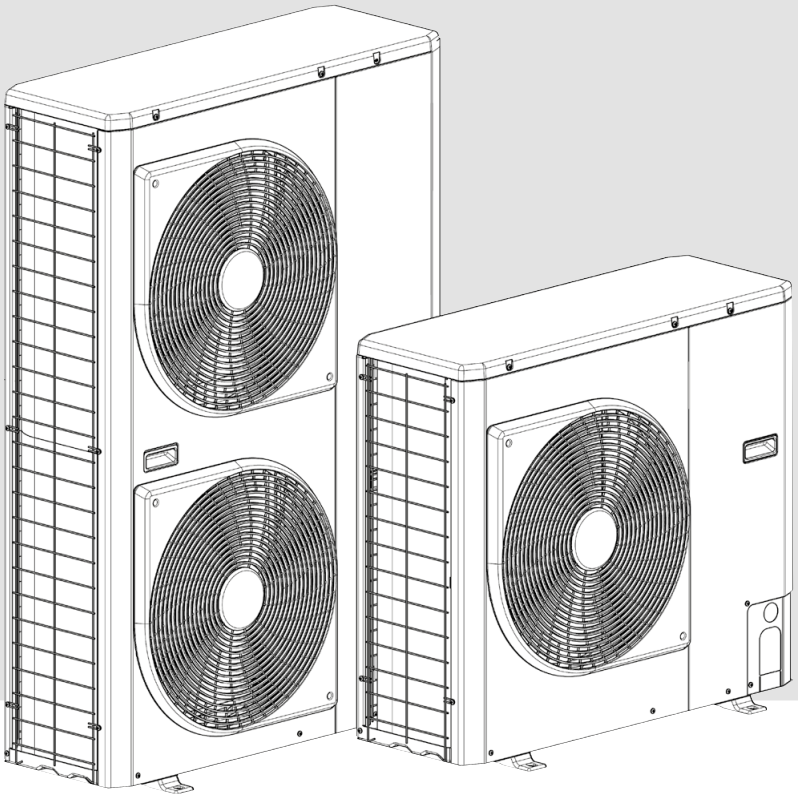
Carrier

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS



AquaSnap Plus Reversible Inverter

30AWH

Original instructions

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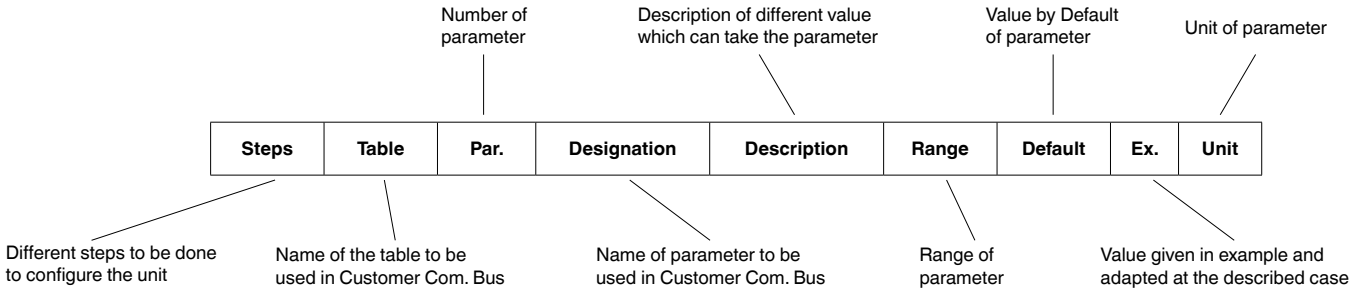
The cover photograph is for illustrative purposes only and is not part of any offer for sale or contract.

ACRONYMS AND LEGEND

Acronyms

IAT	Indoor Air Temperature
BPHE	Brazed Plate Heat Exchanger
CHWS	Chiller Water System
DHW	Domestic Hot Water
EHS	Electric Heater Stage
EWT	Entering Water Temperature
FCU	Fan Coil Unit
LWT	Leaving Water Temperature
NHC	New Hydraulic Control (refer to wiring diagram 'Main control card')
OAT	Outdoor Air Temperature
PMV	Pulse Modulating Valve
SHC	Space Heating / Cooling Control
TR	Refrigerant Temperature
UFC	Underfloor Cooling
UFH	Underfloor Heating
WUI	User Interface (Wall-mounted User Interface)

Control Configuration Legend

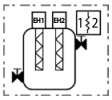
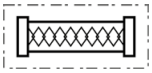


Possible to configure by direct access on WUI. Refer to WUI end user Manual.

✓ Check to be done

Advanced Configuration Level (for basic operation no need to modify the setting)

Standard installation Legend

Label	Symbol	Designation	Notes
-		Device	Field supplied
-		Accessory	Field mounted
-		Option	Factory mounted
-		Balancing valve	Field supplied Balancing to adjust the water flow rate
-		Stop valve	Field supplied
-		Automatic Air vent	Field supplied Automatic air vent(s) on highest position in the loop
Add EXP-T		Additional expansion tank	Field supplied Additional expansion tank depending the total water in the loop contend - taking in account the expansion tank (XXL) embedded in hydraulic module
-		Boiler	Boiler used to boost or backup the heat pump for comfort
EH1 & EH2		Electrical Heater (1 or 2)	Electrical heaters up to two with a max. stages up to 3 Used to boost or backup the heat pump for comfort
EH3		DHW-Electrical Heater Backup (1 stage)	Domestic Hot Water Electrical Heater - one stage used to backup DHW (when condtions are out of heat pump map)
DHW-T		Domestic Hot Water - Tank	Field supplied
DHW-S		Domestic Hot Water - Sensor	Accessory to mount on top of the DHW-Tank Measure DHW-Temperature
DHW-V		Domestic Hot Water - Valve or Diverting valve	Accessory to be field mounted, it will position the valve to send either to comfort loop or DHW-T, the processed water
add_pmp		Additional Water Pump	Field Supplied, it is used for comfort loop as a secondary loop
De-Coupling Tank		De-Coupling Tank	Field Supplied, it is used to connect different water loop rates as well as to receive the boiler loop
Backup-EH		Backup electrical heater	Field Supplied, it is used for comfort loop as a Booster Heater (HP+EH) or Backup (EH only) when HP is out of the map.
-		Flexible	Field supply, it is used to lower vibrations transmissions if necessary
HTSS		High Temperature Safety Switch	Field supplied, use to stop system when UFH max, water temperature is triggered

1 - INTRODUCTION

1.1 - Introduction

Prior to the initial start-up of the 30AWH units, the people involved should be thoroughly familiar with these instructions and technical data for the installation.

The 30AWH outdoor systems are designed to provide a very high level of safety and reliability making installation, start-up, operation and maintenance easier and more secure. They will provide safe and reliable service when operated within their application range.

They are designed for an operating life of 15 years by assuming a 75% utilisation factor; that is approximately 100,000 operating hours.

The procedures in this manual are arranged in the sequence required for machine installation, start-up, operation and maintenance.

Be sure you understand and follow the procedures and safety precautions contained in the instructions supplied with the machine, as well as those listed in this guide, such as: protective clothing such as gloves, safety glasses, safety shoes and appropriate tools, and suitable qualifications (electrical, air conditioning, local legislation).

To find out, if these products comply with European directives (machine safety, low voltage, electromagnetic compatibility, equipment under pressure, etc.) check the declarations of conformity for these products.

1.2 - Safety

1.2.1 - Installation safety considerations

After the unit has been received, and before it is started up, it must be inspected for damage. Check that the refrigerant circuits are intact, especially that no components or pipes have shifted or been damaged (e.g. following a shock). If in doubt, carry out a leak tightness check. If damage is detected upon receipt and before signature, immediately file a claim with the shipping company.

This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.

Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

Do not remove the pallet or the packaging until the unit is in its final position. These units can be moved with a fork lift truck, as long as the forks are positioned in the right place and direction on the unit.

The units can also be lifted with slings (refer to Figure 1 and 2).

Use slings with the correct capacity, and always follow the lifting instructions on the certified drawings supplied for the unit.

Safety is only guaranteed, if these instructions are carefully followed. If this is not the case, there is a risk of material deterioration and injuries to personnel.

DO NOT COVER ANY PROTECTION DEVICES.

This applies to fuse plugs and relief valves (if used) in the refrigerant or heat transfer medium circuits. Check if the original protection plugs are still present at the valve outlets. These plugs are generally made of plastic and should not be used. If they are still present, please remove them. Install devices at the valve outlets or drain piping that prevent the penetration of foreign bodies (dust, building debris, etc.) and atmospheric agents (water can form rust or ice). These devices, as well as the drain piping, must not impair operation and not lead to a pressure drop that is higher than 10% of the control pressure.

Control

When the unit is subjected to fire, the fluid may then be decomposed into toxic residues when subjected to the flame :

- ***Stay away from the unit.***
- ***Set up warnings and recommendations for personnel in charge to stop the fire.***
- ***Fire extinguishers appropriate to the system and the refrigerant type must be easily accessible.***

All precautions concerning handling of refrigerant must be observed in accordance with local regulations.

Accumulation of refrigerant in an enclosed space can displace oxygen and cause asphyxiation or explosions.

Inhalation of high concentrations of vapour is harmful and may cause heart irregularities, unconsciousness, or death. Vapour is heavier than air and reduces the amount of oxygen available for breathing. These products cause eye and skin irritation. Decomposition products can be hazardous.

Short-circuit power

This equipment complies with EN 61000-3-12 provided that the short-circuit power Ssc is greater than or equal to 1,6 MVA at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a short-circuit power Ssc greater than or equal to 1,6 MVA.

1.2.2 - Equipment and components under pressure

These products incorporate equipment or components under pressure, produced by manufacturers. We recommend that you consult your appropriate national trade association or the owner of the equipment or components under pressure (declaration, re-qualification, retesting, etc.). The characteristics of this equipment/these components are given on the nameplate or in the required documentation, supplied with the products.

The units are intended to be stored and operate in an environment where the ambient temperature must not be less than the lowest allowable temperature indicated on the nameplate.

Do not introduce significant static or dynamic pressure with regard to the operating pressures used during operation or for tests in the refrigerant circuit or in the heat exchange circuits.

NOTES:

Monitoring during operation, re-qualification, re-testing, exemption from retesting:

- ***Follow local regulations on the monitoring of pressure-containing equipment.***
- ***The user or the operator is usually requested to create and maintain a monitoring and maintenance register.***
- ***In absence of regulation or in addition to the regulations, follow the guidance in ISO 5149.***
- ***Follow the local professional recommendations, whenever they exist.***
- ***Regularly monitor the surface of the components to detect cavernous corrosion. To do this check an uninsulated part of the pressure vessel or at a joint in the insulation.***
- ***Regularly check for possible presence of impurities (e.g. silicon grains) in the heat exchange fluids. These impurities can cause wear and/or pitting corrosion.***
- ***Filter the heat exchange fluid.***
- ***The reports of the periodical checks by the user or the operator must be included in the monitoring and maintenance register.***

REPAIR:

Any repair or modification of a pressure vessel is prohibited.

Only the replacement of the vessel by an original part from the manufacturer is allowed. In this case, the replacement must be carried out by a qualified technician. The replacement of the vessel must be entered in the monitoring and maintenance register.

RECYCLING:

The pressure equipment can be recycled in whole or in part. After use they may contain refrigerant vapours and oil residue. Some parts are painted.

1.2.3 - Maintenance safety considerations

Professional technicians working on the electric or refrigeration components must be authorized, trained and fully qualified to do so.

All refrigerant circuit work must be carried out by a trained person, fully qualified to work on these units. He must have been trained and be familiar with the equipment and the installation. All welding operations must be carried out by qualified specialists.

The units use high-pressure R-410A refrigerant (the unit operating pressure is above 40 bar, the pressure at 35°C air temperature is 50% higher than for R-22). Special equipment must be used when working on the refrigerant circuit (pressure gauge, charge transfer, etc.).

Do not clean the unit with hot water or steam. This may cause a pressure increase of the refrigerant.

Any manipulation (opening or closing) of a shut-off valve must be carried out by a qualified and authorised technician, observing applicable standards (e.g. during draining operations). The unit must be switched off while this is done.

During any handling, maintenance and service operations the qualified technician working on the unit must be equipped with safety gloves, safety glasses, shoes and protective clothing.

Never work on a unit that is still energized. Never work on any of the electrical components, until the general power supply to the unit has been cut.

If any maintenance operations are carried out on the unit, lock the power supply circuit in the open position and secure the machine upstream with a padlock.

If the work is interrupted, always ensure that all circuits are still de-energized before resuming the work.

CAUTION:

Even if the unit has been switched off, the power circuit remains energized, unless the unit or customer circuit disconnect switch is open. Refer to the wiring diagram for further details. Attach appropriate safety labels. When working in a fan area, specifically if the grilles have to be removed, isolate the power supply to the fans to prevent their operation.

CAUTION:

The variable frequency drives (VFD) fitted to the units have circuit capacitors whose discharge time is five (5) minutes after disconnecting the power supply.

Therefore, after disconnecting the power supply of the control box, wait for 5 minutes before access it.

Before any intervention, verify that there is no voltage present at any accessible conducting parts of the power circuit.

Moreover be careful of contact with zones at hot temperature inside the unit, which can exist after the operation of unit (refrigerant and electronic parts).

It is recommended to install an indicating device to show if part of the refrigerant has leaked from the valve. The presence of oil at the outlet orifice is a useful indicator that refrigerant has leaked. Keep this orifice clean to ensure that any leaks are obvious. The calibration of a valve that has leaked is generally lower than its original calibration. The new calibration may affect the operating range. To avoid nuisance tripping or leaks, replace or re-calibrate the valve.

OPERATING CHECKS:

- ***IMPORTANT INFORMATION REGARDING THE REFRIGERANT USED:***

This product contains fluorinated greenhouse gas covered by the Kyoto protocol.

Refrigerant type: R-410A

Global Warming Potential (GWP): 2088

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

CAUTION:

1. ***Any intervention on the refrigerant circuit of this product should be performed in accordance with the applicable legislation. In the EU, the regulation is called F-Gas, N°517/2014.***
2. ***Ensure that the refrigerant is never released to the atmosphere during installation, maintenance or equipment disposal.***
3. ***The deliberate gas release into the atmosphere is not allowed.***
4. ***If a refrigerant leak is detected, ensure that it is stopped and repaired as quickly as possible.***
5. ***Only a qualified and certified personnel can perform installation operations, maintenance, refrigerant circuit leak test as well as the equipment disposal and the refrigerant recovering.***
6. ***The gas recovery for recycling, regeneration or destruction is at customer charge.***

7. Periodic leak tests have to be carried out by the customer or by third parties. The EU regulation set the periodicity here after:

System WITHOUT leakage detection		No Check	12 Months	6 Months	3 Months
System WITH leakage detection		No Check	24 Months	12 Months	6 Months
Refrigerant charge/circuit (CO_2 equivalent)		< 5 Tons	5 ≤ Charge < 50 Tons	50 ≤ Charge < 500 Tons	Charge > 500 Tons(1)
Refrigerant charge/ Circuit (kg)	R134A (GWP 1430)	Charge < 3.5 kg	3.5 ≤ Charge < 34.9 kg	34.9 ≤ Charge < 349.7 kg	Charge > 349.7 kg
	R407C (GWP 1774)	Charge < 2.8 kg	2.8 ≤ Charge < 28.2 kg	28.2 ≤ Charge < 281.9 kg	Charge > 281.9 kg
	R410A (GWP 2088)	Charge < 2.4 kg	2.4 ≤ Charge < 23.9 kg	23.9 ≤ Charge < 239.5 kg	Charge > 239.5 kg
	HFO's: R1234ze	No requirement			

(1) From 01/01/2017, units must be equipped with a leakage detection system

8. A logbook must be established for equipments subject to periodic leak tests. It should contain the quantity and the type of fluid present within the installation (added and recovered), the quantity of recycled fluid, regenerated or destroyed, the date and output of the leak test, the designation of the operator and its belonging company, etc.

9. Contact your local dealer or installer if you have any questions.

Protection device checks:

- ***If no national regulations exist, check the protection devices on site in accordance with standard ISO 5149: every five years for external relief valves.***

NOTE: The following statements are only indicated if a pressure switch is available on the unit.

The company or organisation that conducts a pressure switch test shall establish and implement a detailed procedure to fix:

- Safety measures
- Measuring equipment calibration
- Validating operation of protective devices
- Test protocols
- Recommissioning of the equipment.

Consult Service for this type of test. The manufacturer mentions here only the principle of a test without removing the pressure switch:

- Verify and record the setpoints of pressure switches and relief devices (valves and possible rupture discs)
- Be ready to switch-off the main disconnect switch (on the unit or on the installation) of the power supply if the pressure switch does not trigger (avoid over-pressure)
- Connect a calibrated pressure gauge (with Schrader female port of ½ UNF)

CAUTION:
Inspect the protection devices such as valves.

If the machine operates in a corrosive environment, inspect the protection devices more frequently.

Check regularly for leaks and repair immediately. Ensure regularly that the vibration levels remain acceptable and close to those at the initial unit start-up.

Before opening a refrigerant circuit, transfer the refrigerant to bottles specifically provided for this purpose and consult the pressure gauges.

Change the refrigerant after an equipment failure, following a procedure such as the one described in NF E29-795 or carry out a refrigerant analysis in a specialist laboratory.

If the refrigerant circuit remains open after an intervention (such as a component replacement, etc.):

- ***Seal the openings if the duration is less than a day***
- ***If more than 1 day, charge the circuit with oxygen free nitrogen (inertia principle).***

The objective is to prevent penetration of atmospheric humidity and the resulting corrosion.

1.2.4 - Repair safety considerations

All installation parts must be maintained by the personnel in charge to avoid deterioration and injury. Faults and leaks must be repaired immediately. The authorized technician must have the responsibility to repair the fault immediately. After each unit repair check the operation of the protection devices and create a 100% parameter operation report.

Comply with the regulations and recommendations in unit and HVAC installation safety standards, such as: ISO 5149.

If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

RISK OF EXPLOSION 

Never use air or a gas containing oxygen during leak tests to purge lines or to pressurise a machine. Pressurised air mixtures or gases containing oxygen can be the cause of an explosion. Oxygen reacts violently with oil and grease.

Only use dry nitrogen for leak tests, possibly with an appropriate tracer gas.

If the recommendations above are not observed, this can have serious or even fatal consequences and damage the installation.

Never exceed the specified maximum operating pressures. Verify the allowable maximum high- and low-side test pressures by checking the instructions in this manual and the pressures given on the unit name plate.

Do not unweld or flamecut the refrigerant lines or any refrigerant circuit component until all refrigerant (liquid and vapour) as well as the oil have been removed from the heat pump. Traces of vapour should be displaced with dry nitrogen. Refrigerant in contact with an open flame can produce toxic gases.

The necessary protection equipment must be available, and appropriate fire extinguishers for the system and the refrigerant type used must be within easy reach.

Do not siphon refrigerant.

Avoid spilling liquid refrigerant on skin or splashing it into the eyes. Use safety goggles and safety gloves. Wash any spills from the skin with soap and water. If liquid refrigerant enters the eyes, immediately and abundantly flush the eyes with water and consult a doctor.

The accidental releases of the refrigerant, due to small leaks or significant discharges following the rupture of a pipe or an unexpected release from a relief valve, can cause frostbites and burns to personnel exposed. Do not ignore such injuries. Installers, owners and especially service technicians for these units must:

- ***Seek medical attention before treating such injuries.***
- ***Have access to a first-aid kit, especially for treating eye injuries.***

We recommend to apply standard ISO 5149.

Never apply an open flame or live steam to a refrigerant circuit. Dangerous overpressure can result.

During refrigerant removal and storage operations follow applicable regulations. These regulations, permitting conditioning and recovery of halogenated hydrocarbons under optimum quality conditions for the products and optimum safety conditions for people, property and the environment are described in standard NF E29-795. The units must never be modified to add refrigerant and oil charging, removal and purging devices. All these devices are provided with the units.

Refer to the certified dimensional drawings for the units.

It is dangerous and illegal to re-use disposable (non-returnable) cylinders or attempt to refill them. When cylinders are empty, evacuate the remaining gas pressure, and move them to a designated place for recovery. Do not incinerate.

Do not attempt to remove refrigerant circuit components or fittings, while the machine is under pressure or while it is running. Be sure pressure is at 0 kPa and that the unit has been shut-down and de-energised before removing components or opening a circuit.

Do not attempt to repair or recondition any safety devices when corrosion or build-up of foreign material (rust, dirt, scale, etc.) is found within the valve body or mechanism. If necessary, replace the device. Do not install safety valves in series or backwards.

CAUTION:
No part of the unit must be used as a walkway, rack or support. Periodically check and repair or if necessary replace any component or piping that shows signs of damage.

Do not step on refrigerant lines. The lines can break under the weight and release refrigerant, causing personal injury.

Do not climb on a machine. Use a platform, or staging to work at higher levels.

Use mechanical lifting equipment (crane, hoist, winch, etc.) to lift or move heavy components. For lighter components, use lifting equipment when there is a risk of slipping or losing your balance.

Use only original replacement parts for any repair or component replacement. Consult the list of replacement parts that corresponds to the specification of the original equipment.

Do not drain water circuits containing industrial brines, without informing the technical service department at the installation site or a competent body first.

Close the entering and leaving water shut-off valves and purge the unit hydraulic circuit, before working on the components installed on the circuit (screen filter, pump, water flow switch, etc.).

Periodically inspect all valves, fittings and pipes of the refrigerant and hydraulic circuits to ensure that they do not show any corrosion or any signs of leaks.

It is recommended to wear ear defenders, when working near the unit and the unit is in operation.

Always ensure you are using the correct refrigerant type before recharging the unit.

Charging any refrigerant other than the original charge type (R-410A) will impair machine operation and can even lead to a destruction of the compressors. The compressors operate with R-410A and are charged with asyntheticpolyol-ester oil.

Before any intervention on the refrigerant circuit, the complete refrigerant charge must be recovered.

1.3 - Preliminary checks

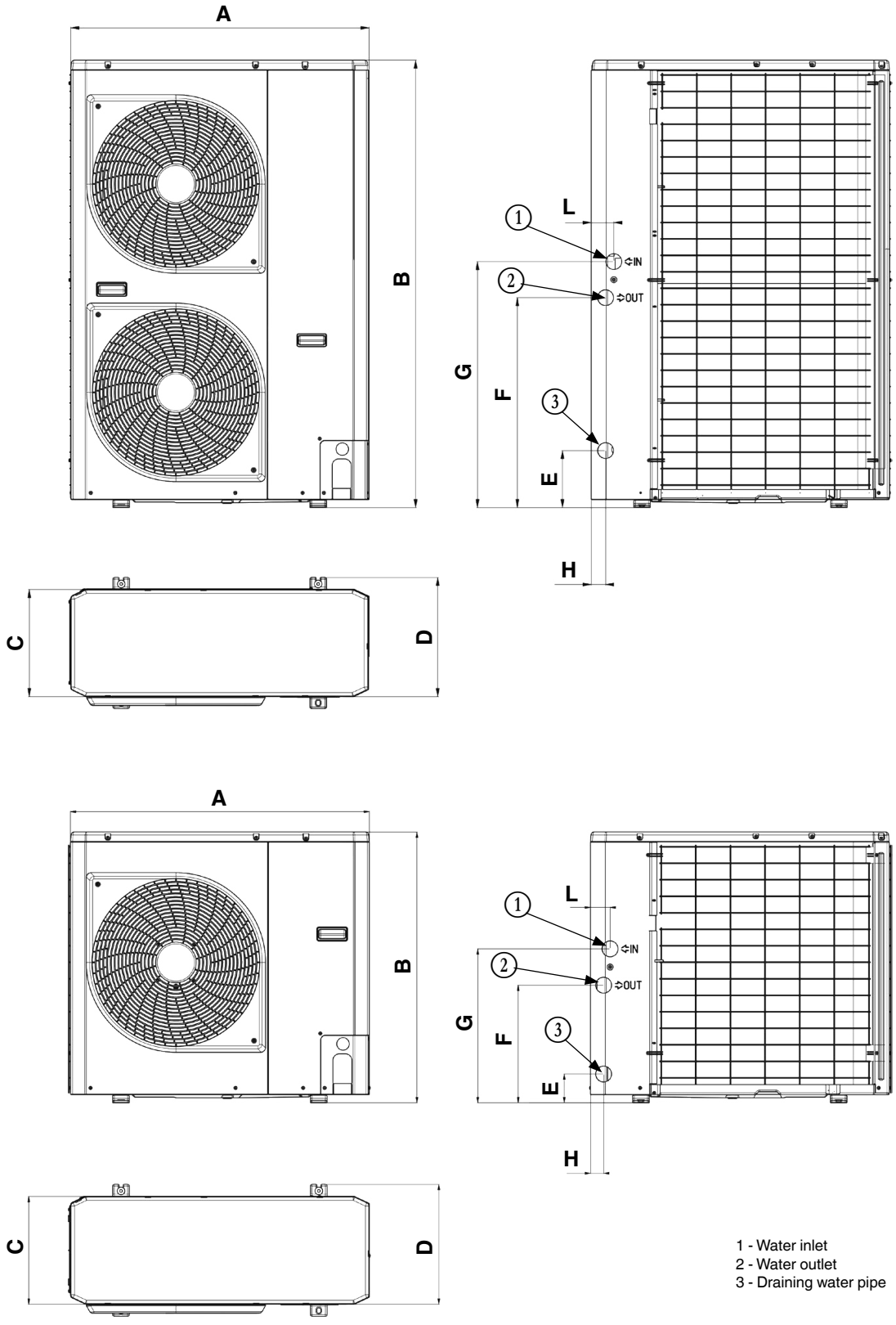
Check equipment received:

- Inspect the unit for damage or missing parts. If damage is detected, or if shipment is incomplete, immediately file a claim with the shipping company.
- Confirm that the unit received is the one ordered. Compare the name plate data with the order.
- The name plate is attached to the unit in two locations:
  - on the outside on one of the unit sides
  - on the inside.
- The unit name plate must include the following information:
  - Model number - size
  - CE marking
  - Serial number
  - Year of manufacture, pressure and leaktightness test date
  - Fluid being transported
  - Refrigerant used
  - Refrigerant charge per circuit
  - PS: Min./max. allowable pressure (high and low pressure side)
  - TS: Min./max. allowable temperature (high and low pressure side)
  - Unit leak test pressure
  - Voltage, frequency, number of phases
  - Maximum power input
  - Unit net weight
- Confirm that all options ordered for on-site installation have been delivered, and are complete and undamaged.

The unit must be checked periodically, if necessary removing the insulation (thermal, acoustic), during its whole operating life to ensure that no shocks (handling accessories, tools, etc.) have damaged it. If necessary, the damaged parts must be repaired or replaced. See also chapter §5. Maintenance.

1.4 - Dimensions and clearance for 30AWH 5-15 units

1.4.1 - Dimensions and location of hydraulic connections

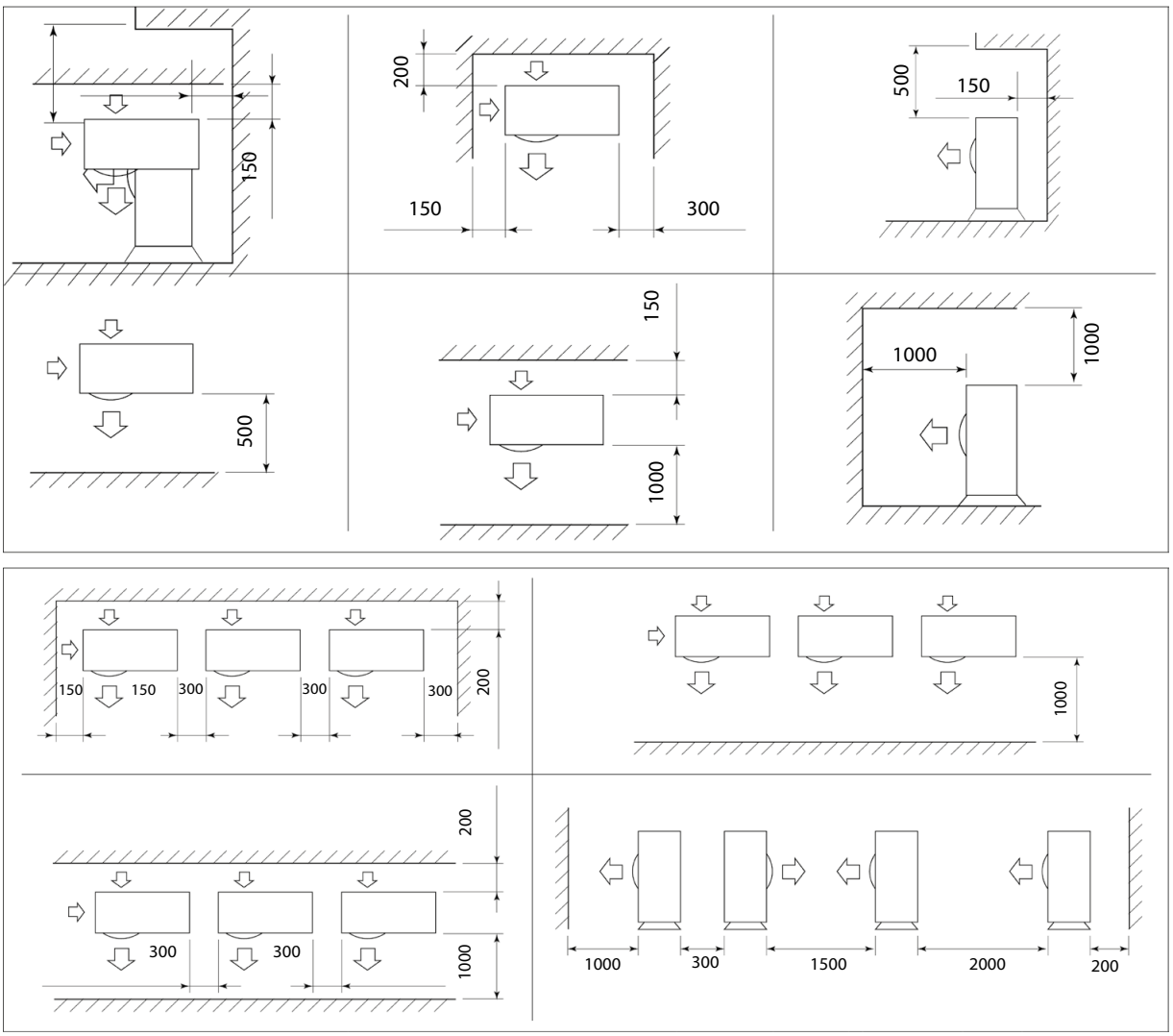


30 AWH	A	B	C	D	E	F	G	H	L	masse (kg)
005_1Ph	908	821	326	350	87	356	466	40	60	57
007_1Ph	908	821	326	350	87	356	466	40	60	69
011_1Ph	908	1363	326	350	169	645	744	43	73	115
015_1Ph	908	1363	326	350	169	645	744	43	73	115
011_3Ph	908	1363	326	350	169	645	744	43	73	121
015_3Ph	908	1363	326	350	169	645	744	43	73	121

NOTE : Dimensions are given in mm

1.4.2 - Clearances to ensure the correct air flow

The picture presents the minimal distances of the wall to ensure the correct air flow on air heat exchanger(1).



(1) Anticipate different maintenance actions before to place the unit (access of different parts / opening of panel/ part replacement…)

1.5 - Physical data and electrical data of 30AWH units

1.5.1 - Physical data 30AWH 5-15

30AWH		5 (1Ph)	7 (1Ph)	11 (1Ph)	15 (1Ph)	11 (3Ph)	15 (3Ph)
Sound levels							
Standard unit							
Sound power level (2)	dB(A)	64	65	68	69	69	69
Sound pressure level at 10 m (3)	dB(A)	33	34	37	38	38	38
Dimensions							
Length	mm	908	908	908	908	908	908
Width	mm	350	350	350	350	350	350
Height	mm	821	821	1363	1363	1363	1363
Operating Weight (1)							
Standard unit	kg	57	69	115	115	121	121
Compressors	Rotary compressor	1	1	1	1	1	1
Refrigerant	**R410A**						
Charge (1)	kg	1,10	1,60	2,80	2,80	3,00	3,00
Capacity control							
Minimum capacity (4)	%	23%	20%	20%	17%	20%	17%
Condenser	Grooved copper tubes, aluminium fins						
Fans	Axial type						
Quantity		1	1	2	2	2	2
Maximum total air flow	l/s	800	800	1800	1800	1800	1800
Maximum rotational speed	rpm	560	660	820	820	820	820
Evaporator	Brazed plate heat exchanger						
Water volume	l	1,7	2,3	4,4	4,4	4,4	4,4
Hydraulic module	**Circulator, relief valve, paddle flow switch, expansion tank**						
Circulator	Centrifugal pump (variable speed)						
Expansion tank volume	l	2	2	3	3	3	3
Max. water-side operating pressure with hydraulic module (5)	kPa	300	300	300	300	300	300
Water connections							
Inlet diameter (BSP GAS)	inch	1	1	1	1	1	1
Outlet diameter (BSP GAS)	inch	1	1	1	1	1	1
Chassis paint colour	Colour code:	RAL 7035	RAL 7035	RAL 7035	RAL 7035	RAL 7035	RAL 7035

(1) Values are guidelines only. Refer to the unit nameplate.
(2) In dB ref=10^{-12} W, (A) weighting. Declared dualnumber noise emission values in accordance with ISO 4871 (with an associated uncertainty of +/-2dB(A)). Measured in accordance with ISO 9614-1 and certified by Eurovent.
(3) In dB ref 20 µPa, (A) weighting. Declared dualnumber noise emission values in accordance with ISO 4871 (with an associated uncertainty of +/-2dB(A)). For information, calculated from the sound power level Lw(A).
(4) Cooling Eurovent condition.
(5) Min. water-side operating pressure with variable speed hydraulic module is 40 kPa.

