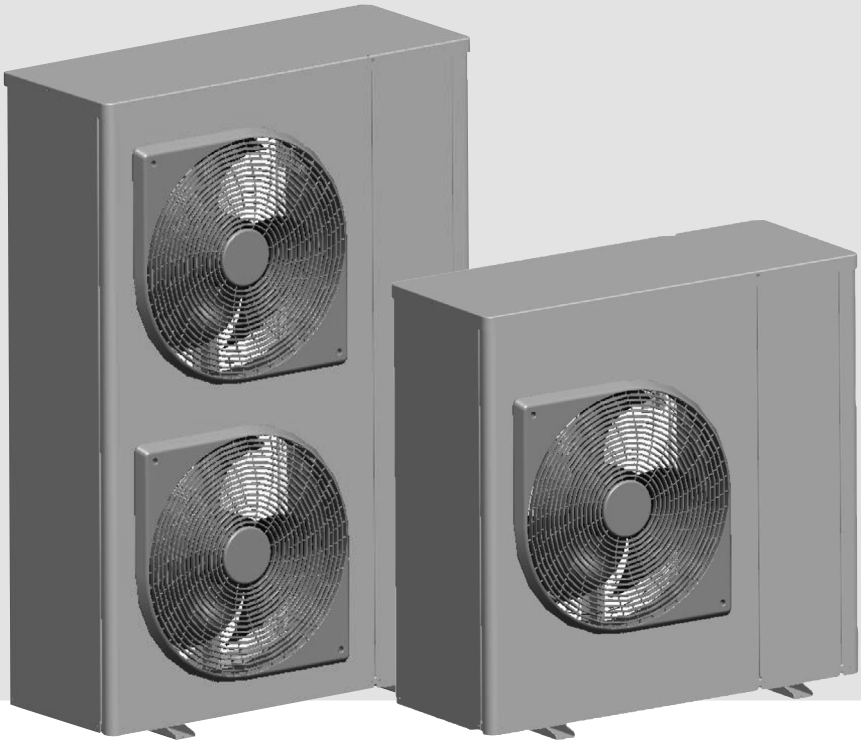
Carrier

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS



30 AWH-P

Original document

CONTENTS

FIGURES CONTENT

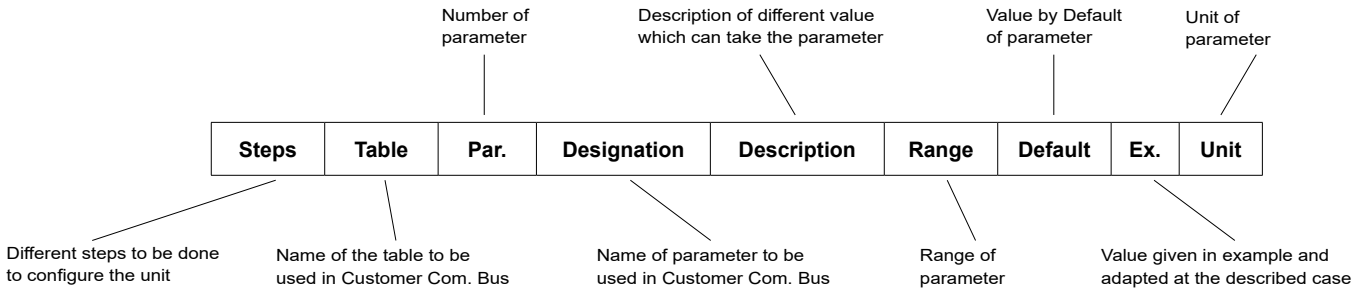
TABLES CONTENT

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	Wall-mounted User Interface

Control Configuration Legend



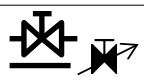
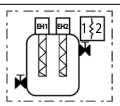
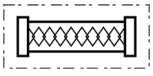
Possible to configure by direct access on WUI. Refer to WUI end user Manual.

✓ Check to be done

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

ACRONYMS AND LEGEND

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 outside of building on the exit side of the unit
Add EXP-T		Additional expansion tank	Field supplied Expansion tank depending on the total water loop volume
-		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

1.1 - Introduction

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

The instaler must conduct his own risk analysis before starting the installation of this unit.

The 30AWH-P 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 (Machinery, low voltage, electromagnetic compatibility, pressure equipment, etc.) check the declarations of conformity for these products.

1.2 - Safety

General warning: this unit uses very pure propane as a refrigerant. Do not try to replace the refrigerant with domestic propane. In the event of a leak, refrigerant and air mixture may form a flammable atmosphere. Any ignition source, such as open flamme, hot surfaces (Above 370°C) or any device potentially source of electric arc (sockets, electrical switches, static discharge, ...) must be kept at least one meter distance from the unit.

Take protective measures to prevent all electrostatic discharges.

ISO 7010-W021 (2011-05) 	Flammable material	Warning relative to the association of flammable material and propane refrigerant
ISO 7010-P003 	No open flame	Do not smoke, use ignition source material or open flamme near the unit
ISO 7000-1659 (2004-01) 	Read service manual	Read and understand service and technical documents relative to the unit
ISO 7000-0790 (2004-01) 	Read operator's manual	Read and understand operator's manual before the power up of the unit
ISO 7010-W012 	Electricity hazard	Death or serious injury can be caused by the unit under tension, always make sure to service the unit without power or wearing the proper safety equipement
ISO 7010-W017 	Hot surface	Serious injury can be caused by differents hot surfaces present close to the unit, always make sure to service the unit off or wearing the proper safety equipement

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.

In case of damage, carry out a leak detection test before removing the cardboard box.

