MUNDOCLIMA®

MINI CHILLER INVERTER H4

User's & Installation manual

MUENR-H4

(10, 12, 14, 16 kW)

CL25612 to CL25615
English

INDEX

The following symbols are used in this publication and inside the unit:

U User

I Installer

A Assistance

Important

Prohibition

Danger voltage

Danger moving blades

Danger high temperatures

GENERAL WARNINGS

U I A

⚠ These units have been designed to chill and/or heat water and must be used in applications compatible with their performance characteristics; these appliances are designed for residential or similar applications.
Incorrect installation,regulation and maintenance or improper use absolve the manufacturer from all liability,whether contractual or otherwise,for damage to people,animals or things.Only those applications specifically indicated in this list are permitted.
Read this manual carefully.All work must be carried out by qualified personnel in conformity with legislation in force in the country concerned.

The guarantee is invalidated if the above instructions are not respected and if the unit is started up for the first time without the presence of personnel authorised by the Company (where specified in the supply contract) who should draw up a “start-up” report.

The documentation supplied with the unit must be consigned to the owner who should keep it carefully for future consultation in the event of maintenance of service.

All repair or maintenance work must be carried out bythe Company’s Technical Service or qualified personnel following the instructions in this manual.
The air-conditioner must under no circumstances be modified or tampered with as this may create situations of risk.Failure to observe this condition absolves the manufacturer of all liability for resulting damage.

FUNDAMENTAL SAFETY RULES

U I A

When operating equipment involving the use of electricity and water,a number of fundamental safety rules must be observed,namely:

⛔ 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.

Do not touch the unit with bare feet or with wet or damp parts of the body
Do not carry out cleaning operations without first disconnecting the system from the electricity supply.

Do not modify safety or regulation devices without authorisation and instructions from the manufacturer.

Do not pull,detach or twist the electrical cables coming from the unit,even when disconnected from the mains electricity supply.
Do not open doors or panels providing access to the internal parts of the unit without first ensuring that the mains switch is in the off position.

Do not introduce pointed objects through the air intake and outlet grills.

Do not dispose of,abandon or leave within reach of children packaging materials (cardboard, staples, plastic bags, etc.) as they may represent a hazard.

⚠ The chiller appliances are supplied without the main switch.The power supply to the unit must be disconnected using a suitable main switch that must be supplied and installed by the installer.

⚠ Respect safety distances between the unit and other equipment or structures.Guarantee adequate space for access to the unit for maintenance and/or service operations;
Power supply:the cross section of the electrical cables must be adequate for the power of the unit and the power supply voltage must correspond with the value indicated on the respective units.All units must be earthed in conformity with legislation in force in the country concerned.

⚠ Hydraulic connections should be carried out as indicated in the instructions to guarantee correct operation of the unit.Empty the water circuit or add glycol if the unit is not used during the winter.
Handle the unit with the utmost care to avoid damage.

These air cooled reverse-cycle chillers with axial-flow fans operate with refrigerant fluid and are suitable for outdoor installation.The units conform to the essential requisites of EEC directive 98/37.
They are factory tested and on site installation is limited to water and electrical connections.

STRUCTURE
Panels and base are made from galvanised steel plate painted with epoxy powder to ensure total resistance to atmospheric agents.Condensate collection pan as standard.

COMPRESSORS
Hermetic rotary or scrollcompressor with crankcase heater and thermal cut-out .

EVAPORATOR
AISI 316 stainless steel plate type evaporator complete withelectric heater and differential pressure switch.
Casing lined with anti-condensate closed cell neoprene cladding.

PUMPS
The units feature a pump with the moving parts in contact with the water made from corrosion resistant materials, extra wear ring on the impeller,built-in capacitor for high starting torque and automatic venting of impeller chamber.

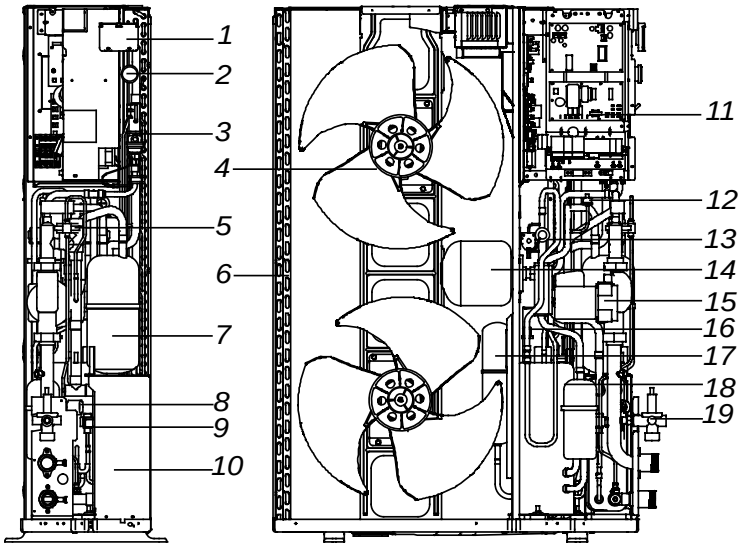
PUMP ASSEMBLY
Pump assembly with expansion tank,safety valve,auto-water replenishing assembly,pressure gauge and pump.

CONDENSING COILS
Made from copper tubes and high surface area aluminium fins.Condensing coil protection grills as standard.

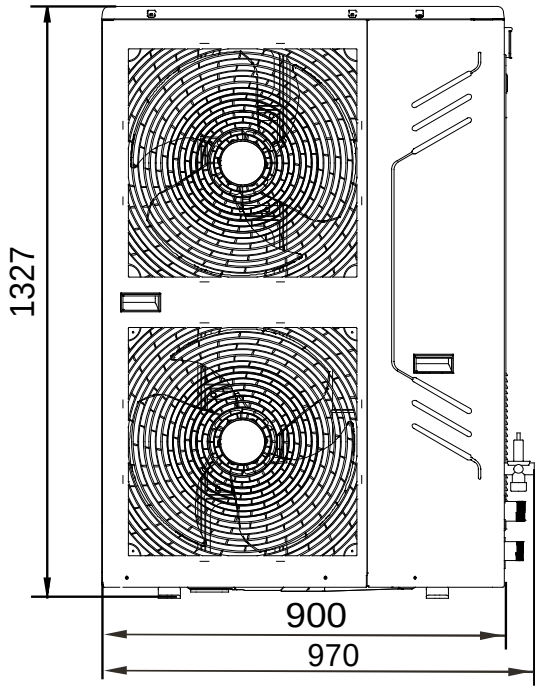
FANS
Axial-flow fans.DC motor with built-in thermal cut-out.
Housed in aerodynamic tubes with accident prevention grill.
Device for operation with low outside air temperatures: continuous fan rotation speed control via condensing temperatures transducer.

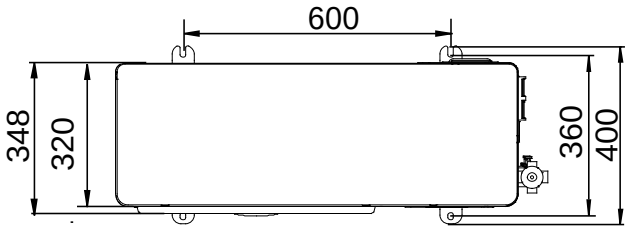
POWER AND CONTROL ELECTRICAL PANEL
Power and control electrical panel constructed in accordance with IEC 204-1/EN60335-2-40,complete with compressor contactor.Control via “A2” control panel.

OPTIONAL ACCESSORIES
-Removable metal mesh filter.
-Remote keyboard kit.
-Additional pump.
The above accessories are optional.Consult the relative documentation for assembly instructions and technical data.



1 Operation panel
2 Water manometer
3 Automatic discharge valve
4 Axial-flow fan
5 Differential pressure switch
6 Condenser
7 Accumulater
8 Security discharge
9 Electric expansive valve
10 Plate heat exchanger
11 Electrical panel
12 High pressure switch
13 4-ways valve
14 Expansion tank
15 Pump
16 Low pressure switch
17 Storage tank
18 Compressor
19 Water supply valve





1- Hydraulic connections IN : 1 1/4" (10 to 16kW)
2- Hydraulic connections OUT : 1 1/4" (10 to 16kW)

INSTALLATION

CHOICE OF INSTALLATION SITE

Before installing the unit, agree with the customer the site where it will be installed,taking the following points into consideration:

-check that the fixing points are adequate to support the weight of the unit;

-payscrupulous respect to safety distances between the unit and other equipment or structures to ensure that air entering the unit and discharged by the fans is free to circulate.

POSITIONING

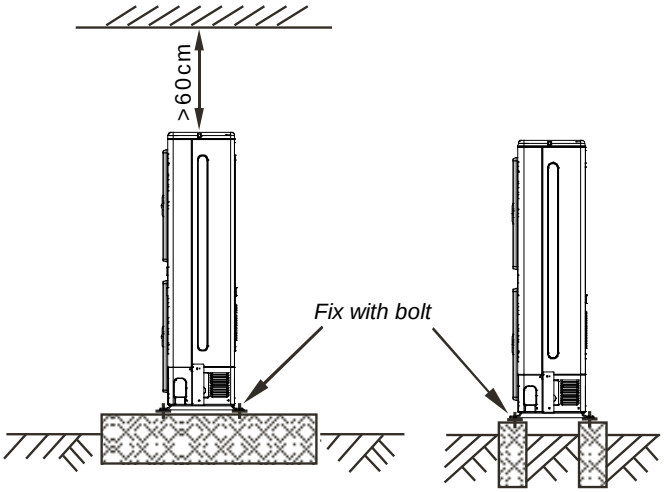
Before handling the unit,check the capacity of the lifting equipment used,respecting the instructions on the packaging.

Tomove the unit in the horizontal,make appropriate use of a lift truck or similar,bearing in mind the weight distribution of the unit.To lift the unit,insert tubes long enough to allow positioning of the lifting slings and safety pins in the feet on the unit.

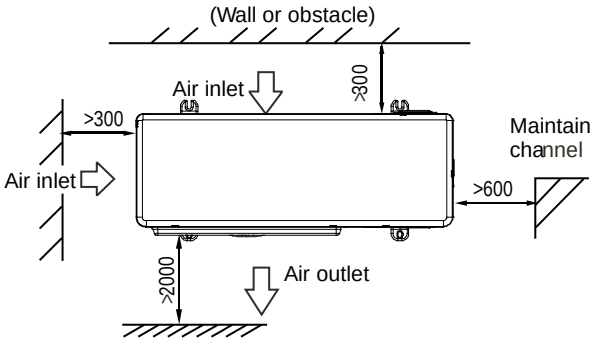
Toavoid the slings damaging the unit,place protection between the slings and the unit.Position the unit in the site indicated by the customer.Place either a layer of rubber (min.thickness 10 mm) or vibration damper feet (optional) between the base and support surface.Fix the unit,making sure it is level and that there is easy access to hydraulic and electrical components.If the site of installation is exposed to strong winds,fix the unit adequately to the support surface using tie rods if necessary.If a heat pump unit is being installed,make sure the condensate is drained using the drain hose supplied as standard.Prevent leaves,branches or snow from accumulating around the unit.These could reduce the efficiency of the unit.

INSTALLATION SPACE

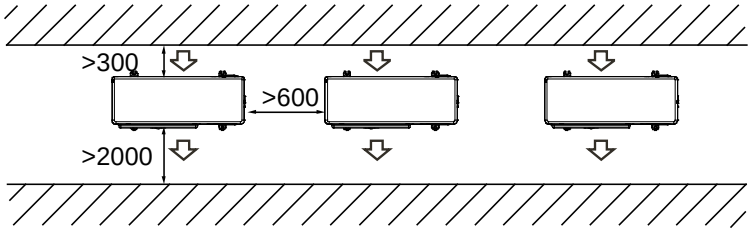
- Since the gravity center of the unit is not at its physical center, so please be careful when lifting it with a sling.
- Never hold the inlet of the outdoor unit to prevent it from deforming.
- Do not touch the fan with hands or other objects.
- Do not lean it more than 45℃, and do not lay it sidelong.
- Make concrete foundation according to the specifications of the outdoor units.
- Fasten the feet of this unit with bolts firmly to prevent it from collapsing in case of earthquake or strong wind.