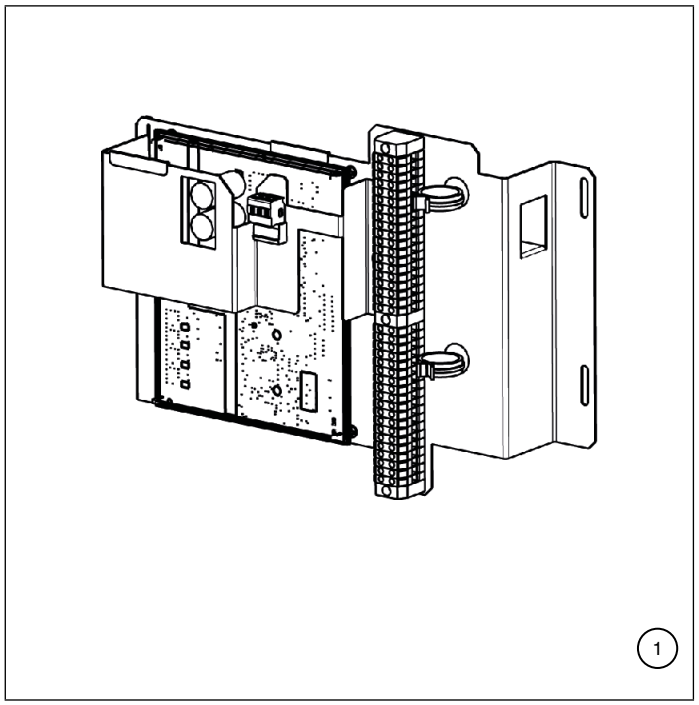
1.5.2 - Electrical data 30AWH 5-15

30AWH		5 (1Ph)	7 (1Ph)	11 (1Ph)	15 (1Ph)	11 (3Ph)	15 (3Ph)
Power circuit							
Nominal power supply	V-ph-Hz	**230-1+N-50**	**230-1+N-50**	**230-1+N-50**	**230-1+N-50**	**400-3+N-50**	**400-3+N-50**
Voltage range	V	220-240	220-240	220-240	220-240	380-415	380-415
Control circuit supply		24V AC via internal transformer					
Maximum unit power input (Un) (1)	kW	1,80	3,38	4,73	5,18	10,32	10,32
Cos Phi unit at maximum power (1)		0,98	0,98	0,98	0,98	0,98	0,98
Maximum unit current drawn (Un-10%) (2)	A	8,9	16,7	23,3	25,6	16,8	16,8
Maximum unit current drawn (Un) (3)	A	8	15	21	23	15,2	15,2
Maximum Start-up current, standard unit (4)	A	Not Applicable (less than the operating current)					

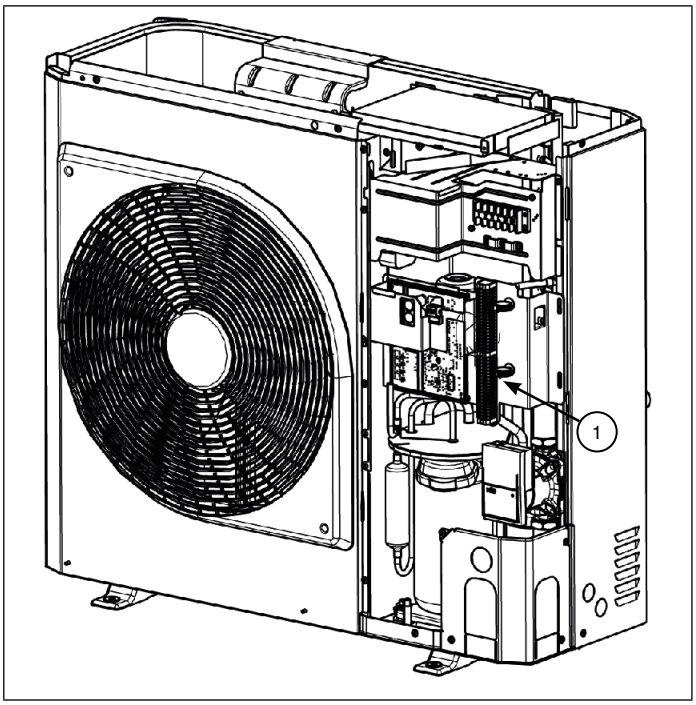
(1) Power input, compressors and fans, at the unit operating limits (saturated suction temperature 15 °C, saturated condensing temperature 68.3 °C) and nominal voltage of 400 V (data given on the unit nameplate).
(2) Maximum unit operating current at maximum unit power input and at 360 V.
(3) Maximum unit operating current at maximum unit power input and at 400 V (values given on the unit nameplate).
(4) Maximum instantaneous start-up current at operating limits (maximum operating current of the smallest compressor(s) + fan current + locked rotor current of the largest compressor).

1.5.3 - Inside view

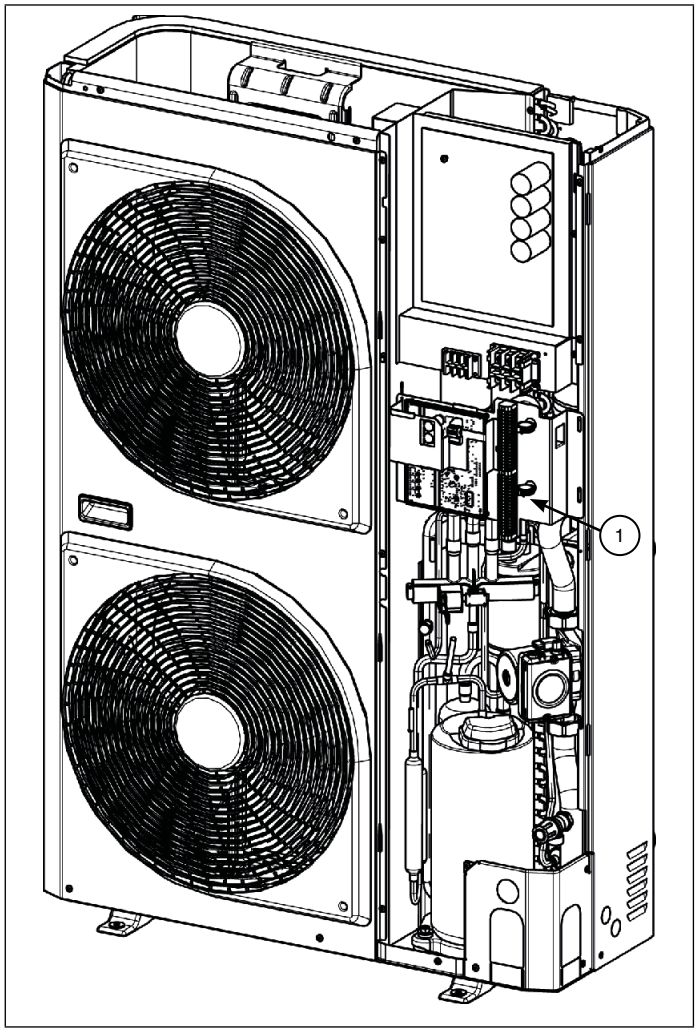
Electrical box



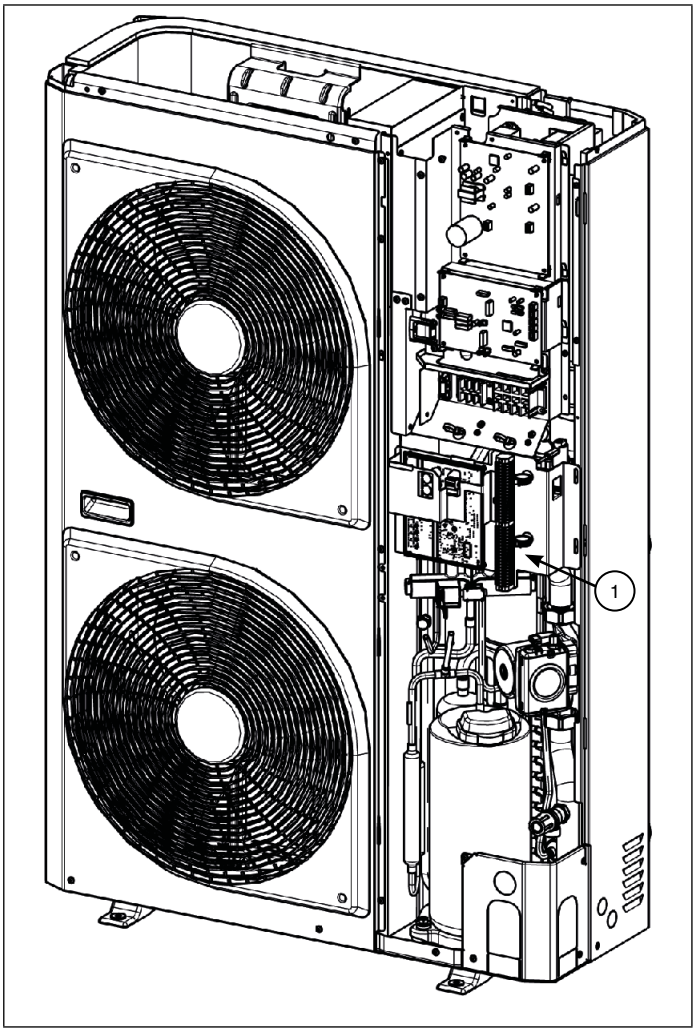
5 - 7 kW unit (1 Ph)



11 - 15 kW unit (1 Ph)



11 - 15 kW unit (3 Ph)



1.6 - Options and accessories

Options	Description	Advantages	Utilisation
Variable speed hydraulic module with expansion tank	See hydraulic module chapter	Easy and fast installation	30AWH 5-15

Accessories	Description	Advantages	Utilisation
Master / Slave sensor	Unit equipped with supplementary water outlet temperature sensor kit to be field-installed allowing master/slave operation of two to four units connected in parallel	Optimised operation of chillers connected in parallel with operating time equalisation	30AWH 5-15
Domestic hot water management sensor and 3 way valve	Sensor enabling to manage the water setpoint inside the tank used for domestic hot water production	Useful for domestic hot water production	30AWH 5-15
Remote human interface	Remotely installed user interface	Remote heat pump control with room temperature sensor used to offset the water control point. Possibility to configure the unit on field.	30AWH 5-15
Additional outdoor ambient temperature sensor	Additional outdoor ambient temperature sensor	Better reading of outdoor air temperature	30AWH 5-15
Water filling kit	System enabling to fill the hydraulic circuit	Hydraulic circuit easy filling	30AWH 5-15

2 - INSTALLATION OF UNIT

2.1 - General

To install an unit 30AWH 5-15 the following steps are requested

1. Place the unit
2. Make hydraulic connections to filling the system with water or brine fluid
3. Make electrical connections
4. Check for water leaks and the water flow rate control
5. Finally, make commissioning of the unit

2.2 - Moving and placing the unit

2.2.1 - Moving

See §1.2.1 Installation safety considerations.

Figure 1: Transport configuration

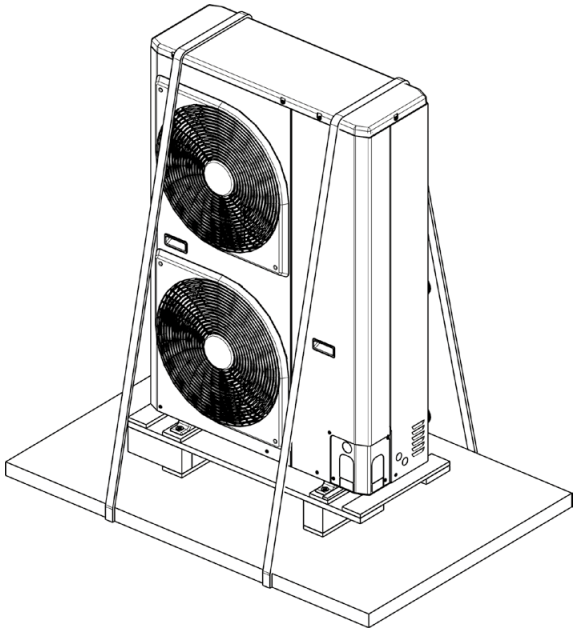
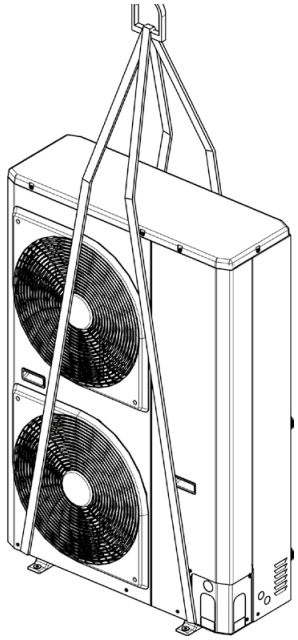


Figure 2: Offloading configuration



2.2.2 - Placing the unit

In case of extra-high units the machine environment must permit easy access for maintenance operations.

Always refer to § 1.4. Dimensions and clearances to confirm that there is adequate space for all connections and service operations. For the centre of gravity coordinates, the position of the unit mounting holes, and the weight distribution points, refer to the certified dimensional drawing supplied with the unit.

Typical applications of these units do not require earthquake resistance. Earthquake resistance has not been verified.

CAUTION:
Only use slings at the designated lifting points (refer to Figure 2 to offload the unit).

Before siting the unit check that:

- the permitted loading at the site is adequate or that appropriate strengthening measures have been taken.
- if the unit has to operate as a heat pump in temperatures below 0°C it must be raised at least 300 mm from the ground. This is necessary to avoid ice build-up on the unit chassis and also to permit correct unit operation in locations where the snow level may reach this height.
- the unit is installed level on an even surface (maximum tolerance is 5 mm in both axes).
- there is adequate space above the unit for air flow and to ensure access to the components (see dimensional drawings).
- the number of support points is adequate and that they are in the right places.
- the location is not subject to flooding.
- for outdoor installations, where heavy snowfall is likely and long periods of sub-zero temperatures are normal, provision has to be made to prevent snow accumulating by raising the unit above the height of drifts normally experienced. Baffles may be necessary to deflect strong winds. They must not restrict air flow into the unit.
- OAT sensor, located on the coil, should not be exposed to the sun or other heat sources.

CAUTION:
Before lifting the unit, check that all casing panels are securely fixed in place. Lift and set down the unit with great care. Tilting and jarring can damage the unit and impair unit operation.

If 30AWH units are hoisted with rigging, it is advisable to protect coils against crushing while a unit is being moved. Use struts or a lifting beam to spread the slings above the unit. Do not tilt a unit more than 15°.

CAUTION:
Never push or lever on any of the enclosure panels of the unit. Only the base of the unit frame is designed to withstand such stresses. If a unit includes a hydraulic module, the hydraulic module and pump piping must be installed in a way that does not submit it to any strain. The hydraulic module pipes must be fitted so that the pump does not support the weight of the pipes.

2.2.3 - Removing the unit panel

To access at the inside of the unit (refrigerant parts / electrical parts), the panel can be removed. This operation must be carried out by a qualified technician.

Figure 3 : How to remove front panel for 11 & 15 kW units

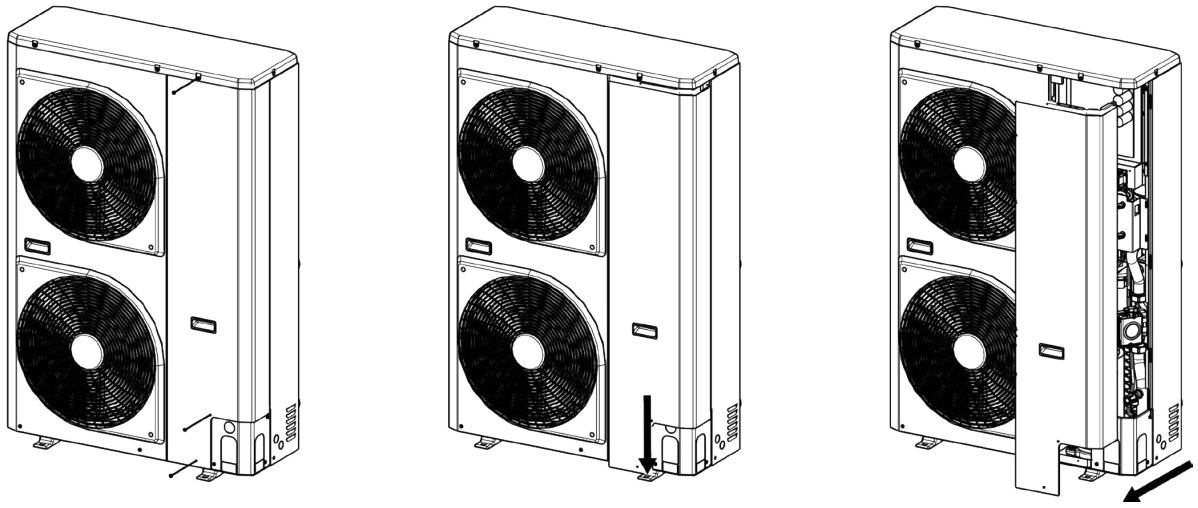


Figure 4 : How to remove front panel for 5 & 7 kW units

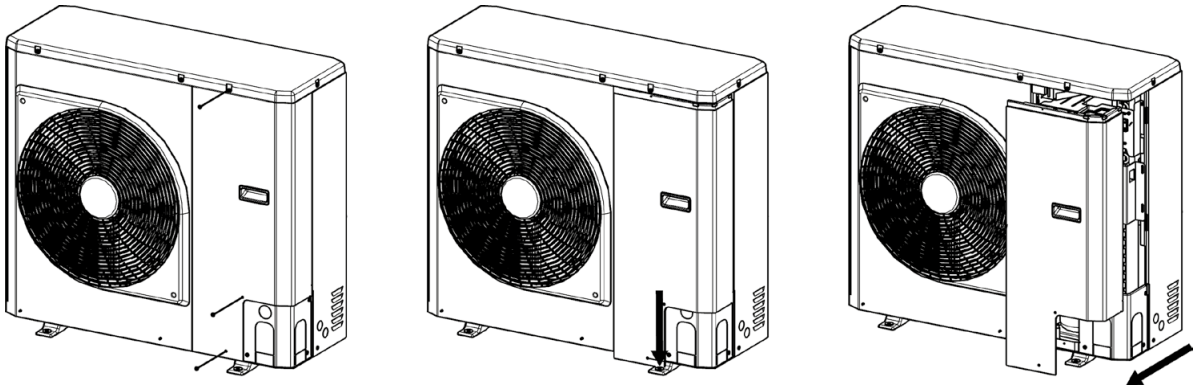
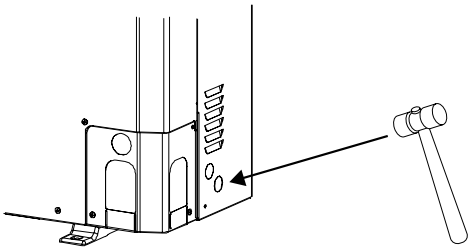


Figure 5 : Opening cable knockouts



2.2.4 - Checks before system start-up

Before the start-up of the refrigeration system, the complete installation, including the refrigeration system must be verified against the installation drawings, dimensional drawings, system piping and instrumentation diagrams, and wiring diagrams.

For these checks national regulations must be followed. If the national regulation does not specify any details, refer to standard ISO 5149 as follows:

External visual installation checks:

- Ensure that the machine is charged with refrigerant. Verify on the unit nameplate that the 'fluid being transported' is R-410A and is not nitrogen.
- Compare the complete installation with the refrigeration system and power circuit diag rams.
- Check that all components comply with the design specifications.
- Check that all protection documents and equipment provided by the manufacturer (dimensional drawings, P&ID, declarations etc.) to comply with the regulations are present.
- Verify that the environmental safety and protection and devices and arrangements provided by the manufacturer to comply with the regulations are in place.
- Verify that all documents for pressure containers, certificates, name plates, files, instruction manuals provided by the manufacturer to comply with the regulations are present.
- Verify the free passage of access and safety routes.
- Verify the instructions and directives to prevent the deliberate removal of refrigerant gases.
- Verify the installation of connections.
- Verify the supports and fixing elements (materials, routing and connection).
- Verify the quality of welds and other joints.
- Check the protection against mechanical damage.
- Check the protection against heat.
- Check the protection of moving parts.
- Verify the accessibility for maintenance or repair and to check the piping.
- Verify the status of the valves.
- Verify the quality of the thermal insulation and of the vapour barriers.

2.3 - Water connections

For size and position of the unit water inlet and outlet connections refer to the certified dimensional drawings supplied with the unit. The water pipes must not transmit any radial or axial force to the heat exchangers nor any vibration.

The water supply must be analysed and appropriate filtering, treatment, control devices, shut-off and bleed valves and circuits built in, to prevent corrosion (example: damage to the protection of the tube surface if the fluid is polluted), fouling and deterioration of the pump fittings.

Before any start-up verify that the heat exchange fluid is compatible with the materials and the water circuit coating.

In case additives or other fluids than those recommended by the manufacturer are used, ensure that the fluids are not considered as a gas.

Recommendations on heat exchange fluids:

- No NH^{4+} ammonium ions in the water, they are very detrimental for copper. This is one of the most important factors for the operating life of copper piping. A content of several tenths of mg/l will badly corrode the copper over time.
- Cl^- Chloride ions are detrimental for copper with a risk of perforations by corrosion by puncture. If possible keep below 10 mg/l.
- SO_4^{2-} sulphate ions can cause perforating corrosion, if their content is above 30 mg/l.
- No fluoride ions (<0.1 mg/l).
- No Fe^{2+} and Fe^{3+} ions with non negligible levels of dissolved oxygen must be present. Dissolved iron < 5 mg/l with dissolved oxygen < 5 mg/l.
- Dissolved silicon: silicon is an acid element of water and can also lead to corrosion risks. Content < 1mg/l.
- Water hardness: >0.5 mmol/l. Values between 1 and 2.5 mmol/l can be recommended. This will facilitate scale deposit that can limit corrosion of copper. Values that are too high can cause piping blockage over time. A total alkalimetric title (TAC) below 100 mg/l is desirable.
- Dissolved oxygen: Any sudden change in water oxygenation conditions must be avoided. It is as detrimental to deoxygenate the water by mixing it with inert gas as it is to over-oxygenate it by mixing it with pure oxygen. The disturbance of the oxygenation conditions encourages destabilisation of copper hydroxides and enlargement of particles.
- Electric conductivity: 0.001-0.06 S/m (10-600 µS/cm).
- pH: Ideal case pH neutral at 20-25°C (7 < pH < 8).

CAUTION:
Charging, adding or draining fluid from the water circuit must be done by qualified personnel, using air vents and materials suitable for the products. Water circuit charging devices are field-supplied.

Charging and removing heat exchange fluids should be done with devices that must be included on the water circuit by the installer. Never use the unit heat exchangers to add heat exchange fluid.

CAUTION:
The use of units in an open loop is forbidden.

2.3.1 - Operating precautions and recommendations

The water circuit should be designed to have the least number of elbows and horizontal pipe runs at different levels. Below the main points to be checked for the connection:

- Comply with the water inlet and outlet connections shown on the unit.
- Install manual or automatic air purge valves at all high points in the circuit.
- Use a pressure reducer to maintain pressure in the circuit(s) and install a relief valve as well as an expansion tank. Units with the hydraulic module include a relief valve and an expansion tank (if option chosen).
- Install drain connections at all low points to allow the whole circuit to be drained.
- Install stop valves, close to the entering and leaving water connections.
- Use flexible connections to reduce vibration transmission.
- Insulate all pipework, after testing for leaks, both to reduce thermal leaks and to prevent condensation.
- Use thermal tape to seal joints and to seam the insulation.

- If the external unit water pipes are in an area where the ambient temperature is likely to fall below 0°C, they must be protected against frost (frost protection solution or trace heating).
- The use of different metals on hydraulic piping could generate electrolytic pairs and consequently corrosion. Verify then, the need to install sacrificial anodes.

The plate heat exchanger can foul up quickly at the initial unit start-up, as it complements the filter function, and the unit operation will be impaired (reduced water flow rate due to increased pressure drop).

Units with hydraulic module are equipped with a screen filter.

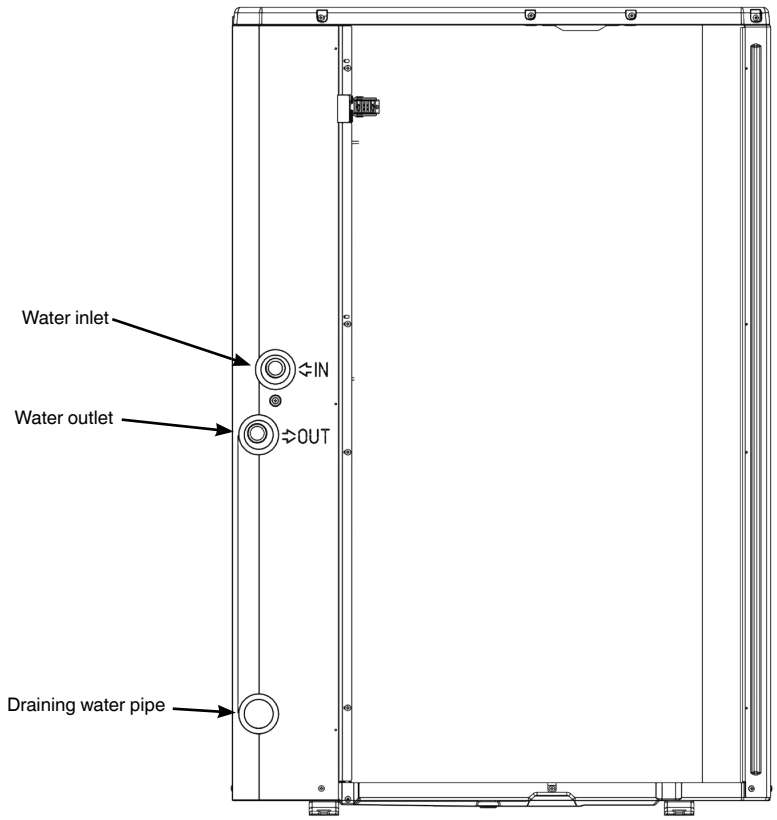
Do not introduce any significant static or dynamic pressure into the heat exchange circuit (with regard to the design operating pressures).

The products that may be added for thermal insulation of the containers during the water piping connection procedure must be chemically neutral in relation to the materials and coatings to which they are applied. This is also the case for the products originally supplied by the manufacturer.

2.3.2 - General

For details on connection diameters, refer to §1.5.1 Physical data 30AWH 5-15.

Figure 6: Water connection on unit



2.3.3 - Minimum water loop volume

The minimum water loop volume, in litres, is given by the following formula:

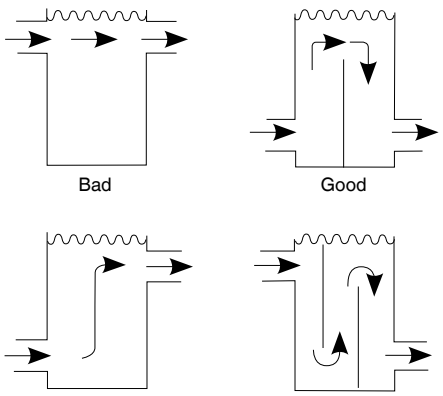
$$\text{Volume (l)} = \text{CAP (kW)} \times N$$

Where CAP is the nominal cooling capacity at nominal operating conditions.

Application	N
Air conditioning	3,5
Heating or domestic hot water application	6
Industrial process cooling	See note below

Note: For industrial process cooling applications, where high stability of water temperature levels must be achieved, the values above must be increased. We recommend consulting the factory for these particular applications.

This volume is required to obtain temperature stability and precision. To achieve this volume, it may be necessary to add a storage tank to the circuit. This tank should be equipped with baffles to allow mixing of the fluid (water or brine). Please refer to the examples below.



2.3.4 - Maximum water loop volume

Units with hydraulic module incorporate an expansion tank that limits the water loop volume. The table below gives the maximum loop volume for pure water or ethylene glycol with various concentrations.

If the total system volume is higher than the values given above, the installer must add another expansion tank, suitable for the additional volume.

Water maximum volume (L)		
	30AWH 5-15	
Static pressure (bar)	**1,5**	**3**
Fresh water	200	50
Ethylen glycol 10%	150	38
Ethylen glycol 20%	110	28
Ethylen glycol 30%	90	23
Ethylen glycol 40%	76	19

2.3.5 - Hydraulic circuit

Figure 7: Typical diagram of the hydraulic circuit without the hydraulic module

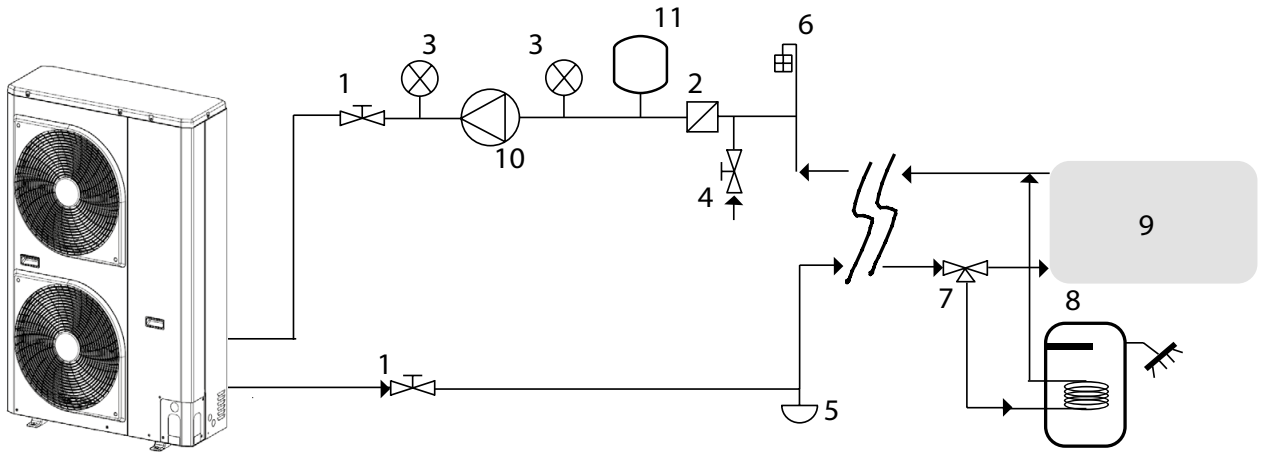
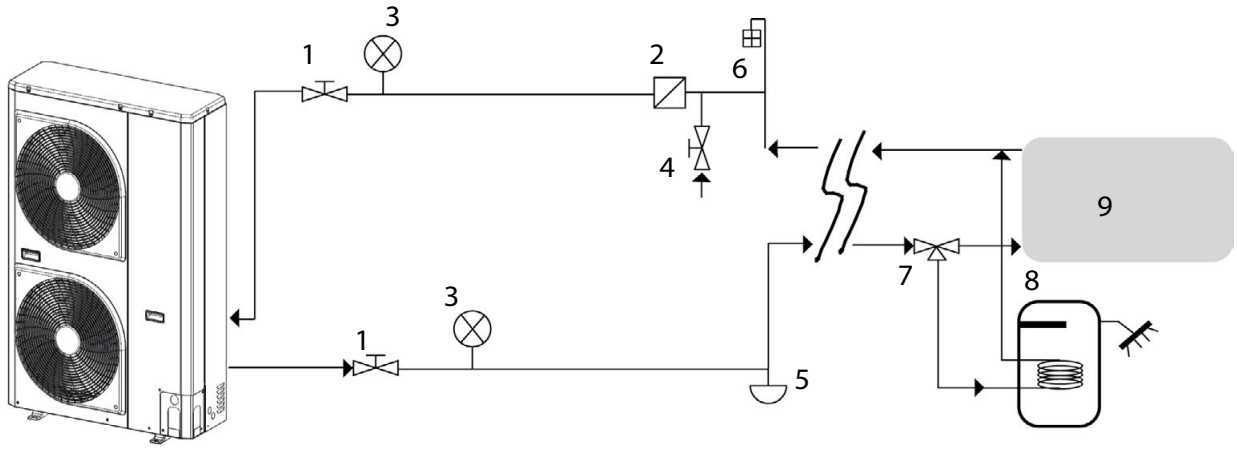


Figure 8: Typical diagram of the hydraulic circuit with the hydraulic module



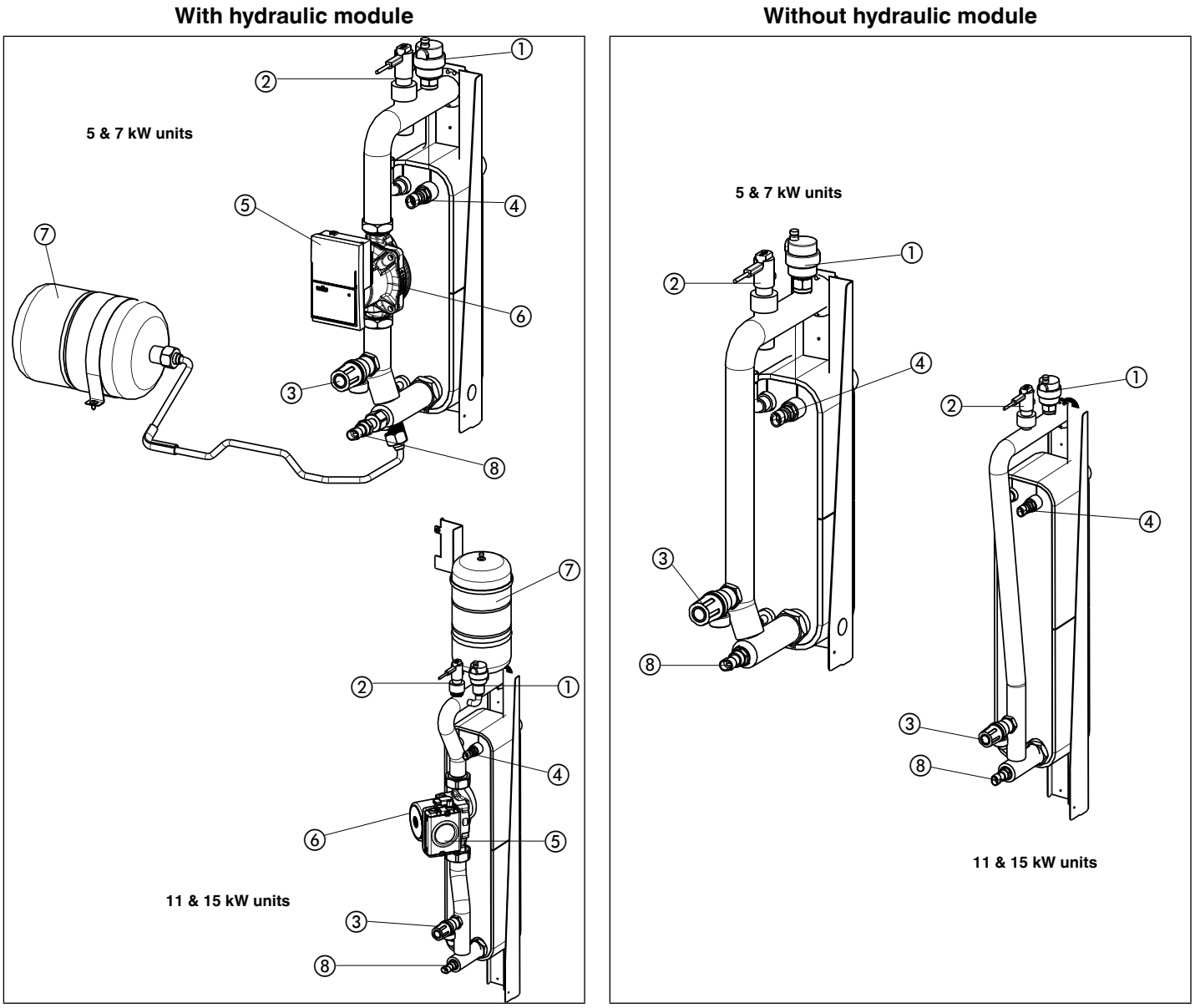
Legend:

1 Shut-off valves
2 Line filter for water
3 Pressure gauges
4 Filling valve
5 System drain valve
6 Air flushing valve
7 3-way valve
8 Sanitary water accumulation tank
9 Inside system
10 Water circulation pump
11 Expansion vessel

CAUTION: The use of the hydraulic module on open loop is prohibited.