The unit must be stored outside or in a controled environment (R290 sensors and non ignition source area).

The units can not be stacked.

The unit must be installed outdoors following clearance from §1.4.2. A minimum distance of one meter around the unit must be cleared of any obstacles for safe use.

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 see figure 3.

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.

The coil of this unit can reach a temperature above 50 °C and can present a burn risk.

The water pipings can also reach temperatures up to 75 °C and be a source of burn if touched.

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 relief valves and rupture disks 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 as far as possible.**
- **Set up warnings and recommendations for personnel in charge to stop the fire.**
- **Make sure to precise that the unit contain propane refrigerant as well as lubricant oil.**
- **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 (3-phase models only)

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 3,8 MVA.

1.2.2 - Pressurized equipment and components

These products incorporate pressurized equipment or components, produced by manufacturers. We recommend that you consult your appropriate national trade association or the owner of the pressure equipment or component (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.**
- **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. The operator 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 R-290 refrigerant (propane). The unit operating pressure is above 20 bar when the outside air temperature is 35 °C.

Be aware that the refrigerant does not contain an odour.

Special equipment must be used when working on the refrigerant circuit (pressure gauge, recovery unit, vaccum pump, etc.).

Equipment must be compatible with the use of R-290.

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

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

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.

Personal protective equipment (PPE)	Operation		
	Manutention	Maintenance, service	Welding, brazing
Hand protection (gloves), eye protection (safety googles), foot protection (safety shoes), clothing protection	X	X	X
Ear protection		X	X
Filtering respirator			X

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, electronic parts, compressor and water piping).

Risk of fatal injury from magnetic field for people with medical implants (e.g. pacemakers) due to permanent magnets installed in the pump or the fan motor.

Follow the general behavioural guidelines that apply to handling electrical devices!

The fan or pump motors must never be disasembled.

The presence of oil at the outlet orifice of the Schrader valve is a useful indicator that refrigerant has leaked. Keep this orifice clean to ensure that any leaks can be easily detected

OPERATING CHECKS:

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

Refrigerant type: R-290

Global Warming Potential (GWP): 3

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

	Damage limitation accessory(1) in case of an external fire
Refrigerant side	
Internal relief valve (2)	X
Heat transfer fluid side	
External relief valve	(3)

(1) Classified for protection in abnormal service situations.
(2) The instantaneous over-pressure limited to 10% of the operating pressure does not apply to this abnormal service situation. The control pressure can be higher than the service pressure. In this case the design temperature ensures that the service pressure is not exceeded in normal service situations.
(3) The classification of these relief valves must be made by the personnel that completes the whole hydraulic installation.

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.***
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
	R-290	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 : 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:

- The pressure switch test must always be carried out with all the panels closed.
- 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 the procedure below. or carry out a refrigerant analysis in a specific 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.

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 or an explosion.

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.

Do not store any flammable material at less than one meter of the unit.

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.**

Make sure that all the heat or cold generator on the water loop are turned off before any intervention on the water loop.

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 every applicable standard. 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 protections, 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-290) will impair machine operation and can even lead to a destruction of the compressors. The compressors operate with R-290 and are charged with mineral oil.

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

The machine is operated from the human machine interface.

The maintenance is done in the following position (schéma avec technicien sur le côté de la machine).

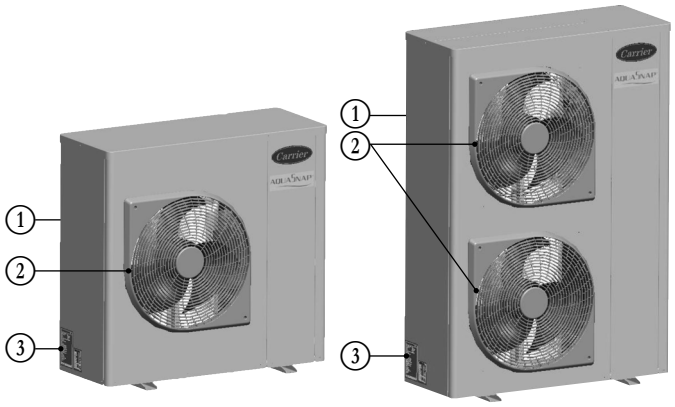
1.3 - Preliminary checks

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
- 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.