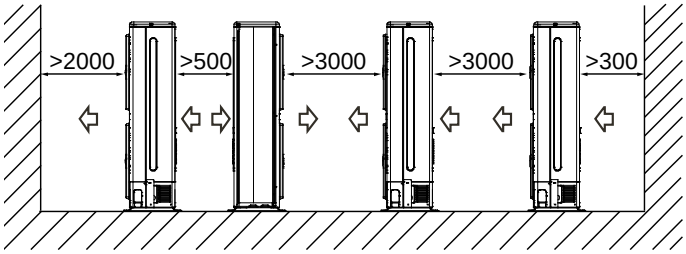
Single unit installation



Parallel connect two units or above



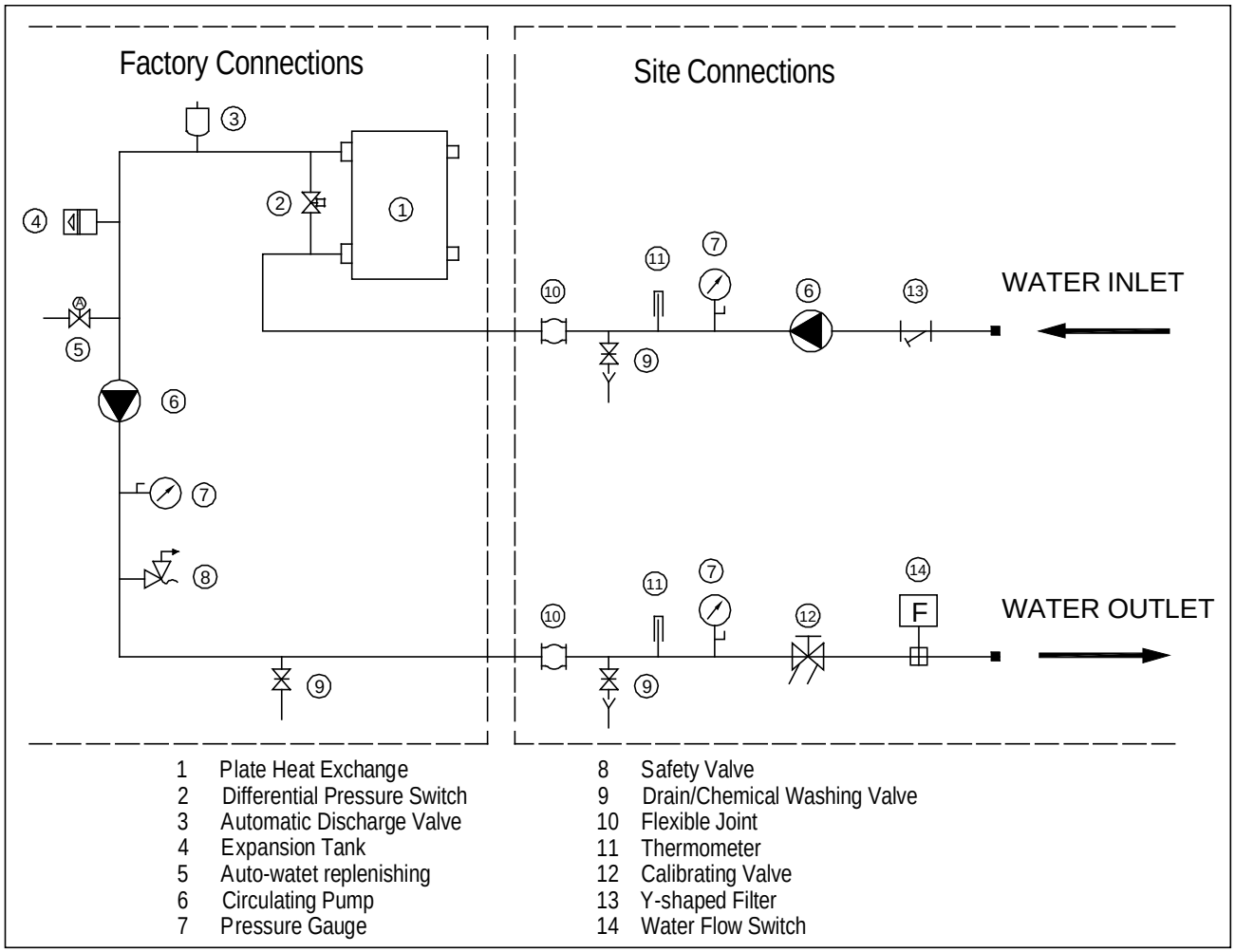
Parallel connect the front with rear sides



All the pictures in this manual are for explanation purpose only. They may be slightly different from the air conditioner you purchased (depend on model).The actual shape shall prevail.

The choice and installation of components is the responsibility of the installer who should follow good working practice and current legislation.Before connecting the pipes,make sure they do not contain stones,sand,rust, dross or other foreign bodies which might damage the unit.Construction of a bypass is recommended to enable the pipes to be washed through without having to disconnect the unit (see drain valves).The connection piping should be supported in such a way as to avoid it weighing on the unit.It is recommended that the following devices are installed in the water circuit of the evaporator.
A hydraulic safety valve shall be mounted in water system, which should open constantly.

1.Two pressure gauges with a suitable scale (inlet and outlet).
2.Two vibration damper joints (inlet and outlet).
3.Two gate valves (normal in inlet and calibrating in outlet).
4.A flow switch (inlet) or a differential pressure switch (inlet-outlet).
5.Two thermometers (inlet and outlet).
6.An inlet filter as close as possible to the evaporator and positioned to allow easy access for routine maintenance.
7. An energy-saving water tank.
8. Additional pump.
9. The connecting line of flow switch, which mounted outside the unit, should be connected in series with the pressure-difference switch, which mounted inside the unit.



1	Plate Heat Exchange	8	Safety Valve
2	Differential Pressure Switch	9	Drain/Chemical Washing Valve
3	Automatic Discharge Valve	10	Flexible Joint
4	Expansion Tank	11	Thermometer
5	Auto-watet replenishing	12	Calibrating Valve
6	Circulating Pump	13	Y-shaped Filter
7	Pressure Gauge	14	Water Flow Switch

If the installation requires a useful head higher than that obtained by installing a pump assembly and storage tank, it is recommended that an additional pump is installed on the unit. Provided the additional pump installed inside of unit(only model 12/14/16KW can be installed inside of unit), the pump must connected close to plate heat exchanger. Provided the pump installed outside of unit, the pump shall be connected at water pipe's outlet.The pump can be easily installed on the unitby removing the pump connection pipe (see page 3). Connect to terminal PL,PN on the electrical panel.

⚠ The chillers must be providedwith a filling/top-up system connected to the return line and a drain cock in the lowest part of the installation.Installations containinganti-freeze or covered by specific legislation must be fitted with hydraulic disconnectors.

⚠ The manufactureris not liable for obstruction, breakage or noise resulting from the failure to install filters or vibration dampers.Particular types of water used for fillingor topping up must be treated with appropriate treatment systems.For reference values, see the table.

PH6-8	
Electrical conductivity	less than 200 mV/cm (25°C)
Chlorine ions	less than 50 ppm
Sulphuric acid ions	less than 50 ppm
Total iron	less than 0.3 ppm
Alkalinity M	less than 50 ppm
Total hardness	less than 50 ppm
Sulphur ions	none
Ammonia ions	none
Silicon ions	less than 30 ppm

FILLING THE INSTALLATION

-Before filling,check that the installation drain cock is closed.

-Open all installation and terminal air vents.

-Open the gate valves.

-Begin filling,slowly opening the water filling cock outside the unit.

-When water begins to leak out of the terminal air vent valves ,close them and continue filling until the pressure gauge indicates a pressure of 1.5 bars.

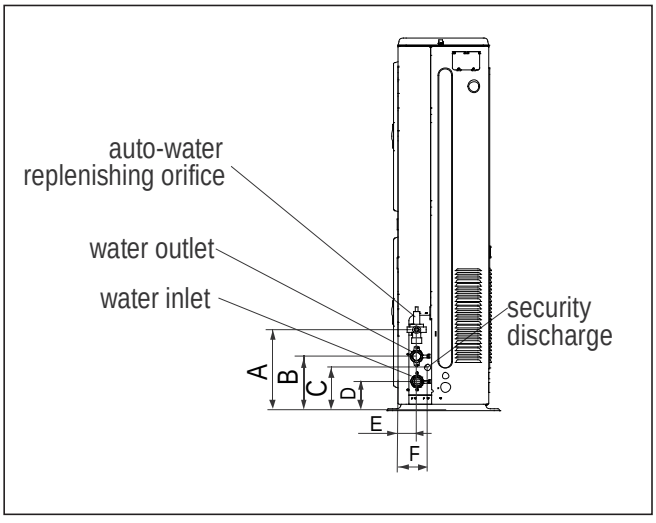
EMPTYING THE INSTALLATION

-Before emptying,place the mains switch in the "off " position

-Make sure the installation fill/top-up water cock is closed

-Open the drain cock outside the unit and all the installation and terminal air vent valves.

SIZE AND POSITION OF CONNECTIONS



⚠ The installation must be filled to a pressure of between 1 and 2 bars.
It is recommended that this operation be repeated after the unit has been operating for a number of hours.The pressure of the installation should be checked regularly and if it drops below 1 bar,the water content should be topped-up.
Checkthe hydraulic tightness of joints.

⚠ an all-pole disconnection device which has at least 3mm separation distance in all pole and a residual current device (RCD) with the rating of above 10mA shall be incorporated in the fixed wiring according to the national rule the appliance shall be installed in accordance with national wiring regulations.

⚠ If the fluid in the circuit contains anti-freeze,it should not be allowed to drain freely as it is pollutant.It should be collected for possible reuse.When draining after heat pump operation,take care as the water may be hot (up to 50°).

Model	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	Water inlet/outlet (Ø)	Auto-water replenishing (Ø)	Security discharge (Ø)
MUENR-10-H4 MUENR-12-H4 MUENR-14-H4 MUENR-16-H4	300	195	155	105	68	105	R5/4	G1/2	G1/2

DESIGN OF THE STORE TANK IN THE SYSTEM

- kW is the unit for cooling capacity, L is the unit for (G) minimum water flow volume in the formula.

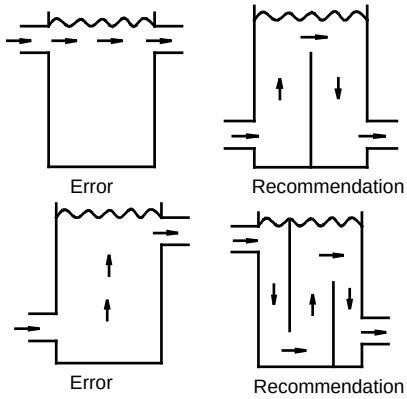
  Comfortable type air conditioner

  G= cooling capacity×2.6L

  Process type cooling

  G= cooling capacity×7.4L

- In certain occasion (especially in manufacture cooling process), for conforming the system water content requirement, it's necessary to mount a tank equipping with a cut-off baffle at the system to avoid water short-circuit, Please see the following schemes:



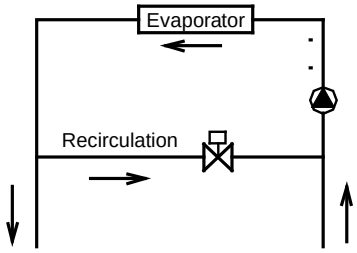
CHILLER WATER FLOW

Minimum chilled water flow

The minimum chilled water flow is shown in the below table.

If the system flow is less than the minimum unit flow rate the evaporator flow can be recalculated, as shown in the diagram.

For minimum chilled water flow rate

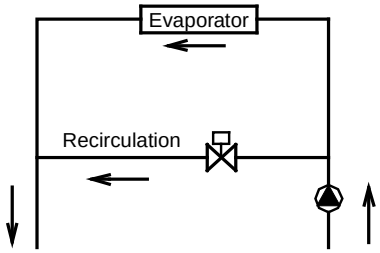


Maximum chilled water flow

The maximum chilled water flow is limited by the permitted pressure drop in the evaporator. It is provided in the below table.

If the system flow is more than the maximum unit flow rate, bypass the evaporator as shown in the diagram to obtain a lower evaporator flow rate.

