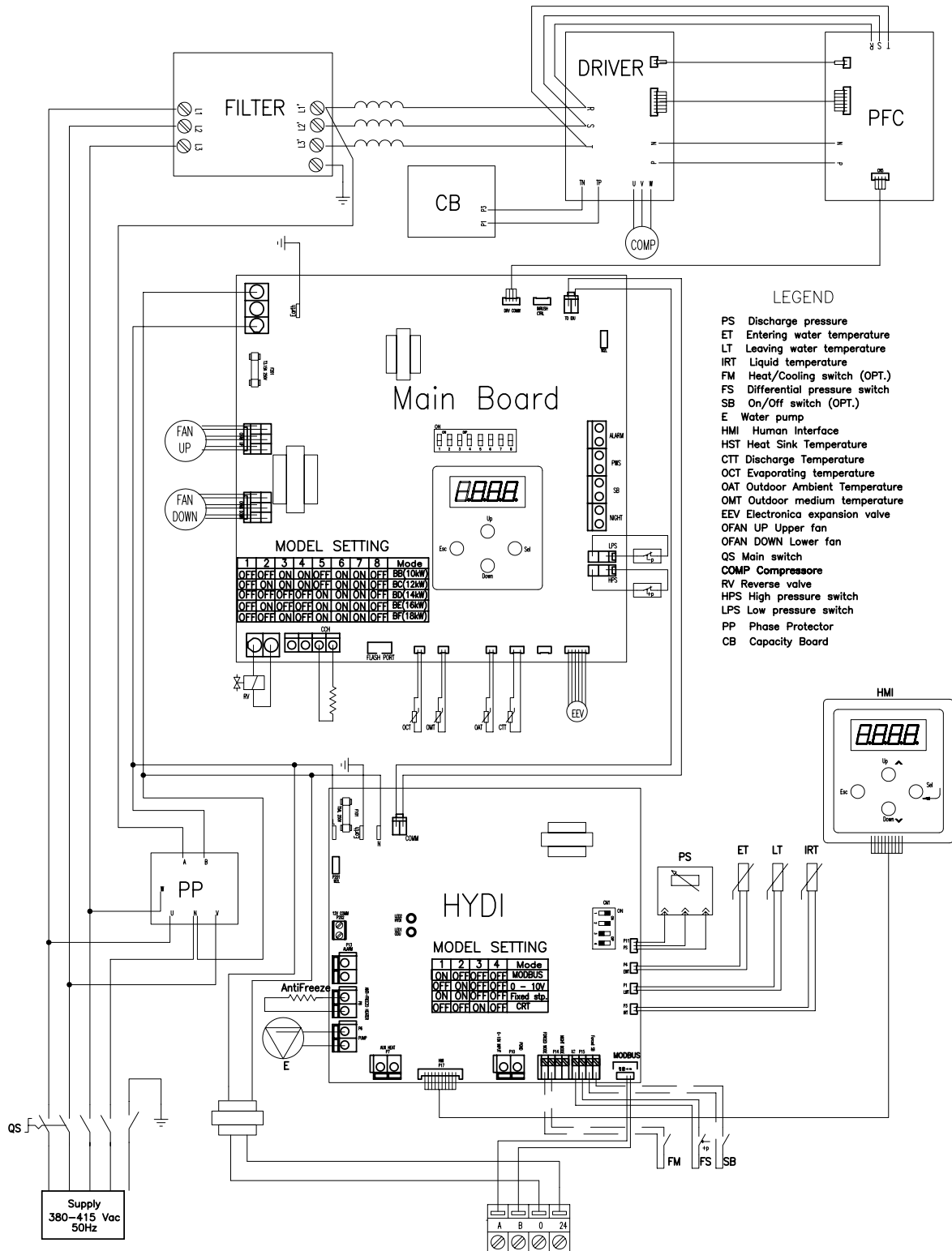
Installation

MQHD10M



Installation

MQHD 10T/12/14/16/18



Installation

#	Name	Default Values	Possible Values	New value
	<i>Capacity_Group (CAP)</i>	0	0 – 4	Depending on size
	<i>Model (dl)</i>	A	A/B/C/D	
	<i>Load_Or_LWT_SPT (LoT)</i>	0	0/1	
	<i>SPT_Cool (SPC)</i>	7	5 – 20	Depending on plant
	<i>SPT_Heat (SPH)</i>	45	24 – 55	Depending on plant
	<i>System_Mode (odE)</i>	Sb	Sb/C/H	
	<i>Forced_Mode (FCD)</i>	0	0/1	1
	<i>Mod_Bus_Baud_Rate (br)</i>	9600	1200/9600	
	<i>Mod_Bus_Address (Add)</i>	1	1-247	
	<i>Night_Or_Domestic_Hot_Water(nod)</i>	0	0/1	
	<i>Pump logic (PUP)</i>	0	0/1	
	<i>Glycol level (Gly)</i>	0	0/1	
	<i>Auxiliary heater (AUH)</i>	0	0/1	
	<i>DIP SWITCH on HYDI board</i>	ON-ON-OFF-OFF		

Start-up

6 START-UP



On MQHD 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.

6.1 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.

6.2 Start-up

Start-up sequence:

6.2.1 MQHD 06/08

- 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 parameters depending of type of application, refer to chapter 5.8.
- Start the appliance.

6.2.2 MQHD10M/10T/12/14/16/18

- 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 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 parameters depending of type of application, refer to chapter 5.8.
- Start the appliance.

Start-up

6.3 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 at startup that in case of stabilised operation.

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.