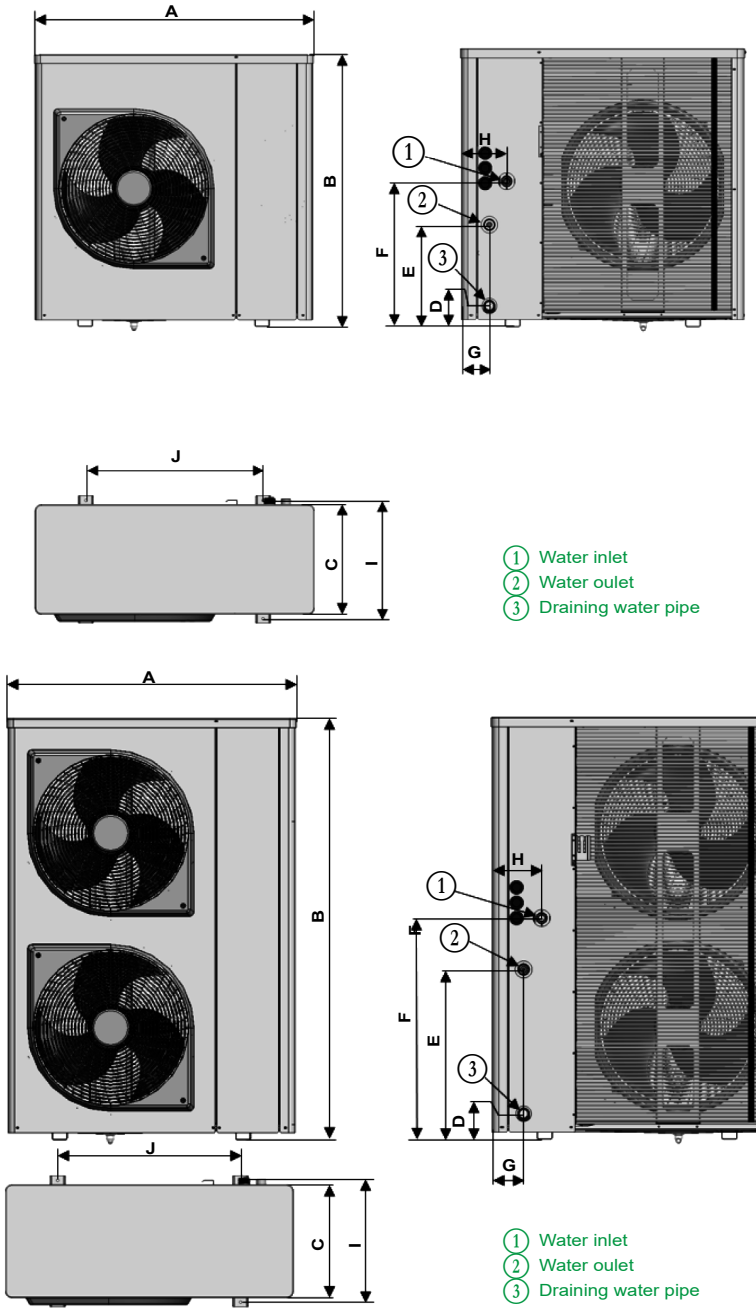
Always make sure that all the panels of the unit are close before powering up the unit (fan grid, top panel and compressor side panels).



Legend:
① Air inlet
② Fan grid
③ Nameplate

1.4 - Dimensions and clearance for 30AWH-P 4-14 units

1.4.1 - Dimensions and location of hydraulic connections

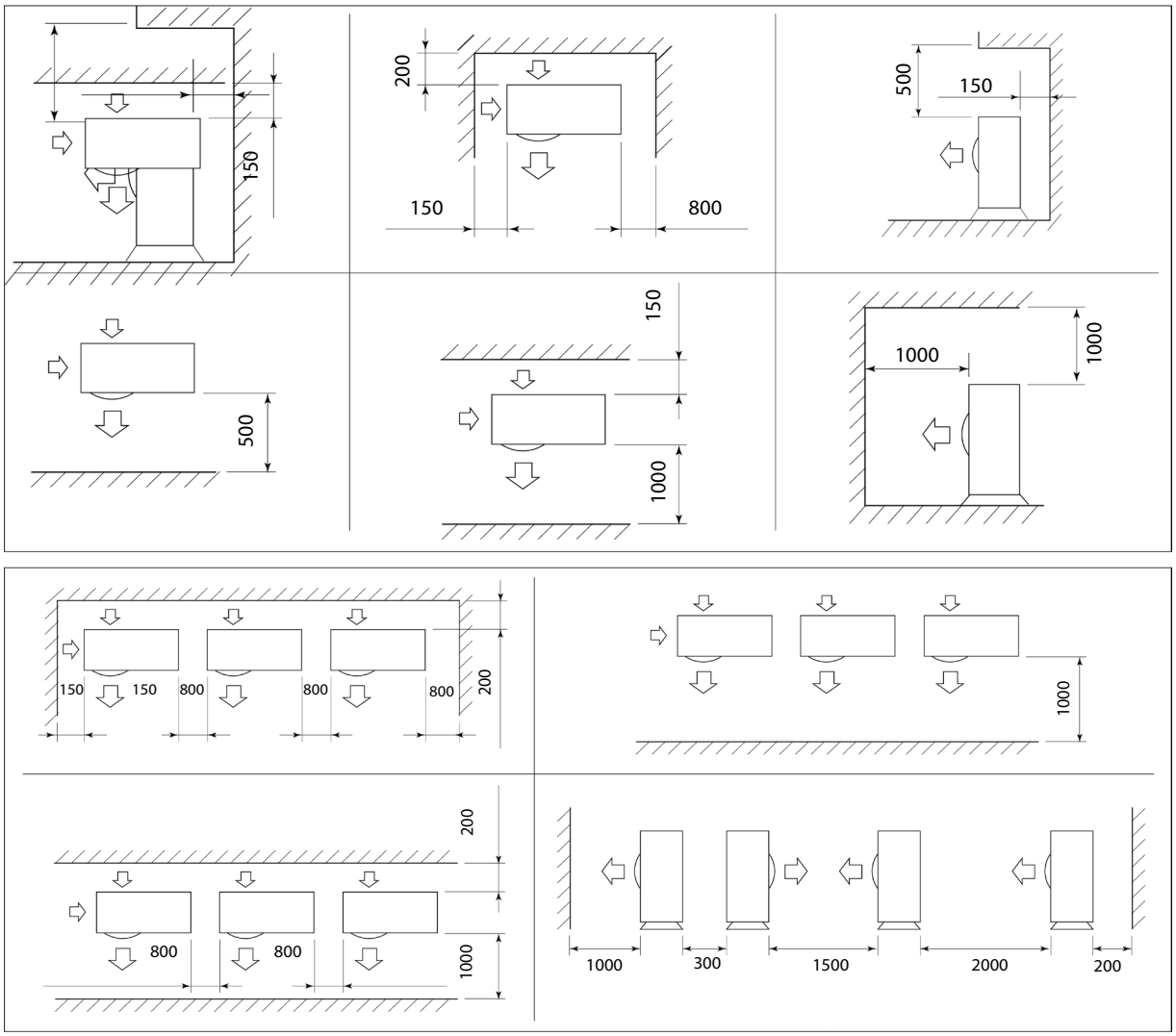


30AWH-P	A	B	C	D	E	F	G	H	I	J
004	946	927	372	71	341	485	93	150	400	600
006	946	927	372	71	341	485	93	150	400	600
008	946	927	372	71	341	485	93	150	400	600
010	946	927	372	71	341	485	93	150	400	600
012	946	1375	372	83	553	720	102	160	400	600
014	946	1375	372	83	553	720	102	160	400	600