For maximum chilled water flow rate



Minimum and maximum water flow rates

Item / Model	Water flow rate(m^3/h)	
	Minimum	Maximum
MUENR-10-H4	1.54	1.89
MUENR-12-H4	1.72	2.11
MUENR-14-H4	1.93	2.36
MUENR-16-H4	2.24	2.73

WATER QUALITY CONTROL

When industrial water is used as chilled water, little furring may occur; however, well water or river water, used as chilled water, may cause much sediment, such as furring, sand, and so on. Therefore, well water or river must be filtered and softening water equipment before flowing into chilled water system. If sand and clay settle in the evaporator, circulation of chilled water may be blocked, and thus leading to freezing accidents; if hardness of chilled water is too high, furring may occur easily, and the devices may be corroded. Therefore, the quality of chilled water should be analyzed before being used, such as PH value, conductivity, concentration of chloride ion, concentration of sulfide ion, and so on.

PH	6 - 8
Total hardness	less than 50 ppm
Electrical conductivity	less than 200 mV/cm (25C)
Sulfide ion	none
Chlorine ion	less than 50 ppm
Ammonia ion	none
Sulfate ion	less than 50 ppm
Silicon	less than 30 ppm
Total iron	less than 0.3 ppm
Sodium ion	No requirement
Calcium ion	less than 50 ppm

FILLING THE INSTALLATION

- Before filling, check that the installation drain cock is closed.
- Open all installation and terminal air vents.
- Open the gate valves.
- Begin filling, slowly opening the water filling cock outside the unit.
- When water begins to leak out of the terminal air vent valves, close pressure gauge indicates a pressure of 1.5 bars.

EMPTYING THE INSTALLATION

- Before emptying, place the mains switch in the "off" position.
- Make sure the installation fill/top-up water cock is closed.
- Open the drain cock outside the unit and all the installation and terminal air vent valves.

The unitary minichillers leave the factory already wired, and require the installation of an omnipolar thermal overload switch,a lockable mains disconnecting switch for the connection to the mains power supply,and the connection of the flow switch to the corresponding terminals.All the above operations must be carried out by qualified personnel in compliance with the legislation in force.

For all electrical work,refer to the electrical wiring diagrams in this manual.You are also recommended to check:
-that the characteristics of the mains electricity supply are adequate for the absorptions indicated in the electrical characteristics table below,also bearing in mind the possible use of other equipment at the same time.

⚠ Power to the unit must be turned on only after installation work (hydraulic and electrical) has been completed.
All electrical connections must be carried out by qualified personnel in accordance with legislation in force in the country concerned.
Respect instructions for connecting phase, neutral and earth conductors.The power line should be fitted upstream with a suitable device to protect against short-circuits and leakage to earth, isolating the installation from other equipment.

⚠ Voltage must be within a tolerance of ±10% of the rated power supply voltage for the unit (for three phase units,the unbalance between the phases must not exceed 3%).If these parameters are not respected,contact the electricity supply company.
For electrical connections,use double insulation cable in conformity with current legislation in the country concerned

An omnipolar thermal overload switch and a lockable mains disconnecting switch,in compliance with the CEI-EN standards (contact opening of at least 3mm),with adequate switching and residual current protection capacity based on the electrical data table shown below,must be installed as near as possible to the appliance

⚠ The devices on the unit must be lockable.
An efficient earth connection is obligatory.Failure to earth the appliance absolves the manufacturer of all liability for damage.
In the case of three phase units,ensure the phases are connected correctly.

⛔ Do not use water pipes to earth the unit.

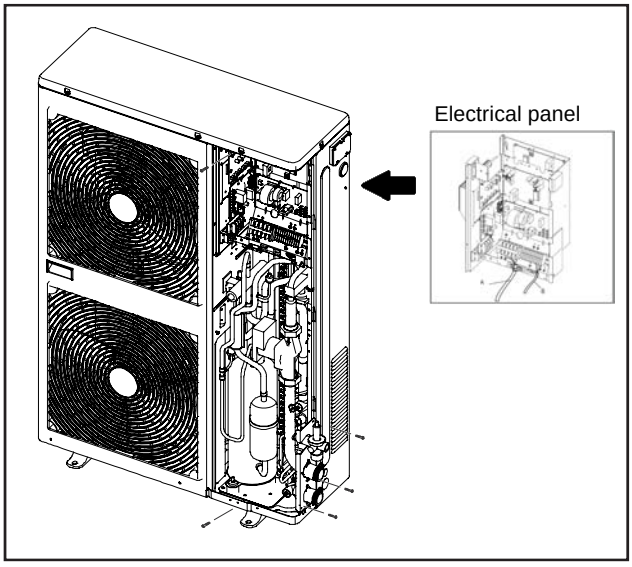
ELECTRICAL DATA

Model	Outdoor Unit					Power Supply			Compressor		OFM	
	Hz	Voltage	Phase	Min.	Max.	MCA	TOCA	MFA	MSC	RLA	kW	FLA
MUENR-10-H4	50Hz	220~240V	1Ph	198V	264V	15.1	25.0	30	52	12.1	0.20	1.8
MUENR-12-H4	50Hz	380~415V	3Ph	342V	456V	8.6	8.9	15	44	6.9	0.20	1.8
MUENR-14-H4	50Hz	380~415V	3Ph	342V	456V	8.6	9.6	15	44	6.9	0.20	1.8
MUENR-16-H4	50Hz	380~415V	3Ph	342V	456V	8.6	10.1	15	44	6.9	0.20	1.8

Remark:
MCA: Min. Current Amps. (A)
TOCA: Total Over-current Amps. (A)
MFA: Max. Fuse Amps. (A)
MSC: Max. Starting Amps. (A)
RLA: Rated Current Amps. (A)
OFM: Outdoor Fan Motor
FLA: Full Load Amps. (A)
kW: Rated Motor Output (kW)

ELECTRICAL PANEL

The electrical panel is located inside the unit at the top of the technical compartment where the various components of the refrigerant circuit are also to be found.
To access the electrical panel,remove the front panel of the unit by undoing the screws.



ELECTRICAL POWER CONNECTIONS

The Specification of Power

Model	MUENR-10-H4	MUENR-12-H4	MUENR-14-H4	MUENR-16-H4
Power(V/Ph/Hz))	220~ 240/1/50	380~415/3/50	380~415/3/50	380~415/3/50
Circuit breaker/fuse (A)	40/35	30/25	30/25	30/25
Power wire (mm^2)	3×4.0	5×3.0	5×3.0	5×3.0
Ground wire (mm^2)	4.0	2.5	4.0	2.5

⚠ The power cord type designation is H07RN-F.

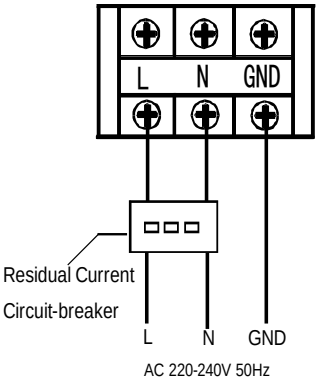
Connecting cable between indoor unit and outdoor unit shall be approved polychloroprene sheathed flexible cord, type designation H07RN-F or heavier cord.

The means for disconnection from a power supply shall be incorporated in the fixed wiring and have an air gap contact separation of at least 3mm in each active(phase) conductors.

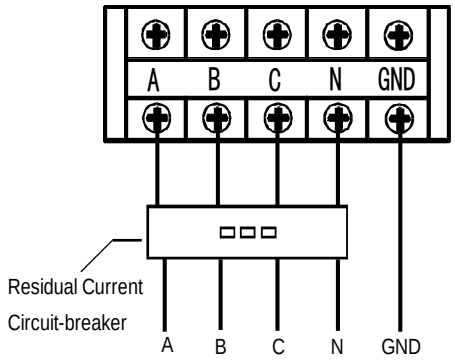
For the functional connection of the unit,bring the power supply cable to the electrical panel inside the unit and connect it to terminals L-N and ⏚ respecting the (L) phase, (N) neutral and ⏚ earth in the case of single phase units (220-240V~50Hz),or L1-L2-L3 phases,N neutral and PE earth in three phase units (380-415V 3N~ 50Hz).

Dealer provides power cord.

For MUENR-10-H4:



For MUENR-12/14/16-H4:

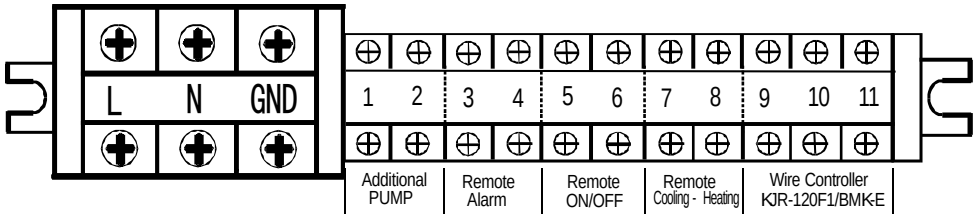


NOTE: The outdoor units must be installed with an Residual Current Circuit-breaker near the power supply and must be effectively earthed.

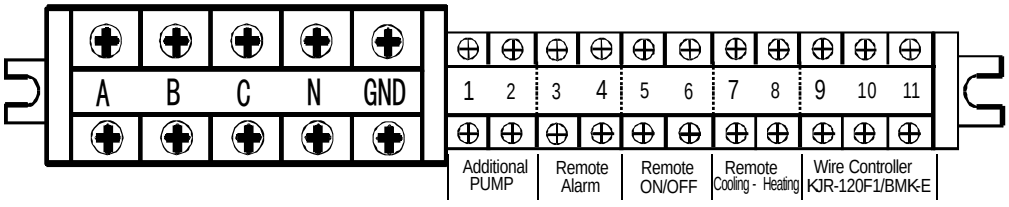
AUXILIARY CONNECTIONS

All terminals referred to in the explanations below are to be found on the terminal board inside the electrical panel and described as “installer terminals”.

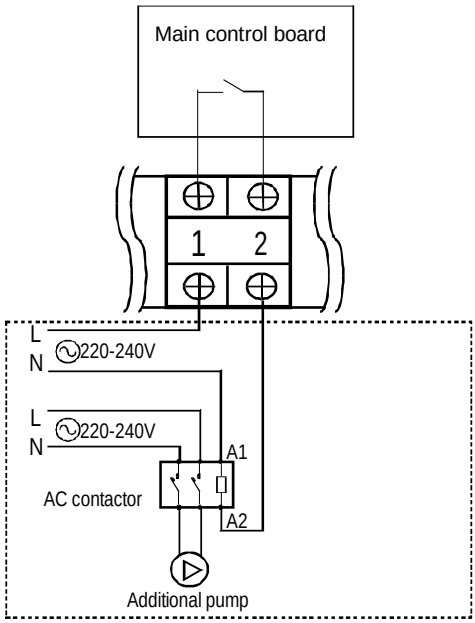
For MUENR-10-H4:



For MUENR-12/14/16-H4:



a. Additional pump

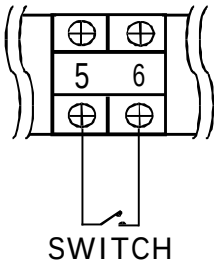


Note:

Additional pump terminal (1 - 2) only provides passive switching signal.

Additional water pump must be controlled by the AC contactor.

b. Remote ON/OFF



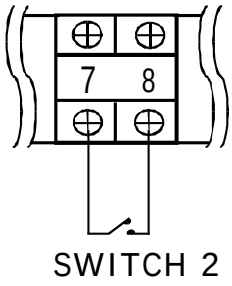
Note:

If switch is closed, the unit will be stopped forcibly.

Under this circumstance, anti-frozen protection and other protecion functions are still effective.

If switch breaks, unit can run normally according settings.

c. Remote cooling / heating

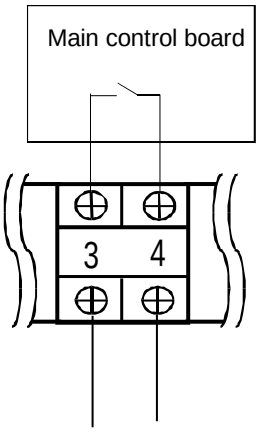


If switch 2 is closed, the unit will shift to heating mode forcibly;
If switch 2 breaks, the unit will shift to cooling mode forcibly.