Bad Good

Figure 9: Hydraulic module equipped with variable speed single pump low available pressure with expansion tank



Legend:

① Automatic purge valve
② Flow switch
③ Safety valve outlet
④ Leaving water temperature probe
⑤ Circulation pump
⑥ Plug to unblock the seizing pump
⑦ Expansion vessel
⑧ Entering water temperature probe

Minimum and maximum pressures necessary in the hydraulic circuit for correct operation of the units.

Hydraulic circuit	Minimum pressure at the suction of the pump to avoid the cavitation phenomena.	Maximum pressure at the suction of the pump before the opening of the water relief valve(1)
Variable speed hydraulic module	40 kPa (0.4 bar)	300 kPa(3 bar).

2.4 - Electrical connections

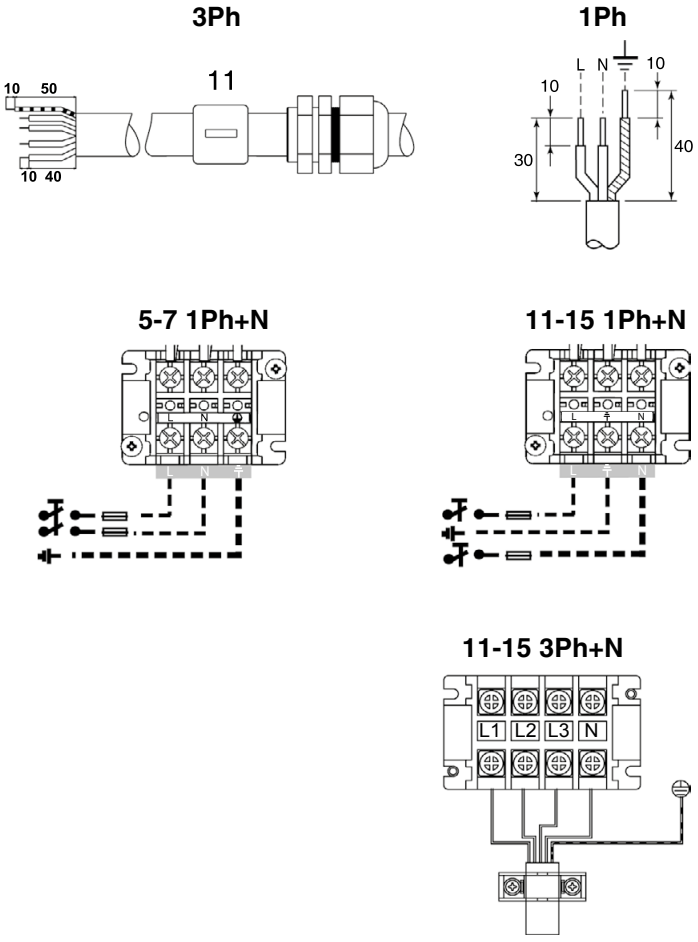
Please refer to the certified wiring drawings, supplied with the unit.

2.4.1 - Power supply

The power supply must conform to the specification on heat pump nameplate. The supply voltage must be within the range specified in the electrical data table. For connections refer to the wiring diagrams and the certified dimensional drawings.

CAUTION:
After the unit has been commissioned, the power supply must only be disconnected for quick maintenance operations (one day maximum). For longer maintenance operations or when the unit is taken out of service and stored (e.g. during the winter or if the unit does not need to generate cooling) the power supply must be maintained to ensure supply to the electric heaters (compressor coil heater, unit frost protection).

Figure 10: Power connection with Main Switch



2.4.2 - Recommended wire sections

Wire sizing is the responsibility of the installer, and depends on the characteristics and regulations applicable to each installation site. The following is only to be used as a guideline, and does not make Manufacturer in any way liable. After wire sizing has been completed, using the certified dimensional drawing, the installer must ensure easy connection and define any modifications necessary on site.

The connections provided as standard for the field-supplied power entry cables are designed for the number and type of wires, listed in the table below.

The calculations of favourable and unfavourable cases are performed by using the maximum current possible of each unit fitted with a hydraulic kit (see the tables of electrical data for the unit and the hydraulic module).

The calculation is based on PVC or XLPE insulated cables with copper core. A maximum ambient temperature of 46°C has been taken into consideration. The given wire length limits the voltage drop to < 5% (length L in metres - see table below).

IMPORTANT:
Before connection of the main power cables (L1 - L2 - L3 - N - PE or L1 - N - PE) on the terminal block, it is imperative to check the correct order of the 3 phases before proceeding to the connection and the good connection of the neutral wire (if the neutral conductor is not connected correctly, the unit can be damaged permanently).

Table 1: Minimum and maximum wire section (per phase) for connection to 30AWH units

	Max. connectable section(1)	Calculation favourable case:			Calculation unfavourable case:		
		- Suspended aerial lines (standardised routing No. 17) - XLPE insulated cable			- Conductors in conduits or multi-conductor cables in closed conduit (standardised routing No. 41) - PVC insulated cable, if possible		
30AWH	**Section**	**Section(2)**	**Max. length for voltage drop <5%**	**Cable type**	**Section(2)**	**Max. length for voltage drop <5%**	**Cable type(3)**
	mm² (per phase)	**mm² (per phase)**	**m**	**-**	**mm² (per phase)**	**m**	**-**
5 (1Ph)	$3G4^2$	$3G2,5^2$	100	H07RNF	$3G2,5^2$	80	H07RNF
7 (1Ph)	$3G4^2$	$3G2,5^2$	100	H07RNF	$3G2,5^2$	80	H07RNF
11 (1Ph)	$3G4^2$	$3G4^2$	100	H07RNF	$3G4^2$	80	H07RNF
15 (1Ph)	$3G4^2$	$3G4^2$	100	H07RNF	$3G4^2$	80	H07RNF
11 (3Ph)	$5G4^2$	$5G2,5^2$	100	H07RNF	$5G2,5^2$	80	H07RNF
15 (3Ph)	$5G4^2$	$5G2,5^2$	100	H07RNF	$5G2,5^2$	80	H07RNF
Accessory Remote WUI	Use cables H07RN-F 4x0.75 mm^2 up to 50m to connect the user interface WUI (not supplied with accessory) **CAUTION:** Use the grey ferrite which is supplied in accessory to clamp around the WUI cable. Please clamp it directly after the customer's terminal block						

Notes:

(1) Connection capacities actually available for each machine, defined according to the connection terminal size, the control box access opening size and the available space inside the control box.
(2) Selection simultation result considering the hypothesis indicated.
(3) If the maximum calculated section is for an XLPE cable type, this means that a selection based on a PVC cable type can exceed the connection capacity actually available. Special attention must be given to the selection.

Power cable entry

The power cables must be entered through the cable gland from the rear of the unit.

CAUTION:
Use a black ferrite which is supplied in accessory to clamp around the supply cable. Please clamp it directly after the customer's terminal block.
Please clamp the second one close to the cable gland.
The power cable should not be in contact with hot parts of the system.

2.4.3 - Recommended customer electrical protection

Electrical protection is the responsibility of the installer, and depends on the characteristics and regulations applicable to each installation site. The following is only to be used as a guideline, and does not make manufacturer in any way liable.

30AWH		**5 (1Ph)**	**7 (1Ph)**	**11 (1Ph)**	**15 (1Ph)**	**11 (3Ph)**	**15 (3Ph)**
Circuit breaker:							
Type		C	C	C	C	C	C
Current	A	10	16	25	25	16	16
Fuses:							
Type		gG	gG	gG	gG	gG	gG
Current	A	16	20	32	32	20	20

Electrical data and operating conditions notes:

- 30AWH 5-15 units have a single power connection point located immediately upstream of the field power connections.
- The control box includes the following standard features:
  - Variable frequency drive for compressor, fans and pump (option)
  - The control devices.
- **Field connections:**

All connections to the system and the electrical installations must be in full accordance with all applicable local codes.

- The 30AWH units are designed and built in compliance with EN 60335-1 and 2 (1).

NOTES:

- The operating environment for the 30AWH units is specified below:

1. Physical environment(2). The classification of environment is specified in standard EN 60364:
   - outdoor installation: protection level IP44 (2)
   - operating temperature range: -20°C to +46°C
   - storage temperature range: -20°C to +48°C
   - altitude: ≤ 2000 m (see note for table 1.5.4 - Electrical data, hydraulic module)
   - presence of hard solids, class AE3 (no significant dust present)
   - presence of corrosive and polluting substances, class AF1 (negligible)
2. Power supply frequency variation: ± 2 %.
3. The neutral (N) conductor must be always connected to the unit
4. Overcurrent protection of the power supply conductors is not provided with the unit.
5. The units are designed for simplified connection on TT networks (IEC 60364).

Caution: If particular aspects of an actual installation do not conform to the conditions described above, or if there are other conditions which should be considered, always contact your local representative.

(1) The absence of main power disconnect switch is an exception that must be taken into account at field installation level.
(2) The required protection level for this class is IP43BW (according to reference document IEC 60529). All 30AWH units fulfil this protection condition:
   - Closed electrical box is IP44
   - When accessing to interface, the level is IPxxB

2.5 - Water flow rate control

2.5.1 - Water leakage

Check that the water-side connections are clean and show no sign of leakage.

2.5.2 - Minimum water flow rate

If the installation flow rate is below the minimum flow rate, there is a risk of excessive fouling.

2.5.3 - Maximum water flow rate

This is limited by the permitted water heat exchanger pressure drop.

2.5.4 - Water heat exchanger flow rate

Data applicable for:

- Fresh water 20°C
- In case of use of the glycol, the maximum water flow is reduced.

30AWH units with hydraulic module			
	Minimum water flow rate m^3/h	Nominal water flow rate (1) m^3/h	Maximum water flow rate m^3/h
5 (1Ph)	0,18	0,9	4,3
7 (1Ph)	0,42	1,2	4,3
11 (1Ph)	0,6	1,9	7,0
15 (1Ph)	0,6	2,6	7,0
11 (3Ph)	0,6	1,9	7,0
15 (3Ph)	0,6	2,6	7,0

(1) Eurovent heating conditions

2.5.5 - Nominal system water flow control

The water circulation pumps of the 30AWH units have been sized to allow the hydraulic modules to cover all possible configurations based on the specific installation conditions, i.e. for various temperature differences between the entering and the leaving water (ΔT) at full load, which can vary between 3 and 10 K.

This required difference between the entering and leaving water temperature determines the nominal system flow rate. Use this specification for the unit selection to find the system operating conditions.

In particular, collect the data to be used for the control of the system flow rate:

- Units with variable speed pump-control on adjustable constant speed: nominal flow rate,
- Units with variable speed pump - control on temperature difference: heat exchanger T (variable flow).

If the information is not available at the system start-up, contact the technical service department responsible for the installation to get it. These characteristics can be obtained from the technical literature using the unit performance tables for a ΔT of 5 K at the water heat exchanger.

Table 2: Steps to clean, purge, and define a flow rate for hydraulic circuit

	N°	Without Hydraulic module	With Variable Speed Hydraulic module Adjustable constant speed	With Variable Speed Hydraulic module ΔT
Cleaning procedure	1	Open the manual control valve fully.	No manual control valve required with Variable Speed Hydraulic module	
	2	Set the system pump (1).		
	3	Read the BPHE pressure drop...		
		… by taking the difference of the readings of the pressure gauge connected to the unit inlet and outlet.		
	4	Let the pump run for two consecutive hours to flush the hydraulic circuit of the system (presence of solid contaminants).		
	5	Take another reading.		
	6	Compare this value to the initial value.		
	7	If the pressure drop…		
		… has decreased, this indicates that the screen filter must be removed and cleaned, as the hydraulic circuit contains solid particles.		
	8	In this case stop the pump (1) and close the shut-off valves at the water inlet and outlet and remove the screen filter after emptying the hydraulic section of the unit.		
	9	Repeat, if necessary, to ensure that the filter is not contaminated.		
Purge procedure	1	After filling with water, wait about 24h before activating the purge procedure.		
	2	Activate the purge mode (1): water pump is requested to run continuously at maximum speed to purge the hydraulic circuit regardless the flow switch value (2).		
	3	The air purge is field-supplied.		
		If the purge is automatic, air will vent from circuit automatically.		
		If the purge is manual, open the valve to vent air from the circuit		
Water flow control procedure	1	When the circuit is cleaned and purged, activate the pump in quick test mode (1), and read the pressures at the pressure gauges (entering water pressure - leaving water pressure), …		No need to adjust the flow rate because of ΔT control. But it is necessary to adjust the Minimum pump speed [P567]to ensure closure of flow switch (1).
	2	… to find out the unit pressure drop (plate heat exchanger + internal water piping).		
	3	Compare the value obtained with the pressure drop (Graphic 2).	Compare this value to the graph of available external static pressure using the appropriate speed curve (Graphic 1).	
	4	If the pressure read is higher than the value specified the unit flow rate (and thus system flow rate) is too high. The pump supplies an excessive flow rate based on the global pressure drop of the application. In this case close the control valve and read the new pressure difference.	If the flow rate corresponding is higher, decrease pump speed (1), and vice versa.	
	5	Proceed by successively closing the control valve until you obtain the specific pressure that corresponds to the nominal flow rate at the required unit operating point.	Proceed by successively adjusting the pump speed until the expected water flow rate is achieved.	

(1) For configuration details, refer to table 3.
(2) CAUTION: In purge mode, the value of the flow switch is ignored, so check that there is water in the circuit, to avoid damage to the pump.

Table 3: Actions in WUI parameter menu or Service tools to activate the cleaning purge and control of flow rate for hydraulic circuit

Steps		Table	Par.	Designation	Description	Range	Default	Ex.	Unit
Cleaning procedure		QCK_ TEST	**321**	Quick Test enable	Access to Quick test mode	0 to 1	0	1	-
			331	Water Pump Speed	Activate the pump	0 to 100	0	100	%
					Wait around 2h that the hydraulic circuit is cleaned				
			331	Water Pump Speed	Stop the pump	0 to 100	0	0	%
			321	Quick Test enable	Exit the Quick test mode	0 to 1	0	0	-
Purge procedure		MOD_ REQ	**44**	System Mode Request	8 = Purge (water pump is constantly running to purge the hydraulic circuit) 0 to 6 and 9 = not used for this configuration	0 to 9	-	8	-
					Wait that the circuit purges				
			44	System Mode Request	To exit purge mode, change the value of [P044] with the wanted mode (0 or 1 or 2 or 4)	0 to 9	-	0 / 1 /2 /4	-
Water flow control procedure	**Variable speed pump – control on adjustable constant speed**	QCK_ TEST	**321**	Quick Test enable	Access to Quick test mode	0 to 1	0	1	-
			331	Water Pump Speed	Adjust water pump speed until obtain the expected design water flow (refer to Graphic 1).	0 to 100	0	?	%
			331	Water Pump Speed	When the pump speed is identified, stop the pump.	0 to 100	0	0	%
			321	Quick Test enable	Exit the quick mode	0 to 1	0	0	-
		PMP_ CONF	**566**	Var Speed Pump Logic	0 = Adjustable Constant Speed (use [P568] parameter to set the water pump constant speed) 1 = not used for this configuration	0 to 1	1	0	-
			568	Maximum Pump Speed	If variable speed pump configuation is set to adjustable speed, then the maximum pump speed parameter corresponds to the design water flow.	50 to 100	100	Enter pump speed determined at last step [P331]	%
	Variable speed pump - control on ΔT	PMP_ CONF	**566**	Var Speed Pump Logic	1 = Water pump Speed controlled by the Water Delta T 0 = not used for this configuration	0 to 1	1	1	-
			569	Water Delta T Setpoint	Set a ΔT value	2.0 to 20.0	5	5	K
Determine the min pump speed to allow closure of flow switch	**Variable speed pump: - control on adjustable constant speed - and control on ΔT**	QCK_ TEST	**321**	Quick Test enable	To determine the minimum pump speed in function of pressure drop and closing of flow switch of hydraulic circuit, activate the quick test	0 to 1	0	1	-
			331	Water Pump Speed	Increase the water pump speed until the closing of flow switch (to check the status of flow switch refer to parameter Flow Switch Status [P105]: Open (0) / Close (1)) Note: this value change in function of pressure drop of circuitand min possibie pump speed is 19%and max ipossibie pump speed is 50%	0 to 100	0	?	%
			321	Quick Test enable	When the minimum pump speed is determined, exit of quick test mode	0 to 1	0	0	-
		PMP_ CONF	**567**	Minimum Pump Speed	Enter the minimum pump speed	19 to 50	19	?	%

NOTE:

If the system has an excessive pressure drop in relation to the available static pressure provided by the system pump the nominal water flow rate cannot be obtained (the resulting flow rate is lower) and the temperature difference between the water heat exchanger entering and leaving water will increase.

To reduce the pressure drops of the hydraulic system:

- reduce the individual pressure drops as much as possible (bends, level changes, options, etc.).
- use a correctly sized piping diameter.
- avoid hydraulic system extensions, wherever possible.

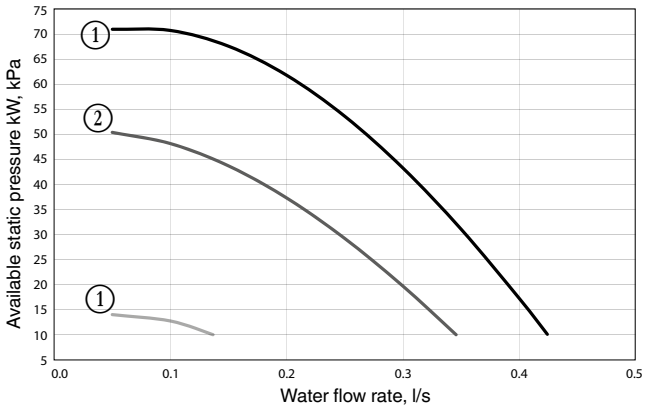
2.5.6 - Available external static pressure

Data applicable for:

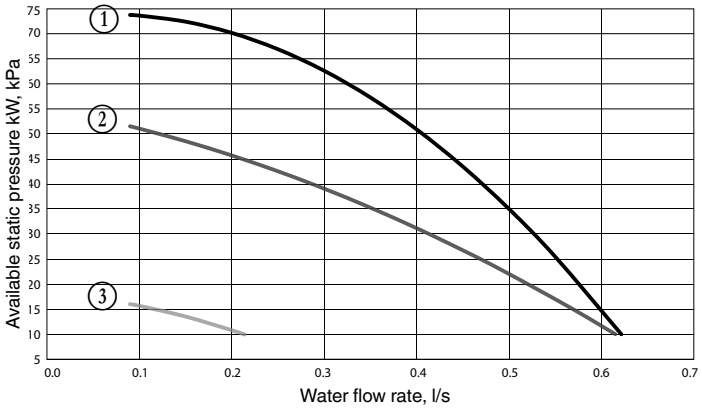
- Fresh water 20°C
- If glycol is used, the maximum water flow is reduced.

Graphic 1: Available static pressure for 5 to 15 kW units with hydraulic module

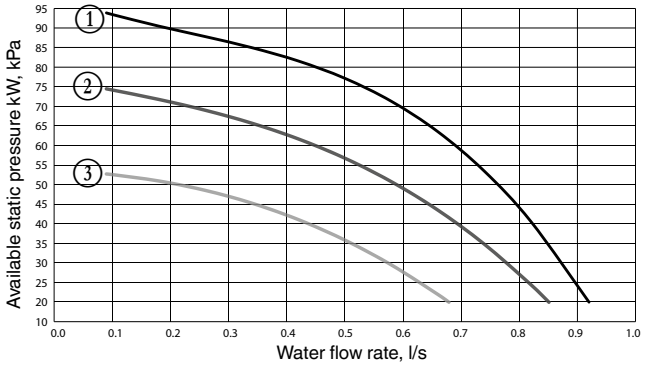
30AWH 5 kW



30AWH 7 kW



30AWH 11 and 15 kW

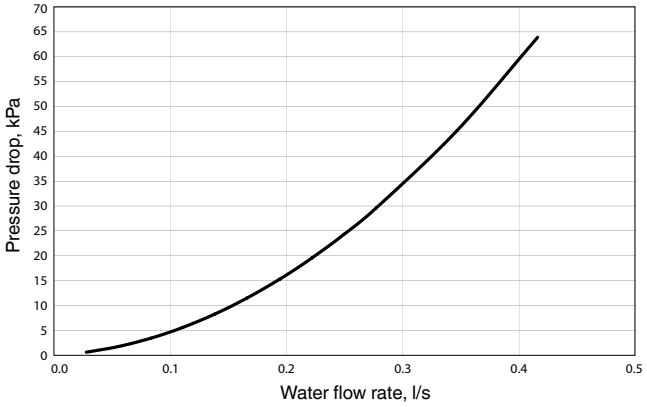


Legend:

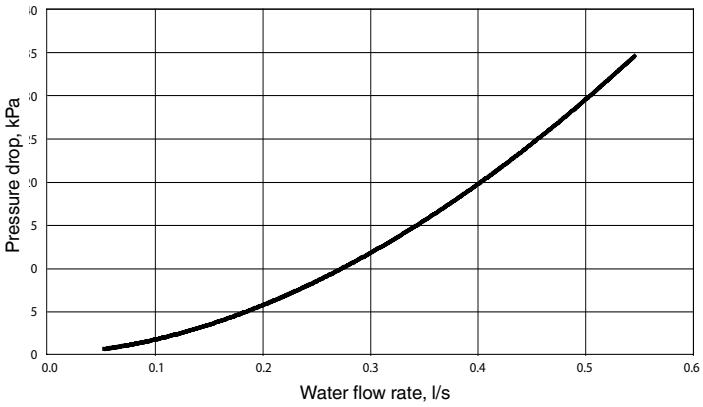
① High speed
② Medium speed
③ Low speed

Graphic 2: Pressure drop for 5 to 15 kW units without hydraulic module

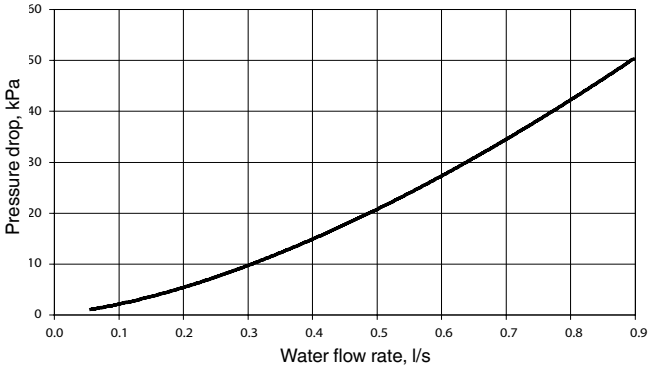
30AWH 5 kW



30AWH 7 kW



30AWH 11 and 15 kW



2.6 - Commissioning modes

IMPORTANT:
Field connection of interface circuits may lead to safety risks: any control box modification must maintain equipment conformity with local regulations. Precautions must be taken to prevent accidental electrical contact between circuits supplied by different sources:

- ***The routing selection and/or conductor insulation characteristics must ensure dual electric insulation.***
- ***In case of accidental disconnection, conductor fixing between different conductors and/or in the control box prevents any contact between the conductor ends and an active energised part.***

Refer to the 30AWH 5-15 wiring diagram supplied with the unit for the field control wiring of the following features:

- Safety switch (normally close contact, mandatory)

Three possible control configurations:

1/ Connections to the customer remote control (for more details, refer to Figure 10 and §4.2.4 Switches)

- On/Off remote switch
- Heat/Cool select remote switch
- Home/Sleep select remote switch
- Alarm/Alert or Operation report…

2/ Connections to the user interface

When the remote-mounted user interface accessory is chosen, the user interface has to be connected at the terminal block (refer to §3.7 Unit with remote user interface).

3/ Connections to the customer communication bus

- The connection to the Proprietary Protocol is carried out using a connector provided for this purpose inside the control box. One connector is provided to allow service connection.

2.7 - Check before start the unit

Never be tempted to start the heat pump without reading fully, and understanding, the operating instructions and without having carried out the following pre-start checks:

- Ensure that all electrical connections are properly tightened.
- Ensure that the unit is level and well-supported.
- Check that the hydraulic circuit has sufficient water flow and that the pipe connections correspond to the installation diagram.
- Ensure that there are no water leaks. Check the correct operation of the valves installed.
- All panels should be fitted and firmly secured with the corresponding screws.
- Make sure that there is sufficient space for servicing and maintenance purposes.
- Ensure that there are no refrigerant leaks.
- Confirm that the electrical power source agrees with the unit nameplate rating, wiring diagram and other documentation for the unit.
- Ensure that the power supply corresponds to the applicable standards.
- Make sure that compressors float freely on the mounting springs.

CAUTION:

- ***Commissioning and start-up of the heat pump must be supervised by a qualified refrigeration qualified technician.***
- ***Start-up and operating tests must be carried out with a thermal load applied and water circulating in the water heat exchanger.***
- ***All set point adjustments and control tests must be carried out before the unit is started up.***

Ensure that all safety devices are operational, and that any alarms are acknowledged.

NOTE:
If the Manufacturer instructions (power and water connections and installation) are not observed, the Manufacturer warranty becomes invalid.

3 - INSTALLATION OF SYSTEM

In this section, the general customer electrical connection is detailed as well as the main steps of configuration and examples of standard installation:

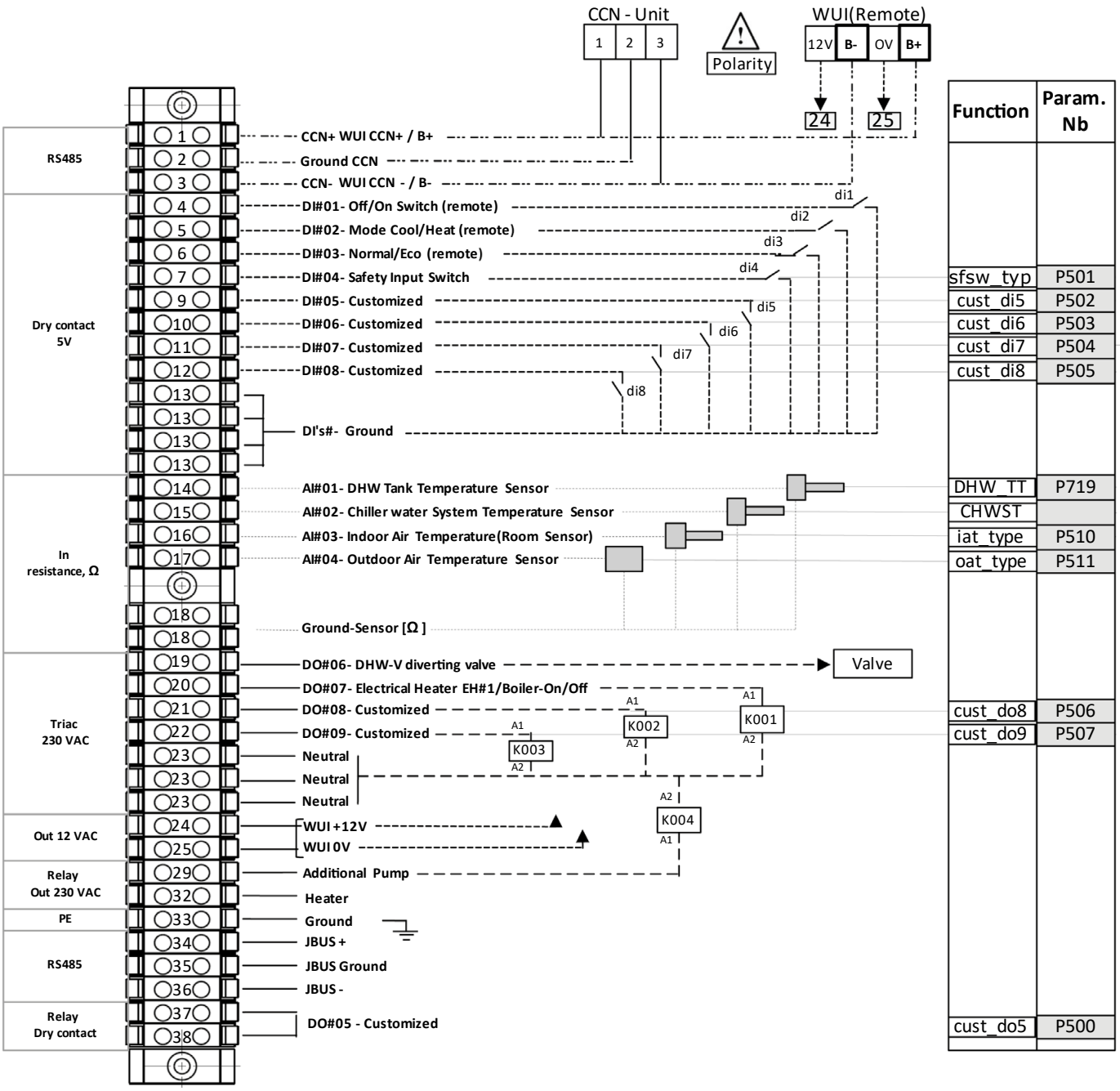
- Installation with electrical booster heaters
- Installation with DHW production and boiler
- Master / Slave installation

Likewise the setpoint configuration with remote user interface is shown as well as the installation of additional OAT sensor and IAT senor.

To obtain the list of all parameters, refer to §7.Parameter overview.