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).
The unit should also be kept one meter away from any opening (doors, windows...).
The unit shall not be installed so that, in the event of a leak, the refrigerant may accumulate or stagnate (propane is heavier than air).



(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-P units

1.5.1 - Physical data 30AWH-P 4-14

30AWH-P		004 (1Ph)	006 (1Ph)	008 (1Ph)	010 (1Ph)	012 (1Ph)	014 (1Ph)	012 (3Ph)	014 (3Ph)
Sound levels									
Standard unit									
Sound power level (2)	dB(A)	49	50	51	51	54	54	54	54
Sound pressure level at 5 m (3)	dB(A)	23,5	24,5	25,5	25,5	28,0	28,0	28,0	28,0
Dimensions									
Length	mm	946	946	946	946	946	946	946	946
Width	mm	430	430	430	430	430	430	430	430
Height	mm	927	927	927	927	1375	1375	1375	1375
Operating Weight (1)									
Standard unit	kg	78	84	91	93	126	126	128	128
Compressors	Rotary compressor	1	1	1	1	1	1	1	1
Refrigerant	**R290**								
Charge (1)	kg	0,39	0,58	0,76	0,76	1,07	1,07	1,07	1,07
Capacity control									
Minimum capacity (5)	%	40%	32%	34%	27%	25%	21%	25%	21%
Air Heat Exchanger		Grooved copper tubes, aluminium fins							
Fans		Axial type							
Quantity		1	1	1	1	2	2	2	2
Maximum total air flow	l/s	800	800	800	800	1800	1800	1800	1800
Maximum rotational speed	rpm	730	730	820	820	820	820	820	820
Water Heat Exchanger		Brazed plate heat exchanger							
Water volume	l	0,6	0,9	0,9	0,9	1,5	1,5	1,5	1,5
Hydraulic module		Circulator, relief valve, paddle flow switch							
Circulator		Centrifugal pump (variable speed)							
Max. water-side operating pressure (4)	kPa	300	300	300	300	300	300	300	300
Water connections									
Inlet diameter (BSP GAS)	inch	1	1	1	1	1	1	1	1
Outlet diameter (BSP GAS)	inch	1	1	1	1	1	1	1	1
Chassis paint colour	Colour code:	RAL 7035	RAL 7035	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 EN 12102-1 (with an associated uncertainty of +/-2dB(A)) as required by Ecodesign regulation and Eurovent certification. Measured in accordance with ISO 9614-1 at ErP C condition (A7/W55)
(3) In dB ref 20 µPa, (A) weighting. Declared dualnumber noise emission values in accordance with EN 12102-1 (with an associated uncertainty of +/-2dB(A)). For information, calculated from the sound power level Lw(A) at ErP C condition (A7/W55).
(4) Min. water-side operating pressure with variable speed hydraulic module is 110 kPa.
(5) Heating Eurovent condition

1.5.2 - Electrical data 30AWH-P 4-14

30AWH-P		004 (1Ph)	006 (1Ph)	008 (1Ph)	010 (1Ph)	012 (1Ph)	014 (1Ph)	012 (3Ph)	014 (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**	**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	220-240	220-240	380-415	380-415
Control circuit supply		24V AC via internal transformer							
Maximum unit power input (Un) (1)	kW	3,5	4,4	5,0	6,4	7,1	7,1	10,5	10,5
Cos Phi unit at maximum power (1)		1,00	1,00	1,00	1,00	1,00	1,00	0,94	0,94
Maximum unit current drawn (Un-10%) (2)	A	15,3	19,4	21,8	28,2	31,0	31,0	16,3	16,3
Maximum unit current drawn (Un) (3)	A	15,1	19,2	21,6	27,9	30,8	30,8	16,1	16,1
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 and nominal voltage (data given on the unit nameplate).
(2) Maximum unit operating current at maximum unit power input and at 207 or 360 V.
(3) Maximum unit operating current at maximum unit power input and at 230 or 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).