Note:

- Remote ON/OFF and Remote cooling/heating is optional function.
- Choose this function by DIP switch SW4_1(SW3_1 for 12/14/16kW) on PCB Board.
- When the remote control and wired controller used at the same time, the unit will carry out the last command of arbitrary terminal.
- Remote ON/OFF has the highest priority. In the status of remote ON/OFF, other controller can't start the unit.

d. Remote alarm

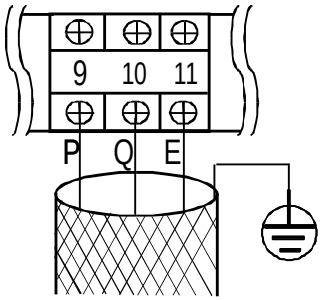


Note:

Remote alarm terminal only provides passive switching signal.

Current passing through the terminal interface should less than 1.5A, other wise please use AC contactor to control load indirectly.

e. Wire controller (optional)



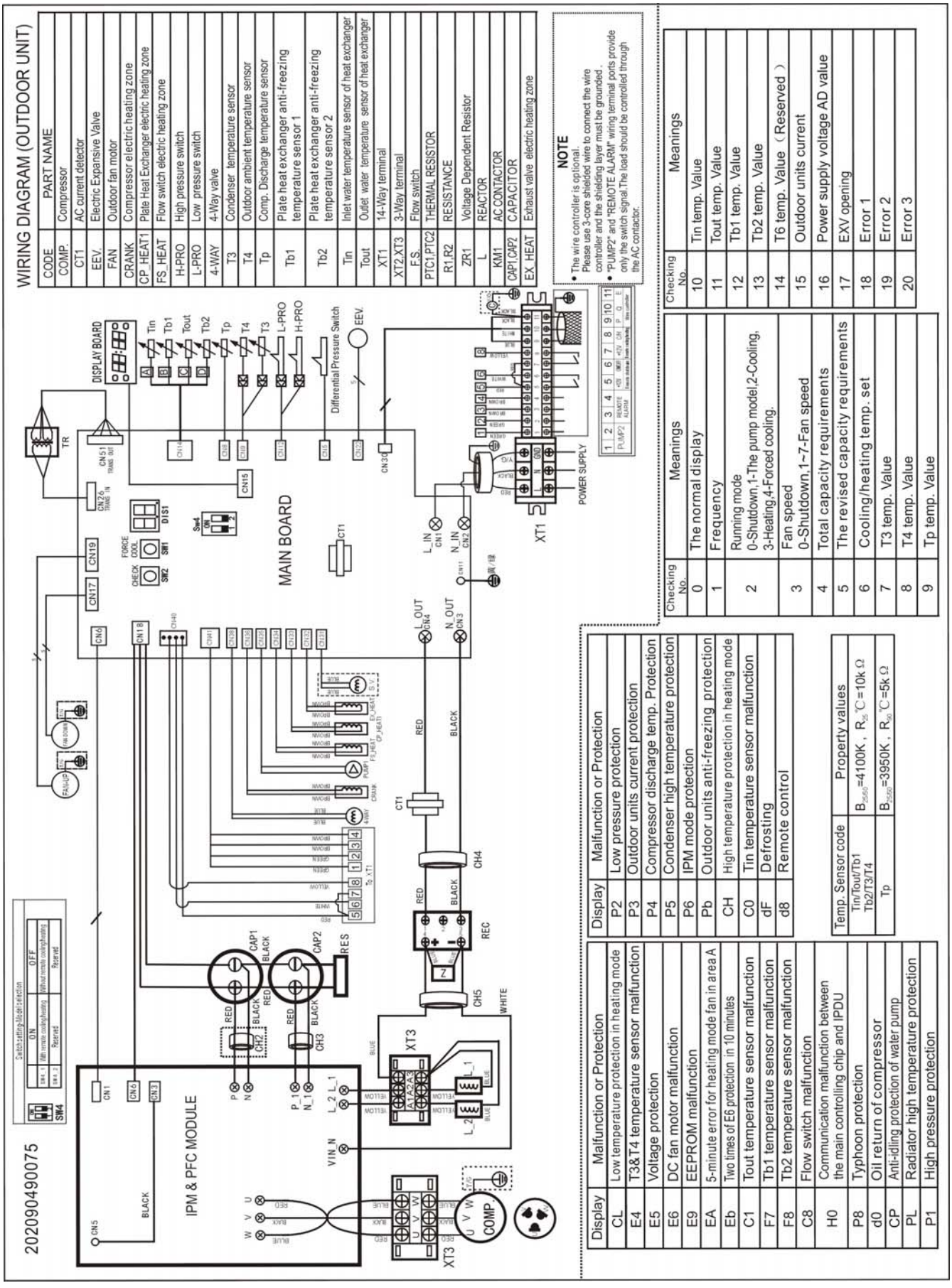
KJR-120F1/BMK-E
(CL92340)

Note:

- The wired controller KJR-120F1/BMK-E is optional.
- Please use 3-core shielded wire to connect the wired controller and the shielding layer must be grounded.
- When connecting wired controller, outdoor unit control panel is mainly used for display which can check parameters and inquiry, can't be used to set mode and temperature.

WIRING DIAGRAM

MUENR-10-H4



CODE	PART NAME
COMP.	Compressor
CT1	AC current detector
EEV.	Electric Expansive Valve
FAN	Outdoor fan motor
CRANK	Compressor electric heating zone
CP_HEAT1	Plate Heat Exchanger electric heating zone
FS_HEAT	Flow switch electric heating zone
H-PRO	High pressure switch
L-PRO	Low pressure switch
4-WAY	4-Way valve
T3	Condenser temperature sensor
T4	Outdoor ambient temperature sensor
Tp	Comp. Discharge temperature sensor
Tb1	Plate heat exchanger anti-freezing temperature sensor 1
Tb2	Plate heat exchanger anti-freezing temperature sensor 2
Tin	Inlet water temperature sensor of heat exchanger
Tout	Outlet water temperature sensor of heat exchanger
XT1	14-Way terminal
XT2,XT3	3-Way terminal
F.S.	Flow switch
PTC1,PTC2	THERMAL RESISTOR
R1,R2	RESISTANCE
ZR1	Voltage Dependent Resistor
L	REACTOR
KM1	AC CONTACTOR
CAP1,CAP2	CAPACITOR
EX_HEAT	Exhaust valve electric heating zone

Checking No	Meanings
0	The normal display
1	Frequency
2	Running mode 0-Shutdown,1-The pump model;2-Cooling, 3-Heating,4-Forced cooling.
3	Fan speed 0-Shutdown,1~7-Fan speed
4	Total capacity requirements
5	The revised capacity requirements
6	Cooling/heating temp. set
7	T3 temp. Value
8	T4 temp. Value
9	Tp temp. Value

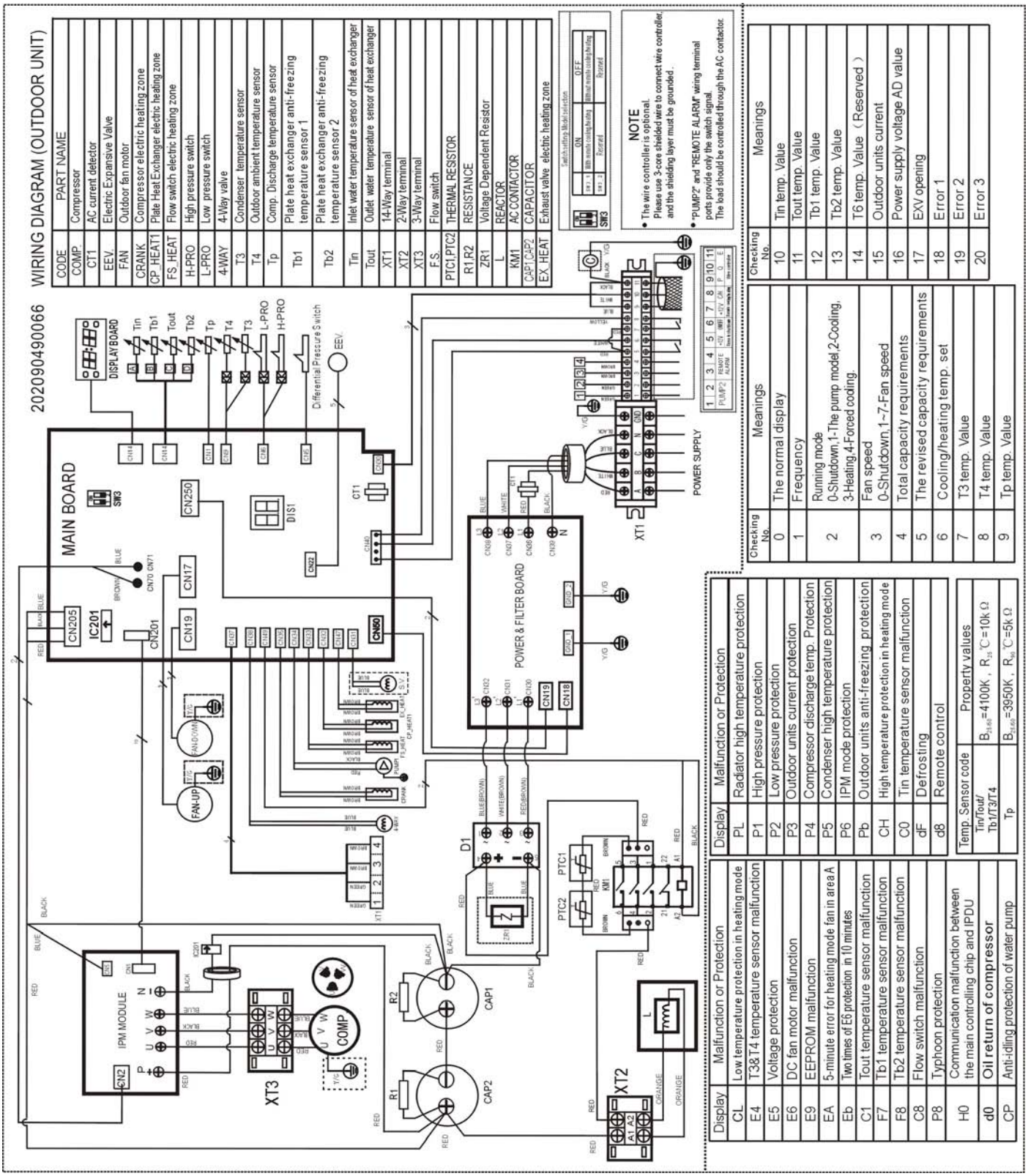
Checking No	Meanings
10	Tin temp. Value
11	Tout temp. Value
12	Tb1 temp. Value
13	Tb2 temp. Value
14	T6 temp. Value（Reserved）
15	Outdoor units current
16	Power supply voltage AD value
17	EXV opening
18	Error 1
19	Error 2
20	Error 3

Display	Malfunction or Protection
CL	Low temperature protection in heating mode
E4	T3&T4 temperature sensor malfunction
E5	Voltage protection
E6	DC fan motor malfunction
E9	EEPROM malfunction
EA	5-minute error for heating mode fan in area A
Eb	Two times of E6 protection in 10 minutes
C1	Tout temperature sensor malfunction
F7	Tb1 temperature sensor malfunction
F8	Tb2 temperature sensor malfunction
C8	Flow switch malfunction
H0	Communication malfunction between the main controlling chip and IPDU
P8	Typhoon protection
d0	Oil return of compressor
CP	Anti-idling protection of water pump
PL	Radiator high temperature protection
P1	High pressure protection

Display	Malfunction or Protection
P2	Low pressure protection
P3	Outdoor units current protection
P4	Compressor discharge temp. Protection
P5	Condenser high temperature protection
P6	IPM mode protection
Pb	Outdoor units anti-freezing protection
CH	High temperature protection in heating mode
C0	Tin temperature sensor malfunction
dF	Defrosting
d8	Remote control

Temp. Sensor code	Property values
Tin/Tout/Tb1 Tb2/T3/T4	$B_{25/50}$=4100K，R_{25}℃=10k Ω
Tp	$B_{25/50}$=3950K，R_{25}℃=5k Ω

MUENR-12-H4; MUENR-14-H4; MUENR-16-H4;