3.1 - General customer electrical connection on terminal block

Figure 11: Customer electrical connection on terminal block



All customer wiring and devices have to be field provided & connected according to your system configuration.

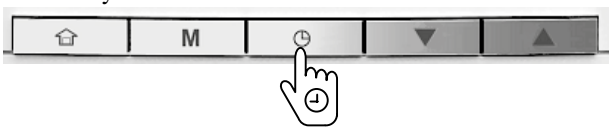
3.2 - First step of configuration: Setting the time and day

Before using any parameter menu of the WUI or Proprietary Protocol, it is necessary to set the time and day of the control.

N°	Steps	Table	Par.	Designation	Description	Range	Default	Ex.	Unit
1	Control of date and hour	UI_CONF	526	Interface Time Broadcast	0 = UI shall read the Date and Time in the Main Controller. 1 = UI shall broadcast Date and Time over the CCN bus.	0 to 1	1	0	-
2a	Set the day and hour	If unit is fitted with user interface, refer to WUI procedure below							
2b		If no user interface is availabe , enter date and hour using Proprietary Protocol ([P661] to [P667] in Date & Time Table)							

The following sections explain the procedures for unit with user interface. If there is no user interface on the unit, it is necessary to use Customer communication bus (Proprietary Protocol or Jbus) to configure the unit.

To access the time configuration menu, press and hold the **Schedule** key for 2 seconds.

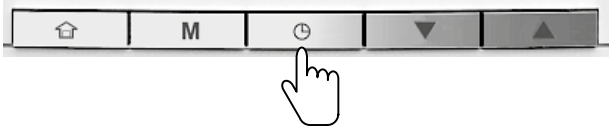


3.2.1 - Day of week setting

The current day starts flashing.

If necessary, **press** the **Down** key or the **Up** key to change the day of the week.

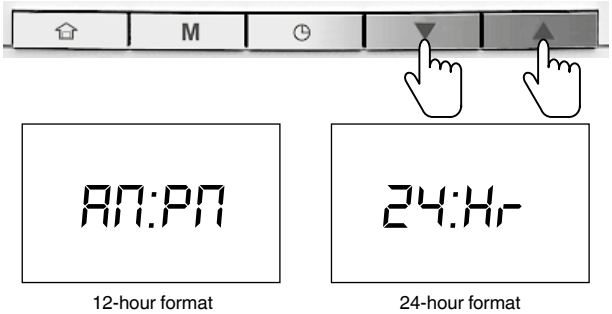
Press the **Schedule** key to confirm your selection and go to the next parameter.



3.2.2 - Time format setting

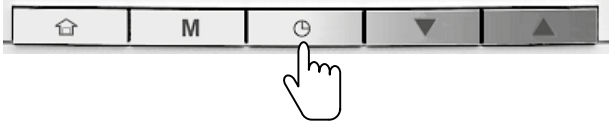
Once the day of the week has been confirmed, set the time format.

Press the **Down** key or the **Up** key to change the time format.



12-hour format 24-hour format

Press the **Schedule** key to confirm the time display.



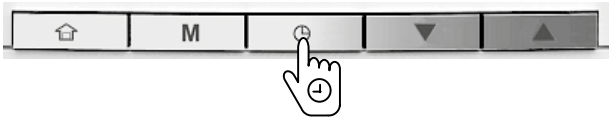
3.2.3 - Time setting

Once the time format has been confirmed, set the time.

Press the **Down** key or **the Up** key to set the time.

For 24-hour format: Set the hour and press the **Schedule** key to confirm. Then, set minutes and press the **Schedule** key to confirm.

To confirm all changes, press and hold the Schedule key for 2 seconds.



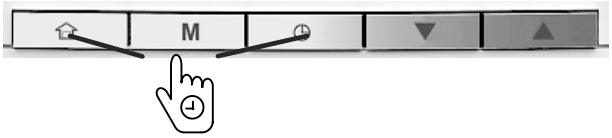
3.3 - Second step of configuration: Parameter menu

According to the application of unit, several parameters are to be configured to allow the correct operation of system. The following sections explain some standard cases of installation. But to configure the unit, it is necessary to access the parameter menu. If there is no user interface on the unit, it is necessary to use Customer communication bus (Proprietary Protocol or Jbus) to configure the unit. Otherwise in the case with user interface, follow the next procedure.

3.3.1 - To access the parameter menu

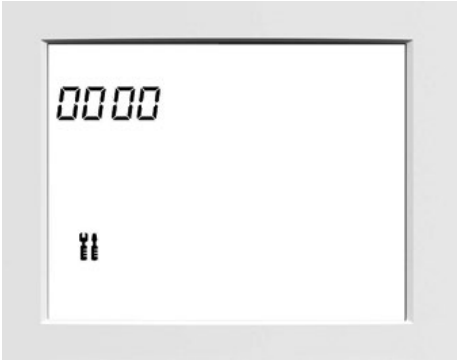
If the user interface is in standby mode, press one key to activate the WUI screen.

Press and hold the **Occupancy** key and the **Schedule** key simultaneously for 2 seconds.



The password screen is displayed.

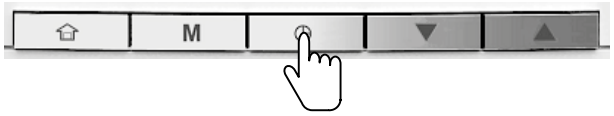
Figure 12: Password screen



Enter the password: **0120**.

To change the number, press the **Up** or **Down** key.

To validate each number, press the **Schedule** key.

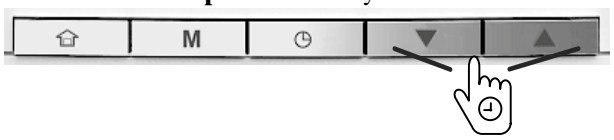


To validate the password and access parameter configuration, press and hold the **Mode** key for 2 seconds.

.3.3.2 - To navigate in the parameter menu

a - First possibility

Press and hold the **Up** or **Down** key.



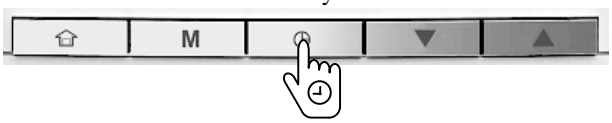
Select the Parameter Number with the **Up** or **Down** key. Scroll until the required parameter is reached.

b - Second possibility

Press the **Up** or **Down** key until reach the required parameter.

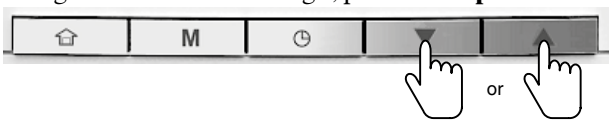
3.3.3 - To change a setting

Press and hold the **Schedule** key for 2 seconds.

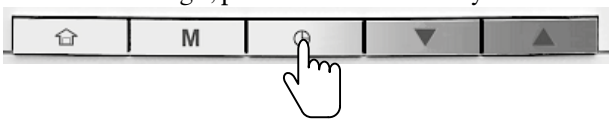


In the next sections, four standard installations are introduced, with for each example a hydraulic scheme, electrical connexion diagram and configuration steps.

To change the value of one digit, press the **Up** or **Down** key.



To validate each digit, press the **Schedule** key.



Repeat these steps for each digit of the setting.

When all the digits are selected and correct, press the **Mode** key to freeze the value.

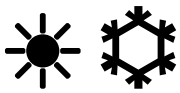
Next navigate through the parameter menu and configure all those necessary for the correct operation of the unit (refer to the following sections).

3.3.4 - To exit the parameter menu

Press and hold the **Occupancy** key until the home screen is displayed.

3.4 - Installation with electrical booster heaters

This installation could be composed of:

	30AWH
	With or without integrated hydraulic kit (variable speed)
	With Remote User Interface
	Cooling Mode Heating Mode
	Up to three electrical booster heaters
Available accessories (if ordered)	Additional Outdoor Air Temperature Sensor

IMPORTANT:

For more information, refer to §4.2.11 Electric Heaters.

3.4.1 - Standard installation

Figure 13: Standard installation with electrical booster heaters

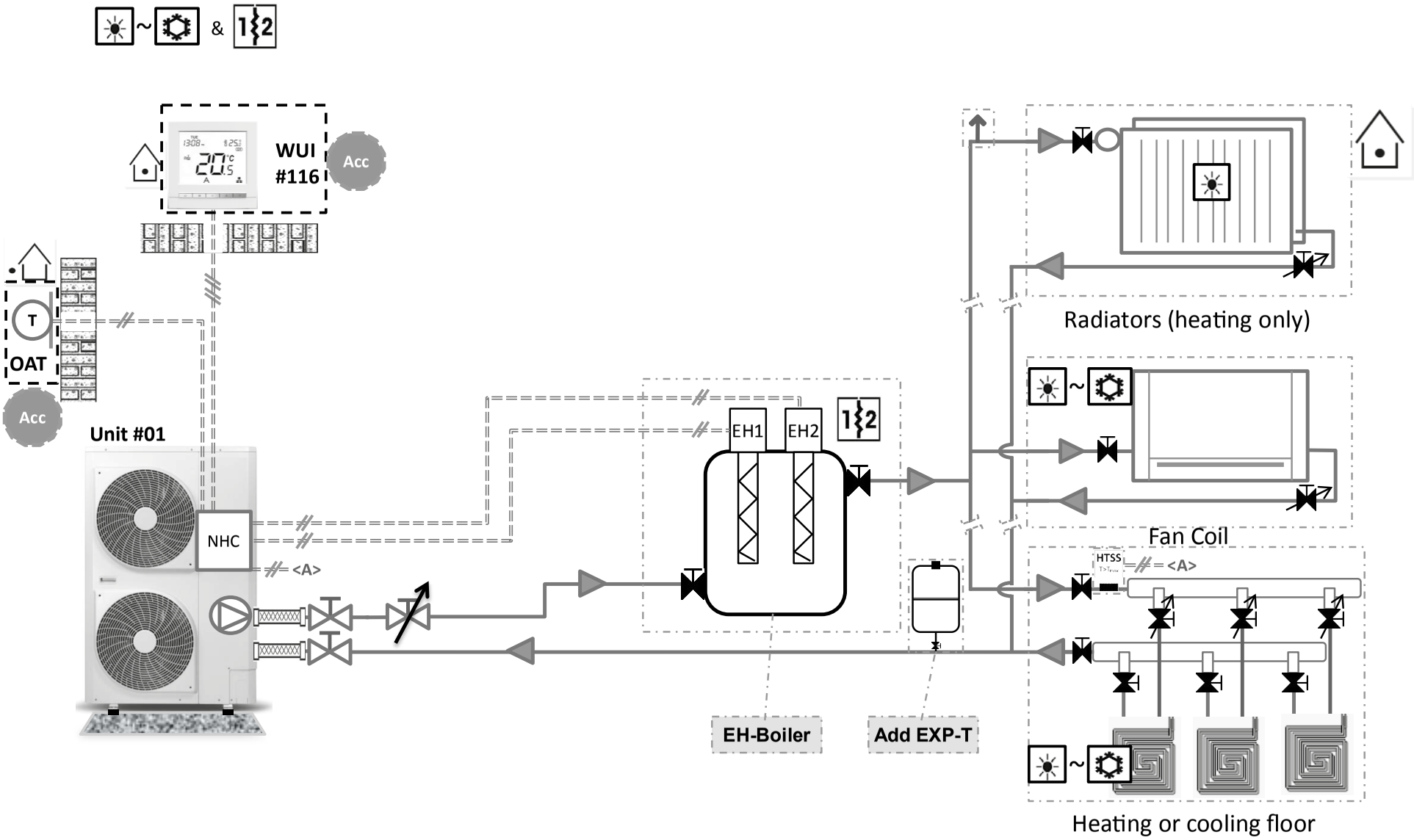
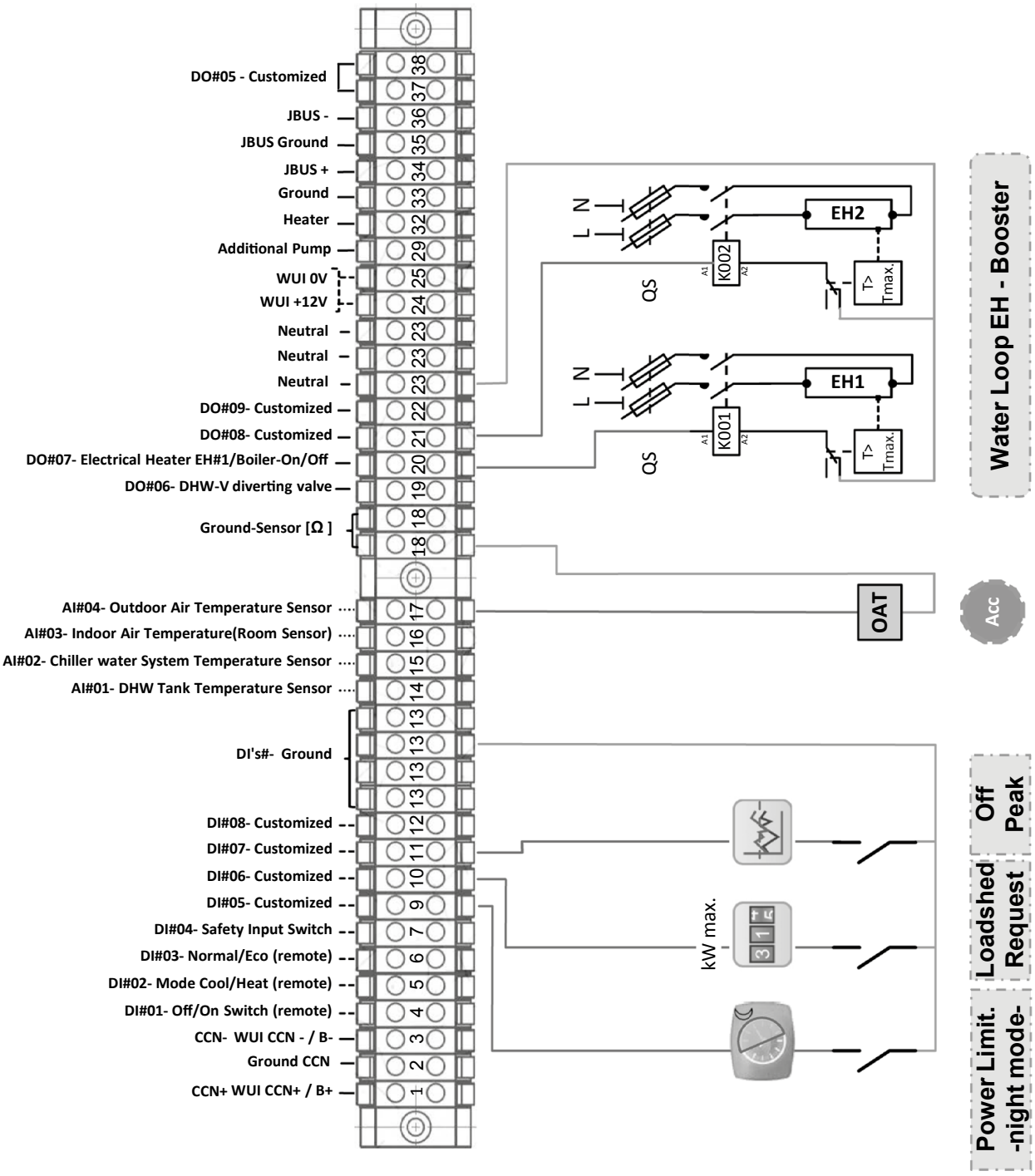


Figure 14: Electrical connection on terminal block for electrical booster heaters

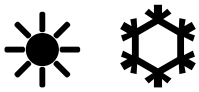


3.4.3 - Control configuration steps

N°	Steps	Table	Par.	Designation	Description	Range	Default	Ex.	Unit
1	Set Booster stages	BCK_ CONF	601	Backup Type	0 = No backup 1 = Booster by 1 Electric Heat Stage (EH1) 2 = Booster by 2 Electric Heat Stages (EH1/EH2) 3 = Booster by 3 Electric Heat Stages with 2 outputs (EH1/EH2) 4 = Booster by 3 Electric Heat Stages with 3 outputs (EH1/EH2/EH3) 5 to 10 = not used for this configuration	0 to 10	0	3	-
			602	Booster Warm up Timer	Once the unit has started, if after this timer has expired the capacity demand is at maximum and the setpoint isn't reached, then the booster is activated	0 to 120	30	20	min
			604	Booster OAT Threshold	Booster heating is allowed to run if OAT goes below this threshold (with 1 K hysteresis).	- 20 to 15	-7.0	2	°C
		GEN_ CONF	506	Customized DO #8 Config	0 = Disabled 10 = Electrical heat stage #2 11 = Electrical heat stage #3 1 to 9 and 13 = not used for this configuration	0 to 13	1	10	-
3	Advanced settings Pump configuration	PMP_ CONF	563	Anti-sticking function	The pump is started and run for 30 seconds provided that it has been inactive for 24 hours. Starting the pump regularly increases the lifetime of the pump.	0 to 1	1	1	-
		PMP_ CONF	565	Main Pump Logic	If Remote user interface or IAT sensor This parameter defines the Main Pump functioning in Standby Mode: 1 = Always On 3 = According to Space Temp 2 = not used for this configuration"	1 to 3	1	3	-

3.5 - Master / Slave installation

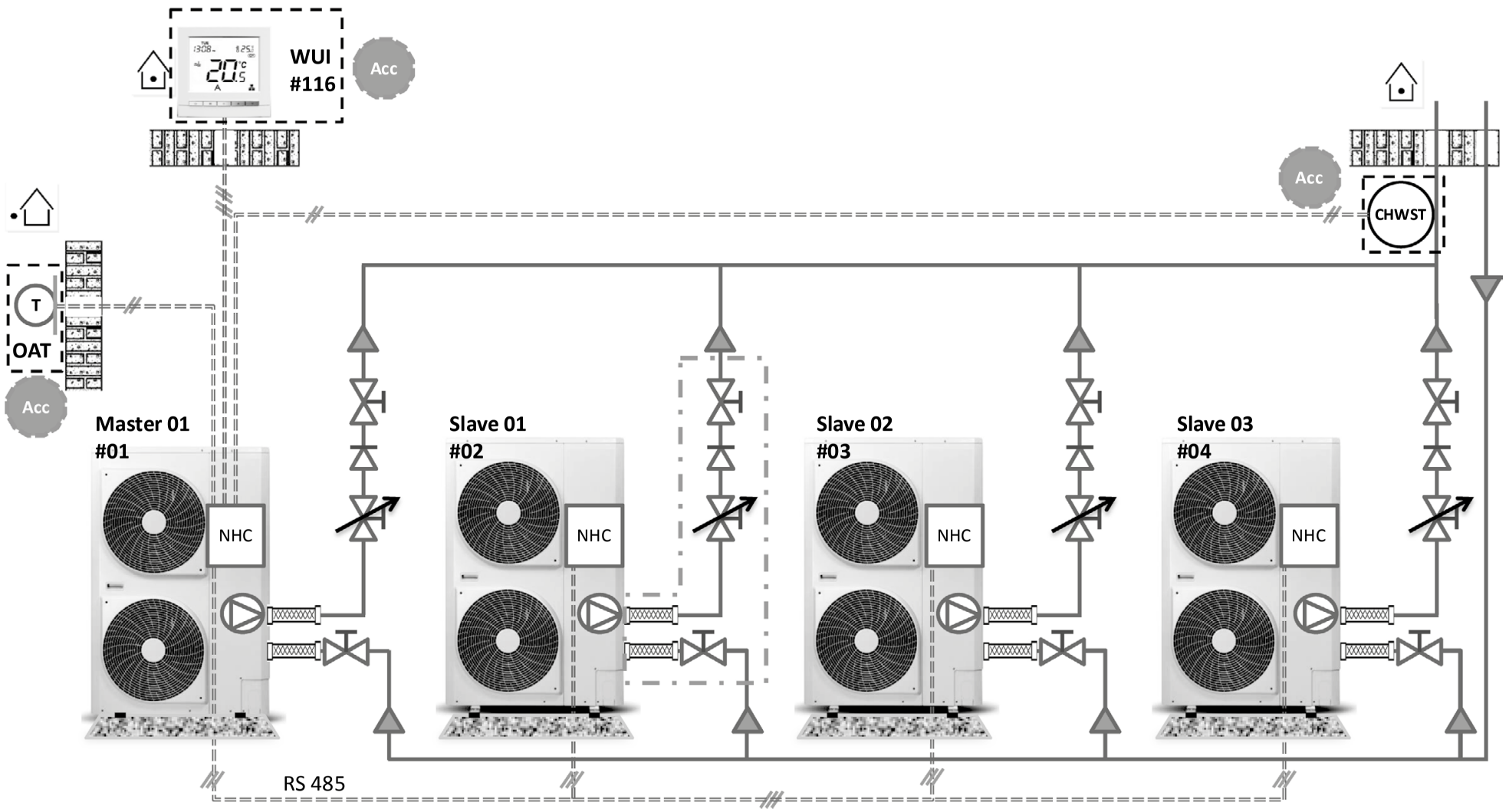
This installation could be composed of:

	30AWH (same type / same size for one Master / Slave installation)
	With integrated hydraulic kit: - variable speed (no T logic)
	Master unit fitted with or without remote user interface No user interface on slave units
	Cooling Mode Heating Mode (according unit type)
Available accessories (if ordered)	Master / Slave leaving water temperature sensor (to be connected only on Master unit) Additional Outdoor Air Temperature Sensor (to be connected only on Master unit)

IMPORTANT:
For more information, refer to§ 4.2.9 Master / Slave.

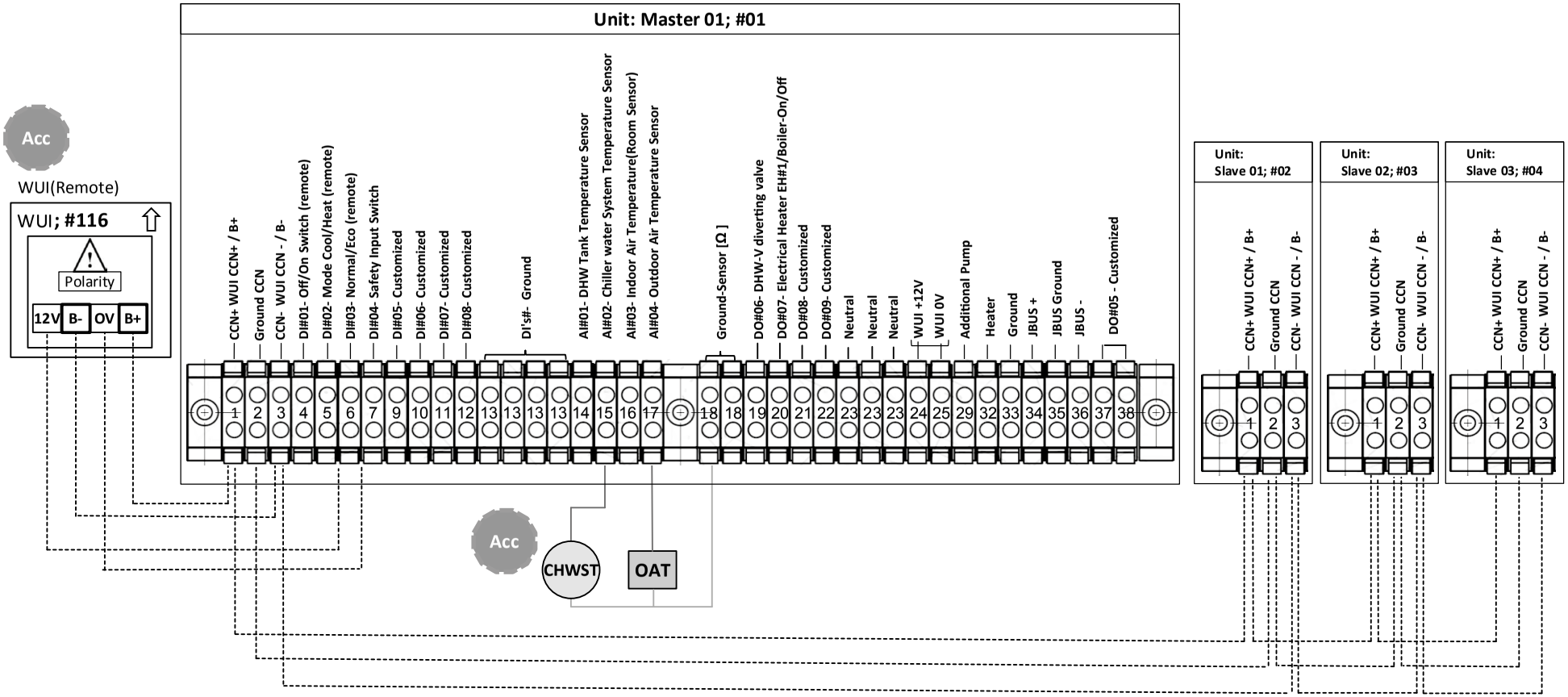
3.5.1 - Standard installation

Figure 15: Standard installation with Master / Slave (example with 3 slaves)



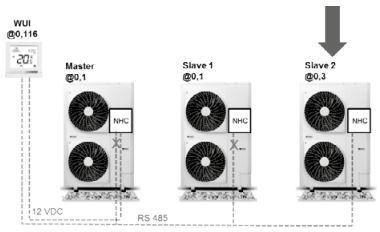
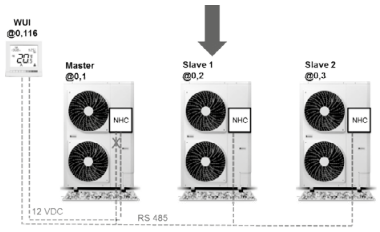
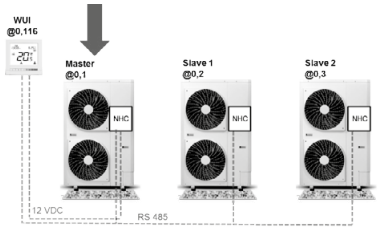
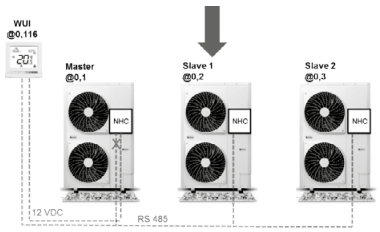
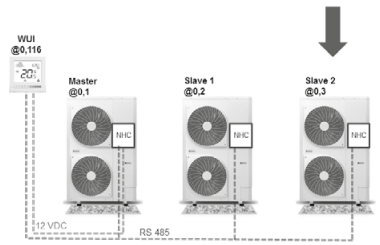
3.5.2 - Electrical connection

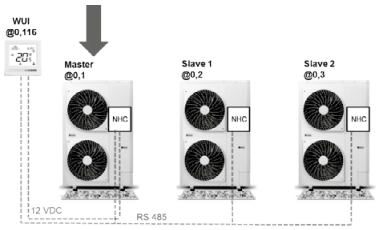
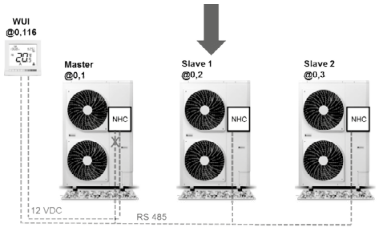
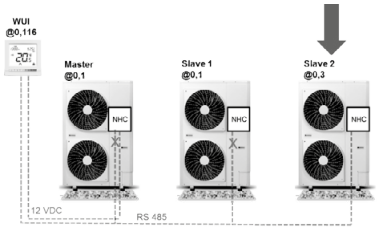
Figure 16: Electrical connection on terminal block for Master / Slave installation



3.5.3 - Control configuration steps

a - Configuration steps: one master and two slaves with one user interface on master

N°	Steps	Figure	Table	Par.	Designation	Description	Range	Default	Ex.	Unit
1	Change Slave 2 NHC address to 3		For master unit with a WUI, to address the different units of master/slave installation, it is necessary to disconnect RS485 bus (Green connector J6) from Master and all Slaves **except the last one**. But WUI is switched on by master unit (12VDC)							
				641	CCN Element Address	It is necessary to set the NHC board address of Slave 2 different as NHC board address of Master	0 to 239	0	3	-
			Wait 30s before next step. An error can appear on WUI screen, but it is not a problem to continue the configuration.							
2	Change Slave 1 NHC address to 2		Connect the RS485 bus (Green connector J6) on Slave 1, besides Slave 2							
				641	CCN Element Address	It is necessary to set the NHC board address of Slave 1 different as NHC board address of Master	0 to 239	0	2	-
			Wait 30s before next step. An error can appear on WUI screen, but it is not a problem to continue the configuration.							
3	Configure Master board		Connect the RS485 bus (Green connector J6) on Master, besides Slave 1 + 2							
			MSL_CONF	743	Slave #1 Address	It is necessary to set the Slave address different as Master address	0 to 239	0	2	-
				744	Slave #2 Address	It is necessary to set the Slave address different as Master address	0 to 239	0	3	-
				742	Master/Slave Selection	Allow the Master/Slave operation as Master: 0 = Disable 1 = Master 2 = Slave	0 to 2	0	1	-
4	Compressor Control method choice			751	Cascade Type	The cascade type configuration refers to the control of master / slave operation. 0 = Starting Master First, then first Slave to last Slave. Stopping Last Slave to first Slave, then Master. 1 = Starting/stopping units according to their wear factors. 2 = All units (Master and Slaves) are started/stopped at the same time.	0 to 2	1	1	-
				746	Capa. to Start Next Unit	If Cascade Type = 0 or 1, then it is possible to set this parameter [P746]. It define the purcentage of capacity that the operating unit must reach before to start the next unit. This parameter is defined only on master unit.	30 to 100	75	75	%
5	Configure Slave 1		Apply procedure §3.7.3.b-Manage the Master and Slave units with a commom user interface to pass on Slave 1 status							
			MSL_CONF	742	Master/Slave Selection	Allow the Master/Slave operation as Slave: 0 = Disable 1 = Master 2 = Slave	0 to 2	0	2	-
			UI_CONF	521	User Interface Type	Configure User interface for Slave: 0 = No User Interface 1 = Remote control by contacts or SUI 2 = WUI remotely installed in the house (“Air Temp” icon is displayed) 3 = WUI locally installed on the unit (“Water Temp” icon is displayed)	0 to 3	0	1	-
6	Configure Slave 2		Apply procedure § 3.7.3.b-Manage the Master and Slave units with a commom user interface to pass on Slave 2 status							
			MSL_CONF	742	Master/Slave Selection	Allow the Master/Slave operation as Slave: 0 = Disable 1 = Master 2 = Slave	0 to 2	0	2	-
			UI_CONF	521	User Interface Type	Configure User interface for Slave: 0 = No User Interface 1 = Remote control by contacts or SUI 2 = WUI remotely installed in the house (“Air Temp” icon is displayed) 3 = WUI locally installed on the unit (“Water Temp” icon is displayed)	0 to 3	0	1	-

N°	Steps	Figure	Table	Par.	Designation	Description	Range	Default	Ex.	Unit
7	Main Variable speed pump configuration for Master/Slave installation	If the units are fitted with internal main variable speed pump, then several parameters are to set for each unit of Master / Slave installation								
			To configure main pump of Master unit, the other units of installation must be in mode OFF (only Master unit is activated)							
			Apply procedure § 3.7.3.b-Manage the Master and Slave units with a commom user interface to pass on Master status							
			MSL_CONF	758	Master/Slave Pump Type	0 = No pump control 1 = Common Water Pump (a pump is installed outside of the unit on the water loop and is controlled by the Master unit) 2 = Individual Water Pump: running according to M/S Overrall Status (Par.229) 3 = Individual Water Pump: stopped if unit is satisfied	0 to 3	2	2	-
			Determine the min pump speed to allow closure of flow switch (refer to Table 3: Actions in WUI parameter menu or Service tools to activate the cleaning purge and control of flow rate for hydraulic circuit)							
			Adjust pump speed to obtain the expected water flow rate (refer to Table 3: Actions in WUI parameter menu or Service tools to activate the cleaning purge and control of flow rate for hydraulic circuit - Line 'Variable speed pump – control on adjustable constant speed')							
			To configure main pump of Slave 1 unit, the other units of installation must be in mode OFF (only Slave 1 is activated)							
			Apply procedure §3.7.3.b-Manage the Master and Slave units with a commom user interface to pass on Slave 1 status							
			MSL_CONF	758	Master/Slave Pump Type	0 = No pump control 1 = Common Water Pump (a pump is installed outside of the unit on the water loop and is controlled by the Master unit) 2 = Individual Water Pump: running according to M/S Overrall Status (Par.229) 3 = Individual Water Pump: stopped if unit is satisfied	0 to 3	2	2	-
			Determine the min pump speed to allow closure of flow switch (refer to Table 3: Actions in WUI parameter menu or Service tools to activate the cleaning purge and control of flow rate for hydraulic circuit)							
			Adjust pump speed to obtain the expected water flow rate, with pump logic = adjustable constant speed (refer to Table 3: Actions in WUI parameter menu or Service tools to activate the cleaning purge and control of flow rate for hydraulic circuit - Line 'Variable speed pump – control on adjustable constant speed')							
			To configure main pump of Slave 2 unit, the other units of installation must be in mode OFF (only Slave 2 is activated)							
			Apply procedure §3.7.3.b-Manage the Master and Slave units with a commom user interface to pass on Slave 2 status							
			MSL_CONF	758	Master/Slave Pump Type	0 = No pump control 1 = Common Water Pump (a pump is installed outside of the unit on the water loop and is controlled by the Master unit) 2 = Individual Water Pump (each Master or Slave unit has its own pump)	0 to 3	2	2	-
			Determine the min pump speed to allow closure of flow switch (refer to Table 3: Actions in WUI parameter menu or Service tools to activate the cleaning purge and control of flow rate for hydraulic circuit)							
			Adjust pump speed to obtain the expected water flow rate, with pump logic = adjustable constant speed (refer to Table 3: Actions in WUI parameter menu or Service tools to activate the cleaning purge and control of flow rate for hydraulic circuit - Line 'Variable speed pump – control on adjustable constant speed')							
8	The master unit is then used for all the other configuration points (setpoint…). To know the status of different Slaves, follow the procedure below (refer to § 3.6.3. b-Manage the Master and Slave units with a commom user interface).									

b- Manage the Master unit and Slave units with a common user interface

Thanks to common user interface on the master unit, it is possible to access data of slaves (main screen, parameter menu...).