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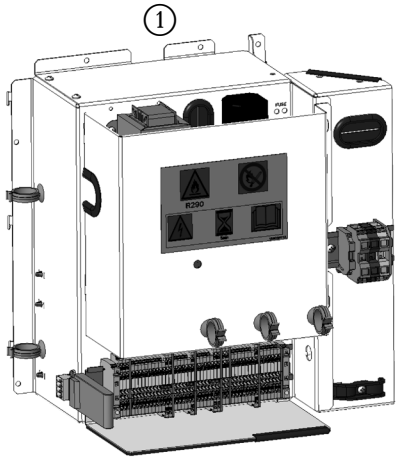
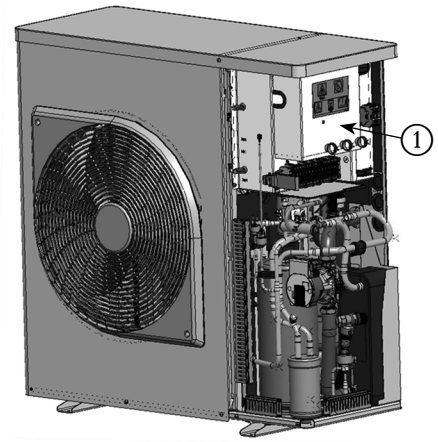
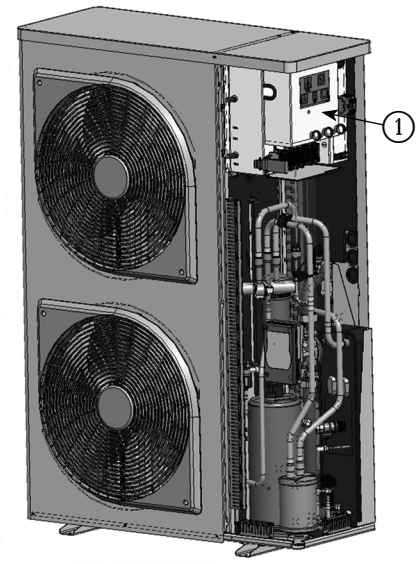
1.5.3 - Inside view



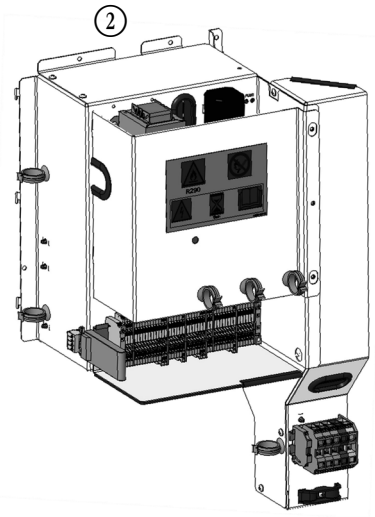
1Ph Electricl Box



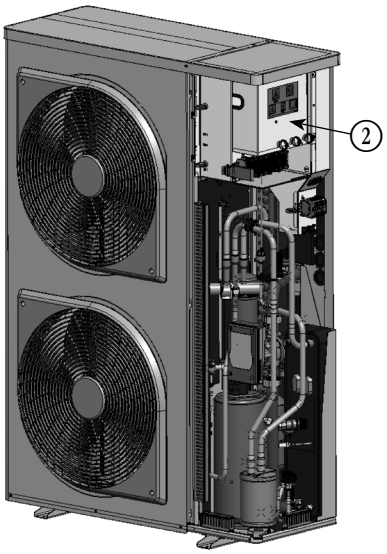
004 – 010



012 – 014



3Ph Electricl Box



012 - 014

1.6 - Accessories

Accessories	Description	Advantages
Flexible hydraulic tubes	Tubes are used to decoupling hydraulic circuits and the units	Reduces vibration transmission to hydraulic installation
Anti-vibration mounts	Cushion installed under the unit to avoid vibration trasmission	Reduces vibration transmission
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.
Additional outdoor ambient temperature sensor	Additional outdoor ambient temperature sensor	Better reading of outdoor air temperature
Drain panel heater	Electrical heater to prevent condensate freezing (base panel and drain duct)	Condensates proper evacuation for cold climate
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
Domestic Hot Water 3 way valve	Solenoid valve for domestic hot water production	Useful for domestic hot water production
Water filling kit	System enabling to fill the hydraulic circuit including: ball valve, check valve, pressure gauge	hydraulic circuit easy filling
Installlation kit	Package for basic installation including: Anti-vibration mounts, flexible hydraulic tubes, valves, filter, antifreeze valve, filling kit	Ease installation providing common necessary accessories

2.1 - General

To install an unit 30AWH-P 4-14 the following steps are requested

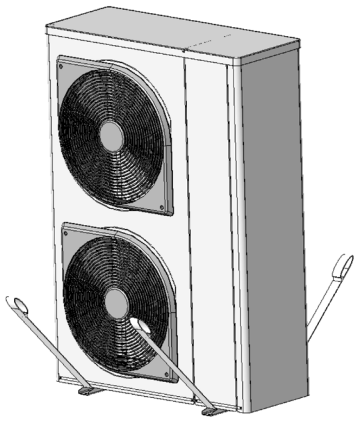
1. Place the unit
2. Make hydraulic connections to fill the system with water or brine fluid
3. Make electrical connections
4. Check for water leaks and the water flow rate control
5. Verify that al the panels are in place and tightly secured in place. Make sure that the fan blade protection is installed and locked in place
6. Finally, make commissioning of the unit

2.2 - Moving and placing the unit

2.2.1 - Moving

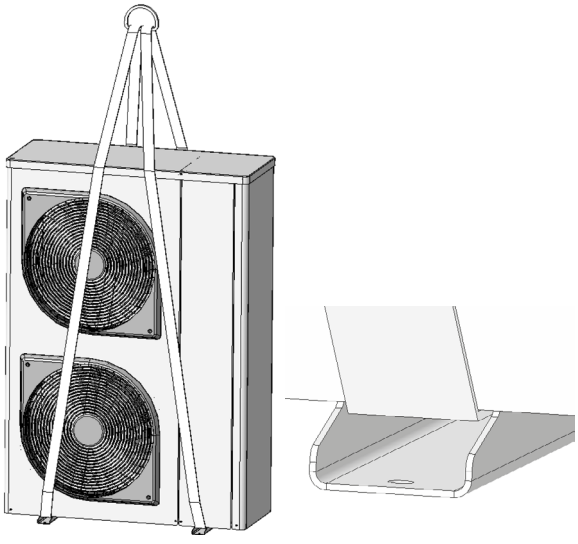
See §1.2.1 Installation safety considerations.