CODE	PART NAME
COMP.	Compressor
CT1	AC current detector
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FAN	Outdoor fan motor
CRANK	Compressor electric heating zone
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FS_HEAT	Flow switch electric heating zone
H-PRO	High pressure switch
L-PRO	Low pressure switch
4-WAY	4-Way valve
T3	Condenser temperature sensor
T4	Outdoor ambient temperature sensor
Tp	Comp. Discharge temperature sensor
Tb1	Plate heat exchanger anti-freezing temperature sensor 1
Tb2	Plate heat exchanger anti-freezing temperature sensor 2
Tin	Inlet water temperature sensor of heat exchanger
Tout	Outlet water temperature sensor of heat exchanger
XT1	14-Way terminal
XT2	2-Way terminal
XT3	3-Way terminal
F.S.	Flow switch
PTC1,PTC2	THERMAL RESISTOR
R1,R2	RESISTANCE
ZR1	Voltage Dependent Resistor
L	REACTOR
KM1	AC CONTACTOR
CAP1,CAP2	CAPACITOR
EX_HEAT	Exhaust valve electric heating zone

Checking No.	Meanings
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3	Fan speed 0-Shutdown,1~7-Fan speed
4	Total capacity requirements
5	The revised capacity requirements
6	Cooling/heating temp. set
7	T3 temp. Value
8	T4 temp. Value
9	Tp temp. Value

Checking No.	Meanings
10	Tin temp. Value
11	Tout temp. Value
12	Tb1 temp. Value
13	Tb2 temp. Value
14	T6 temp. Value（Reserved）
15	Outdoor units current
16	Power supply voltage AD value
17	EXV opening
18	Error 1
19	Error 2
20	Error 3

Display	Malfunction or Protection
CL	Low temperature protection in heating mode
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E5	Voltage protection
E6	DC fan motor malfunction
E9	EEPROM malfunction
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Eb	Two times of E6 protection in 10 minutes
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F7	Tb1 temperature sensor malfunction
F8	Tb2 temperature sensor malfunction
C8	Flow switch malfunction
P8	Typhoon protection
H0	Communication malfunction between the main controlling chip and IPDU
d0	Oil return of compressor
CP	Anti-idling protection of water pump

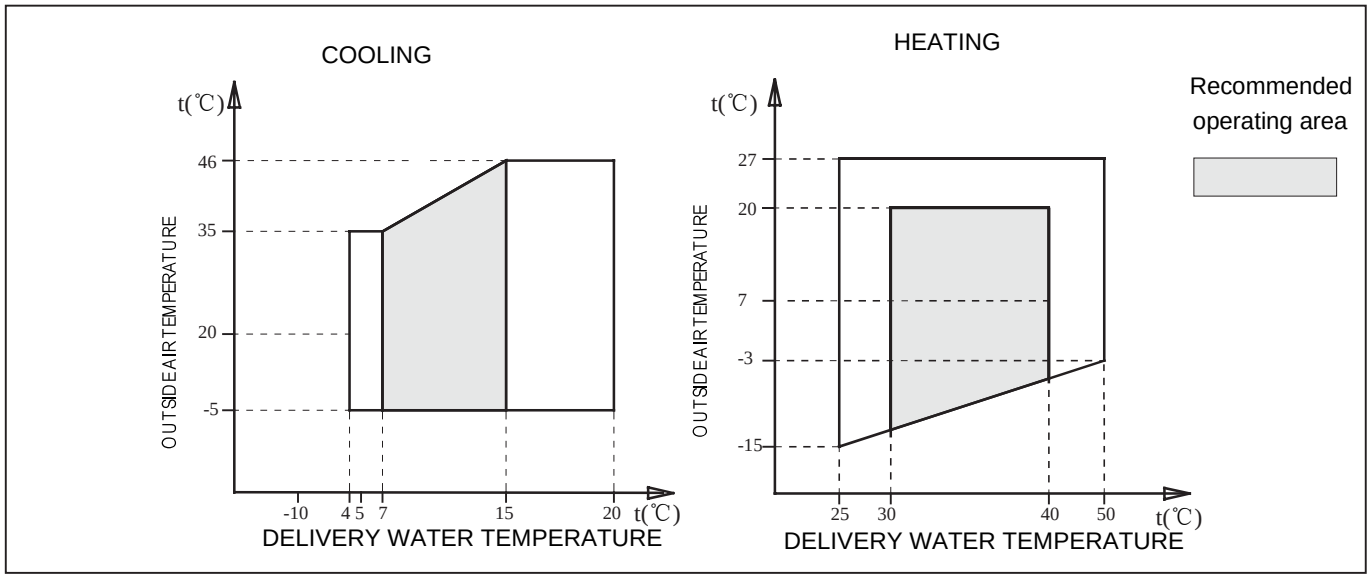
Display	Malfunction or Protection
PL	Radiator high temperature protection
P1	High pressure protection
P2	Low pressure protection
P3	Outdoor units current protection
P4	Compressor discharge temp. Protection
P5	Condenser high temperature protection
P6	IPM mode protection
Pb	Outdoor units anti-freezing protection
CH	High temperature protection in heating mode
C0	Tin temperature sensor malfunction
dF	Defrosting
d8	Remote control

Temp. Sensor code	Property values
Tin/Tout/ Tb1/T3/T4	$B_{25/50}$=4100K，R_{25}℃=10kΩ
Tp	$B_{25/50}$=3950K，R_{90}℃=5kΩ

Air conditioner operating conditions
For proper performance, run the air conditoner under the following temperature conditions

Cooling	Outdoor temperature: - 5 ~ 46ºC (- 15 ~ 24ºC, Adding antifreeze from 5ºC)
Heating	Outdoor temperature: - 15 ~ 27ºC (- 15 ~ 24ºC, Adding antifreeze from 5ºC)
Water temperature setting (intlet)	Cooling: 10 ~ 26ºC Heating: 30 ~ 50ºC

If air conditioner is used beyond the above conditions, safely protection features may come into operation



Thermal head min.- max.	4-6
Water circuit pressure (bars)	1-3
Max.storage temperature	63

ETHYLENE GLYCOL SOLUTIONS

Water and ethylene glycol solutions used as a thermal vector in the place of water reduce the performance of the unit.Multiply the performance figures by the values given in the following table.

Freezing point (°C)						
	0	-5	-10	-15	-20	-25

Percentage of ethylene glycol in weight						
	0	12%	20%	28%	35%	40%
cPf	1	0.98	0.97	0.965	0.96	0.955
cQ	1	1.02	1.04	1.075	1.11	1.14
cdp	1	1.07	1.11	1.18	1.22	1.24

cPf: correction factor refrigerating capacity
cQ: correction factor flow rate
cdp: correction factor pressure drop

⚠ During winter leaving the unit unused, please drain water out completely from unit if no antifreeze were charged into pipeline, or keep power on(at standby or off status) and ensure that water is contained inside of unit.
When ambient temperature lower 5℃running cooling mode must be charged antifreeze. Refer to upper parameters for the charged volume.

FOULING FACTORS

The performance data given refer to conditions with clean evaporator plates (fouling factor=1).For different fouling factors,multiply the figures in the performance tables by the coefficient given in the following table.

Fouling factors	Evaporator		
(m^2 °C/W)	f1	fk1	fx1
4.4 x 10^{-5}	-	-	-
0.86 x 10^{-4}	0.96	0.99	0.99
1.72 x10^{-4}	0.93	0.98	0.98

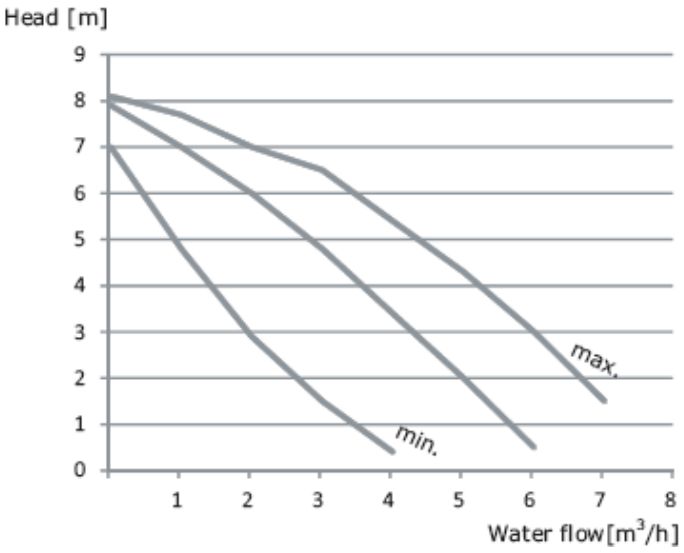
f1 capacity correction factor

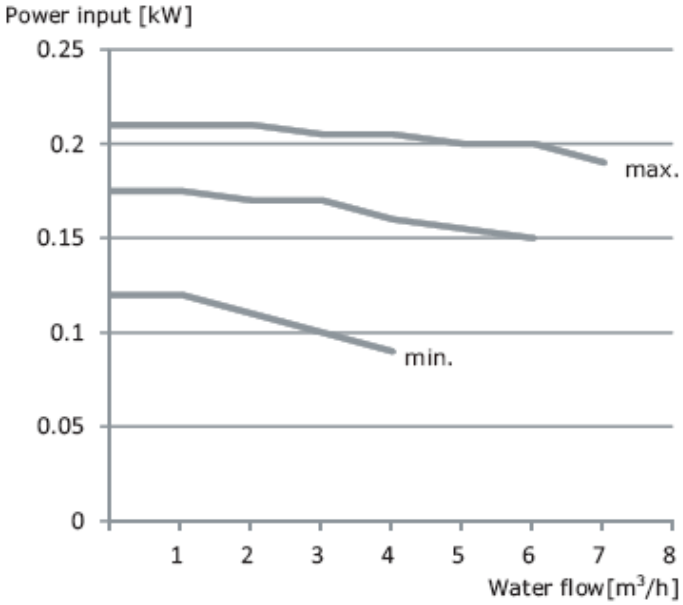
fk1 compressor power input correction factor

fx1 total power input correction factor

If the total water volume in the system is less than the value in the table above, the additional water tank is necessary in order to avoid the compressor On and Off frequently.
The minimum size of the water tank is calculated as:
Size of additional water tank(L) = Minimum water volume(L) - Actual water volume(L)

USEFUL PUMP HEAD CURVES (10 to 16 kW)

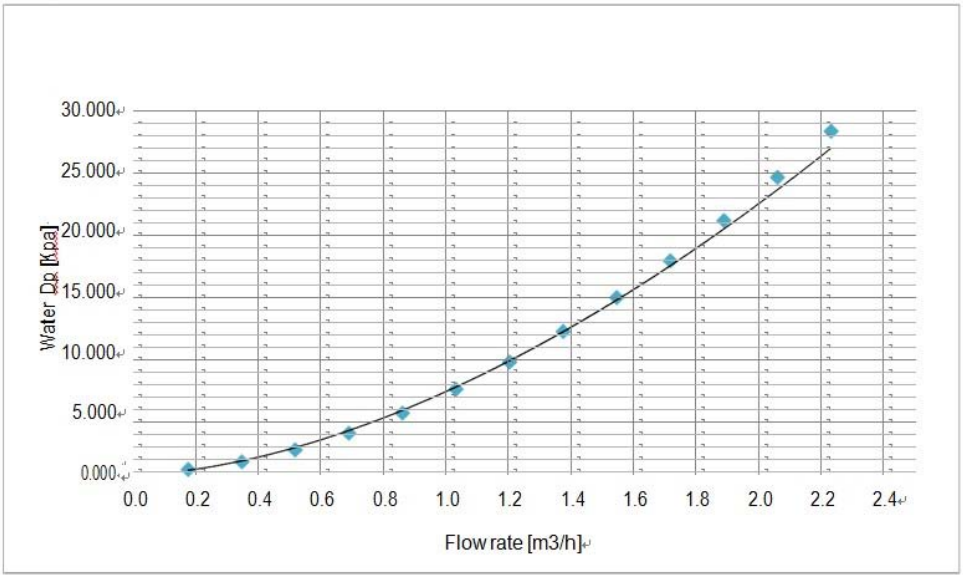




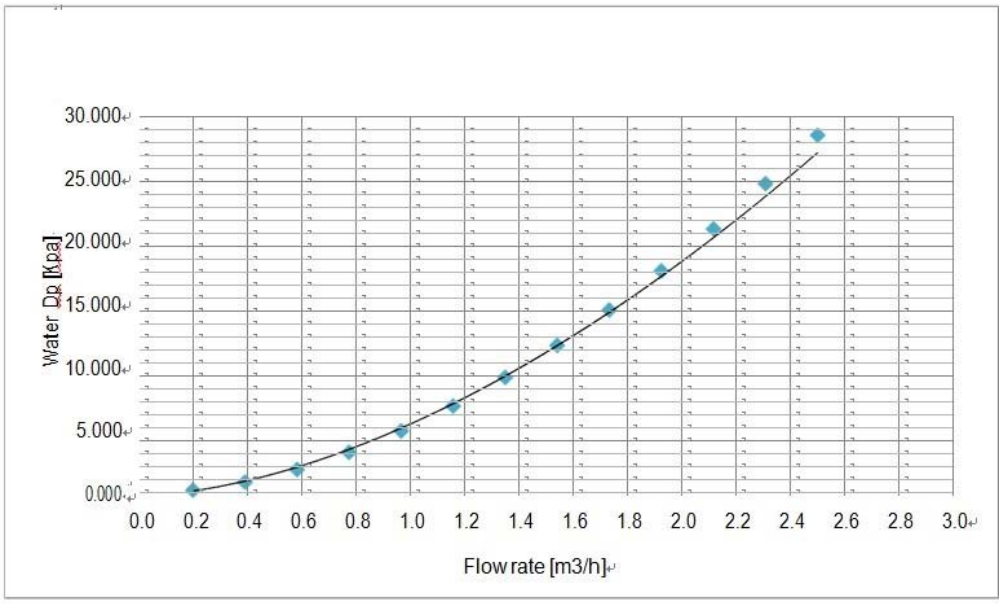
(*) To obtain the useful head of the installation,subtract the pressure drop of the plate heat exchanger.