General Description

7 GENERAL

7.1 Introduction

MQHD units are air-cooled heat pumps with a refrigerant circuit equipped with rotary compressors for size 06, twin rotary compressor for size 08/10M and with scroll compressors for size 10T/12/14/16/18.

MQHD 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.

All the units have water expansion tank and a pump with stainless steel impeller in the hydraulic circuit.

7.2 General Specifications

MQHD units are supplied completed 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 7032 - white baked polyester enamel, which makes the unit corrosion - proof and weather - proof.

7.3 Compressors

Compressors are rotary compressors for size 06, twin rotary compressor for size 08/10M and scroll compressors for size 10T/12/14/16/18. All compressors 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

06/08 units include: a four-way cycle valve, electronic expansion valve, heat exchanger, drier filter, high pressure transducer, and refrigerant charge of HFC-410A. All pipes and refrigeration components are welded.

10M/10T/12/14/16/18 units include: a four-way cycle valve, electronic expansion valve, 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 size 06/08/10M/10T/12 and 1" female gas threaded type for size 14/16/18.

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.

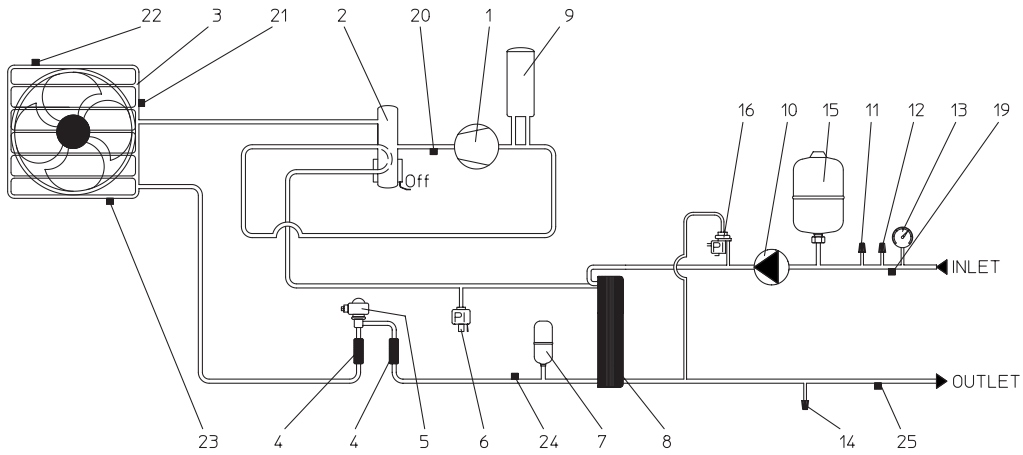
7.7 Fan

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.