The procedure to navigate between the different general status of units and pass from Master to Slave 1, then to Slave 2 (if existing), then to Slave 3 (if existing), is the following:

To navigate from Master to Slave or Slave to Salve, press and hold the **Occupancy** key and **Up** key simultaneously for 2 seconds.

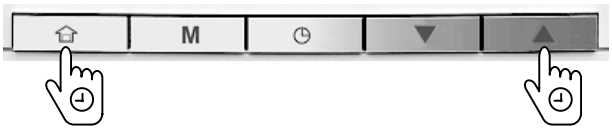
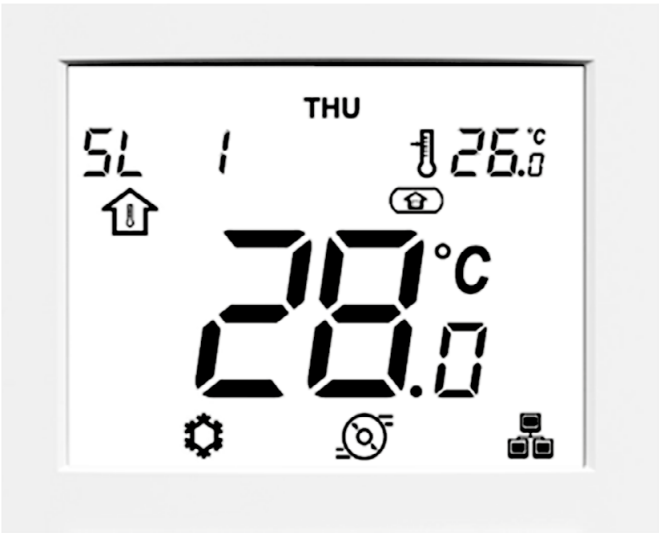


Figure 17: WUI screen for Slave 1

From this screen, it is possible to access all data of Slave 1 (parameter menu…).



To finish the commissioning, it is necessary to configure setpoint according to the user interface configuration

3.6 - Unit with remote user interface

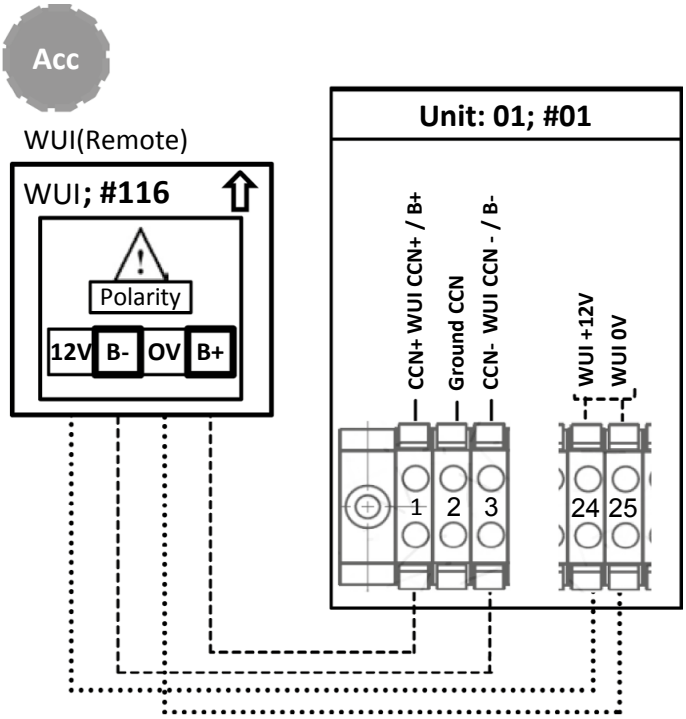
The user interface is an accessory and must be installed indoors by the installer.

IMPORTANT: For more information on:

- ***how to use this user interface, please refer to WUI end user manual,***
- ***the setpoint control, refer to §4.2.5 Setpoint,***
- ***WUI installation document, refer to document provided with accessory.***

3.6.1 - Electrical connection

Figure 18: Electrical connection of remote interface



3.6.2 - Control configuration steps

N°	Steps	Table	Par.	Designation	Description	Range	Default	Ex.	Unit	Access	Check
1	Check that the unit is configured in Remote Interface	UI_CONF	521	User Interface Type	0 = No User Interface 1 = Remote control by contacts or SUI 2 = WUI remotely installed in the house 3 = WUI locally installed on the unit	0 to 3	0	2	-		
		Check on WUI screen that the unit is configured in Air setpoint 									
2	Control on air setpoint	AIR_STP	421	Heat Home Setpoint	Air setpoint for heating mode when Occupancy mode = Home	12.0 to 34.0	19	20	°C	▼ ▲	
			422	Heat Sleep Offset	Air offset for heating mode when Occupancy mode = Sleep	-10.0 to 0.0	-2.0	-1	°C	▼ ▲	
			423	Heat Away Offset	Air offset for heating mode when Occupancy mode = Away	-10.0 to 0.0	-4.0	-3	°C	▼ ▲	
			424	Cool Home Setpoint	Air setpoint for cooling mode when Occupancy mode = Home	20.0 to 38.0	26	24	°C	▼ ▲	
			425	Cool Sleep Offset	Air offset for cooling mode when Occupancy mode = Sleep	0.0 to 10.0	2	2	°C	▼ ▲	
				Cool Away Offset	Air offset for cooling mode when Occupancy mode = Away	0.0 to 10.0	4	4	°C	▼ ▲	

3a	First possibility: control on predefined climatic curve	CLIMCURV	581	Heat Clim Curv Select	0 = No Curve / Fixed Water Setpoint
					1 to 12 = Heating Climatic Curve #number
					13 = Custom Climatic Curve
						-1 to 12	-1	2	-		

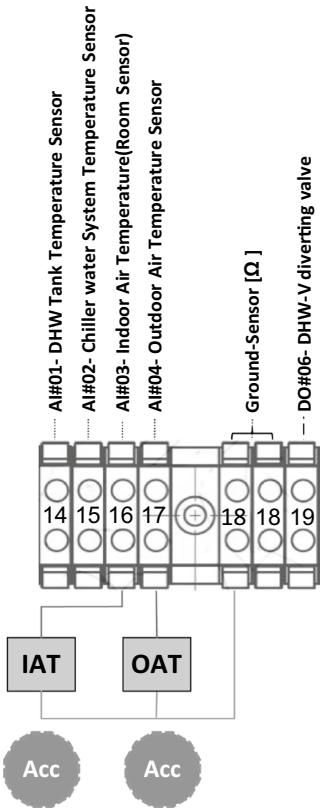
			412	Heat Curv Max Stp Offset	Heat Maximum Water Setpoint can be offseted by this parameter, to adjsut at best the setpoint at customer needs	-5.0 to 5.0	0	5	°C		
			586	Cool Clim Curv Select	0 = No Curve / Fixed Water Setpoint 1 to 2 = Cooling Climatic Curve #1number 3 = Custom Climatic Curve	-1 to 2	-1	1	-		
			413	Cool Curve Min Stp Offset	Cool Minimum Water Setpoint can be offseted by this parameter, to adjsut at best the setpoint at customer needs	-5.0 to 5.0	0	5	°C		
3b	Second possibility: control on fixed LWT setpoint	WAT_STP	581	Heat Clim Curv Select	Heating climatic curve select	-1 to 12	-1	-1	-		✓
			401	Heat Home Setpoint	Water setpoint for heating mode when Occupancy mode = Home	20.0 to 60.0	45	50	°C	▼ ▲	
			402	Heat Sleep Offset	Water offset for heating mode when Occupancy mode = Sleep	-10.0 to 0.0	0.0	-5	°C	▼ ▲	
			403	Heat Away Offset	Water offset for heating mode when Occupancy mode = Away	-10.0 to 0.0	-5.0	-10	°C	▼ ▲	
			586	Cool Clim Curv Select	Cooling climatic curve select	-1 to 2	0	-1	-	▼ ▲	✓
			407	Cool Home Setpoint	Water setpoint for cooling mode when Occupancy mode = Home	0.0 to 18.0	12	18	°C	▼ ▲	
			408	Cool Sleep Offset	Water offset for cooling mode when Occupancy mode = Sleep	0.0 to 10.0	0	2	°C	▼ ▲	
			409	Cool Away Offset	Water offset for cooling mode when Occupancy mode = Away	0.0 to 10.0	5	5	°C	▼ ▲	
3c	Third possibility: control on customer climatic curve	CLIMCURV	581	Heat Clim Curv Select	Heating climatic curve select	-1 to 12	-1	0	-		
			582	Heat Minimum OAT	In heating mode, Customer minimum OAT	-30.0 to 10.0	-7.0	-20	°C		
			583	Heat Maximum OAT	In heating mode, Customer maximum OAT	10.0 to 30.0	20	20	°C		
			584	Heat Min Water Setpoint	In heating mode, Customer minimum Water Temperature	20.0 to 40.0	20	20	°C		
			585	Heat Max Water Setpoint	In heating mode, Customer maximum Water Temperature	30.0 to 60.0	38	38	°C		
			412	Heat Curv Max Stp Offset	Heat Maximum Water Setpoint can be offseted by this parameter, to adjsut at best the setpoint at customer needs	-5.0 to 5.0	0	5	°C		
			586	Cool Clim Curv Select	Cooling climatic curve select	-1 to 2	-1	0	-		
			587	Cool Minimum OAT	In cooling mode, Customer minimum OAT	0.0 to 30.0	20	22	°C		
			588	Cool Maximum OAT	In cooling mode, Customer maximum OAT	24.0 to 46.0	35	35	°C		
			589	Cool Min Water Setpoint	In cooling mode, Customer minimum Water Temperature	5.0 to 20.0	10	7	°C		
			590	Cool Max Water Setpoint	In cooling mode, Customer maximum Water Temperature	5.0 to 20.0	18	15	°C		
			413	Cool Curve Min Stp Offset	Cool Minimum Water Setpoint can be offseted by this parameter, to adjsut at best the setpoint at customer needs	-5.0 to 5.0	0	5	°C		
4	Configure Summer mode	DHW_CONF	716	Summer Mode OAT Thrshold	The summer mode is set when the Summer Mode switch is closed. • Summer Mode is set to "On" if OAT is above Summer Mode OAT Threshold [P716] for at least the Summer Mode On Delay [P717]. • Summer Mode is reset if OAT goes below Summer Mode OAT Threshold [P716] minus 2 K for at least the Summer Mode Off Delay [P718] .	15.0 to 30.0	20	22	°C		
			717	Summer Mode On Delay		0 to 12	0	7	h		
			718	Summer Mode Off Delay		0 to 12	0	7	h		

3.7 - Additional OAT sensor

If the unit is unfavorably located, leading to incorrect reading of OAT, it is possible to install an additional outdoor air temperature sensor, located in an appropriate position. This sensor is available as an accessory (refer to §1.6.1 Options and accessories tables). For more details on its installation, refer to accessory document.

3.7.1 - Electrical connection

Figure 19: Electrical connection of additional OAT sensor and IAT sensor



3.7.2 - Control configuration steps

Steps	Table	Par.	Designation	Description	Range	Default	Ex.	Unit
Configure an additional Outdoor air temperature sensor	GEN_CONF	511	OAT sensor type	0 = No additional OAT sensor 1 = 10kOhm additional OAT sensor (connected on NHC Board) 2 = 5kOhm additional OAT sensor (connected on NHC Board) 3 = 3kOhm additional OAT sensor (connected on NHC Board)	0 to 3	0	3	-

3.8 - IAT sensor

If needed, it is possible to add an Indoor Air Temperature sensor, which measures the room temperature instead of the WUI air temperature sensor (when WUI remote) or when there is no user interface. When this sensor is installed and configured, IAT value is compared to air setpoint to determine the demand in heating or cooling.

3.8.1 - Electrical connection

For details on electrical connection, refer to Figure 21 Electrical connection of additional OAT sensor and IAT sensor.

3.8.2 - Control configuration steps

Steps	Table	Par.	Designation	Description	Range	Default	Ex.	Unit
Check that the unit is configured in Air setpoint	UI_CONF	**521**	User Interface Type	0 = No User Interface 1 = Remote control by contacts or SUI 2 = WUI remotely installed in the house 3 = WUI locally installed on the unit	0 to 3	0	2 (Even if localWUI)	-
	Check on WUI screen that the unit is configured in Air setpoint							
Set a IAT sensor	GEN_CONF	**510**	IAT Sensor Type	0 = No IAT sensor 1 = 10 KOhms Thermistor 2 = 5 KOhms Thermistor 3 = 3 KOhms Thermistor	0 to 3	0	2	-

To configure the setpoint, refer to §4.2.5 - Setpoint.

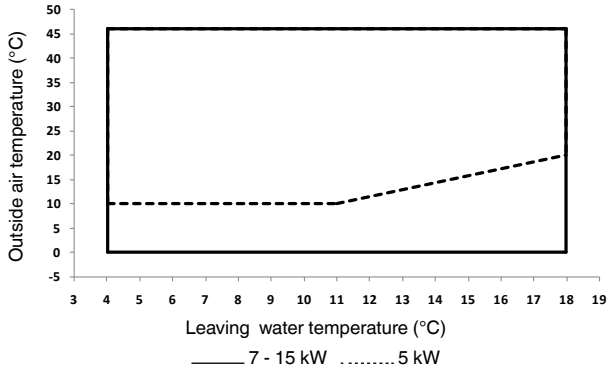
4 - OPERATION

4.1 - Unit range - 30AWH

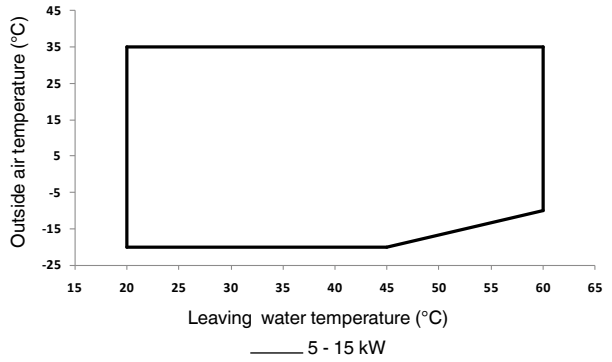
Cooling Cycle			
Evaporator Water Temperature	**°C**	**Minimum**	**Maximum**
Entering water temperature at start-up		6	30
Leaving water temperature during operation		4	18
Condenser Air Temperature	**°C**	**Minimum**	**Maximum**
Standard unit		0 / 10 (1)	46
Heating Cycle			
Condenser Water Temperature	**°C**	**Minimum**	**Maximum**
Entering water temperature at start-up		15	52 / 59 (2)
Leaving water temperature during operation		20	60
Evaporator Air Temperature	**°C**	**Minimum**	**Maximum**
Standard unit		-20 (3)	35

(1) 0°C for 30AWH 7-15 KW and 10°C for 30AWH 5 kW
(2) 52 °C with unit stopped at EWT threshold and 59 °C with unit running at EWT threshold
(3) For operation at outdoor ambient temperature below 0°C (heating mode), the water freeze protection should be available and according to the water installation, the water loop can be protected against freeze by the installer, using an anti-freeze solution or trace heater.

Operating range - Cooling mode



Operating range - Heating mode



4.2 - Operating modes

4.2.1 - Occupancy mode

Depending on unit configuration, the system can be controlled in two ways. The first possible method embraces the use of setpoints, where the outdoor air temperature has no effect on the temperature set by the control. The second control method is based on a climatic curve. In this case, the water temperature is adjusted in response to changes in the external temperature.

The unit may operate in HOME, SLEEP, or AWAY mode. The occupancy can be set manually by the user or automatically according to the schedule (refer to WUI end user manual).

Occupancy	WUI Display	Comfort Type
Home		Comfort
Sleep		Comfort
Away		Eco

CAUTION: In case of power cycle, the previous operating mode (cooling / heating / DHW) or occupancy mode (home / sleep / away) will be automatically restored.

4.2.2 - Operating modes

The user can normally choose one of three available operating modes, i.e. cooling, heating or domestic hot water production only. Other modes such as booster cooling or booster heating, purge, and drying, can be selected only with service access level.

The unit may run in the following modes:

- Off: Unit is requested to stop.
- Cool: Unit is requested to run in Cooling mode.
- Heat: Unit is requested to run in Heating mode.
- DHW Only: Unit is requested to run in DHW mode Only.
- Booster Cool: Unit is requested to run in Cooling mode at maximum compressor frequency.
- Booster Heat: Unit is requested to run in Heating mode at maximum compressor frequency.
- Purge: Water pump is requested to run in order to purge the hydraulic circuit.
- Drying: Unit is requested to run in Heating mode and the heating water setpoint is increased in order to dry UFH.

When Cooling mode is selected, the chiller or heat pump will operate in the Cooling mode in order to cool the water loop to the selected temperature.

When the heat pump is in Heating mode, the heat pump heats the water loop to the selected temperature. When the outdoor air temperature is very low, electric heaters or boiler heating can be used in order to satisfy the heating demand.

When DHW Only is requested, the unit is not allowed to operate in cooling or heating modes.

It is also possible for the unit to operate in DHW mode when heating mode or cooling mode is selected, according to schedule / temperature condition / maximum runtime.

When the system is in the Off mode, the compressor and the pump are stopped (except for home anti-freeze protection and water freeze protection, refer to § 4.2.6 Home anti-freeze protection and 4.2.7 Water freeze protection).

4.2.3 - Operating mode control

The operating mode selection may differ depending on access level and the use of communication methods, i.e. WUI display, Proprietary Protocol communication, or JBus communication.

In the following sections of this document, the configuration steps are the same for all of these three communication methods, except when the configuration is described with WUI direct access.

a - WUI control

If the unit is fitted with a user interface, the mode selection can be done by direct access on WUI.

When the unit is Off, press the **Mode** key to wake up the user interface and then press the **Mode** key successively to select the required operating mode.

Table 4: Different operating modes

System Mode	WUI display	Icon
Off	-	[no icon]
Cool		[steady icon]
Heat		[steady icon]
DHW only		[steady icon]
Booster Cool (1)		[flashing fast]
Booster Heat (1)		[flashing fast]
Purge (1)		[flashing fast]
Drying (1)		[flashing slow]

(1) Service access level only (with password 0120).

For more information on user interface, please refer to the WUI end user manual.

b - Proprietary Protocol communication

The unit can be started or stopped and its operating mode can be selected from the network.

Steps	Table	Par.	Designation	Description	Range	Default	Ex.	Unit
Mode selcetion on WUI advanced menu	MOD_REQ	44	System Mode Request	0 = Off 1 = Cool 2 = Heat 4 = DHW 5 = Booster Cooling 6 = Booster Heating 8 = Purge (water pump is constantly running to purge the hydraulic circuit) 9 = Drying (slow water temp. ramp-up in Heating mode for UFH drying)	0 to 9	-	1	-

c - JBus communication

The unit can be started or stopped and its System Mode can be selected from the JBus network. Refer to JBus registers in § 7. Parameter overview.

4.2.4 - Switches

Some modes described below (summer mode / night mode…) could be activated or desactivated by switches. Moreover other remote contacts can be connected to the unit in order to add new features. If the unit is managed by remote contacts, it is necessary to change the value of parameter User Interface type in UI_CONF table, with [P521] = 1.

Table 5: Possible switches to install on system

Switch	Definition
On/Off Switch (remote)	Used to start and stop the unit (if no user interface).
Mode Heat/Cool (remote)	Used to select (if no user interface): - Cooling Mode = contact opened - Heating Mode = contact closed
Normal/Eco (remote)	Used to select (if no user interface): - Home Mode = contact opened - Away Mode = contact closed
Safety Input Contact	This contact should be a 'normally closed' type. Parameter [P501] is used to configure the safety contact type: 1 = Full Safety Contact: unit is stopped when contact is opened 2 = Under Floor Heating Safety Contact: Heating Mode is not allowed when contact is opened 3 = Under Floor Cooling Safety Contact: Cooling Mode is not allowed when contact is opened
Power Limitation Contact (Night Mode)	Used to reduce the compressor maximum frequency to avoid noise
Off Peak Contact	This switch is to close when the rate electricity price is high (Electric Heat Stages are not allowed)

Switch	Definition
Loadshed Request Switch	This contact is requested by electricity company (i.e. in Germany) to control the green electricity (wind, solar) production and consumption more efficiently. When switch is closed then unit shall be stopped as soon as possible
Solar Input Contact	When switch is closed then the unit is not allowed to run in Heating or DHW Mode because hot water is produced from a solar source
DHW Request Switch from tank	When this input is closed, the Domestic Hot Water production is requested. A thermal switch mounted on the Domestic Hot Water tank shall be connected to this input
DHW Priority Contact (thermal switch)	When the status of this input goes from open to closed, the unit is switched to Domestic Hot Water production for the programmed duration [P708] regardless of the Space Heating demand and the current DHW schedule
Anti-Legionella Cycle Request Button	When the status of this input goes from open to closed, the Domestic Hot Water production is requested with the Anti-Legionella setpoint
Summer Switch	Used to select the summer mode (contact closed). For more information about the summer mode please refer to the section 4.2.17
Energy Meter Input	This input is used to count the number of pulses received from an external energy meter (not supplied)
External Alarm Indication Input	When this input is opened, alarm is tripped. This alarm is for information only, it does not affect the unit operation.

4.2.5 - Setpoint

To achieve better comfort, it is possible to adjust the room temperature setpoint or water temperature setpoint according to your needs. Please note that the temperature setpoint can be adjusted only within a range defined for each occupancy mode.

When the unit is equipped with a remote user interface or IAT sensor, the control can be based on the air setpoint.

Air setpoint configuration

Depending on the occupancy and heating/cooling/DHW mode, the air setpoint is as given below.

The air setpoint can be configured in two ways:

- By direct access to the WUI (refer to WUI end-user manual)
- By access to the parameter menu via the WUI or JBus or Proprietary Protocol (refer to § 7. Parameter Overview)

COOLING

WUI Occupancy	Air setpoint on WUI direct access	Range	Air setpoint on parameter menu	Range
	Cool Home Setpoint	20 to 38°C	Cool Home Setpoint [P424]	20 to 38°C
	Cool Sleep Setpoint	20 to 38°C	Cool Sleep Offset [P425]	0 to 10°C
	Cool Away Setpoint	20 to 38°C	Cool Away Offset [P426]	0 to 10°C

HEATING

WUI Occupancy	Air setpoint on WUI direct access	Range	Air setpoint on parameter menu	Range
	Heat Home Setpoint	12 to 34°C	Heat Home Setpoint [P421]	12 to 34°C
	Heat Sleep Setpoint	12 to 34°C	Heat Sleep Offset [P422]	-10 to 0°C
	Heat Away Setpoint	12 to 34°C	Heat Away Offset [P423]	-10 to 0°C

Once air setpoints are defined, water setpoints must be configured (refer to §3.7. Unit with remote interface). Please, find here below more details about water setpoint configuration.

Water setpoint configuration

The water setpoint calculation can be based on:

1/ Predefined Climatic Curves depending on OAT: climatic curves already preconfigured in the control logic.

2/ Fixed Water Setpoint: using a fixed value for each occupancy mode.

3/ Custom Climatic Curve depending on OAT: define customized climatic curves in function of the application.

4/ Offset on climatic curves (predefined and customer)

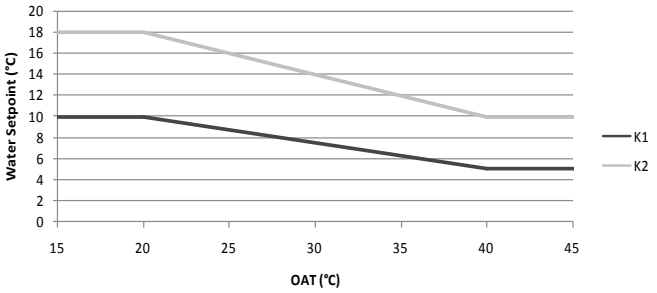
1/ Predefined climatic curves

COOLING: If the cooling climatic curve [P586] is configured to "1" or "2", the water setpoint will be calculated according to the selected cooling climatic curve.

Two predefined cooling climatic curves are available:

Climatic Curve	Min. OAT	Max. OAT	Min. Water Temp	Max. Water Temp	Application
K1	20°C	40°C	5°C	10°C	FCU's
K2	20°C	40°C	10°C	18°C	UFC

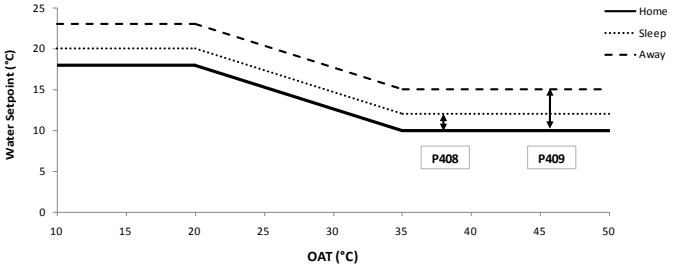
Cooling Climatic Curves



- If OAT is invalid (not transmitted by the Inverter, out-of-range value, etc.), the Water Setpoint is equal to the current Min. Water Temp.
- If OAT is above the current Maximum OAT threshold, the Water Setpoint is equal to the current Max. Water Temp.

The climatic curve corresponds to the water setpoint in Home mode. To define the other occupancy modes, it is necessary to configure Cool Sleep Offset [P408] and Cool Away Offset [P409]:

Cooling Climatic Curve in function of occupancy mode



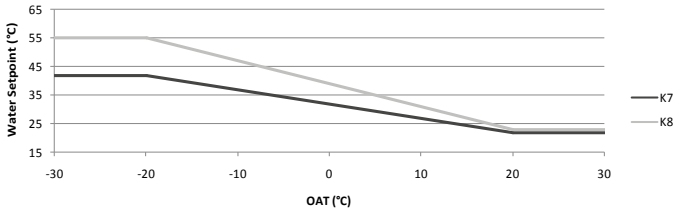
☀ **HEATING: If the heating climatic curve [P581] is configured to a parameter from "1" to "12", the water setpoint will be calculated according to the selected heating climatic curve.**

Twelve predefined heating climatic curves are available:

Climatic Curve	Min. OAT	Max. OAT	Min. Water Temp	Max. Water Temp	Application
K1	-7°C	20°C	20°C	38°C	UFH
K2	-5°C	20°C	20°C	33°C	UFH
K3	-9°C	20°C	20°C	45°C	FCU's
K4	-8°C	20°C	40°C	50°C	FCU's
K5	-5°C	20°C	40°C	55°C	Radiators
K6	0°C	20°C	40°C	60°C	Radiators
K7	-20°C	20°C	22°C	42°C	FCU's
K8	-20°C	20°C	23°C	55°C	Radiators
K9	-12.7°C	20°C	24°C	60°C	Radiators
K10	-5.9°C	20°C	25°C	60°C	Radiators
K11	-1.5°C	20°C	26°C	60°C	Radiators
K12	3.5°C	20°C	27°C	60°C	Radiators

Example:

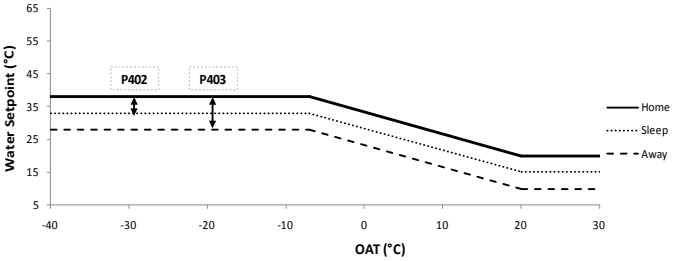
Heating Climatic Curves (K7 to K8)



- If OAT is invalid (not transmitted by the Inverter, out-of-range value, etc.), the Water Setpoint is equal to the current Max. Water Temp.
- If OAT is above the current Maximum OAT threshold, the Water Setpoint is equal to the current Min. Water Temp.

The climatic curve corresponds corresponds to the water setpoint in Home mode. To define the other occupancy modes, it is necessary to configure Heating Sleep Offset [P402] and Heating Away Offset [P403]:

Heating Climatic Curve in function of occupancy mode



2/ Fixed water setpoint

If the cooling climatic curve [P586] or the heating climatic curve [P581]is configured to "-1", the water control point will be determined according to the Occupancy mode.

The water setpoint can be configured in two ways:

- By direct access to the WUI (refer to WUI end-user manual)
- By accessing the parameter menu via WUI or JBus or Proprietary Protocol (refer to § 7. Parameter Overview)

COOLING

WUI Occupancy	Water setpoint on WUI direct access	Range	Water setpoint on parameter menu	Range
	Cool Home Setpoint	5 to 18°C	Cool Home Setpoint [P407]	5 to 18°C
	Cool Sleep Setpoint		Cool Sleep Offset [P408]	0 to 10°C
	Cool Away Setpoint		Cool Away Offset [P409]	0 to 10°C

HEATING

WUI Occupancy	Water setpoint on WUI direct access	Range	Water setpoint on parameter menu	Range
	Heat Home Setpoint	20 to 60°C	Heat Home Setpoint [P401]	20 to 60
	Heat Sleep Setpoint		Heat Sleep Offset [P402]	-10 to 0°C
	Heat Away Setpoint		Heat Away Offset [P403]	-10 to 0°C

DHW only(setpoints defined below change also the setpoints for DHW mode)

WUI Occupancy	Water setpoint on WUI direct access	Range	Water setpoint on parameter menu	Range
	DHW Setpoint	30 to 60°C	DHW Setpoint [P406]	30 to 60°C
	DHW Anti-Legionella Stp	50 to 60°C	DHW Anti-Legionella Stp [P405]	50 to 60°C

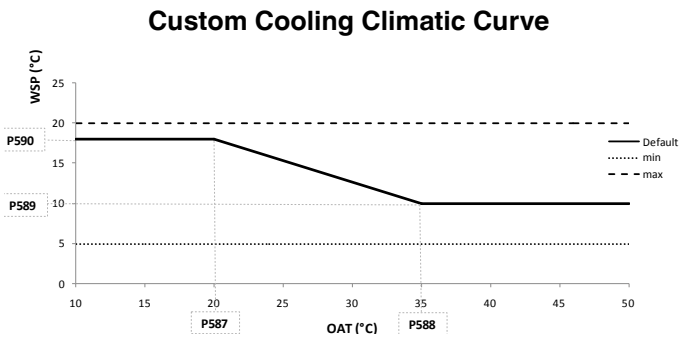
3/ Custom climatic curve

☼ **COOLING:** If the cooling climatic curve [P586] is configured to "0", the water setpoint will be calculated according to the custom cooling climatic curve.

This custom cooling climatic curve can be defined using the following parameters:

Parameter	Description	Default	Min.	Max.
P587	Custom Minimum OAT	20°C	0°C	30°C
P588	Custom Maximum OAT	35°C	24°C	46°C
P589	Custom Minimum Water Temp	10°C	5°C	18°C
P590	Custom Maximum Water Temp	18°C	5°C	18°C

Example:



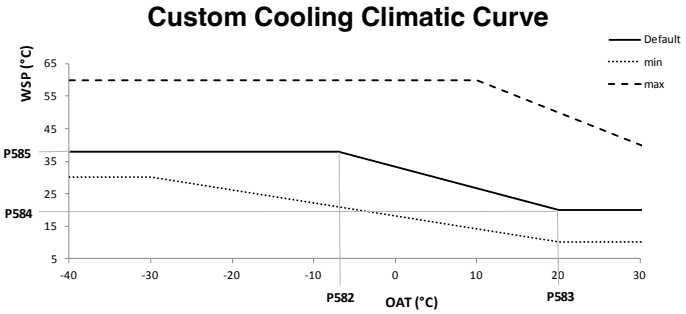
- If OAT is invalid, the Water Setpoint is equal to the Custom Minimum Water Temp [P589].
- If OAT is above the current Maximum OAT threshold, the Water Setpoint is equal to the Custom Maximum Water Temp [P590].
- If Minimum OAT is greater or equal to Maximum OAT threshold, the Water Setpoint is equal to the Custom Maximum Water Temp [P590].

☀ **HEATING:** If the heating climatic curve [P581]is configured to "0", the water setpoint will be calculated according to the custom heating climatic curve.