Figure 1: Transport configuration



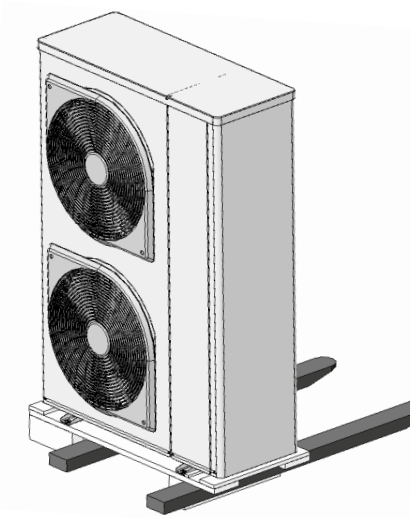
In the case of manual lifting of the unit, it is needed at least three (3) persons for the 004 - 010 units and four (4) persons for the 012 - 014 units. In both situations, at least one person must lift the fan side and the others must lift the compressor side. This configuration permits to limit the load per lifter to 40 kg.

Figure 2: Offloading configuration



CAUTION: The lifting sling must always slide through the feet.

Figure 3: Forklift position



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.
- It is mandatory to use 4 (four) bolts with sufficient strength in the 4 (four) foot holes
- 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.
- If the unit is installed must be install above the ground, always make sure to use adapted wall brackets and verify that the weight allowed is higher than the unit weight.

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-P 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.

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.

It is advised to conduct a leak detection before opening any panel. In the technician is not qualified to conduct this leak detection, any ignition source must be eliminated in the area within two (2) meters of the unit. When the panel is opened, wait for five (5) minutes before doing any intervention inside the unit.