General Description

Refrigerant Flow Diagrams - MQHD06/08



Refrigerant Circuit:

- 1 - Compressor
- 2 - 4 way valve
- 3 - Coil+ Fan
- 4 - Filter
- 5 - EEV (Electronic Expansion Valve)
- 6 - High pressure sensor
- 7 - Liquid receiver
- 8 - Heat exchanger
- 9 - Accumulator

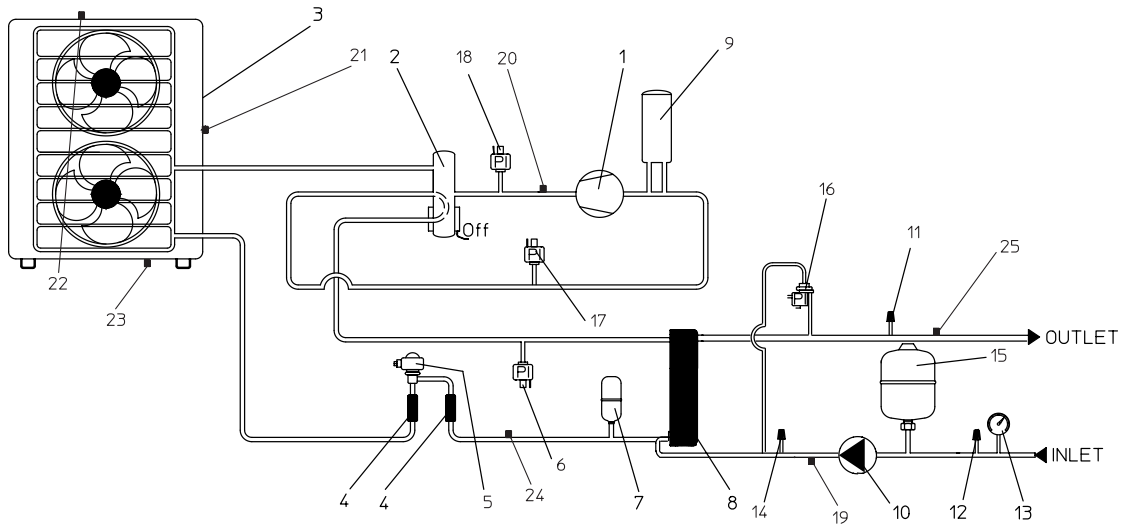
Hydraulic Circuit:

- 10 - Pump
- 11 - Air vent
- 12 - Safety valve
- 13 - Water manometer
- 14 - Drain valve
- 15 - Expansion tank
- 16 - Differential pressure switch

Probe:

- 19 - ET: Entering water Temperature
- 20 - CTT: discharge temperature
- 21 - OT: gas temperature(coil)
- 22 - OAT: outdoor ambient temperature
- 23 - OCT: evaporating temperature (coil)
- 24 - IRT: liquid temperature
- 25 - LT: leaving water temperature

Refrigerant Flow Diagrams - MQHD10M/10T/12/14/16/18



Refrigerant Circuit:

- 1 - Compressor
- 2 - 4 way valve
- 3 - Coil + Fan
- 4 - Filter
- 5 - EEV (Electronic Expansion Valve)
- 6 - High pressure sensor
- 7 - Liquid receiver
- 8 - Heat exchanger
- 9 - Accumulator
- 17 - Low pressure switch
- 18 - High pressure switch

Hydraulic Circuit:

- 10 - Pump
- 11 - Air vent
- 12 - Safety valve
- 13 - Water manometer
- 14 - Drain valve
- 15 - Expansion tank
- 16 - Differential pressure switch