This custom heating climatic curve can be defined using the following parameters:

Parameter	Description	Default	Min.	Max.
P582	Custom Minimum OAT	-7°C	-30°C	10°C
P583	Custom Maximum OAT	20°C	10°C	30°C
P584	Custom Minimum Water Temp	20°C	20°C	40°C
P585	Custom Maximum Water Temp	38°C	30°C	60°C

Example:



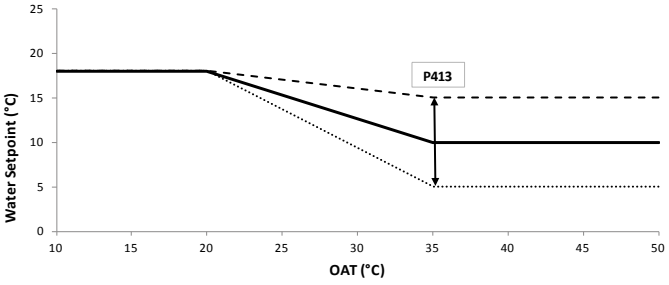
- If OAT is invalid, the Water Setpoint is equal to the Custom Max. Water Temp [P585].
- If OAT is above the current Maximum OAT threshold, the Water Setpoint is equal to the Custom Min. Water Temp [P584].
- If Min. OAT is greater or equal to Max. OAT threshold, the Water Setpoint is equal to the Custom Max. Water Temp [P584].

4/ Offset on climatic curves (predefined and customer)

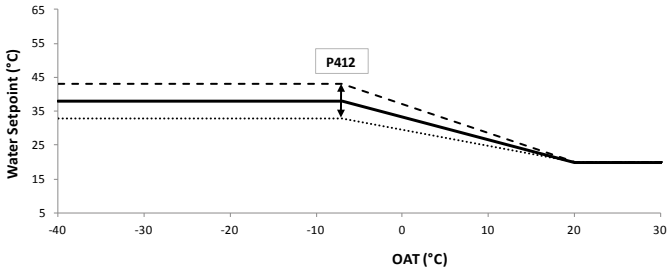
Two other parameters are also configurable to adjust water setpoint to suit customer needs:

- for cooling curve, Cool Minimum Water Setpoint [P589] can be offsetted by an offset on foot of the curve (Cool Curve Min Stp Offset [P413])
- and for heating curve, Heat Maximum Water Setpoint [P585] can be offsetted by an offset on head of the curve (Heat Curv Max Stp Offset [P412])

Custom Cooling Climatic Curve : Offset on foot of the curve



Heating Cooling Climatic Curve : Offset on head of the curve



4.2.6 - Home Anti-freeze protection

This protection is used on 30AWH, only with remote user interface or IAT sensor. It is used to maintain the minimum room temperature which is by default set to 6°C. When the room temperature goes below the Home Anti-freeze setpoint[P427], the unit will run in Heating mode until the room temperature is increased: [P427] + 2°C.

Steps	Table	Par.	Designation	Description	Range	Default	Ex.	Unit
Set the minimum room temperature	AIR_STP	427	Home Anti-freeze setpoint	This is the minimum room temperature that is allowed. If room temperature drops below this setpoint, the unit will start to operate in Heating mode.	6.0 to 12.0	6	10	°C

Never switch off the unit, otherwise home anti-freeze protection cannot be guaranteed. For this reason the main unit and / or customer circuit disconnect switch must always be left closed.

4.2.7 - Water freeze protection

When the OAT is low (and pump is stopped), the risk to freeze the water exchanger and the water pipes is high. The pump shall be turned on regularly or continuously to make water circulate and decrease the risk. Likewise the BPHE and piping electric heaters present on the hydraulic kit (refer to Figures 7 and 8) are activated in some cases.

The pump is controlled as follows:

- If OAT goes below AntiFreezeDeltaSetpoint(1) [P517] + 6°C, the pump runs for 1 minute every 15 minutes at maximum speed.
- If OAT goes below AntiFreezeDeltaSetpoint(1) [P517] + 6°C and EWT or LWT goes below AntiFreezeDeltaSetpoint(1) [P517] + 3°C, the pump runs continuously at maximum speed.
- A 1K hysteresis is applied to exit these two overrides.

The electric heaters are controlled as follows:

- The electric heaters are energized during defrost and for 1 minute after defrost end.
- The electric heaters are energized if OAT is below the AntiFreezeDeltaSetpoint(1) [P517] + 6.0 °C and if either EWT or LWT are lower than AntiFreezeDeltaSetpoint(1) [P517] + 4.0 °C.
- The electric heaters are de-energized if OAT is above the AntiFreezeDeltaSetpoint(1) [P517] + 7.0 °C or if both EWT (if configured) and LWT are higher than AntiFreezeDeltaSetpoint(1) [P517] + 4.5 °C.
- The electric heaters are energized if either alarm #50 or alarm #51 is active and can still automatically be reset

(1) Modifying the pre-configured value is at the user's responsibility.

Steps	Table	Par.	Designation	Description	Range	Default	Ex.	Unit
Define the criteria to activate the water freeze protection	GEN_CONF	517	Anti-Freeze Delta Setpoint	Outdoor air temperature criteria for activation of the anti freeze protection	0.0 to 6.0	0	3	°C

Never switch off the unit, otherwise freeze protection cannot be guaranteed. For this reason the main unit and/or customer circuit disconnect switch must always be left closed.

If a shut-off valve is installed, a bypass must be included as shown below.

Figure 20: Winter position for unit with hydraulic module

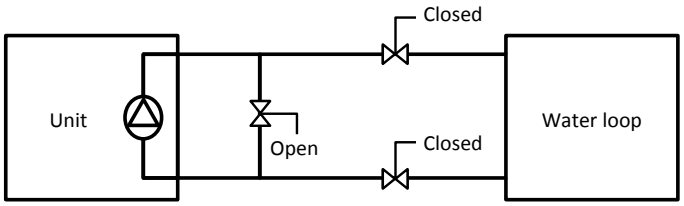
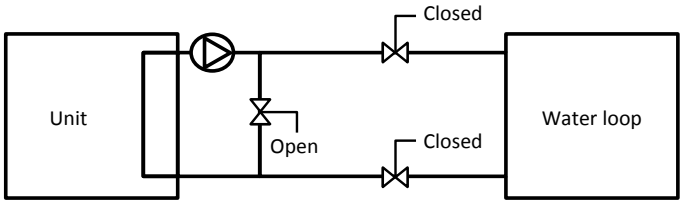


Figure 21: Winter position for unit without hydraulic module



IMPORTANT: Depending on the atmospheric conditions in your area you must do the following when switching the unit off in winter:

- ***Add ethylene glycol or propylene glycol with an adequate concentration to protect the installation up to a temperature of 10 K below the lowest temperature likely to occur at the installation site.***
- ***If the unit is not used for an extended period, it should be drained, and ethylene glycol or propylene glycol should be charged in the heat exchanger as a safety precaution, using the water inlet purge valve connection.***
- ***At the start of the next season, refill the unit with water and add an inhibitor.***
- ***For the installation of auxiliary equipment, the installer must comply with basic regulations, especially for minimum and maximum flow rates, which must be between the values listed in the operating limit table (application data).***
- ***To prevent corrosion by differential aeration, the complete drained heat transfer circuit must be charged with nitrogen for a period of one month. If the heat transfer fluid does not comply with the manufacturer regulations, the nitrogen charge must be added immediately.***
- ***If frost protection is dependent on electric trace heaters, never switch off their power.***
- ***If trace heating is not used, or during a prolonged power failure, the unit water system must be drained to protect the unit.***
- ***The heat exchanger temperature sensor are part of frost protection: If piping trace heaters are used, ensure the external heaters do not affect the measurement of these sensors.***

CAUTION:
Please note that "water freeze protection" and "home anti-freeze protection" are two different modes. Water freeze protection is used in order to reduce the risk to freeze the water exchanger and the water pipes, whereas the home anti-freeze protection is used to maintain the minimum room temperature.

4.2.8 - Domestic hot water mode

For heat pumps with a domestic water tank (only 30AWH), the DHW mode is used to produce hot water for domestic purposes. The system control manages the operation of the hot domestic water tank, as well as the diverting valve.

If the unit is fitted with a variable speed hydraulic kit, then in DHW mode, the pump must be controlled by the adjustable constant speed logic (no T logic).

And an additional water pump can be installed on secondary water loop (refer to §Installation with DHW production and boiler for details).

a - DHW diverting valve

The units can drive a diverting valve to manage a domestic hot water storage tank application. In case of a domestic hot water request, the operating logic controls a diverting valve which directs the hot water to the storage tank.

Characteristics	Diverting valve with spring return and two wires control Recommendation: - Kvs = 16 - Max. Temperature = 150°C - CHAR:L

b - DHW temperature sensor or thermostat

According the configuration, it is possible to control the DHW option with either a temperature sensor or thermostat

	Temperature sensor	**Thermostat**
Characteristics	Accessory Resistance = 10 KOhms Cable length = 6 m	When the thermostat is closed, the domestic hot water mode is requested

The DHW production is possible when:

- DHW only mode is selected and there is DHW production demand (temperature conditions)
- DHW schedule is activated and there is DHW production demand (temperature conditions) and operating time in this mode is below DHW Maximal Runtime [P707].

c - DHW electric heater

When the unit is requested to run in DHW mode, the DHW electric heater (if configured) can be used in order to provide domestic hot water.The discrete output can control a contactor (not supplied with unit).

Characteristics	Contactor Coil: 230 VAC 50Hz

Electric heater is started when tank temperature is below DHW setpoint and one of the following conditions is true:

- OAT is below Booster OAT Threshold [P604]
- OAT is above Maximum OAT for Heating [P515]
- Anti-legionella mode is active
- Defrost is active
- In case of unit of failure

IMPORTANT:
Electric heating is disabled when Off Peak or Load Shedding is active or in the case of DHW thermistor sensor failure (refer to § 4.2.4 Switch).

d - Domestic water tank

The water inside the domestic water tank must be constantly controlled in order to minimize the risk of any contamination, including legionella bacteria. Bearing this in mind, it is important to inform the user about the significance of water temperature control.

Water tank protection system

The system is scheduled to heat up water in the domestic hot water tank in order to eliminate the possibility of legionella growth or kill any existing bacteria.

Legionella will not survive if the temperature is above 50°C. The risk of contamination is practically non-existent when the water temperature is set to 60°C.

Water tank protection settings

To protect the domestic water tank against legionella bacteria, the following parameters must be set:

- Anti-Legionella Start Day of Week [P714]
- Anti-Legionella Start Time [P715]
- Anti-Legionella Setpoint[P405] (anti-legionella protection is stopped when the water temperature reaches the pre-set temperature)

e - DHW limitation mode

DHW limitation mode [P543] reduces noise levels, by reducing the compressor frequency when DHW mode is active.

4.2.9 - Master/Slave

a - Installation

Master/slave installation permits connection for multiple units in parallel : one master unit can control several slave units.

This kind of installation must comprise the same unit size (For example all 5 kW units or all 11 kW units, but not a mix of different sizes), equipped with hydraulic kit. If the unit is fitted with a variable speed hydraulic kit, the pump must be controlled by the adjustable constant speed logic (no T logic). The master / slave operation is incompatible with Domestic Hot Water production.

Only the Master unit can be fitted with user interface options. If the Slave units have been ordered with a user interface, then it is necessary to disconnect it.

Additional common leaving water temperature sensor must be installed on site, on the common piping.

Characteristics	Accessory Resistance = 5 KOhms Cable length = 15 m
Electrical connection	Refer to § 3.6 Master/Slave installation
Configuration	Refer to § 3.6 Master/Slave installation

The RS485 communication cable (not supplied) must be connected on each unit.

b - Control

All units installed in the same master/slave group share the same operating mode as well as the same setpoint.

The Master unit is connected to a user interface which can be installed remotely. The "Master" user interface is a decision point for all other units in the same master/slave group, which means that the operating mode (cooling / heating) and the water setpoint defined by the master will be transmitted to other "slave" units.

When there are at least two units configured in the master/slave assembly, it is possible to define how compressors are started. Three compressor control methods are available.

Compressors can be started:

Based on address configuration: The Master unit is started first. Then, slave units will be started sequentially (beginning with slave 1 and ending with, for example, slave 3). When stopping, the last slave is stopped first – the Master is the last unit stopped.

According to wear factor: Units are started sequentially based on the wear factor. As system demand increases, the unit with the lowest wear factor is started first, when system demand decreases capacity, the unit with, the highest wear factor is stopped first.

Simultaneously: All units are started and stopped at the same time. Compressor frequency is increased or decreased simultaneously on all units.

For more details on Master /Slave icon display on WUI, refer to WUI end-user manual.

CAUTION:

In the case of master/slave communication failure, the Master will either run in the standalone mode or it will continue to operate with other Slave units that are still communicating. The affected Slave unit will stop all of its operations.

4.2.10 - Pump configuration

There are several possible configurations of the hydraulic circuit:

- Unit with hydraulic module (internal main pump included),
- If a secondary hydraulic loop is used, this will have its own additional pump.

Table 6: Different configurations of pump

Different configurations with pump	Internal main pump		Additional pump (not supplied)
	Variable speed pump		
	Adjustable speed	ΔT	Fixed speed pump
Internal main pump			✓
External main pump	×		✓
Master / Slave installation	✓	×	✓ (only on master unit)

For external main pump and additional pump, the discrete output can control a contactor (not supplied with unit).

Characteristics	Contactor Coil: 230 VAC 50Hz

CAUTION:

The installer is responsible for ensuring the protection of any additional pump against the low water flow rate (no flow switch can be managed by unit control).

The management of different states of main pump (ON / OFF) is different according to the kind of installation (options, accessories, applications). In the compatibility table below, the different control logics for main pump are presented in function of installation:

Table 7: Different control logic for main pump

Main Pump Logic [P565]	Remote WUI	OFF Mode	Cooling / Heating Mode		Boiler	
			Satisfied Demand	Demand	On	Off
Always On	✓	Off	On	On	Off	N.A.
Water Sampling	N.A.	Off	Off (On for sampling)	On	Off	N.A.
According to Space Temp	✓	Off	According to IAT vs Air Setpoint	On	Off	N.A.

The management of different states of additional pump (ON / OFF) is different according to the kind of installation (options, accessories, applications). In the compatibility table below, the different control logics for additional pump are presented in function of installation:

Table 8: Different control logic for additional pump

Addotional Pump Logic [P573]	Remote WUI	OFF Mode	Cooling / Heating Mode		Boiler		DHW	
			Satisfied Demand	Demand	On	Off	On	Off
No additional pump	✓	Off	Off	Off	Off	N.A.	N.A.	N.A.
Always On	✓	Off	On	On	On	N.A.	N.A.	N.A.
According to Space Temp	✓	Off	According to IAT vs Air Setpoint	On	On	N.A.	N.A.	N.A.
Always On, but Off when DHW activated	✓	Off	On	On	On	N.A.	Off	N.A.
According to Space Temp, but Off when DHW activated	✓	Off	According to IAT vs Air Setpoint	On	On	N.A.	Off	N.A.

4.2.11 - Electric Heaters

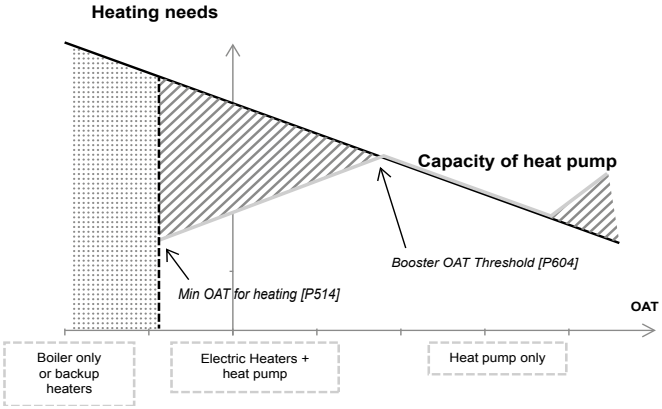
NOTE:
The installer is responsible for ensuring that the installation complies with the applicable legislation in terms of electrical and thermal safety.

It is possible to include electric heaters in the hydraulic circuit to ensure heating in case of low OATor heat pump failure.

When OAT is below Booster OAT Threshold [P604], then the electrical booster heaters can be activated. The electrical booster heaters can operate at the same time as the heat pump.

When OAT is below Min OAT for heating [P514], the heat pumps is stopped, and the electric heaters can be activated.

Figure 22: Operation of booster and backup



Depending on the configuration, it is possible to control up to three electric heaters or three electric heat stages (refer to § 3.1 General customer electrical connection on terminal block):

- One electric heat stage with one customized discrete output: EH1.
- Two electric heat stages with two customized discrete outputs: EH1 and EH2.
- Three electric heat stages with two customized discrete outputs: EH1 and EH2.
- Three electric heat stages with three customized discrete outputs: EH1 and EH2 and EH3. This configuration cannot be activated if DHW heater is present.

Each discrete output can control a contactor (not supplied with unit).

Characteristics	Contactor Coil: 230 VAC 50Hz
Electrical connection	Refer to § 3.4 Installation with electrical booster heaters
Configuration	Refer to § 3.4 Installation with electrical booster heaters

4.2.12 - Boiler

To satisfy the heating demand during periods very low ambient temperature, it is possible to install a boiler. The boiler is considered as a backup: when it is activated, the heat pump cannot operate. Boiler is activated when OAT is below Minimum OAT for Heating [P514] or in case of heat pump failure.

Characteristics	Contactor Coil: 230 VAC 50Hz

4.2.13 - Coil heating control for compressor

CAUTION: When the unit doesn't operate, the compressor can be energized. The coil heating control has the function of heating the compressor by applying a current to the compressor whennot operating instead of using a case heater.

This control is for the purpose of preventing stagnation of the refrigerant inside the compressor.

4.2.14 - Defrost cycle (traditional defrost)

When the outdoor air temperature is low and the ambient humidity is high, the probability of frost forming on the surface of the outdoor coil increases. The frost covering the outdoor coil may reduce the air flow across the coil and impair the performance of the unit. To remove the frost from the coil, the control initiates the defrost cycle when necessary.

During the defrost cycle, the refrigerant circuit is forced into the cooling mode. To prevent the water loop from cooling down, BPHE and piping electric heaters may be started.

CAUTION:
Please note that "defrost" and "home anti-freeze protection" are two different modes. Defrost is used in order to remove the frost that is covering the outside coil, whereas the home anti-freeze protection is used to maintain the minimum room temperature.

4.2.15 - Energy Soft

Energy Soft extracts energy from outdoor air in order to melt frost on the coil using fans while compressor is OFF.

Unlike traditional defrost, Energy Soft has almost no impact on the water loop because the refrigerant circuit is not forced in cooling mode.

4.2.16 - Night mode capacity control

The night period is defined by the start hour and the end hour which can be set by the user. The night mode allows users to configure the unit to operate with specific parameters within a given period of time, e.g. night period. Particularly this mode permits the reduction of compressor frequency (and noise level) during defined period.

Steps	Table	Par.	Designation	Description	Range	Default	Ex.	Unit
Set the night mode	CMP_CONF	541	Power Limitation value	The compressor frequency is limited to this percentage of the maximum allowed frequency.	50 to 100	75	50	%
		518	Night Mode Start Time	Hour of starting up of night mode	00:00 to 23:59	0:00	23:00	hh:mm
	GEN_CONF	519	Night Mode Stop Time	Hour of stop of night mode	00:00 to 23:59	0:00	7:00	hh:mm

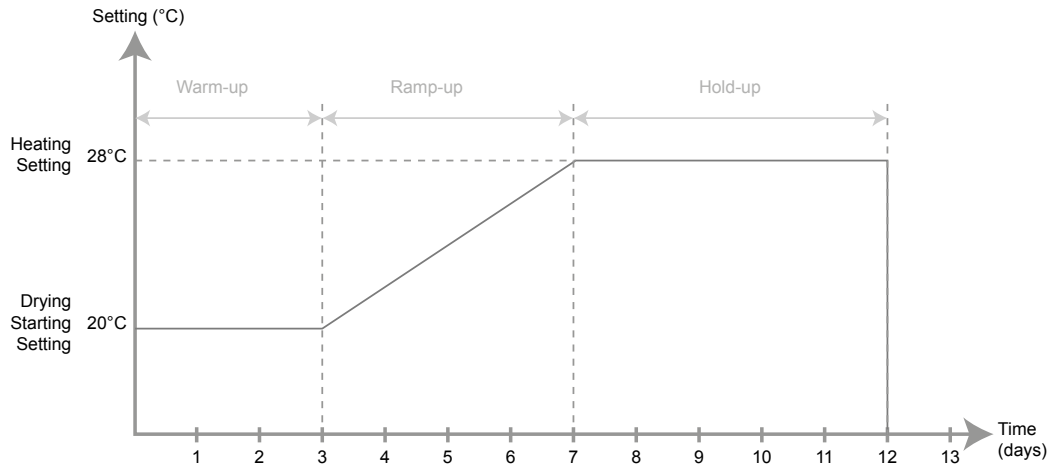
4.2.17 - Drying mode

The Drying mode enables a gradual water temperature ramp-up in Heat mode for UFH drying. This operating mode can only be selected from the service access level, it is automatically stopped at the end of the configured period.

Example of application in drying mode:

- Drying Starting Setpoint [P595] is set to 20°C
- Drying Warm-up days [P596] is set to 3 days
- Drying Ramp-up days [P597] is set to 4 days
- Drying Hold-up days [P598] is set to 5 days
- and Heating Home Water Setpoint [P401] is set to 28°C

Figure 23: Activation and configuration for drying mode



The Drying Mode will be deactivated after 12 days and the unit will switch to Off Mode.

Steps	Table	Par.	Designation	Description	Range	Default	Ex.	Unit
Configure the number of days in drying mode	DRYING	596	Drying Warm-up days	Number of Warm-up days	0 to 99	3	3	day
		597	Drying Ramp-up days	Number of Ramp-up days	0 to 99	4	4	day
		598	Drying Hold-up days	Number of Hold-up days	0 to 99	4	5	day
Configure the water temperature for drying mode	DRYING	595	Drying Starting Setpoint	Water setpoint to warm-up days	20.0 to 60.0	20	20	°C
	WAT_STP	401	Heat Home Setpoint	Water setpoint for ramp-up and hold up days	20.0 to 60.0	45	28	°C
Activate the drying mode	MOD_REQ	44	System Mode Request	0 = Off	0 to 9	-	9	-
				1 = Cool				
				2 = Heat				
				4 = DHW				
				5 = Booster Cooling				
				6 = Booster Heating				
				8 = Purge (water pump is constantly running to purge the hydraulic circuit)				
				9 = Drying (slow water temp. ramp-up in Heating mode for UFH drying)				

4.2.18 - Summer mode

30AWH units may operate in Summer mode which is active under the following conditions:

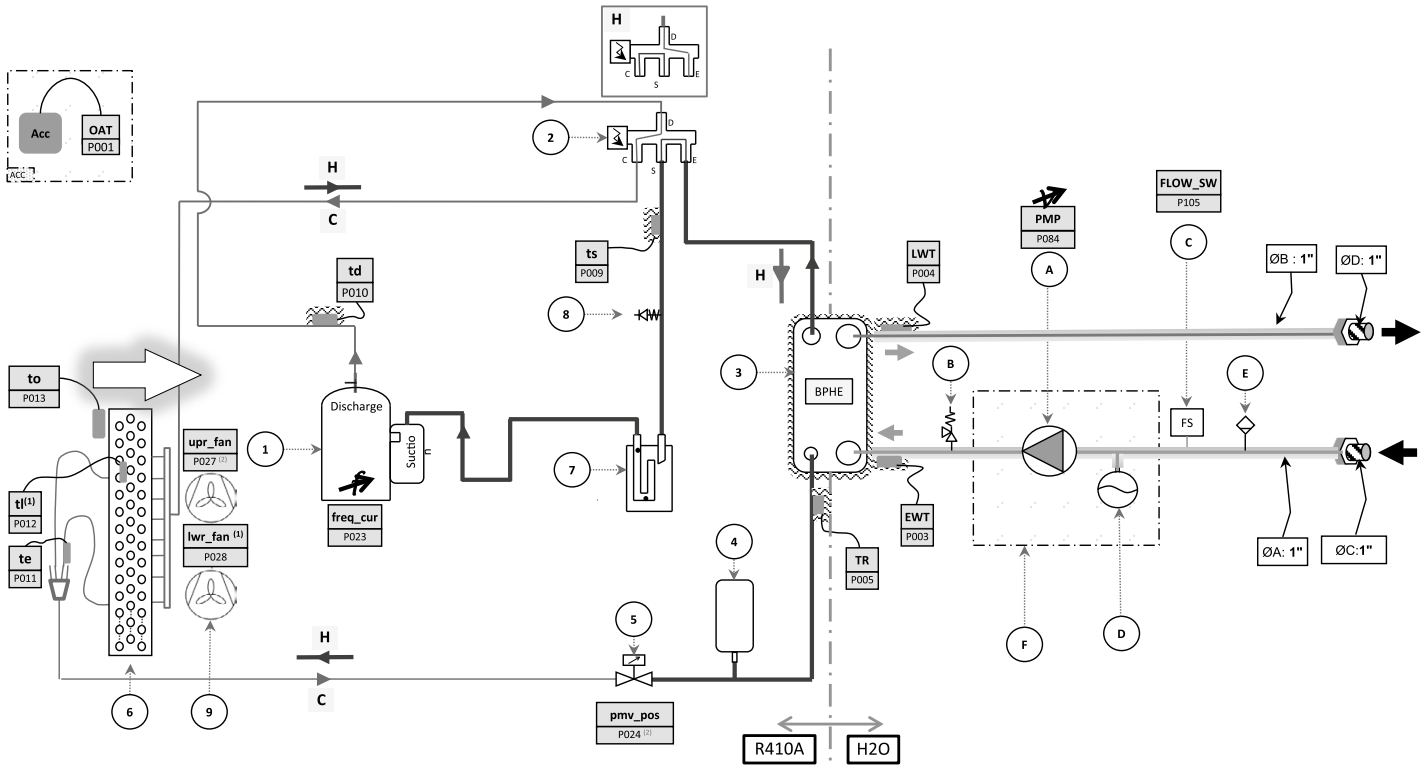
- when the Summer Switch is closed
- or when conditions on OAT [P716] and time [P717] and [P718] are validated.

When the Summer mode is active, then the unit may operate only as specified in the table below.

Cooling Mode	Heating Mode	DHW Mode
✓	×	✓

4.3 - Major system components

4.3.1 - General – Refrigerant part



(1) tl and lwr_fan only for 11 and 15 kW units
(2) P024 and P027 only for 11 and 15 kW units

Water side legend

Label	Description
A	Water Pump - Main water pump - primary loop (in hydraulic module)
B	Water High Pressure Safety Relief Valve (300 kPa)
C	Flow Switch (standard)
D	Expansion vessel (in hydraulic module option)
E	Air vent
F	Hydraulic module equipped with variable speed single pump

Unit refrigeration circuit legend

Label	Description
1	Variable speed rotary compressor
2	Reverse 4 way valve (energized when in Heating mode)
3	Water exchanger - BPHE
4	Receiver
5	Expansion valve - pulse modulating valve
6	Air cooled Exchanger
7	Accumulator or anti-slugging bottle
8	Service valve (Schrader valve)
9	Upper & Lower fans
OAT	Software point
P001	Value read under «Parameter number»; ie: OAT value read@ parameter 001 'P001'

4.3.2 - Compressors

30AWH units use hermetic rotary compressor. It is driven by a variable frequency drive (VFD). The rotary compressor incorporates an oil coil heating inside the shell.

The compressor sub-assembly is complete with:

- Anti-vibration mountings between the unit and the compressor chassis.
- A compressor case thermostat control at the discharge of compressor.

The compressors installed in these units have a specific oil charge.

NOTE: Do not use refrigerants and lubricant besides those specified. Do not compress air (there must be no air intake due to leakage in the refrigeration cycles).

4.3.3 - Air evaporator/condenser

The 30AWH coils are heat exchangers with internally grooved copper tubes with aluminium fins.

4.3.4 - Fans

The fans are driven by permanent magnet synchronous motor. The motors are managed via a variable frequency drive (VFD).

According to the Regulation No. 327/2011 implementing Directive 2009/125/EC with regard to ecodesign requirements for fans driven by motors with an electric input power between 125 W and 500 kW.

Product		11 & 15 kW
Overall efficiency	%	29,1
Measurement category		A
Efficiency category		Static
Target efficiency level ERP2015		N(2015) 40
Efficiency level at the optimum efficiency point		40,6
Variable speed drive		YES
Year of manufacture		See label on the unit
Fan manufacturer		Complast Industrie SRL
Motor manufacturer		Nidec
Fan PN		C025223H01
Motor PN		B036870H01
Nominal power of the motor	kW	0,15
Flow rate	m^3/s	0,84
Pressure at optimum energy efficiency	Pa	51
Nominal speed	rpm	847
Specific ratio		1,002
Relevant information to facilitate the disassembly, recycling or removal of the product at the end of the life		See Maintenance Manual
Relevant information to minimise the impact on the environment		See Maintenance Manual

NOTE : 30AWH 5 and 7 kW units are not concerned with this table because their fans have an input power lower than 125 W.

According to the Regulation No. 640/2009 and amendment 4/2014 implementing Directive 2005/32/EC with regard to ecodesign requirements for electric motors.

Motor type	Permanent magnet synchronous motor
Motor included in the application domain of the regulation 640/2009 & amendment 4/2014	NO

4.3.5 - Pulse Motor Expansion Valve (PMV)

The PMV is equipped with a stepper motor (0-500 pulses). The 5 to 15 kW units have one PMV in its refrigerant circuit.

4.3.6 - Moisture indicator

Located on the liquid line, this indicator permits monitoring of the unit charge and indicates moisture in the circuit. The presence of bubbles in the sight-glass can indicate an insufficient charge or non-condensables in the system. The presence of moisture changes the colour of the indicator paper in the sight-glass.

4.3.7 - Filter drier

This is a one-piece, brazed filter drier, located in the liquid line. The role of the filter drier is to keep the circuit clean and moisture-free. The moisture indicator shows when it is necessary to change the filter drier. The filter drier is a bi-flow device on the 30AWH units that means that it filters and dehydrates in both operating modes. The pressure drop is much higher in the heating mode. A difference in temperature between the filter inlet and outlet shows that the element is dirty.

4.3.8 - Water evaporator/condenser

The evaporator/condenser is a plate heat exchanger. The water connection of the heat exchanger is a threaded connection. It has a thermal insulation of 6 and 13 mm thick polyurethane foam and includes frost protection, as standard.

The products that may be added for thermal insulation of the containers during the water piping connection procedure must be chemically neutral in relation to the materials and coatings to which they are applied. This is also the case for the products originally supplied by the manufacturer.

NOTES - Monitoring during operation:

- ***Follow the regulations on monitoring pressurised equipment.***
- ***It is normally required that the user or operator sets up and maintains a monitoring and maintenance file.***
- ***If there are no regulations or to complement them follow the control programmes of ISO 5149.***
- ***If they exist follow local professional recommendations.***
- ***Regularly check for possible presence of impurities (e.g. silicon grains) in the heat exchange fluids. These impurities maybe the cause of the wear or corrosion by puncture.***
- ***The reports of periodical checks by the user or operator must be included in the supervision and maintenance file.***

4.3.9 - Refrigerant

30AWH units operate with refrigerant R-410A.

4.3.10 - Receiver

30AWH units are equipped with mechanically welded storage tanks that stores the excess refrigerant when the unit operates in heating mode.

4.3.11 - Four-way valve

For 30AWH units, this device permits the reversal of the refrigeration cycle to allow operation in cooling mode, in heating mode, and during defrost cycles.

4.3.12 - Inverter subassembly for compressor and fans

The 30AWH units are fitted with Inverter modules to control the compressor and the fan motors.

4.3.13 - Accumulator

The 30AWH units are fitted with an accumulator in the compressor suction line to prevent liquid carry-over to the compressor, particularly during defrost cycle and transient operations.

5 - MAINTENANCE

5.1 - Standard maintenance

To ensure optimal efficiency and reliability of the units, we recommend establishing a maintenance contract with your local Service organisation. This contract will include regular inspections by Service specialists so that any malfunction is detected and corrected quickly, ensuring that no serious damage can occur.

A Service maintenance contract is the best way to ensure the maximum operating life for your equipment and, through the expertise of technicians, provides the ideal way to manage your system cost effectively. Air conditioning equipment must be maintained by professional technicians, whilst routine checks can be carried out locally by specialised technicians. See the standard ISO 5149.

All refrigerant charging, removal and draining operations must be carried out by a qualified technician and with the correct material for the unit. Any inappropriate handling can lead to uncontrolled fluid or pressure leaks.

CAUTION:
Before doing any work on the machine ensure that the power is switched off. If a refrigerant circuit is opened, it must be evacuated, recharged and tested for leaks. Before any operation on a refrigerant circuit, it is necessary to remove the complete refrigerant charge from the unit with a refrigerant charge recovery group.
Simple preventive maintenance will allow you to get the best performance from your HVAC unit:

- improved cooling and heating performance
- reduced power consumption
- prevention of accidental component failure
- prevention of major time-consuming and costly interventions
- protection of the environment

There are five maintenance levels for HVAC units, as defined by the AFNOR X60-010 standard.