Figure 4 : How to remove front panel for 4 to 10 units

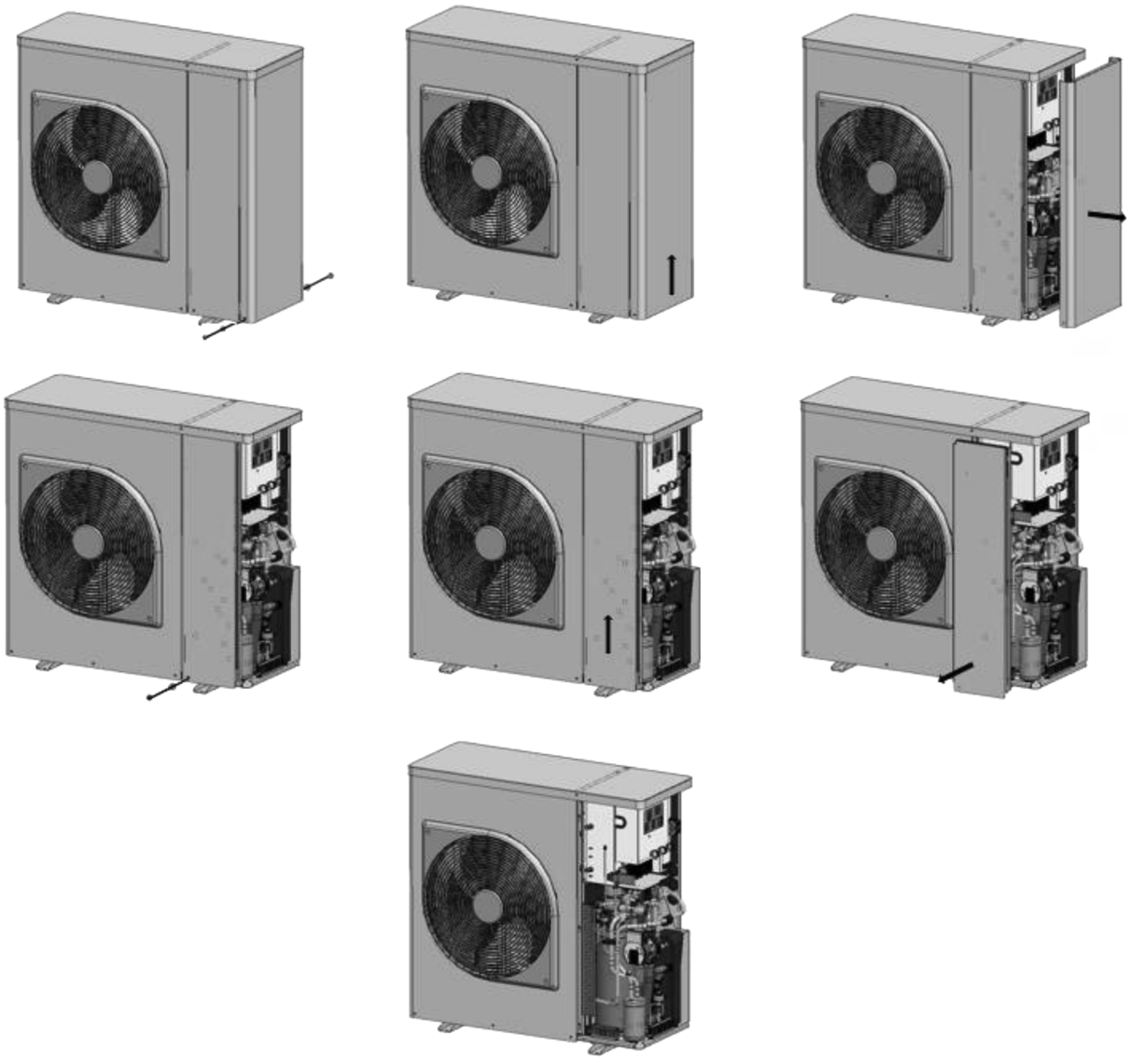
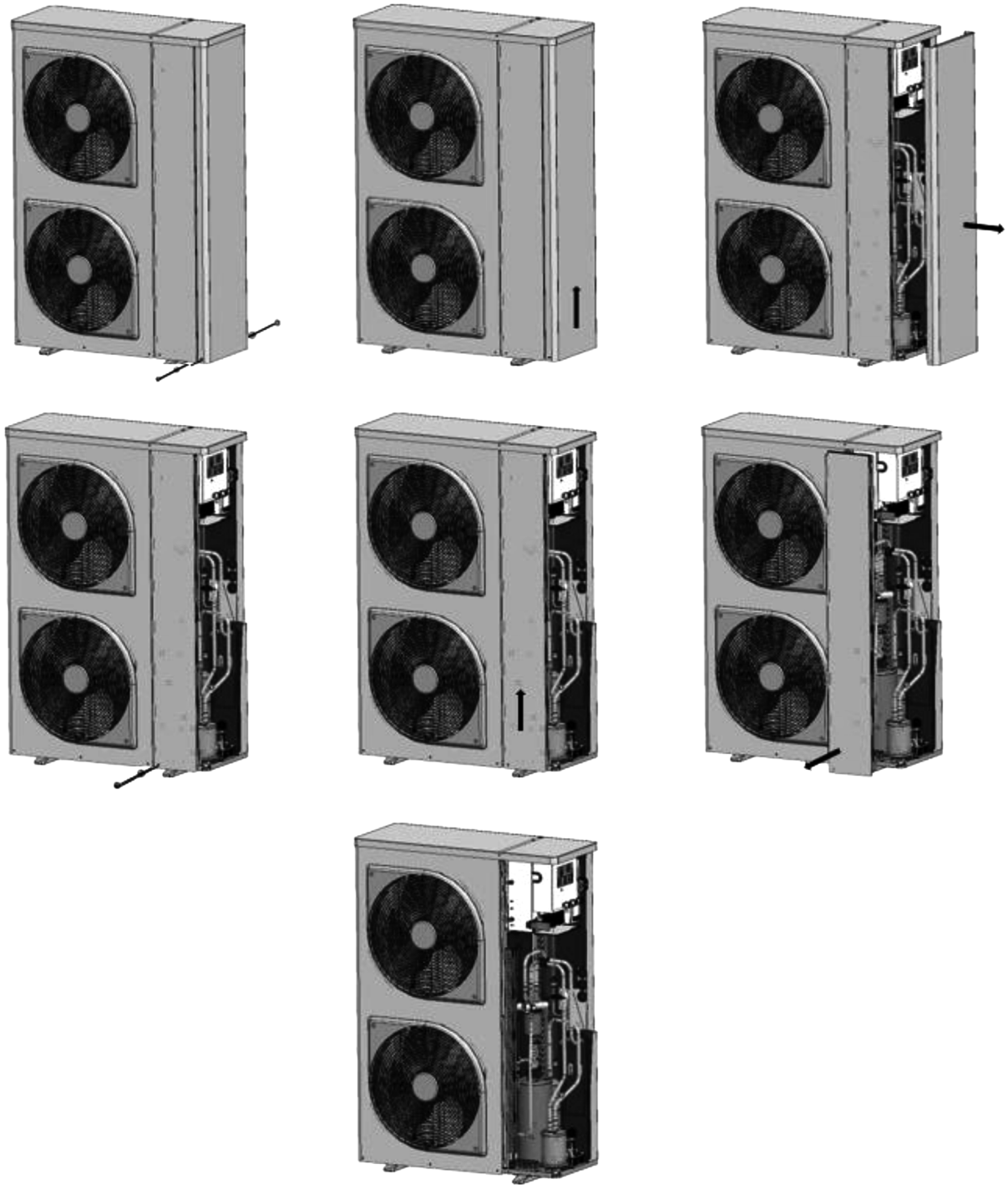


Figure 5 : How to remove front panel for 12 and 14 units



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.

External visual installation checks:

- Ensure that the machine is charged with refrigerant. Verify on the unit nameplate that the 'fluid being transported' is R-290 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 use of flexible tubing is mandatory to limit the forces applied to the heat exchanger connectors.

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.

The installation of an automatic air vent on the water loop leaving the unit is mandatory. This air vent must be situated on a well ventilated area without ignition source.

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 water loop is forbidden. Do not use the water loop of the unit to heat directly the pool water. Use a well design water echanger and all the safety component necessary on the pool system.

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.
- All purges must be installed in an igntion source free environment.
- Make sure that no water above 75 °C can enter the unit water circuit at any time during operation or maintenance.
- Use a pressure reducer to maintain pressure in the circuit(s) and install a relief valve as well as an expansion tank. Units include a relief valve.
- 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).

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.