HEAT EXCHANGER PRESSURE DROP (WATER SIDE)

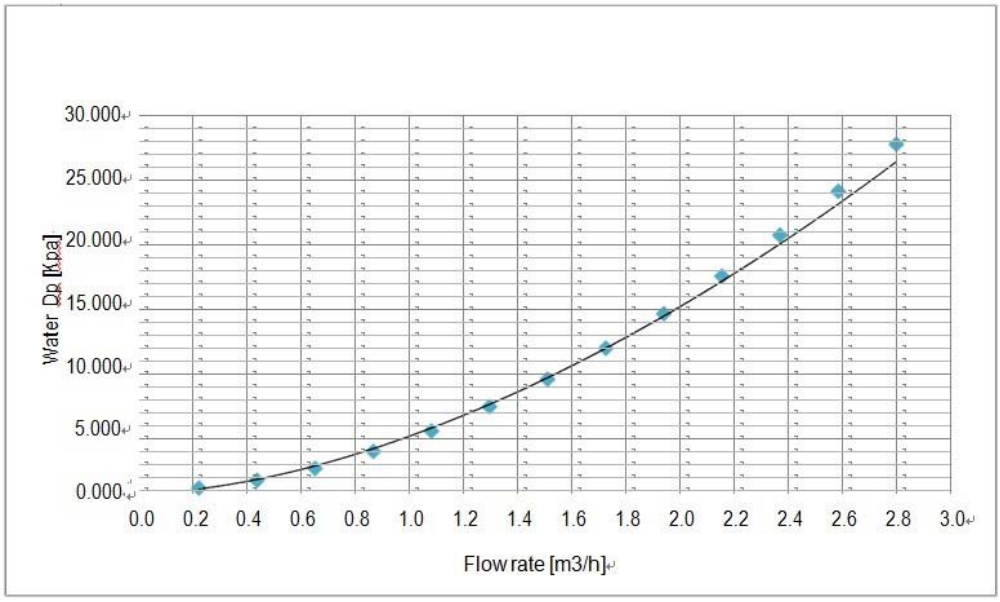
MUENR-10-H4



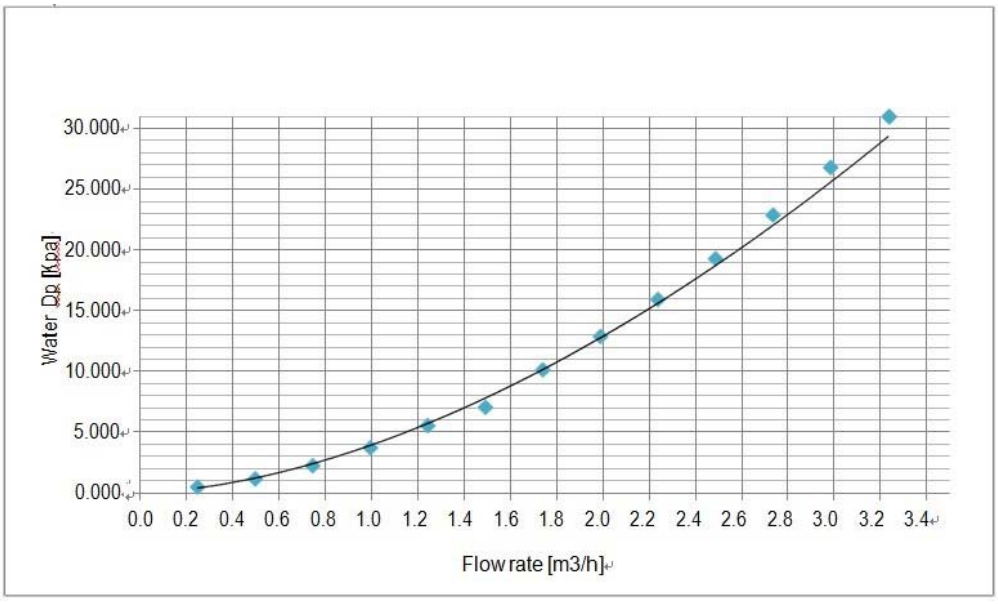
MUENR-12-H4

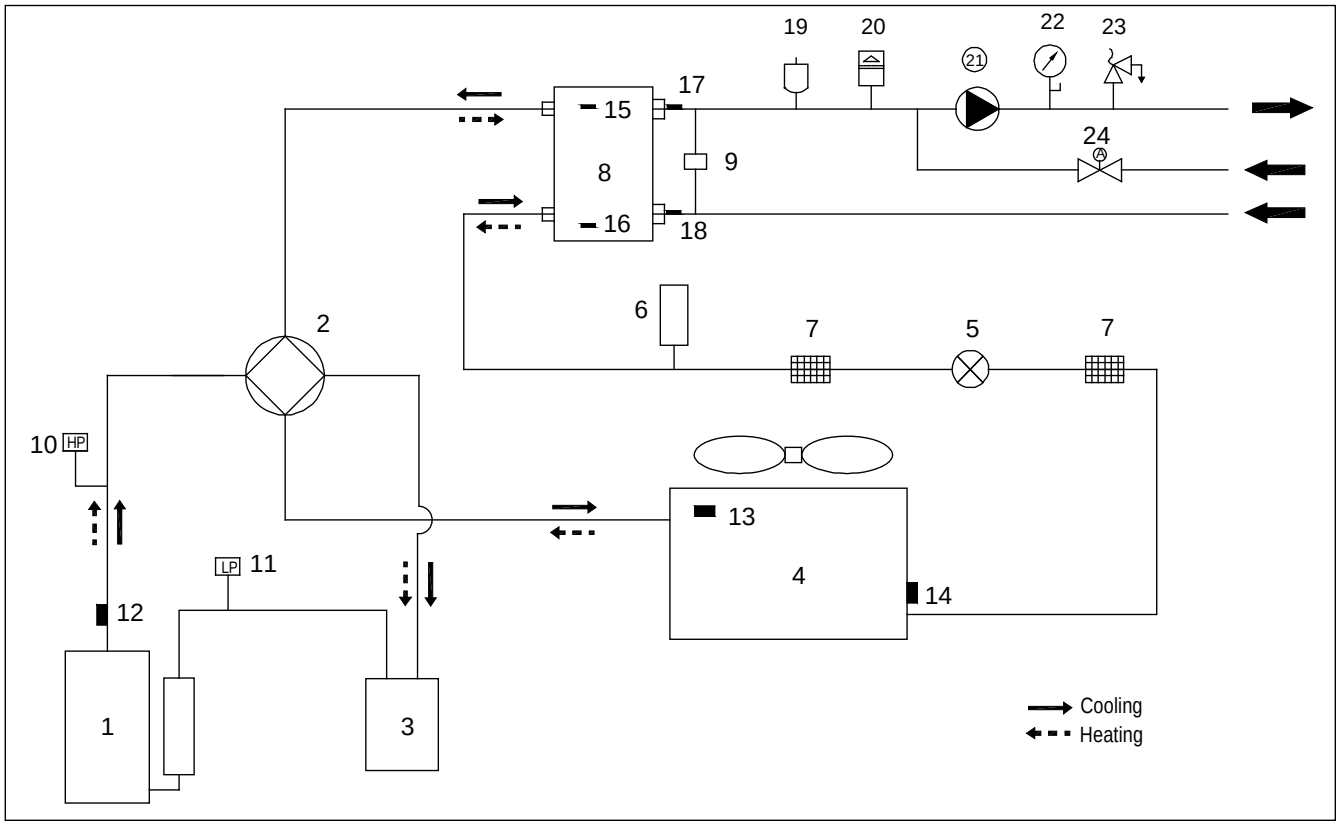


MUENR-14-H4



MUENR-16-H4





1	Compressor	9	Differential Pressure Switch	17	Thermistor For Water Outlet
2	4-Way Valve	10	High Pressure Switch	18	Thermistor For Water Inlet
3	Accumulatior	11	Low Pressure Switch	19	Automatic Discharge Valve
4	Air Side Heat Exchanger	12	Discharge Gas thermistor	20	Expansion Tank
5	Electronic Expansion Valve	13	thermistor For Outdoor Temperature	21	Circulating Pump
6	Storage Tank	14	Thermistor For Evaporation In Heating	22	Pressure Gauge
7	Strainer		(Thermistor For Condenser In Cooling)	23	Safety Valve
8	Water Side Heat Exchanger	15	Thermistor For Plate Heat Exchange 1	24	Auto-watet replenishing
	(Plate Heat Exchange)	16	Thermistor For Plate Heat Exchange 2		

PREPARING FOR FIRST START UP

Restarting after shutting down for long periods

The chiller must be started up for the first time by the Technical Service.Before starting up the chillers,make sure that:

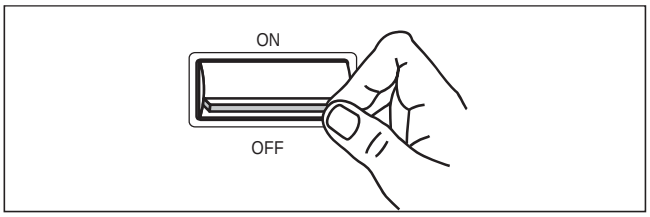
-All safety conditions have been respected
-The chiller is adequately fixed to the surface it rests on
-Functional distances have been respected;
-Hydraulic connections have been carried out as indicated in the instruction manual
-The water circuit is filled and vented.When draining after heat pump operation,take care as the water may be hot;
-The water circuit valves are open
-Electrical connections have been carried out correctly
-Voltage is within a tolerance of 10% of the rated voltage for the unit
-The unit is correctly earthed
-All electrical and hydraulic connections are tight and have been completed correctly.

⚠ The unit must be started up for the first time with standard settings.Set point values may be modified only aftertesting has been completed.Before starting up,power the unit for at least two hours by switching QF1 and QS1 toON and setting the control panel "HSW7" to OFF toallow the oil in the compressor sump to heat up.