NOTE:
Any deviation or non-observation of these maintenance criteria will render the guarantee conditions for the HVAC unit nul and void, and the manufacturer, will no longer be responsible.

5.1.1 - Level 1 maintenance

See note in §5.1.3 Level 3.
Simple procedures can be carried out by the user on a weekly basis:

- Visual inspection for oil traces (sign of a refrigerant leak),
- Air heat exchanger cleaning - see §5.3Air heat exchanger,
- Check for removed protection devices, and badly closed panels,
- Check the unit alarm report when the unit does not work (refer to WUI end user manual),
- General visual inspection for any signs of deterioration,
- Verify the charge in the sight-glass.

Check that the water temperature difference between the heat exchanger inlet and outlet is correct.

5.1.2 - Level 2 maintenance

This level requires specific know-how in the electrical, hydraulic and mechanical fields.

The frequency of this maintenance level can be monthly or annually depending on the verification type.

In these conditions, the following maintenance operations are recommended.

Carry out all level 1 operations, then:

Electrical checks

- At least once a year tighten the power circuit electrical connections (refer to § 5.2 for the main electrical connections).
- Check and retighten all control/command connections, if required (refer to § 5.2 for the main electrical connections).
- Remove the dust and clean the interior of the control boxes, if required.
- Check the status of the contactors, disconnect switches and capacitors.
- Check the presence and the condition of the electrical protection devices.
- Check the correct operation of all electric heaters.
- Check that no water has penetrated into the control box.

Mechanical checks

- Check the tightening of the fan tower, fan, compressor and control box fixing bolts.

Water circuit checks

- Always take care when working on the water circuit to ensure that the condenser close by is not damaged.
- Check the water connections.
- Check the expansion tank for signs of excessive corrosion or gas pressure loss and replace it, if necessary.
- Purge the water circuit (see §2.5 Water flow rate control).
- Clean the water filter (see §2.5 Water flow rate control).
- Examine the fixed speed pump bearing after 17500 hours of operation with water and the fixed speedpump mechanical seal after 15000 hours. Check the operation of the low water flow rate safety device.
- Check the status of the thermal piping insulation.
- Check the concentration of the anti-freeze protection solution (ethylene glycol or propylene glycol).

Refrigerant circuit

- Fully clean the air heat exchangers with a low-pressure jet and a bio-degradable cleaner.
- Check the unit operating parameters and compare them with previous values.
- Carry out an oil contamination test.
- Check the fouling of the filter drier. Replace it if necessary.
- Keep and maintain a maintenance sheet, attached to each HVAC unit.

All these operations require strict observation of adequate safety measures: individual protection garments, compliance with all industry regulations, compliance with applicable local regulations and using common sense.

5.1.3 - Level 3 (or higher) maintenance

The maintenance at this level requires specific skills/approval/ tools and know-how and only the manufacturer, his representative or authorised agent are permitted to carry out these operations. These maintenance operations concern for example:

- A major component replacement (compressor, evaporator),
- Any intervention on the refrigerant circuit (handling refrigerant),
- Changing of parameters set at the factory (application change),
- Removal or dismantling of the HVAC unit,

- Any intervention due to a missed established maintenance operation,
- Any intervention covered by the warranty.
- One to two leak checks per year with a certified leak detector and carried out by a qualified person.

To reduce waste, the refrigerant and the oil must be transferred in accordance with applicable regulations, using methods that limit refrigerant leaks and pressure drops and with materials that are suitable for the products.

Any detected leaks must be repaired immediately.

The compressor oil that is recovered during maintenance contains refrigerant and must be treated accordingly.

Refrigerant under pressure must not be purged to the open air.

If a refrigerant circuit is opened, plug all openings, if the operation takes up to one day, or for longer periods charge the circuit with nitrogen.

NOTE:
Any deviation or non-observation of these maintenance criteria will render the guarantee conditions for the HVAC unit null and void, and the manufacturer will no longer be held responsible.

5.2 - Tightening torques for the main electrical connections

Component	Designation in the unit	Value (N.m)
Terminal Bloc supply	L1 / L2 / L3 / N / PE	1,2
Terminal Bloc command		0,4 to 0,8
Transformer		0,5

5.3 - Air heat exchanger

We recommend, that finned coils are inspected regularly to check the degree of fouling. This depends on the environment where the unit is installed, and will be worse in urban and industrial installations and near trees that shed their leaves.

For coil cleaning, two maintenance levels are used, based on the AFNOR X60-010 standard:

- If the air heat exchangers are fouled, clean them gently in a vertical direction, using a brush.
- Only work on air heat exchangers with the fans switched off.
- For this type of operation switch off the HVAC unit if service considerations allow this.
- Clean air heat exchangers guarantee optimal operation of your HVAC unit. This cleaning is necessary when the air heat exchangers begin to become fouled. The frequency of cleaning depends on the season and location of the HVAC unit (ventilated, wooded, dusty area, etc.).

Clean the coil, using appropriate products. We recommend products for coil cleaning:

- No. 00PSP000000115A: traditional cleaning method.

CAUTION:
Never use pressurised water without a large diffuser. Do not use high-pressure cleaners for Cu/Cu and Cu/Al coils.

Concentrated and/or rotating water jets are strictly forbidden. Never use a fluid with a temperature above 45°C to clean the air heat exchangers.

Correct and frequent cleaning (approximately every three months) will prevent 2/3 of the corrosion problems.

5.4 - Water heat exchanger maintenance

Check that:

- the insulating foam is intact and securely in place.
- the BPHE and piping electric heaters are operating, secure and correctly positioned.
- the water-side connections are clean and show no sign of leakage.

5.5 - Unit maintenance

CAUTION:
Before any work on the unit ensure that the circuit is isolated and there is no voltage present. Note that it may take 5 minutes for the circuit capacitors to fully discharge after isolating the circuit. Only appropriately qualified personnel are authorised to work on the VFD.

In case of any alarm or persistent problem related to the VFD, contact Service.

The VFDs fitted with 30AWH units do not require an insulation test, even if being replaced; they are systematically verified before delivery. Moreover, the filtering components installed in the VFD can falsify the measurement and may even be damaged. If there is a need to test the insulation of the unit components (fan motors and pumps, cables, etc.), the VFD must be disconnected at the power circuit.

5.6 - Refrigerant volume

The unit must be operated in cooling mode to find out, if the unit charge is correct, by checking the actual subcooling.

Following a small refrigerant leak a loss of refrigerant, compared to the initial charge will be noticeable in the cooling mode and affect the subcooling value obtained at the air heat exchanger (condenser) outlet, but it will not be noticeable in the heating mode.

IMPORTANT:
It is therefore not possible to optimise the refrigerant charge in the heating mode after a leak. The unit must be operated in the cooling mode to check, if an additional charge is required.

5.7 - Characteristics of R-410A

Saturated temperatures based on the gauge pressure (in kPag)					
Saturated Temp. °C	**Gauge pressure, kPag**	**Saturated Temp. °C**	**Gauge pressure, kPag**	**Saturated Temp. °C**	**Gauge pressure, kPag**
-20	297	**11**	1020	**42**	2429
-19	312	**12**	1053	**43**	2490
-18	328	**13**	1087	**44**	2551
-17	345	**14**	1121	**45**	2614
-16	361	**15**	1156	**46**	2678
-15	379	**16**	1192	**47**	2744
-14	397	**17**	1229	**48**	2810
-13	415	**18**	1267	**49**	2878
-12	434	**19**	1305	**50**	2947
-11	453	**20**	1344	**51**	3017
-10	473	**21**	1384	**52**	3088
-9	493	**22**	1425	**53**	3161
-8	514	**23**	1467	**54**	3234
-7	535	**24**	1509	**55**	3310
-6	557	**25**	1596	**56**	3386
-5	579	**26**	1552	**57**	3464
-4	602	**27**	1641	**58**	3543
-3	626	**28**	1687	**59**	3624
-2	650	**29**	1734	**60**	3706
-1	674	**30**	1781	**61**	3789
0	700	**31**	1830	**62**	3874
1	726	**32**	1880	**63**	3961
2	752	**33**	1930	**64**	4049
3	779	**34**	1981	**65**	4138
4	807	**35**	2034	**66**	4229
5	835	**36**	2087	**67**	4322
6	864	**37**	2142	**68**	4416
7	894	**38**	2197	**69**	4512
8	924	**39**	2253	**70**	4610
9	956	**40**	2311		
10	987	**41**	2369		

The units use high-pressure R-410A refrigerant (the unit operating pressure is above 40 bar, the pressure at 35°C air temperature is 50% higher than for R-22). Special equipment must be used when working on the refrigerant circuit (pressure gauge, charge transfer, etc.).

Note :

- ***A vacuum pump is not enough to remove moisture from oil.***
- ***Oils absorb moisture rapidly. Do not expose oil to atmosphere.***
- ***Never open system to atmosphere while it is under vacuum.***
- ***When the system must be opened for service, break vacuum with dry nitrogen.***
- ***Do not vent R-410A into atmosphere.***

6 - ALARM DESCRIPTION

6.1 - Inverter board alarm codes (only for 11-15 kW 1Ph or 3Ph units)

The error which is generating at present and the latest error (latest error information including present) can be confirmed by lighting LED D800 toD804 on the outdoor control P.C. board.

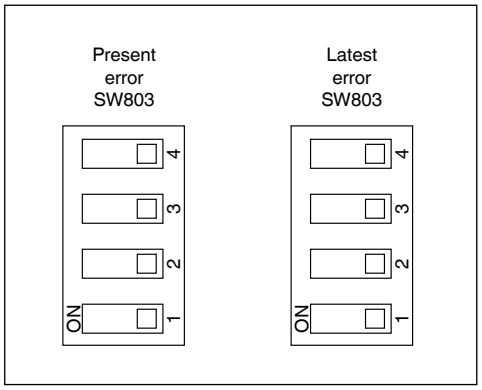
a) When all DIP switch SW803 are OFF, the status of error which is generating at present is displayed.

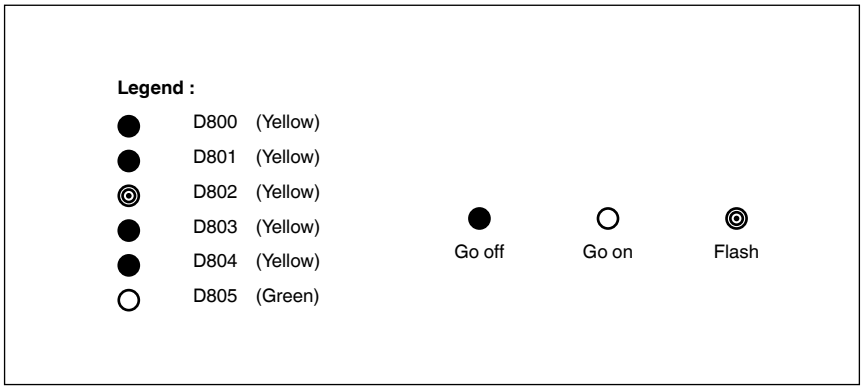
b) <1> only of DIP switch SW803 is turned on, the error which generated before (latest error information including present) is displayed.

c) If there is an error, any of LED D800 to D804 goes on. (Display 1)

d) When pushing the pushdown button switch SW800 for approx. 1 second, the display is exchanged. (Display 2)

e) When pushing SW800 again or after 2 minutes, the status returns to that of Display 1





Display 1 (Initial display)	Display 2 (SW800 operation)	Error contents
●●●●●○	●●●●●○	Normal
○○●●○○	●●◎●●○	Discharge temp. sensor (TD) error
	●◎◎●●○	Heat exchanger temp. sensor (TE) error
	◎◎◎●●○	Heat exchanger temp. sensor (TL) error
	●●●◎●○	Outside temp. sensor (TO) error
	●●◎◎●○	Suction temp. sensor (TS) error
	◎●◎◎●○	Heat sink temp. sensor (TH) error
	◎◎◎◎●○	Heat exchanger sensor (TE, TS) miswiring
	◎◎◎◎◎○	EEPROM error
●●○●○○	◎●●●●○	Compressor break down
	●◎●●●○	Compressor lock
	◎◎●●●○	Current detection circuit error
	●●◎●●○	Case thermostat operation
●○○●○○	●◎●◎●○	Model unset
	◎●◎◎◎○	Communication error between MCU
	◎◎◎◎◎○	Other error (Compressor disorder, etc.)
○○○●○○	◎◎●●●○	Discharge temp. error
	◎●◎●●○	Power supply error
	◎◎◎●●○	Heat sink overheat error
	◎◎◎◎●○	Gas leak detection
	◎◎●◎◎○	4-way valve reverse error
	●●◎●◎○	High pressure protective operation
	●◎◎●◎○	Fan system error
	●◎●◎◎○	Driving element short-circuit
	◎●◎◎◎○	Position detection circuit error

6.2 - Alarm listing

The following tables of alarms list their probable cause and the likely effect on the unit, as well as the reset type.

Table 9: Alarms listing

Inverter error	Current Alarm [P350] to [P354] Past Alarm [P360] to [P364]	Description	Unit Status	Reset type			Investigation / corrective actions
				Automatic	Power cycle	Comment	
-	1	EWT sensor failure	Continue	X		When value returns within correct range	1. Check EWT sensor (EWT). 2. Check NHC board.
-	2	LWT sensor failure	Stop	X		When value returns within correct range	1. Check LWT sensor (LWT). 2. Check NHC board.
-	3	Refrigerant Temperature (TR) sensor failure	Cpr stop	X		When value returns within correct range	1. Check TR sensor (TR). 2. Check NHC board.
-	4	OAT sensor failure	Continue	X		When value returns within correct range	1. Check Additional OAT sensor (OAT). 2. Check NHC board.
-	5	DHW_TT sensor failure	DHW Failed	X		When value returns within correct range	1. Check DHW sensor (DHW_TT). 2. Check NHC board.
-	6	CHWSTEMP sensor failure		X		When value returns within correct range	1. Check CHWSTEMP sensor (CHWSTEMP). 2. Check NHC board.
-	7	IAT sensor failure	Continue	X		When value returns within correct range	1. Check IAT sensor (IAT). 2. Check NHC board.
-	8	UI Indoor Temperature failure	Continue	X		When value returns within correct range	1. Check UI Indoor Temp sensor. 2. Check NHC board.
-	9	Spare Sensor failure	Continue	X		When value returns within correct range	1. Check Spare sensor. 2. Check NHC board.
100	10	Inverter Discharge Temperature (TD) sensor failure	Cpr stop		X	Error becomes definite after retrying operation for 4 times.	1. Check discharge temp. sensor (TD).
102	11	Inverter Air Exchanger Temperature (TE) sensor failure	Cpr stop		X	Error becomes definite after retrying operationfor 4 times.	1. Check temp. sensor (TE).
103	12	Inverter Liquid Temperature (TL) sensor failure	Cpr stop		X	Error becomes definite after retrying operation for 4 times.	1. Check temp. sensor (TL).
104	13	Inverter TO sensor failure	Continue		X	Unit operation continues in backup mode. TO sensor value fixed to 30°C in cooling, 10°C in heating Backup mode is cancelled when any other value is detected by TO sensor.	1. Check outside temp. sensor (TO).
108	14	Inverter Suction Temperature (TS) Sensor failure	Cpr stop		X	Error becomes definite after retrying operation for 4 times.	1. Check suction temp. sensor (TS).
109	15	Inverter Heatsink Temperature failure	Cpr stop		X	Error becomes definite after retrying operation for 8 times.	1. Check correct fan operation
111	16	Inverter TE & TS sensors wrongly connected	Cpr stop		X	Error becomes definite after retrying operation for 4 times.	1. Check temp. sensor (TE, TS).
-	20	Loss of communication with UI	Continue	X		When a new message is received from the UI	
-	21	Loss of communication with Inverter	Cpr stop	X		When a new message is received from the Inverter	
221	22	Communication failure between Inverter's boards	Cpr stop		X	Only delay of communication.	
-	23	Loss of communication with Slaves	Master continues	X			
-	24	Loss of communication with Master	Stop	X			
-	25	Loss of communication with Jbus Master	Stop	X		When a new valid message is received from the Jbus Master	
-	31	Safety Input	Unit stop OR Heat stop OR Cool stop	X		When Safety Input is closed	
-	32	Flow Switch failure	Cpr stop		X	Error becomes definite after retrying operation for 5 times.	
-	50	Exchanger Freeze Protection on Water Temp (in Cooling)	Stop	X		Energized Cooler Heater while alarm is active. Force pump to run.	
-	51	Exchanger Freeze Protection on Refrigerant Temp (in Cooling)	Stop		X	Energized Cooler Heater while alarm is active. Force pump to run until alarm reset kind becomes manual. Error becomes definite after retrying operation more than 12 occurrences within a 2 hours period	
	55	Exchanger High Temp Protection (in Heating)	Stop	X		Heating Mode and LWT above 62°C or TR above 65°C.	1. Stop Unit. 2.Force pump to run while alarm is active.
243	60	Reversing Valve Protection	Cpr stop		X	Error becomes definite after retrying operation for 4 times.	1. Check operation of 4-way valve. 2. Check air heat exchanger (TE), suction temp. sensor (TS). 3. Check BPHE sensor (TR). 4. Check 4-way valve coil. 5. Check PMV (Pulse Motor Valve).
246	61	Fan error	Cpr stop		X		1. Check lock of fan motor. 2. Check power supply voltage between L2 and N.

Inverter error	Current Alarm [P350] to [P354] Past Alarm [P360] to [P364]	Description	Unit Status	Reset type			Investigation / corrective actions
				Automatic	Power cycle	Comment	
250	62	Compressor inverter short circuit protection	Cpr stop		X	Error becomes definite after retrying operation for 8 times. Error detected in either of the following condition; 1) Compressor IPM short circuit detection at start up 2) Compressor IPM short circuit detection during coil heating	
253	63	Compressor motor position detection error	Cpr stop		X	Error becomes definite after retrying operation for 8 times. Error detected when offset voltage of motor current sensor is abnormal before compressor start up.	
129	64	Compressor breakdown	Cpr stop		X	Error becomes definite after retrying operation for 8 times. Error detected in either of the following condition; 1) Compressor over current 2) Compressor IPM short circuit 3) Compressor motor control failure	1. Check power supply voltage. 2. Overload operation of refrigerating cycle
130	65	Compressor lock	Cpr stop		X	Error becomes definite after retrying operation for 8 times. Error detected in either of the following condition; 1) Compressor motor lock 2) Compressor motor IPM over current at start up	1. Trouble of compressor (Lock, etc.): Replace compressor. 2. Wiring error of compressor (Open phase)
132	70	Compressor Thermal Switch Release failure	Cpr stop		X	Error becomes definite after retrying operation for 10 times.	1. Check case thermostat and connector. 2. Check gas leak, recharge 3. Check PMV (Pulse Motor Valve). 4. Check broken pipe.
134	71	Suction Pressure Too Low	Cpr stop		X	Error becomes definite after retrying operation for 8 times.	1. Check clogging of outdoor PMV. 2. Check 2-way valve circuit. 3. Check Ps sensor error (LP). 4. Check clogging of refrigerant filter. 5. Check clogging of refrigerant pipe. 6. Check of fan operation (In heating mode). 7. Check short of refrigerant.
244	72	High Pressure System error (Pressure Switch, Compressor Case Temperature, Power Supply)	Stop		X	Error becomes definite after retrying operation for 10 times.	1. Check outdoor heat exchanger sensor (TL). 2. Check fan. 3. Check PMV (Pulse Motor Valve). 4. Check clogging and short circuit of heat exchanger. 5. Overcharge of refrigerant. Recharge
131	73	Current detection circuit error	Cpr stop		X	Error becomes definite after retrying operation for 8 times. Error detected in either of the following condition; 1) Motor current sensor failure	
227	74	Discharge Temperature too high	Cpr stop		X	Error becomes definite after retrying operation for 4 times.	1. Check refrigerant circuit (Gas leak). 2. Check electronic expansion valve. 3. Check discharge temp. sensor (TD).
229	75	Missing phase in power cable	Cpr stop		X	Error becomes definite after retrying operation for 8 times.	1. Check power supply voltage.
231	76	Inverter Heatsink Temperature too high	Cpr stop		X	Error becomes definite after retrying operation for 4 times.	1. Check heat sink airflow path.
-	78	Other Inverter Error	Continue		X		
-	79	Unknowned Inverter Error	Continue		X		
-	80	Real Time Clock Failure on NHC board	Continue	X			
-	81	EEPROM corrupted on NHC board	Continue		X		
127	82	Inverter EEPROM not readable or EEPROM number out of range	Stop		X	Only delay of communication.	
-	89	Wrong Inverter Program Version for Energy Soft	Stop	X			
-	90	General Invalid Configuration	Stop	X		Automatic when configuration is correct	
-	91	Wrong unit type	Stop	X		Automatic when configuration is correct	
-	92	Wrong unit size for this brand	Stop	X		Automatic when configuration is correct	
-	93	Wrong supply type	Stop	X		Automatic when configuration is correct	
-	94	Wrong mounting type	Stop	X		Automatic when configuration is correct	
-	95	Wrong CDU capacity from Inverter	Stop	X		Automatic when configuration is correct	
-	96	Wrong hydraulic configuration	Stop	X		Automatic when configuration is correct	Check that Par.804 = 0 "No Pump" or Par.804 = 2 "Variable Speed Pump" is selected."
-	97	Wrong compressor map selection	Stop	X		Automatic when configuration is correct	
-	98	Wrong configuration in Master / Slave (DHW, Pool Heating or Split configured)	Stop	X		Automatic when configuration is correct	
-	99	Wrong addressing in Master / Slave (unit as Master, but not address for slaves)	Stop	X		Automatic when configuration is correct	
-	100	Emergency stop	Stop	X		Automatic when [P055] is reset	
-	200	External Alarm	Continue	X		When contact is closed	

7 - PARAMETERS OVERVIEW

7.1 - Parameters list

This section includes an overview of all parameters that can be read or modified by the user.

The parameters are sorted as follows:

- 001 to 299 Display parameters
- 301 to 399 Maintenance parameters
- 401 to 499 Setpoint parameters
- 501 to 799 Configuration parameters

Legend:

No	No access
RO	Read-Only
RW	Read/Write
RO/d	Read-Only and Display on the WUI
RO/F	Read-Only and Parameter Forcing by CCN

Par.	Jbus	Mnemonic	Description	Range	Default	Unit	WUI		Table
001	**0001H**	OAT	Outdoor Air Temperature			1/10°C	RO/d	RO/F	GENUNIT
002	**0002H**	IAT	Indoor Air Temperature			1/10°C	RO/d	RO/F	GENUNIT
003	**0003H**	EWT	Entering Water Temperature			1/10°C	RO	RO/F	GENUNIT
004	**0004H**	LWT	Leaving Water Temperature			1/10°C	RO	RO/F	GENUNIT
005	**0005H**	TR	Refrigerant Temperature			1/10°C	RO	RO/F	GENUNIT
006	**0006H**	SPARE_T	Spare Temperature			1/10°C	RO	RO/F	GENUNIT
007	**0007H**	roomtemp	Room Temperature			1/10°C	RO	RO/F	GENUNIT
008	**0008H**	sst	Saturated Suction Temp			1/10°C	RO	RO	GENUNIT
009	**0009H**	ts	Suction Temperature			1/10°C	RO	RO	GENUNIT
010	**000AH**	td	Discharge Temperature			1/10°C	RO	RO	GENUNIT
011	**000BH**	te	Lower Air Exchanger Temp			1/10°C	RO	RO	GENUNIT
012	**000CH**	tl	Upper Air Exchanger Temp			1/10°C	RO	RO	GENUNIT
013	**000DH**	to	Inv. Outdoor Air Temp			1/10°C	RO	RO	GENUNIT
014	**000EH**	th	Heatsink Temperature			1/10°C	RO	RO	GENUNIT
015	**000FH**	sh	Superheat Temperature			1/10 K	RO	RO	GENUNIT
016	**0010H**	sh_targ	Superheat Target Temp			1/10 K	RO	RO	GENUNIT
017	**0011H**	dc_volt	Inverter DC High Voltage			V	RO	RO	GENUNIT
018	**0012H**	hv_stat	HV Bus Comm. Status	0/1 [Normal/Alarm]		-	RO	RO	GENUNIT
019	**0013H**	inv_mod	Inverter Current Mode			-	RO	RO	GENUNIT
020	**0014H**	freq_min	Actual Min Compr. Freq			1/10 Hz	RO	RO	GENUNIT
021	**0015H**	freq_max	Actual Max Compr. Freq			1/10 Hz	RO	RO	GENUNIT
022	**0016H**	FREQ_REQ	Requested Compr. Freq			1/10 Hz	RO	RO/F	GENUNIT
023	**0017H**	freq_cur	Actual Compressor Freq			1/10 Hz	RO	RO	GENUNIT
024	**0018H**	pmv_pos	PMV Position	0 to 500		step	RO	RO	GENUNIT
025	**0019H**	N.A.	Dummy parameter	N.A.					
026	**001AH**	N.A.	Dummy parameter	N.A.					
027	**001BH**	upr_fan	Upper Fan Speed	0 to 1000		rpm	RO	RO	GENUNIT
028	**001CH**	lwr_fan	Lower Fan Speed	0 to 1000		rpm	RO	RO	GENUNIT
029	**001DH**	EXCH_HTR	Exchanger Heater	0/1 [Off/On]		-	RO	RO/F	GENUNIT
030	**001EH**	BOILER	Boiler Output	0/1 [Off/On]		-	RO	RO/F	GENUNIT
031	**001FH**	EHS	Electrical Heat Stages	0 to 3		-	RO	RO/F	GENUNIT
032		SPARE_P	Backup By-pass Valve	0/1 [Off/On]		-			GEN_UNIT
035		SPARE_P	Spare Pressure			KPa	RO	RO/F	GENUNIT
039(1)	**0027H**	to2	Corrected Inverter TO			1/10°C	RO	RO	GENUNIT
041	**0029H**	CHIL_OCC	Occupancy Mode	0 to 2 [Away/ Sleep/ Home]		-	RW/d	RW/F	STATUS
042	**002AH**	sum_mode	Summer Mode	0/1 [No/Yes]		-	RO	RO	STATUS
043	**002BH**	nightmod	Night Mode	0/1 [No/Yes]		-	RO	RO	STATUS
044	**002CH**	MOD_REQ	System Mode Request	0 to 9		-	RW/d	RW/F	STATUS
045	**002DH**	MOD_STAT	System Mode Status	0 to 109		-	RO/d	RO	STATUS
046	**002EH**	N.A.							
047	**002FH**	mod_ovr	System Mode Override	0 to xxx		-	RO	RO	STATUS
048	**0030H**	setpoint	Current Setpoint	0.0 to 60.0		1/10°C	RW/d	RO	STATUS
049	**0031H**	RESET	User Adjust Temperature	-5.0 to 5.0		1/10 K	RO	RO/F	STATUS
050	**0032H**	IAT_OFF	IAT Offset	-4.0 to 4.0		1/10 K	RO	RO/F	STATUS
051	**0033H**	CTRL_PNT	Control Point	0.0 to 60.0		1/10°C	RO/d	RO/F	"STATUS OR MSL_ STAT"
052	**0034H**	CTRL_TMP	Control Temp	-40.0 to 115.0		1/10°C	RO/d	RO/F	STATUS
053	**0035H**	N.A.							
061	**003DH**	cmp_req	Compressor Mode Request			-	RO	RO	LOADFACT
062	**003EH**	cmp_inv	Compressor Mode To Inv.			-	RO	RO	LOADFACT
063	**003FH**	cmp_stat	Compressor Mode Status			-	RO	RO	LOADFACT
064	**0040H**	cap_ovr	Capacity Override			-	RO	RO	LOADFACT
065	**0041H**	cap_tmr	Capacity Timer			s	RO	RO	LOADFACT

Par.	Jbus	Mnemonic	Description	Range	Default	Unit	WUI		Table
066	**0042H**	CAP_T	Total Capacity	0 to 100		%	RO	RO/F	LOADFACT
067	**0043H**	DEM_LIM	Demand Limit	0 to 100		%	RO	RO/F	LOADFACT
068	**0044H**	FREQ_RED	Frequency Reduction Mode	0/1 [No/Yes]		-	RO	RO/F	LOADFACT
069	**0045H**	RUNNING	Unit Running Status	0/1 [No/Yes]		-	RO	RO/F	LOADFACT
081	**0051H**	pmp_ovr	Pump Override	-1 to 19		-	RO	RO	PMP_STAT
082	**0052H**	flow_err	Water Flow Failure	0/1 [No/Yes]		-	RO	RO	PMP_STAT
083	**0053H**	dtstp	Current DeltaT Setpoint			°C	RO	RO	PMP_STAT
084	**0054H**	delta_t	Water Delta Temperature			1/10 K	RO	RO	PMP_STAT
085	**0055H**	PMP	Water Pump Speed	0 to 100		%	RO	RO/F	PMP_STAT
088	**0058H**	ADD_PMP	Additional Pump Output	0/1 [No/Yes]		-	RO	RO/F	PMP_STAT
91	**005BH**	Backup_ovr	Backup Override	-1 to 100	N.A.	-	RO	RO	BCK_STAT
92	**005CH**	back_flg	Backup Authorized flag	0 to 1	N.A.	-	RO	RO	BCK_STAT
93	**005DH**	warmtime	Booster Warm Up timer	0 to 1800	N.A.	s	RO	RO	BCK_STAT
94	**005EH**	BACK_CAP	Backup Capacity	0 to 100	N.A.	%	RO	RO/F	BCK_STAT
101	**0065H**	ONOFF_SW	On/Off Switch Status	0/1 [Open/Close]		-	RO	RO/F	INPUT
102	**0066H**	HC_SW	Heat/Cool Switch Status	0/1 [Open/Close]		-	RO	RO/F	INPUT
103	**0067H**	ECO_SW	Eco Switch Status	0/1 [Open/Close]		-	RO	RO/F	INPUT
104	**0068H**	SAFE_SW	Safety Switch Status	0/1 [Open/Close]		-	RO	RO/F	INPUT
105	**0069H**	FLOW_SW	Flow Switch Status	0/1 [Open/Close]		-	RO	RO/F	PMP_STAT OR INPUT
106	**006AH**	CUST_DI5	Customized DI#5 Status	0/1 [Open/Close]		-	RO	RO/F	INPUT
107	**006BH**	CUST_DI6	Customized DI#6 Status	0/1 [Open/Close]		-	RO	RO/F	INPUT
108	**006CH**	CUST_DI7	Customized DI#7 Status	0/1 [Open/Close]		-	RO	RO/F	INPUT
109	**006DH**	CUST_DI8	Customized DI#8 Status	0/1 [Open/Close]		-	RO	RO/F	INPUT
110	**006EH**	RED_SW	Power Limitation Switch	0/1 [Open/Close]		-	RO	RO/F	INPUT
111	**006FH**	OPEAK_SW	Off Peak Hour Switch	0/1 [Open/Close]		-	RO	RO/F	INPUT
112	**0070H**	LSHED_SW	Loadshed Request Switch	0/1 [Open/Close]		-	RO	RO/F	INPUT
113	**0071H**	SOLAR_SW	Solar Input Switch	0/1 [Open/Close]		-	RO	RO/F	INPUT
114	**0072H**	DHW_REQ	DHW Request from tank	0/1 [Open/Close]		-	RO	RO/F	INPUT OR DHW_STAT
115	**0073H**	DHW_PRIO	DHW Priority Switch	0/1 [Open/Close]		-	RO	RO/F	INPUT OR DHW_STAT
116	**0074H**	DHW_ANTI	DHW Anti-Legionella Req.	0/1 [Open/Close]		-	RO	RO/F	INPUT OR DHW_STAT
117	**0075H**	SUMM_SW	Summer Switch	0/1 [Open/Close]		-	RO	RO/F	"INPUT OR DHW_STAT"
118	**0076H**	N.A.							
119	**0077H**	N.A.							
120	**0078H**	EXALM_SW	External Alarm Switch	0/1 [Open/Close]		-	RO	RO/F	INPUT
201	**00C9H**	DHW_MODE	DHW Mode	0 to 2 [Eco/ Anti-Leg./ Regular]		-	RW	RO/F	DHW_STAT
202	**00CAH**	dhw_ovr	DHW Override	-1 to 100		-	RO	RO	DHW_STAT
203	**00CBH**	dhw_dem	DHW Demand from Tank	0/1 [No/Yes]		-	RO	RO	DHW_STAT
204	**00CCH**	dhw_cond	DHW Conditions	0/1 [True/False]		-	RO	RO	DHW_STAT
205	**00CDH**	DHW_CTLP	DHW Control Point	20.0 to 60.0		1/10°C	RO	RO/F	DHW_STAT
206	**00CEH**	DHW_TT	DHW Tank Temperature			1/10°C	RO	RO/F	DHW_STAT
207	**00CFH**	shc_time	Current SHC Runtime			min	RO	RO	DHW_STAT
208	**00D0H**	dhw_time	Current DHW Runtime			min	RO	RO	DHW_STAT
209	**00D1H**	DHW_EXCP	DHW Exception Timer	0 to 1440		min	RO	RO/F	DHW_STAT
210	**00D2H**	DHW_VLV	DHW Diverting Valve	0/1 [Off/On]		-	RO	RO/F	DHW_STAT
211	**00D3H**	DHW_EHS	DHW Elec Heat Stage	0/1 [Off/On]		-	RO	RO/F	DHW_STAT
212	**00D4H**	DHW_RUN	DHW Running Status	0/1 [No/Yes]		-	RO	RO/F	DHW_STAT
221	**00DDH**	CHWSTEMP	Chiller Water System Temp			1/10°C	RO	RO/F	MSL_STAT
222	**00DEH**	ms_cap	Mast/Slv Total Capacity	0 to 100	0	%	RO	RO	MSL_STAT
223		mst_req	Master Request Capacity	0 to 100	0	%	RO	RO	MSL_STAT
224		slv1_req	Slave #1 Request Capa.	0 to 100	0	%	RO	RO	MSL_STAT
225		slv2_req	Slave #2 Request Capa.	0 to 100	0	%	RO	RO	MSL_STAT
226		slv3_req	Slave #3 Request Capa.	0 to 100	0	%	RO	RO	MSL_STAT
227		msl_icon	Master/Slave Icon Status	0 to 3		-			N.A.
228		ms_activ	Mast/Slv Active Flag	False/True	False	-	RO	RO	MSL_STAT
229		MS_STAT	Mast/Slv Overall Status	-1 to 101	0	-	RO	RO	MSL_STAT
230	**00E6H**	mast_sta	Master Status	-1 to 101		-	RO	RO	MSL_STAT
231	**00E7H**	slv1_sta	Slave #1 Status	-1 to 101		-	RO	RO	MSL_STAT
232	**00E8H**	slv2_sta	Slave #2 Status	-1 to 101		-	RO	RO	MSL_STAT
233	**00E9H**	slv3_sta	Slave #3 Status	-1 to 101		-	RO	RO	MSL_STAT
234	**00EAH**	MS_LIM	Mast/Slv Demand Limit	0 to 100	100	-	RO	RO/F	MSL_STAT
235		ms_prio	Mast/Slv Priority	123 = Master first, then Slave #1, then Slave #2 213 = Slave #1 first, then Master, then Slave #2 21 = Slave #1 first, then Master		-			MSL_STAT
239		CTRLPNT2	2nd Water Control Point			°C			MSL_STAT
301		model	Inverter Model			-	RO	RO	Inverter