Probe:

- 19 - ET: Entering water Temperature
- 20 - CTT: discharge temperature
- 21 - OT: gas temperature(coil)
- 22 - OAT: outdoor ambient temperature
- 23 - OCT: evaporating temperature (coil)
- 24 - IRT: liquid temperature
- 25 - LT: leaving water temperature

Technical data

8 TECHNICAL DATA

8.1 Technical data

MQHD		06	08	10M	10T	12	14	16	18
Power supply	V/ph/Hz	220~240/1/50			380~415/3/50				
Refrigerant									
Type		R410A							
Charge	kg	1.55	1.76	2.7	2.7	2.7	3.2	3.2	4.1
Compressors									
Type		Rotary	Rotary	Rotary	Scroll	Scroll	Scroll	Scroll	Scroll
Number		1	1	1	1	1	1	1	1
Start-up type		Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct
Evaporator									
Type		Plate							
Number		1	1	1	1	1	1	1	1
Condensor									
Type		Coil							
Hydraulic connections									
Type		Female							
Inlet diameter	Inch	3/4	3/4	3/4	3/4	3/4	1	1	1
Outlet diameter	Inch	3/4	3/4	3/4	3/4	3/4	1	1	1
Weights									
Weight of shipment	kg	81.8	86.8	167	197	197	202	202	219
Dimensions									
Length	mm	950	950	1241	1241	1241	1241	1241	1241
Width	mm	413	413	401	401	401	401	401	401
Height	mm	864	864	1382	1382	1382	1382	1382	1382

Operation Range

Cooling(outlet water)	°C	5~20
Cooling(Air)	°C	-10~46
Heating(outlet water)	°C	24~55
Heating(Air)	°C	-15~35

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

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

Technical data

8.2 Unit Electrical Data

MQHD		06	08	10M	10T	12	14	16	18
Rated voltage	V/ph/Hz	220~240/1/50			380~415/3/50				
Max Power Input	kW	2.5	3	3.5	6.5	6.5	6.5	6.5	6.5
Rated current(CO/HP)	A	6.3/6.9	9.6/8.9	10.7/9.9	3.8/3.5	4.6/4.2	5.3/4.9	6.1/5.6	6.8/6.3
Started current	A	15	15	15	15	15	15	15	15
Circuit breaker rating	A	20	20	20	20	20	20	20	20

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

Fans Electrical data

Fans MQHD		06	08	10M	10T	12	14	16	18
Supply voltage	V	DC 310V							
Rated power per fan	kW	0.125	0.135	0.07	0.077	0.077	0.077	0.077	0.077
Total absorbed current	A	0.43	0.64	0.35	0.35	0.35	0.35	0.35	0.35

(1) All the units are equipped with electric heater for plate exchanger anti-freeze,the input power is 230V/~/70W.

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

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 at least one time/year. 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	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	.	
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 the 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 Air heat exchanger

The air heat exchanger's coils consist of copper pipes and aluminium fins. To ensure the effective and correct operation of the air heat exchanger coils, it is important to keep the air heat exchanger'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 air heat exchanger must be cleaned with 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 air heat exchanger, of axial type, are complete with impeller with aerodynamic profile blades and a cylindrical nozzle. The motor's bearings are lubricated forever.

Maintenance

9.7 Water heat exchanger

Check at regular intervals that the water side of the heat exchanger is perfectly clean. To do this, measure the pressure drop, water side 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 a qualified technician. Also for any other maintenance operations (extraordinary overhauling, replacement of the heat exchanger etc.), contact a qualified technician.

9.8 Expansion vessel

Make sure that expansion vessel is between 1.2-1.5bar.