STARTING UP FOR THE FIRST TIME (after two hours)

Before activating the chiller:

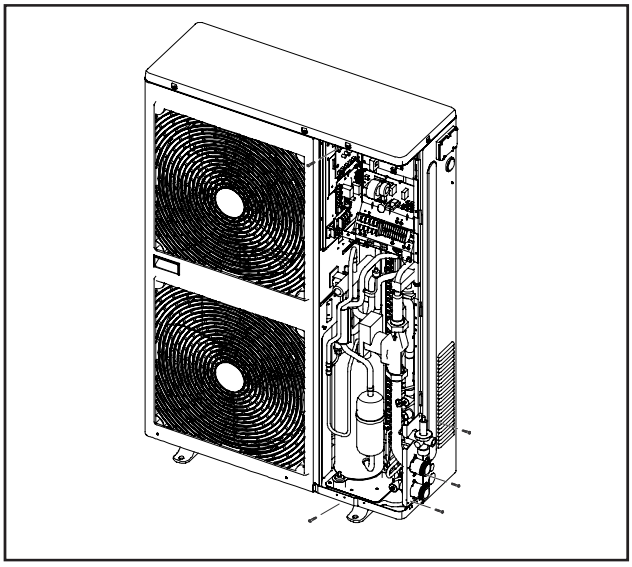
- Make sure the main remote switch QF1 is in the OFF position;



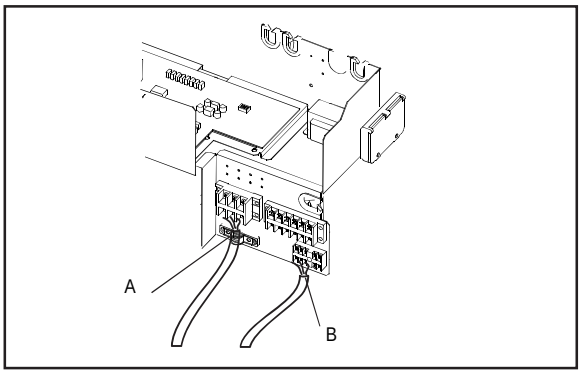
-Make sure the remote secondary switch SA2 is in the OFF or STANDBY position
- Make sure the remote keyboard A6 (if present) is set to OFF

To complete the electrical connections:

- Remove the inspection panel by unscrewing the five screws



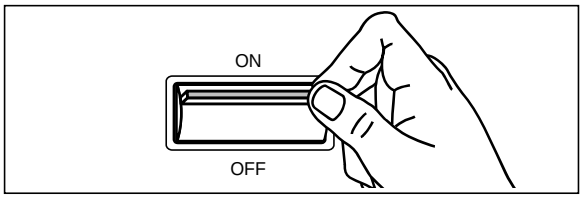
- Use grommet Afor the electrical power cable and grommet Bfor the other external wires.



-Replace the inspection panel
-Position the main switch QF1 (outside the unit) in the "ON" position
-The "POWER" LED on the control panel comes on to signal that voltage is present..

ACTIVATING AND DEACTIVATING THE UNIT

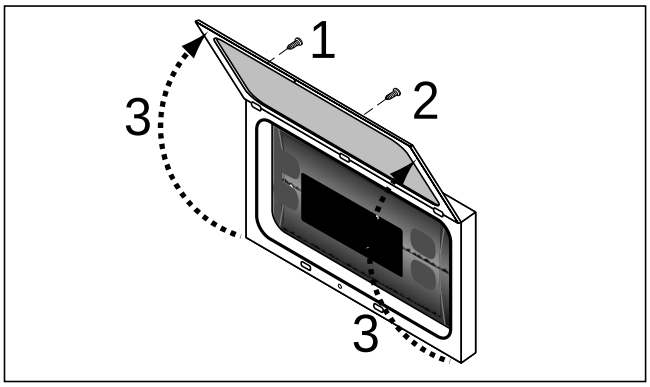
- Set the remote keyboard “A6” (if present) to ON.



-To ACTIVATE and DEACTIVATE the COOLING and HEATING functions,use the "ST542" control panel orthe remote keyboard "A6" if present.

During this phase, if the following indications appear on the display, follow the instructions:

⚠ Er20 check water flow rate and differential pressure switch.

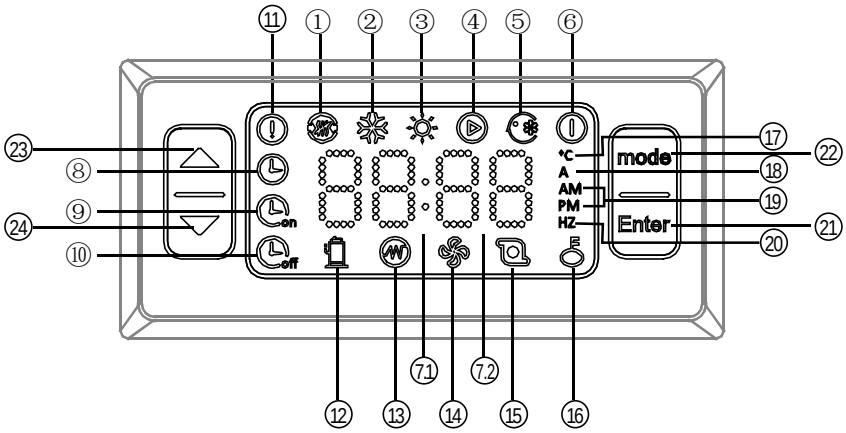


To access the control panel,open the door:
-remove the screw 1 and screw 2;
-lift the door 3.

U I A ACTIVATING AND DEACTIVATING THE UNIT

I.Icon Description

The front panel of the device functions as the user interface and is used to perform all operations relating to the device.



NO.	Icon	Description
①		Outside heat source running icon(reserved)
②		Cooling mode icon This icon will be constantly light when customers choose cooling mode.
③		Heating mode icon This icon will be constantly light when customers choose heating mode.
④		Water pump mode icon This icon will be constantly light when customers choose water pump mode.
⑤		Force cooling icon This icon will be constantly light when customers choose force cooling mode.
⑥		Power off icon This icon will be constantly light when customers choose power off mode.
⑦.1	88:88	Clock icon, the middle”” flicker once every 1s. It will display time when customers set the timer.
⑦.2	88	The last 2 digits of the nixie tube “88” icon. If “88” is constantly light, it will display the current inlet water temperature. Its unit is ℃. When customers do water temperature set, icon will display the set water temperature. When checking, “88” will display the result of checking. When water heating is broken down or in protection, “88” display the error code and protection code.
⑧		Clock icon It will display when finish setting the clock and be extinguished when the clock setting work is done.
⑨		Timing on function icon on will flicker when setting timing on. The icon will be constantly light when finish setting.

NO.	Icon	Description
⑩		Timing off function icon will flicker when setting timing off. The icon will be constantly light when finish setting.
⑪		Breakdown light icon When the unit is broken down or under protection, this icon will flicker and will be extinguished when malfunction and protection are eliminated.
⑫		Compressor booting indicator icon When booting the compressor, this icon will be constantly light. It will be extinguished when the compressor is shut down
⑬		E-heater booting indicator icon When booting the external E-heater, this icon will be constantly light. It will be extinguished when the external E-heater is shut down.
⑭		Fan booting indicator icon When booting the fan, this icon will be constantly light. It will be extinguished when the fan is shut down.
⑮		Water pump booting indicator icon When booting the water pump, this icon will be constantly light. It will be extinguished when the water pump is shut down.
⑯		Key freezing icon When freezing the keys, this icon will be constantly light. It will be extinguished when unfreezing keys.
⑰		Temperature unit icon When the control panel displays temperature, this icon will be constantly light.
⑱		Current unit icon When the control panel displays current, this icon will be constantly light.
⑲	AM PM	Time format icon The unit is 12-hour format. "AM "will be constantly light when it is forenoon. " PM" will be constantly light when it is afternoon
⑳		Frequency unit icon It will be constantly light when the control panel displays frequency of the compressor.
㉑	Enter	ON/OFF and OK button 1.Long press " Enter " for 3S will power on or off the controller. 2.Press " Enter " to confirm the former operation when finishing the setting work.
㉒	mode	Mode choice function. Choose operation mode. 1.Function choice. Long press it for 3s to enter function setting in the main interface.(Clock setting, Timing on and timing off setting) 2.Back to the previous menu. Long press it for 3s to back to previous menu in the function setting interface. Top menu is the main interface.
㉓		Up(Value increase) Forward to the previous interface.
㉔		Down(Value decrease) Backward to the next interface.

II.Control panel operation description

1) ON/OFF
Operation mode one:
Power off: Long press " Enter " for 3s in the main interface. The panel displays "OFF" and other icons will be extinguished. The unit stops.
Power on: When the display panel shows "OFF", long press " Enter " for 3s and wait for the unit to enter standby mode. Then power on the unit according to Operation mode two.

Operation mode 2:
Power off: Press " mode " in the main interface to enter mode choice function and the icon which indicate the current mode will flicker. Press " mode " circularly to choose power off mode, " ⏻ " will flicker at this moment. Press "mode" button to confirm the power off mode. By this time, " ⏻ " will be constantly light and the unit stops.
Power on: In the power off mode, press "mode" to enter mode choice functionn. Press "mode" circularly to choose one kind of "power on" mode, the "mode" button will flicker at the moment. Press " Enter " to confirm the power on mode. The unit will run as the chosen mode when the mode icon will be constantly light.

2) Mode choice and temperature settings
Press " mode " in the main interface to enter mode choice function. The "Mode" icon will flicker. Click "mode" circularly to choose a mode. The circulating order is "Cooling mode"→"Heating mode"→"Water pump mode" →"Power off mode" → "Cooling mode". The chosen mode will flicker. Press " △ "or " ▽ " to increase/decrease the temperature in the chosen mode.
Press " Enter" to confirm power off mode and the set temperature. Mode icon will be constantly light and the unit will run as the chosen mode.
Press " △ " or " ▽ " in the main interface to increase/decrease the temperature in the chosen mode.

3) Clock setting

Long press " mode " for 3s to enter function interface. " ⏲ " clock icon will flicker. Press " Enter " to enter clock setting function. " ⏲ " icon will be constantly light and the first 2 digits on nixie tube will flicker. Press " △ " or " ▽ " to set minute. Press " Enter " when finish setting and " ⏲ " will be extinguished.

4) Timing setting

1. Timing on setting

Long press " mode " for 3s to enter function interface. " ⏲ " clock icon will flicker. Press " mode " again to enter timing on function. " ⏲on " will flicker and press " Enter " to enter timing on setting.

At this moment, last 2 digits of the nixie tube display "01" which means the first group setting begins. Press " Enter " to the next step.

By this time, mode icon will flicker and press " mode " to choose timing on mode. Press " Enter " to confirm your choice and go to the next step.

By this time, the last 2 digits of the nixie tube will flicker and press " △ " or " ▽ " to adjust temperature and set the temperature of the inlet water. Press " Enter " to confirm and move to the next step.

By this time, the first 2 digits of the nixie tube will flicker and press " △ " or " ▽ " to adjust time of timing on. Press " mode " to confirm and switch to minute setting automatically. The last 2 digits of the nixie tube will flicker and press " △ " or " ▽ " to adjust minute setting of timing on.(minimal unit of minute adjustment: 15 minutes) .

Press " Enter " to confirm. The first group setting is finished and " ⏲on " will be constantly light.

When processing the second timing setting, repeat the 1-2 operation above. When the nixie tube displays "01" and flicker, press" △ " or " ▽ " to choose the timing on group. When the nixie tube displays " 02 " which means setting timing on function of the second group. Refers the timing on setting operation of group 1 to set that of group 2.

Long press " mode " for 3s to return to the previous interface to reset the parameter during setting clock timing.

2.Timing off setting

Long press " mode " for 3s in the main interface to enter function interface. Press " mode " circularly to enter timing off function. " ⏲off " will flicker and press " Enter " to enter timing off setting.

At this moment, the last 2 digits of the nixie tube display "01" which means the first group setting begins.

Press " Enter " to the next step.

By this time, the first 2 digits of the nixie tube will flicker and press " △ " or " ▽ " to adjust time of timing off. Press " mode " to confirm and switch to minute setting automatically. The last 2 digits of the nixie tube will flicker and press " △ " or " ▽ " to adjust minute setting of timing off. Press " Enter " to confirm. The first group setting is finished and " ⏲off " will be constantly light.

When processing timing setting of group 2, repeat the 1-2 operation above. When the nixie tube displays "01" and flicker, press " △ " or " ▽ " to choose the timing off group. When the nixie tube displays "02"which means setting timing off function of the second group. Refers the timing off setting operation of group 1 to set that of group 2.

3.Cancel all timing on/off settings

Long press " mode " for 3s to enter function interface. " ⏲ " clock icon will flicker and press " mode " to choose the timing function. " ⏲on " and " ⏲off " flicker simultaneously means choosing to cancel all timing functions.

Press " Enter " to cancel timing settings. " ⏲on " and " ⏲off " both will be extinguished.