Par.	Jbus	Mnemonic	Description	Range	Default	Unit	WUI		Table
302		prg_ver	Inverter Progr Version			-	RO	RO	Inverter
303		prg_rev	Inverter Progr Revision			-	RO	RO	Inverter
304		eep_cod	Inverter EEPROM Code			-	RO	RO	Inverter
305		sw_set	Inverter Switch Setting			-	RO	RO	Inverter
306		cdu_cap	CDU Capacity	0 to 15		-	RO	RO	Inverter
307		mcu_code	MCU Code			-	RO	RO	Inverter
308		cdu_amp	CDU Current			mA	RO	RO	Inverter
311		def_ovr	Defrost Override	-4 to 32	0	-			DEF_STAT
312		def_dt0m	Ref Defrost DeltaT (MD)	0 to 30	-	K			DEF_STAT
313		DEF_DT0	Ref Defrost DeltaT	0 to 30	-	K			DEF_STAT
314		def_dt	Actual Defrost DeltaT			K			DEF_STAT
315		def_fact	Frost Factor			%			DEF_STAT
316		def_nb	Free Defrost sessions number		0	-			DEF_STAT
317		def_time	Free Defrost duration			s			DEF_STAT
318		md_last	Time since last MD			min			DEF_STAT
319		fd_last	Time since last FD			min			DEF_STAT
321	**0141H**	QCK_ENA	QT: Quick Test enable	0/1 [No/Yes]		-	RW	RW/F	QCK_TEST
322	**0142H**	_HP_TEST	QT: HP Switch Test	N.A.		-	RW	RW/F	QCK_TEST
323	**0143H**	_RAT_MOD	QT: Rating Mode	0 to 4 [Rating Off/ Rating Cool/ Rating Heat/ Ramp Cool/ Ramp Heat]		-	RW	RW/F	QCK_TEST
324	**0144H**	_RAT_FRQ	QT: Rating Frequency	0 to 120		1/10 Hz	RW	RW/F	QCK_TEST
325		_FAN_LOW	QT: Lower Fan Speed	0 to 1000		rpm	RW	RW/F	QCK_TEST
326		_FAN_UPP	QT: Upper Fan Speed	0 to 1000		rpm	RW	RW/F	QCK_TEST
327		_PMV_POS	QT: PMV Position	0 to 1000		-	RW	RW/F	QCK_TEST
331	**014BH**	_PMP	QT: Water Pump Speed	0 to 100		%	RW	RW/F	QCK_TEST
332	**014CH**	_EXH_HTR	QT: Water Exchanger Heater	0/1 [Off/On]		-	RW	RW/F	QCK_TEST
333	**014DH**	_ADD_PMP	QT: Additional Pump	0/1 [Off/On]		-	RW	RW/F	QCK_TEST
334	**014EH**	_SPR_REL	QT: Spare Relay	0/1 [Off/On]		-	RW	RW/F	QCK_TEST
335	**014FH**	_DHW_VLV	QT: DHW Diverting Valve	0/1 [Off/On]		-	RW	RW/F	QCK_TEST
336	**0150H**	_BOILER	QT: Boiler or EHS1	0/1 [Off/On]		-	RW	RW/F	QCK_TEST
320	**0140H**	_CUSTDO5	QT: Customized DO#5	0/1 [Off/On]		-	RW	RW/F	QCK_TEST
337	**0151H**	_CUSTDO8	QT: Customized DO#8	0/1 [Off/On]		-	RW	RW/F	QCK_TEST
338	**0152H**	_CUSTDO9	QT: Customized DO #9	0/1 [Off/On]		-	RW	RW/F	QCK_TEST
315		_CAP_OUT	QT: Capacity Output	0 to 100	0	%	RW	RW/F	QCK_TEST
339		_HP_MAX	Maximum High Pressure	0 to 100	0	1/10KPa	RO	RO	QCK_TEST
340	**0154H**	ALMRESET	Alarm Reset	0/1 [No/Yes		-	RW	RW/F	ALARM
341	**0155H**	ALM	Alarm Status	0/1 [Normal/Alarm]	0	-	RO/d	RO	ALARM
342	**0156H**	ALERT	Alarm Status	0/1 [No/Yes]	0	-	RO	RO	ALARM
343	**0157H**	SHUTDOWN	Shutdown Status	0/1 [No/Yes]	0	-	RO	RO	ALARM
344	**0158H**	inv_err	Inverter Error (Code)	0 to 255		-	RO	RO	ALARM
345		inv_erra	Inverter Error (Alpha)	“Normal” / “Xnn”		-	RO	RO	ALARM
346		alm_cod1	Alarm Code bitmap 1			-	RO	RO	ALARM
347		alm_cod2	Alarm Code bitmap 2			-	RO	RO	ALARM
348		alm_cod3	Alarm Code bitmap 3			-	RO	RO	ALARM
349		alm_cod4	Alarm Code bitmap 4			-	RO	RO	ALARM
350	**015EH**	alm_01	Current Alarm #1	0 to 100		-	RO	RO	ALARM
351	**015FH**	alm_02	Current Alarm #2	0 to 100		-	RO	RO	ALARM
352	**0160H**	alm_03	Current Alarm #3	0 to 100		-	RO	RO	ALARM
353	**0161H**	alm_04	Current Alarm #4	0 to 100		-	RO	RO	ALARM
354	**0162H**	alm_05	Current Alarm #5	0 to 100		-	RO	RO	ALARM
360	**0168H**	alm_01p	Past Alarm #1	0 to 100		-	RO	RO	ALARM
361	**0169H**	alm_02p	Past Alarm #2	0 to 100		-	RO	RO	ALARM
362	**016AH**	alm_03p	Past Alarm #3	0 to 100		-	RO	RO	ALARM
363	**016BH**	alm_04p	Past Alarm #4	0 to 100		-	RO	RO	ALARM
364	**016CH**	alm_05p	Past Alarm #5	0 to 100		-	RO	RO	ALARM
371	**0173H**	comp1_st	Compressor Starts Nb			-	RO	RO	RUNTIME1
372	**0174H**	comp1_hr	Compressor Run Hours			h	RO	RO	RUNTIME1
373	**0175H**	pmp_st	Water Pump Starts Nb			-	RO	RO	RUNTIME1
374	**0176H**	pmp_hr	Water Pump Run Hours			h	RO	RO	RUNTIME1
379		wearfact	Unit Wear Factor			-			
381	**017DH**	RUN2_RST	User Runtime Reset	0 to 3	0	-	RW	RW	RUNTIME2
382	**017EH**	comp_hr	Compressor Run Hours			h	RO	RO	RUNTIME2
383	**017FH**	back_hr	Backup Running Hours			h	RO	RO	RUNTIME2
384	**0180H**	cool_hr	Cooling Mode Hours			h	RO	RO	RUNTIME2
385	**0181H**	heat_hr	Heating Mode Hours			h	RO	RO	RUNTIME2
386	**0182H**	dhw_hr	DHW Mode Hours			h	RO	RO	RUNTIME2
387	**0183H**	dfrt_hr	Defrost Mode Hours			h	RO	RO	RUNTIME2
388	**0184H**	nrg_heat	Energy consumed in Heat			kWh	RO	RO	RUNTIME2
389	**0185H**	nrg_cool	Energy consumed in Cool			kWh	RO	RO	RUNTIME2
391	**0187H**	CHIL_S_S	Unit Start/Stop	0/1 [Stop/Start]		-	RO	RO/F	AQUASMRT
392	**0188H**	HC_SEL	Heat/Cool Select	0/1 [Cool/Heat]		-	RO	RO/F	AQUASMRT
393	**0189H**	EMSTOP	Emergency Stop	0/1 [Disable/Enable]		-	RO	RO/F	AQUASMRT

Par.	Jbus	Mnemonic	Description	Range	Default	Unit	WUI		Table
394	**018AH**	CAP_REQ	Special Control (regardless of water temp. vs setpoint): 0 = Unit stopped (satisfied) 1 = Minimum allowed frequency 100 = Maximum allowed frequency	0 to 100	0	%	RO	RO/F	AQUASMRT
399		RESETDEV	Reset Device	0/1 [Disable/Enable]		-			
401	**0191H**	hwoccstp	Heat Home Setpoint (Water)	20.0 to 60.0	45	1/10°C	RW	RW	WAT_STP
402	**0192H**	hwunooff	Heat Sleep Offset (Water)	-20.0 to 0.0	0.0	1/10 K	RW	RW	WAT_STP
403	**0193H**	hwecooff	Heat Away Offset (Water)	-20.0 to 0.0	-5.0	1/10 K	RW	RW	WAT_STP
404	**0194H**	N.A.							
405	**0195H**	leg_stp	DHW Anti-Legionella Stp	50.0 to 60.0	60	1/10°C	RW	RW	WAT_STP
406	**0196H**	dhw_stp	DHW Setpoint	30.0 to 60.0	50	1/10°C	RW	RW	WAT_STP
407	**0197H**	cwoccstp	Cool Home Setpoint (Water)	0.0 to 18.0	12	1/10°C	RW	RW	WAT_STP
408	**0198H**	cwunooff	Cool Sleep Offset (Water)	0.0 to 10.0	0	1/10 K	RW	RW	WAT_STP
409	**0199H**	cwecooff	Cool Away Offset (Water)	0.0 to 10.0	5	1/10 K	RW	RW	WAT_STP
410		hw_hyst	Heat Hysteresis (Water)	0.5 to 2.0	0,5	1/10 K	RW	RW	WAT_STP
411		cw_hyst	Cool Hysteresis (Water)	0.5 to 2.0	0,5	1/10 K	RW	RW	WAT_STP
412		hcurvoff	Heat Curv Max Stp Offset	-5.0 to 5.0	0.0	1/10 K	RW	RW	WAT_STP
413		ccurvoff	Cool Curv Min Stp Offset	-5.0 to 5.0	0.0	1/10 K	RW	RW	WAT_STP
421	**01A5H**	htoccstp	Heat Home Setpoint (Air)	12.0 to 34.0	19	1/10°C	RW	RW	AIR_STP
422	**01A6H**	htunooff	Heat Sleep Offset (Air)	-10.0 to 0.0	-2.0	1/10 K	RW	RW	AIR_STP
423	**01A7H**	htecooff	Heat Away Offset (Air)	-10.0 to 0.0	-4.0	1/10 K	RW	RW	AIR_STP
424	**01A8H**	cloccstp	Cool Home Setpoint (Air)	20.0 to 38.0	26	1/10°C	RW	RW	AIR_STP
425	**01A9H**	clunooff	Cool Sleep Offset (Air)	0.0 to 10.0	2	1/10 K	RW	RW	AIR_STP
426	**01AAH**	clecooff	Cool Away Offset (Air)	0.0 to 10.0	4	1/10 K	RW	RW	AIR_STP
427	**01ABH**	freezstp	Home AntiFreeze Setpoint	6.0 to 12.0	6	1/10°C	RW	RW	AIR_STP
428		deltastp	Air Delta Setpoint	0.2 to 1.0	0,5	1/10 K	RW	RW	AIR_STP
429		iat_fact	IAT Reset Factor	0.0 to 2.0	0	1/10	RW	RW	AIR_STP
501		sfsw_typ	Safety Switch Type	1 to 3	1	-	RW	RW	GEN_CONF
502		cust_di5	Customized DI#5 Config	-15 to 15	1	-	RW	RW	GEN_CONF
503		cust_di6	Customized DI#6 Config	-15 to 15	0	-	RW	RW	GEN_CONF
504		cust_di7	Customized DI#7 Config	-15 to 15	0	-	RW	RW	GEN_CONF
505		cust_di8	Customized DI#8 Config	-15 to 15	0	-	RW	RW	GEN_CONF
500		cust_do5	Customized DO#5 Config	0 to 13	4	-	RW	RW	GEN_CONF
506		Cust_do8	Customized DO#8 Config	0 to 13	1	-	RW	RW	GEN_CONF
507		Cust_do9	Customized DO#9 Config	0 to 13	2	-	RW	RW	GEN_CONF
508		tr_type	Refrigerant Temp Type	0 to 2	0	-	RW	RW	GEN_CONF
509		ewt_type	EWT Sensor Type	0 to 1	1	-	RW	RW	GEN_CONF
510		iat_type	IAT Sensor Type	0 to 3	0	-	RW	RW	GEN_CONF
511		oat_type	OAT Sensor Type	0 to 3	0	-	RW	RW	GEN_CONF
512		iat_bias	IAT Sensor Bias	-5.0 to 5.0	0.0	1/10 K	RW	RW	GEN_CONF
513		oat_bias	OAT Sensor Bias	-5.0 to 5.0	0.0	1/10 K	RW	RW	GEN_CONF
514		oat_min	Minimum OAT for Heating	-20.0 to 10.0	-20.0	1/10°C	RW	RW	GEN_CONF
515		oat_max	Maximum OAT for Heating	5.0 to 99.0	99	1/10°C	RW	RW	GEN_CONF
516		oat_minc	Minimum OAT for Cooling	0.0 to 40.0	0	1/10°C	RW	RW	GEN_CONF
517		freez_dt	Anti-Freeze Delta Setpoint	0.0 to 6.0	0	°C	RW	RW	GEN_CONF
518		nghtstrt	Night Mode Start Time	00:00 to 23:59	00:00	hh:mm	RW	RW	GEN_CONF
519		nghtstop	Night Mode Stop Time	00:00 to 23:59	00:00	hh:mm	RW	RW	GEN_CONF
520		sparetyp	Spare Sensor Type	0 to 5	0	-	RW	RW	GEN_CONF
521		ui_type	User Interface Type	0 to 3	0	-	RW	RW	UI_CONF
522		ui_accss	Parameter Access from UI	0 to 3	3	-	RW	RW	UI_CONF
523		ui_tmt	Interface Comm. Timeout	0 to 240	60	s	RW	RW	UI_CONF
524		ui_back	Backlight Timeout	0 to 7	2	-	RW	RW	UI_CONF
525		ui_buzz	Buzzer on key press	0/1 [No/Yes]	No	-	RW	RW	UI_CONF
526		timebrod	Interface Time Broadcast	0/1 [No/Yes]	Yes	-	RW	RW	UI_CONF
527		ser_pass	Service Password	0 to 9999	120	-	RW	RW	UI_CONF
528		usr_pass	User Password	0 to 9999	0	-	RW	RW	UI_CONF
541		powr_lim	Power Limitation value	50 to 100	75	%	RW	RW	CMP_CONF
542		nght_lim	Nigh Limitation value	50 to 100	75	%	RW	RW	CMP_CONF
543		dhw_lim	DHW Limitation value	50 to 100	100	%	RW	RW	CMP_CONF
560		flui_typ	Fluid Type	1 to 1	1	-	RW	RW	PMP_CONF
561		pmp_ext	External Main Pump Ctrl	0/1 [No/Yes]	0 [No]	-	RW	RW	PMP_CONF
562		flw_chko	Flow Checked if Pump Off	0/1 [No/Yes]	1 [Yes]	-	RW	RW	PMP_CONF
563		pmp_stck	Anti-sticking function	0/1 [No/Yes]	1 [Yes]	-	RW	RW	PMP_CONF
564		sampling	Pmp Sampling Time Stby	5 to 240	15	min	RW	RW	PMP_CONF
565		pmp_log	Main Pump Logic	1 to 3	1	-	RW	RW	PMP_CONF
566		vsp_log	Var Speed Pump Logic	0 to 1	1	-	RW	RW	PMP_CONF
567	**0237H**	vsp_min	Minimum Pump Speed	19 to 100	19	%	RW	RW	PMP_CONF
568	**0238H**	vsp_max	Maximum Pump Speed	19 to 100	100	%	RW	RW	PMP_CONF
569	**0239H**	dt_stp	Water Delta T Setpoint	2.0 to 20.0	5	1/10 K	RW	RW	PMP_CONF
570		dt_kp	Delta T Proport. Gain	-10.000 to -0.001	-2.000	-	RW	RW	PMP_CONF
571		dt_ti	Delta T Integral Time	10 to 120	20	s	RW	RW	PMP_CONF
572		dt_ts	Delta T Sample Time	10 to 120	10	s	RW	RW	PMP_CONF

Par.	Jbus	Mnemonic	Description	Range	Default	Unit	WUI		Table
573		add_pmp	Additional Pump Logic	0 to 4	0	-	RW	RW	PMP_CONF
581		ht_curv	Heat Clim Curve Select	-1 to 12	-1	-	RW	RW	CLIMCURV
582		ht_min_a	Heat Minimum OAT	-30.0 to 10.0	-7.0	1/10°C	RW	RW	CLIMCURV
583		ht_max_a	Heat Maximum OAT	10.0 to 30.0	20	1/10°C	RW	RW	CLIMCURV
584		ht_min_w	Heat Min Water Setpoint	20.0 to 40.0	20	1/10°C	RW	RW	CLIMCURV
585		ht_max_w	Heat Max Water Setpoint	30.0 to 60.0	38	1/10°C	RW	RW	CLIMCURV
586		cl_curv	Cool Clim Curve Select	-1 to 2	-1	-	RW	RW	CLIMCURV
587		cl_min_a	Cool Minimum OAT	0.0 to 30.0	20	1/10°C	RW	RW	CLIMCURV
588		cl_max_a	Cool Maximum OAT	24.0 to 46.0	35	1/10°C	RW	RW	CLIMCURV
589		cl_min_w	Cool Min Water Setpoint	5.0 to 20.0	10	1/10°C	RW	RW	CLIMCURV
590		cl_max_w	Cool Max Water Setpoint	5.0 to 20.0	18	1/10°C	RW	RW	CLIMCURV
595		dry_stp	Drying Starting Setpoint	20.0 to 40.0	20	1/10°C	RW	RW	DRYING
596		drystep1	Drying Warm-up days	0 to 99	3	-	RW	RW	DRYING
597		drystep2	Drying Ramp-up days	0 to 99	4	-	RW	RW	DRYING
598		drystep3	Drying Hold-up days	0 to 99	4	-	RW	RW	DRYING
599		drying_time	Drying Runtime	N.A.	0	hours	RO	RO	RUNTIME2
601		bck_type	Backup Type	0 to 10	0	-	RW	RW	BCK_CONF
602		bck_warm	Booster Warm Up Time	0 to 120	30	min	RW	RW	BCK_CONF
603		bck_delt	Booster Delta Temp	1.0 to 20.0	5	1/10°C	RW	RW	BCK_CONF
604		bck_oat	Booster OAT Threshold	-20.0 to 15.0	-7.0	1/10°C	RW	RW	BCK_CONF
605		ehs_kp	EHS Proport. Gain	0.001 to 10.000	2	-	RW	RW	BCK_CONF
606		ehs_ti	EHS Integral Time	10 to 60	20	s	RW	RW	BCK_CONF
607		ehs_ts	EHS Sampling Time	10 to 120	30	s	RW	RW	BCK_CONF
611		def_sel	Energy Soft select	0 [Disable] to 1 [Enable]	1	-	RW	RW	DEF_CONF
612		def_oat	OAT Min Defrost threshold	2 to 10	2	°C	RW	RW	DEF_CONF
613		fd_nb	Max Free Defrost number	1 to 20	6	-	RW	RW	DEF_CONF
614		md_time	Max time between two MD	1 to 18	6	h	RW	RW	DEF_CONF
615		md_rec	MD Recovery Select	0/1 Disable/Enable	1		RW	RW	DEF_CONF
641		ccn_bus	CCN Element Address	1 to 239	1	-	RW	RW	
642		ccn_elm	CCN Element Bus	0 to 239	0	-	RW	RW	
643		ccn_typ	CCN Device Type	0 to 3		-			
645		ccn_bdr	Primary Baud Rate	0 to 2 [9600/19200/ 38400]	2 [38400]	-	RW	RW	
646		sec_bdr	Secondary Baud Rate	0 to 2 [9600/19200/38400]	2 [38400]	-	RW	RW	
648		location	Location Description			24 char			
650		serialnb	Serial Number			-	RO	RO	
651		ref_nb	Reference Number			24 char			
653		pic_type	PIC Type			-	RO	RO	
654		soft_ver	Software Version Number		-	-	RO	RO	
661		hod	Hour of Day	0 to 23	N.A.	-	RW	RW	TIME
662		mod	Minute of Hour	0 to 59	N.A.	-	RW	RW	TIME
663		dow	Day of Week	1 to 7 [Monday ~ Sunday]	N.A.	-	RW	RW	TIME
664		hol_flag	Holiday Flags	0 to 15	N.A.	-	RW	RW	TIME
665		dom	Day of Month	1 to 31	N.A.	-	RW	RW	TIME
666		month	Month	1 to 12	N.A.	-	RW	RW	TIME
667		year	Year	0 to 99	N.A.	-	RW	RW	TIME
701		dhw_type	Domestic Hot Water Type	0 to 3	0	-	RW	RW	DHW_CONF
702		dhw_vlvr	DHW 3-way Valve run time	0 to 240	30	s	RW	RW	DHW_CONF
703		dhw_prio	Dom. Hot Water Priority	0 to 1	0	-	RW	RW	DHW_CONF
704		shc_min	SHC Minimum Runtime	0 to 720	20	min	RW	RW	DHW_CONF
707		dhw_max	DHW Maximum Runtime	-1 to 720	60	min	RW	RW	DHW_CONF
708		dhw_excp	DHW Exception Time	1 to 24	2	hour	RW	RW	DHW_CONF
709		N.A.							
710		vsp_dhw	Pump Speed in DHW	19 to 100	100	%	RW	RW	DHW_CONF
711		dhw_dow	DHW Schedule Days	0000 0000 to 1111 1110	1111	-	RW	RW	DHW_CONF
712		dhw_strt	DHW Starting Time	00:00 to 23:59	21:00	hh:mm	RW	RW	DHW_CONF
713		dhw_stop	DHW Stopping Time	00:00 to 23:59	06:00	hh:mm	RW	RW	DHW_CONF
714		leg_dow	AntiLegionella Strt DOW	0000 0000 to 1111 1111	0	-	RW	RW	DHW_CONF
715		leg_time	AntiLegionella Strt Time	00:00 to 23:59	02:00	hh:mm	RW	RW	DHW_CONF
716		sum_oat	Summer Mode OAT Thrshold	15.0 to 30.0	20	1/10°C	RW	RW	DHW_CONF
717		sum_on	Summer Mode On Delay	0 to 12	0	h	RW	RW	DHW_CONF
718		sum_off	Summer Mode Off Delay	0 to 12	0	h	RW	RW	DHW_CONF
719		dhw_sens	DHW Tank Sensor Type	0 to 3	0	-	RW	RW	DHW_CONF
720		dhw_bias	DHW Tank Sensor Bias	-5.0 to 5.0	0.0	1/10 K	RW	RW	DHW_CONF
721		dhw_dt	DHW Tank Delta T (start)	2.0 to 10.0	0	1/10 K	RW	RW	DHW_CONF
722		dhw_dt_s	DHW Tank Delta T (stop)	0.0 to 5.0	5	1/10 K	RW	RW	DHW_CONF
741		ms_cod	Mst/Slv Activation Code	“XXXXXXXX”	0	-	RW	RW	MSL_CONF
742		ms_sel	Master/Slave Selection	0 to 2	0	-	RW	RW	MSL_CONF
743		slv1_add	Slave #1 Address	0 to 239	0	-	RW	RW	MSL_CONF

Par.	Jbus	Mnemonic	Description	Range	Default	Unit	WUI		Table
744		slv2_add	Slave #2 Address	0 to 239	0	-	RW	RW	MSL_CONF
745		slv3_add	Slave #3 Address	0 to 239	0	-	RW	RW	MSL_CONF
746		cap_strt	Capa. to Start Next Unit	30 to 100	75	%	RW	RW	MSL_CONF
747		cap_stop	Capa. To Stop Next Unit	1 to 25	25	%			MSL_CONF
750		chws_typ	CHWSTEMP Type	0 to 3	1	-	RW	RW	MSL_CONF
751		casc_typ	Cascade Type	0 to 2	1	-	RW	RW	MSL_CONF
752		ms_h_kp	M/S Heat Proport. Gain	0.001 to 10.000	6,000	-	RW	RW	MSL_CONF
753		ms_h _ti	M/S Heat Integral Time	10 to 120	30	s	RW	RW	MSL_CONF
754		ms_h _ts	M/S Heat Sampling Time	10 to 120	30	s	RW	RW	MSL_CONF
755		mslc_kp	M/S Cool Proport. Gain	-10.000 to -0.001	-0,9	-	RW	RW	MSL_CONF
756		ms_c _ti	M/S Cool Integral Time	10 to 120	30	s	RW	RW	MSL_CONF
757		ms_c _ts	M/S Cool Sampling Time	10 to 120	30	s	RW	RW	MSL_CONF
758		ms_pmp	Master/Slave Pump Type	0 to 3	2	-	RW	RW	MSL_CONF
761	**02F9H**	jbus_ena	JBus Control Enable	0 to 2	1	-	RW	RW	JBUSCONF
762	**02FAH**	jbus_add	JBus Slave Address	1 to 255	11	-	RW	RW	JBUSCONF
763	**02FBH**	jbus_bdr	JBus Baud Rate	0 to 2	2	-			JBUSCONF
764	**02FCH**	jbus_frm	JBus Frame Type	0 to 5	0	-	RW	RW	JBUSCONF
765	**02FDH**	jbus_cod	JBus Activation Code	“XXXXXXXX”	0	-	RW	RW	JBUSCONF
766	**02FEH**	jbus_tmt	JBus Comm. Timeout	0 to 600	600	s	RW	RW	JBUSCONF
767		mbusoff1	Modbus Display Offset	0 to 61440	16384	-	RW	RW	JBUSCONF
768		mbusoff2	Modbus Setpoint Offset	0 to 61440	32768	-	RW	RW	JBUSCONF
769		mbusoff3	Modbus Config Offset	0 to 61440	28672	-	RW	RW	JBUSCONF
770		mbusoff4	Modbus Service Offset	0 to 61440	36864	-	RW	RW	JBUSCONF

(1) Corrected Inverter TO parameter [P039] enables to correct the value measured by TO sensor (located on the air heat exchanger). And OAT [P001] is egal to to2 [P039]

7.2 - Description of customized DI/DO configurations

Par.	Description	Range	Range description
502	Customized DI#5 Config	-15 to 15	0 = Disabled -1 or 1 = Power Limitation Switch -2 or 2 = Off Peak Switch -3 or 3 = Loadshed Request Switch -4 or 4 = Solar Input Switch -5 or 5 = DHW Request Switch from tank -6 or 6 = DHW Priority Button -7 or 7 = Anti-Legionella Cycle Request Button -8 or 8 = Summer Switch -9 or 9 = Pool Heating Priority Button -10 or 10 = Pool Pump Running contact -11 or 11 = Energy Meter Input (1 kWh/pulse) -12 or 12 = Energy Meter Input (0.5 kWh/pulse) -13 or 13 = Energy Meter Input (0.2 kWh/pulse) -14 or 14 = Energy Meter Input (0.1 kWh/pulse) -15 or 15 = External Alarm Indication
503	Customized DI#6 Config		
504	Customized DI#7 Config		
505	Customized DI#8 Config		

Par.	Description	Range	Range description
500	Customized DO#5 Config	0 to 13	0 = Disabled 1 = Unit in Alert (still able to run) 2 = Unit in Alarm (Fail Mode) 3 = Unit is in Standby (Satisfied) 4 = Unit is Running (Cool, Heat, DHW, Defrost) 5 = Unit is Running in Cool Mode 6 = Unit is Running in Heat Mode 7 = Unit is Running in DHW Mode 8 = Unit is Running in Defrost Mode 9 = IAT Reached (FCU) 10 = Electrical Heater #2 (EH2) 11 = Electrical Heater #3 (EH3) 12 = Pool Heating Diverting Valve 13 = Output controlled by customer (via JBus/Modbus)
506	Customized DO#8 Config	0 to 13	
507	Customized DO#9 Config		

8 - START-UP CHECKLIST FOR 30AWH HEAT PUMPS (USE FOR JOB FILE)

8.1 - General information

General information	
Job name	
Location	
Installing contractor	
Distributor	
Start-up performed by	Date
Equipment	
Unit type	
Serial number	
Software version [P654]	
Compressor	Model number
	Serial number
Air handling equipment	
	Manufacturer
	Model number
	Serial number

8.2 - Available options and accessories

Options	Yes	No	Accessories	Yes	No
Floor heating thermal cut off			Master / Slave sensor		
Backup heater			Domestic hot water management sensor		
Hydraulic module equipped with variable speed single pump low available pressure without expansion tank			Remote human interface		
Water filling system			Additional outdoor ambient temperature sensor		

8.3 - Checks before start of unit

		Yes	No	Comment
CHECKS BEFORE START-UP	Is there any shipping damage?			
	Unit is level in its installation			
	Power supply agrees with the unit name plate			
	Electrical circuit wiring has been sized and installed properly			
	Unit ground wire has been connected			
	Unit neutral wire has been connected			
	All terminals are tight			
	All cables and thermistors have been inspected for crossed wires			
	All plug assemblies are tight			
	All air handlers are operating			
	All water valves are open			
	All fluid piping is connected properly			
	All air has been vented from the system			
	Water pump is operating with the correct rotation			
	Water pump control has been properly interlocked with the heat pump			
	Unit has been leak checked (including fittings): Locate, repair, and report any refrigerant leak			
	All incoming power voltage is within rated voltage range			

8.4 - Checks during operation of unit

Date / Hour								
CHECKS DURING OPERATION	Air	Outdoor Air Temp	P001	°C				
	Water	Entering Water Temp	P003	°C				
		Leaving Water Temp	P004	°C				
		Water Control Temp	P052	°C				
	Suction	Suction Temperature	P009	°C				
	Discharge	Discharge Temperature	P010	°C				
		Refrigerant Temperature	P005	°C				
	Compressor	Requested Compressor Frequency	P022	Hz				
		Actual Compressor Frequency	P023	Hz				
	Water control	Water Control Point	P051	°C				
		Flow Switch Status	P105	-				
		Safety Switch Status	P104	-				
	Water pressure / flow rate	Entering water heat exchanger pressure	-	kPa				
		Leaving water heat exchanger pressure	-	kPa				
		Pressure drop (without internal pump)	-	kPa				
		Flow rate from curves (without internal pump)	-	l/s				
		Or available external pressure (with internal pump)	-	kPa				
		Flow rate from curves (with internal pump)	-	l/s				
	Power	Network Voltage	-	V				
		Input Amperage	-	A				

8.5 - Maintenance checks

Date / Hour						
MAINTENANCE CHECKS	Control	Mechanical check				
		Leakage check				
		Relief valve check				
		Electrical connection check				
	Freeze protection	Water freeze protection check				
		Add glycol in water (%)				
	Cleaning	Coil cleaning				
		Water filter cleaning				

Comments:

Order No: 10192, 12.2019 - Supersedes order No: 10192, 01.2019.
Manufacturer reserves the right to change any product specifications without notice.

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