Troubleshooting and diagnostic

10 TROUBLESHOOTING AND DIAGNOSTIC

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 and diagnostic

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

Troubleshooting and diagnostic

Fault analysis and solution

The faults are defined according following table (and shown on the interface):

FAULT		CAUSE	OPERATION
H01	Pressure Sensor is disconnected	Plug is not in place Poor contact sensor connector Bad sensor cable Bad sensorer	Reconnection Replace the sensor
H02	Pressure Sensor is shorted		
H03	LWT is disconnected		
H04	LWT is shorted		
H06	IRT is disconnected/shorted		
H10	EWT bad		
H08	No communication(ODU to HYDI)	Plug is not in place Bad controller	Reconnection Replace the controller
O01	OCT is shorted/disconnected	Plug is not in place Poor contact sensor connector Bad sensor cable Bad sensorer	Reconnection Replace the sensor
O02	CTT is shorted/disconnected		
O03	HST is shorted/disconnected		
O04	OAT is shorted/disconnected		
O05	OMT is shorted/disconnected		
O06	RGT is shorted/disconnected		
O07	RLT is shorted/disconnected		
O08	High pressure protection	Air mixed in refrigeration system Bad ventilation of air heat exchanger Failure of the pressure switch	Discharge air Check the ventilation of air heat exchanger Change the pressure switch.
O09	Low pressure protection	Refrigeration system is block or leaked Low water flow Failure of the pressure switch	Check the system and the water flow Change the pressure switch.
O10	No communication to Driver	Plug is not in place Bad controller	Reconnection Replace the controller
O11	Compressor IPM Fault/IPM Driver Pin/Compressor Current Sensor Fault	Electonics HW Problem	Check all wiring and jumper settings, if ok,replace electronics
O12	No water flow/pump overheating	Low water flow or no water flow/pump over heat Pump is block	Check water flow Clean water system Change water pump
O13	Refrigerant leakage	Refrigeration system is not good	Repair refrigeration system and charge refrigerant if necessary.
O14	DC over voltage/DC under voltage	External power supply instability	Repair external power supply
O15	AC under voltage/AC over voltage/Zero crossing detection		
O16	Mismatch between IDU and ODU models/ Missing ODU configuration/ Undefined ODU Model	HYDI and Outdoor controllers are with different versions	Update software or replace HYDI or HYDU controller
O17	No communication	Communication or grounding wiring is not good	Check HYDI to Outdoor wiring and grounding,If they are ok,Change Controller
O18	System Over Power	Compressor is block	Change compressor
O19	PFC Current sensor	The wiring problem	Check the wiring
O20	Heat Sink over heat	Outdoor temperature is too high Failure of the sensor	Check the ventilation of air heat exchanger Replace the sensor
O21	Deicing	Unit is on Deicing mode	Check OCT and the software
O22	Compressor over heat	The refrigeration system is block The compressor is block	Check the system and remove the block Change the compressor
O23	Compressor over current	Compressor is block Too much refrigerate The wiring problem	Change compressor Check the high and low pressure,if higher,discharge refrigerate Check the wiring
O24	No ofan feedback	Plug is not in place Capacitor or fan motor is bad	Reconnection Replace the capacitor or fan motor
O25	Ofan IPM fault/Ofan IPM driver pin	Electonics HW Problem	Check all wiring if ok,replace electronics
O26	Compressor Lock	In some case,the compressor is not power on ever	Reset the IDU Restart the unit
O27	Indoor Coil defrost	The refrigeration system is block Temperature of entering water is too low	Check the system and the temperature
O28	Abnormal system behavior	LWT<EWT-2 continuously for more than 15 minutes on heat mode	Check the temperature
O29	Refr Pressure Sensor Fault	Fault on Pressure Sensor on Discharge	Check Discharge pressure sensor - ICT
O30	Outdoor Coil Overheating	Bad ventilation of air heat exchanger Too much refrigerate	Check the ventilation of air heat exchanger Discharge some refrigerate
O31	Operation condition is exceeded	The condition exceed the compressor's operation range	Not to start the unit

Dismantling, Demolition and Scrapping

11 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.

11.1 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 5 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 5 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.



As part of our ongoing product improvement programme, our products are subject to change without prior notice. Non contractual photos.

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