III.Functions of combination key

1) Force cooling

Press " ▽ " and " mode " simultaneously for 3s in the main interface to enter into force cooling mode. The force cooling mode icon will be constantly light.

Press " ▽ " button and " mode " button simultaneously for 3s to quit force cooling mode. The unit will enter power off mode automatically when quitting force cooling mode.

2) Parameter checking function

1.To enter parameter checking function

Press " △ " and " ▽ " simultaneously for 3s to enter into the interface of parameter checking function. At this moment, first 2 digits of the nixie tube 88:88 will display sequence number and the last 2 digits is specific parameters.

Press " △ " or " ▽ " to query the relative parameters. See checking orders in Table 1-1.

2.Quit parameter query function

If there's no operation in 20s when enter the parameter query, it will quit automatically and return to the main interface.

Press " △ " and " ▽ " simultaneously to quit parameter query manually.

Table.1-1

No.	Content	Note
0	Normal display	Clock displays when standby. Inlet water temperature displays when running. dF displays when defrosting. Pb displays when anti-freeze running. d0 displays when oil return, d8 displays when remote control is off.
1	Frequency	Display operating frequency when the unit is in cooling mode and heating mode.
2	Operating mode	0-Power off, 1-water pump, 2-cooling, 3-heating, 4-force cooling, 5-force heating
3	Operating fan speed level	0—Power off (1-7)
4	The total required capacity before revised	Actual value (Force cooling displays 5)
5	Capacity requirements after revised	Actual value (Force cooling displays 5)
6	Temperature set	Actual setting temperature under cooling or heating mode
7	T3	Actual value(Outlet temperature of outdoor heat exchanger)
8	T4	Actual value(Outdoor ambient temperature)
9	Tp	Actual value(Compressor discharged temperature)
10	Tin	Actual value (Water inlet temperature of plate heat exchanger)
11	Tout	Actual value (Water outlet temperature of plate heat exchangers)
12	Tb1	Actual value(Temperature 1 of plate heat exchangers)
13	Tb2	Actual value(Temperature 2 of plate heat exchangers(equals to Tb1)
14	T6	Reserved(Cooling fin surface temperature(reserved)
15	Operation current	Actual value
16	Power supply voltage	Actual AD value
17	EXV Opening degrees	Actual value×8
18	Err 1	The last one malfunction code
19	Err 2	The last second malfunction code
20	Err 3	The last third malfunction code

3.Auto-lock(unlock) function

If don't operate the controller in 60s, the keyboard will lock automatically. Press "mode "and " Enter" simultaneously for 3s to unlock.

Error code and protection code shooting table:

Error Code	Content	Note
E9	EEPROM malfunction	The same as 5/7kW
H0	Communication malfunction between main chip and IPDU.	
E4	T3,T4 sensor malfunction	
E5	Voltage protection malfunction	
E6	DC fan motor malfunction	
EA	A fan in the A region run for more than 5 minutes in heating mode	
Eb	There are two times E6 fault in 10 minutes (recovery after power off)	
C0	Inlet water temperature sensor malfunction for 10~16kW models.	10-16kW
C1	Outlet water temperature sensor malfunction (10-16kW)	
F7	Sensor temperature 1 of plate heat exchangers for 10-16kW.	
F8	Sensor temperature 2 of plate heat exchangers for 10-16kW.	
PL	Reserved for 10-16kW.	
P1	High pressure protection	The same as 5/7kW
P2	Low pressure protection	
P3	Current protection of the compressor	
P4	Discharged temperature protection	
P5	T3 high temperature protection of outdoor condenser	
P6	IPDU module protection	
P8	Typhoon protection	
CH	Protection when water temperature is too high in heating mode.	10-16kW
CL	To low water temperature protection in heating mode for 10-16kW	
CP	Anti-idling protection for water pump	

Error Code	Content	Note
Pb	System anti-freeze protection	The same as 5/7kW
C8	Water flow switch protection malfunction	
PH	Protection when temperature difference between inlet water & outlet water is too large for 10-16kW.	10-16kW
dF	Defrosting	The same as 5/7kW
d8	Remote control	

IA OPERATING CHARACTERISTICS

Set point in cooling
(factory set) = 10°C,Hysteresis = 3°C.
The compressor starts with water temperatures above 13°C.
The compressor shuts down with water temperatures of less than 10°C.

Set point in heating
(factory set) = 45°C,hysteresis = 3°C.
The compressor starts with water temperatures below 42°C.
The compressor shuts down with water temperatures above 45°C.

In the event of a temporary power failure,when power returns,the mode set previously will be retained in the memory.

COMPRESSOR START UP DELAY
Two functions prevent the compressor from starting up too frequently
-Minimum time since last shut-down 180 seconds.
-Minimum time since last start-up 360 seconds.

PUMP
The electronic board includes a pump control output.The pump starts when the assembly is powered up and at least 120 seconds before the compressor starts up and stops 120 seconds after the assembly shuts down.
After the first 120 seconds of pump operation when the water flow is at full speed,the water flow alarm functions are activated (differential pressure switch and flow switch).
With a pump connected to terminals PL and PN on the installer terminal board.

FAN SPEED CONTROL
For correct operation of the unit with different outside temperatures,the microprocessor controls the fan speed based on the pressure reading from the pressure probe, thus enabling heat exchange to be increased and/or decreased,maintaining the condensing or evaporation temperature practically constant.
The fan functions independently of the compressor.

FROST PREVENTION ALARM
Toprevent the water freezing and damaging the plate heat exchanger,the microprocessor shuts down the compressor if the temperature measured by the heat exchanger outlet temperature sensor is less than 3°C.
The frost prevention temperature set point can be modified by an authorised service centre only and only after verifying that the water circuit contains antifreeze.
Tripping of this alarm shuts down the compressor but not the pump,which remains active.
Toreset normal functions,the outlet water temperature must rise to more than +15°C.Reset is manual.

WATER FLOW ALARM
The microprocessor provides for management of a water flow alarm controlled by a differential pressure switch fitted as standard on the appliance and a flow switch to be installed on the water delivery piping.
This safety device may trip after the first 120 seconds of pump operation when the water flow is up to speed.
Tripping of this alarm shuts down the compressor but not the pump,which remains active.
Toreset normal functions,the alarm contact must be deactivated for at least five seconds.

When electrical current current exceeds to setting value and condenser temperature over than 65°C, system will shut down,but not returns to normal operation until the condenser temperature decreased less than 52°C. If phase sequence were detected error, please re-input power, and then the system will turn normal.

SHUTTING DOWN FOR LONG PERIODS

A

If it is previewed not to use the machine for long periods After deactivating the chiller:

-Make sure the remote switch SA2 is in the "Standby" position,or alternatively disconnect the unit from the power supply.

-Make sure the remote keyboard (if present) or the ST542 is set to “OFF”.

-Position QF and QS on OFF

-Deactivate the indoor terminal units by placing the switch of each unit in the “OFF” position.

-Close the water valves.

⚠ If there is a possibility that the outside temperature may drop below zero,there is the risk of freezing. The water circuit MUST BE EMPTIED AND SHUT OFF POWER (when draining after heat pump operation take care as the water may be hot)or antifreeze must be added in the proportion recommended by the manufacturer.

ROUTINE MAINTENANCE

A

Never perform any cleaning operations before having disconnected the unit from the mains power supply.
If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similarly qualified manufacturer or its service agent or a similarly qualified.
Regular maintenance is fundamental to maintain the efficiency of the unit both in terms of operation and energy consumption.The Technical Assistance Service maintenance plan must be observed,with an annual service which includes the following operations and checks:

-Filling of the water circuit
-Presence of air bubbles in the water circuit
-Efficiency of safety devices
-Power supply voltage
-Power input
-Tightness of electrical and hydraulic connections
-Condition of the compressor contactor
-Efficiency of the plate heat exchanger heater
-Checking of operating pressure,superheating and subcooling
-Efficiency of compressor heater
-Cleaning of finned coil (*)
-Cleaning of fan grills
-Cleaning of condensate drain pan (if installed).

(*) for “Heat pump” appliances,the checks are to be performed quarterly.
For units installed near the sea,the intervals between maintenance should be halved.

EXTRAORDINARY MAINTENANCE

A

Never perform any cleaning operations before having disconnected the unit from the mains power supply.

CHEMICAL WASHING

You are recommended to chemically wash the plate heat exchanger after every 3 years of operation.For instructions on how to carry out this operation,contact De’ Longhi Spa.

REFRIGERANT GAS CONTENT

The chillers are filled R410a refrigerant gas and tested in the factory.In normal conditions,there should be no need for the Technical Assistance Service to intervene to check the refrigerant gas.However,over time,small leaks may develop at the joints leading to loss of refrigerant and draining of the circuit,causing the unit to function poorly.In this case,the leaks of refrigerant must be identified and repaired and the refrigerant circuit refilled.Proceed as follows:

- Empty and dry the entire refrigerant circuit using a vacuum pump connected to the low and high pressure tap until the vacuometer reads about 10 Pa.Wait a couple of minutes and check that this value does not rise to more than 200 Pa.

-Connect the refrigerant gas cylinder or a filling cylinder to the low pressure line pressure gauge connection.

-Fill with the quantity of refrigerant gas indicated on the rating plate of the unit..

-Always check the superheating and subcooling values.In the nominal operating conditions for the appliance,these should be between 5 and 10°C and between 4 and 8°C respectively.

-After a couple of hours of operation,check that the liquid indicator indicates circuit dry (dry-green)

⚠ In the event of partial leaks,the circuit must be completely emptied before being refilled.
The R410a refrigerant must only be filled in the liquid state.
Operating conditions other than nominal conditions may produce considerably different values.
Seal testing or identification of leaks must only be carried out using R410a refrigerant gas,checking with a suitable leak detector.

⛔ The refrigerant circuit must not be filled with a refrigerant other than that indicated on page 14.
The use of a different refrigerant may cause serious damage to the compressor.
Oxygen,acetylene or other inflammable or poisonous gases must never be used in the refrigerant circuit as they may cause explosion or poisoning.
Oils other than those indicated on pages 14 must not be used.The use of different oils may cause serious damage to the compressor.

A DISPOSAL

Do not dispose this product as unsorted municipal waste. Collection of such waste separately for special treatment is necessary
Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities.
Contact you local government for information regarding the collection systems available.

If electrical appliances are disposed of in landfills or dumps,. hazardous substances can leak into the groundwater and get into the food chain, damaging your health and well-being.

I A TROUBLESHOOTING

FAULT	CAUSE	REMEDY
The chiller does not start up	No voltage	- Check presence of voltage - Check safety systems upstream tof he appliance
	Mains switch in OFF position Remote switch (if present) in OFF position Control panel set to OFF Main unit switch in OFF position Compressor thermal solenoid switch OFF	Switch ON
	Supply voltage too low	Check power line
	Contactor coil faulty Electronic board faulty Start-up capacitor faulty (if present) Compressor faulty	Replace the component
Insufficient output	Insufficient refrigerant Sizing of unit Operation outside recommended limits	Check
Compressor noisy	Liquid returning to compressor Inadequate fixing	Check
	Reversed phase (three phase units only)	Reverse one phase
Noise and vibrations	Contact between metal bodies	Check
	Weak foundations	Repair
	Loose screws	Tighten screws
The compressor stops due to the activation of the protection devices	Excessive delivery pressure Low suction pressure Low voltage Electrical connections not sufficiently tight Operation outside permitted limits	Check
	Faulty operation of pressure switches	Thermal cut-out tripped
	Replace the component	Check supply voltage Check electrical insulation of windings

FAULT	CAUSE	REMEDY
High discharge pressure (greater than 36 bars)	High external water temperature High water inlet temperature	Check
	Insufficient air flow Insufficient water flow	Check fan operation Check pump operation
	Faulty fan regulation	Check
	Air in water circuit	Ventair
	Excessive refrigerant charge	Check
Low discharge pressure (less than 25 bars)	Low outside air temperature Low water inlet temperature	Check
	Moisture in the refrigerant circuit (liquid indicator - moisture yellow)	Faulty fan control
	Faulty fan control	Check
	Air in water circuit	Vent air
	Insufficient gas content	Check
High suction pressure (greater than 10 bars)	High outside air temperature High inflow water temperature	Check
Low suction pressure (less than 5.0 bars)	Low utility water inlet temperature Low external water inlet temperature Clogged water filter Blocked plate heat exchanger	Check

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