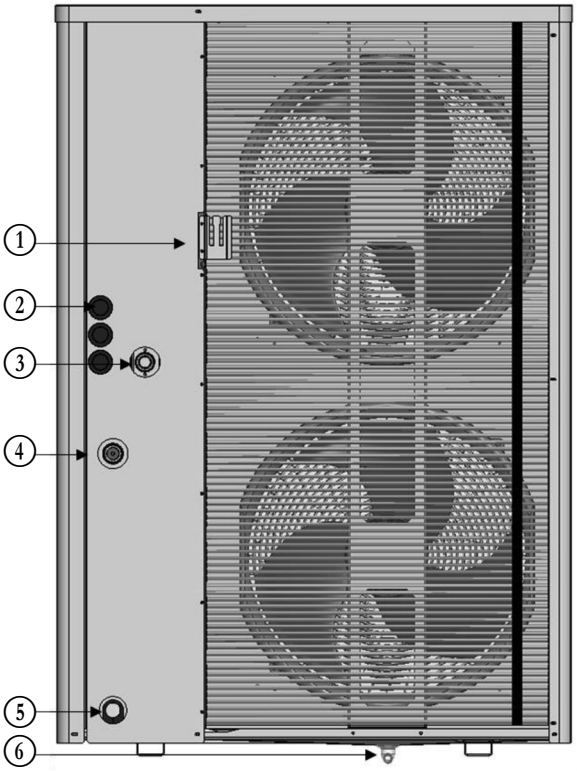
The installation of an external filter (Y shape) at the unit inlet side is highly recommanded. The mesh size must be comprised between 16/10e mm and 20/10e mm.

The unit is using R290 refrigerant. In case of leak, the refrigerant must not accumulate in a not ventilated area. The condensate draining pipe must be connected to a solution allowing the free evacuation of water during defrost. This solution must not permit the accumulation of refrigerant in the case of a leak inside the unit (syphon).

2.3.2 - General

For details on connection diameters, refer to §1.5.1 Physical data.

Figure 6 : Water connection on unit



Legend:
1. Outside Air Temperature sensor
2. Customer electrical connection
3. Water inlet
4. Water outlet
5. Water drain pipe
6. Condensate draining pipe"

2.3.3 - Minimum water loop volume

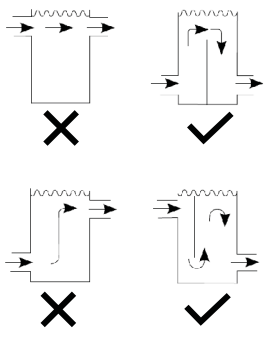
The minimum water loop volume, in litres, is given by the following formula:

Volume (l) = Model number x N

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

Application	N
Air conditioning	8
Heating or domestic hot water application	12

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.



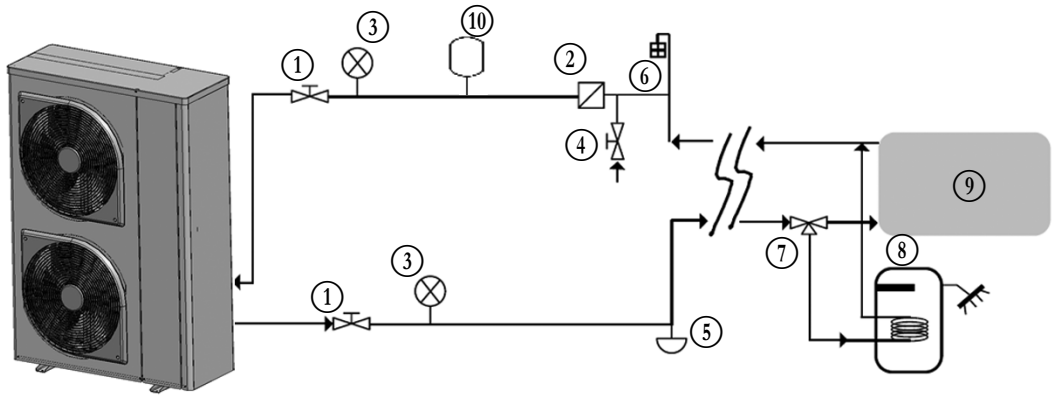
2.3.4 - Maximum water loop volume

The installer must add expansion tank, suitable for the volume of the installation.

The unit is not provided with an expansion vessel, the installer must add an expansion vessel suitable for the water loop volume (taking into consideration the Ethylen glycol concentration if applicable).

2.3.5 - Hydraulic circuit

Figure 7: Typical diagram of the hydraulic circuit

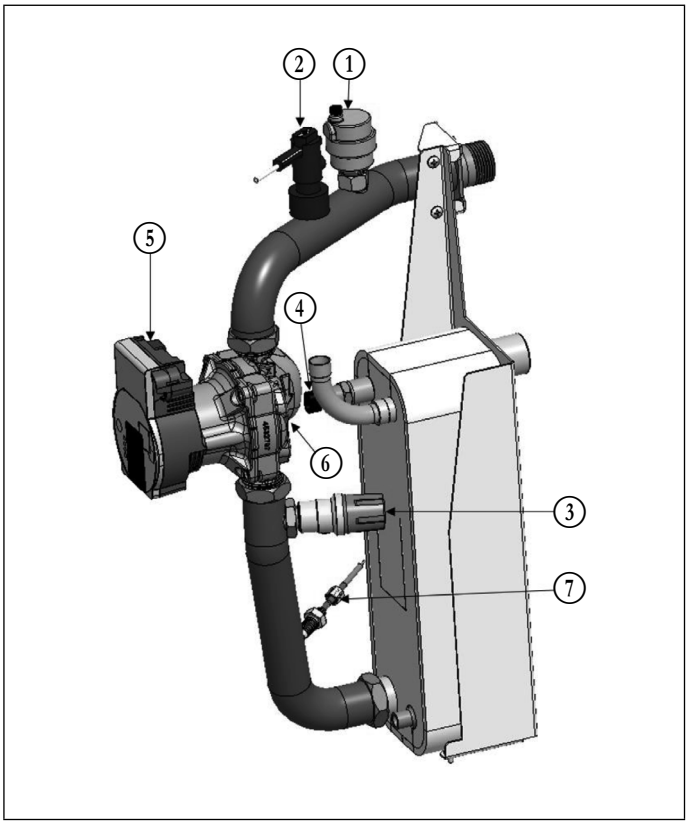


Legend:

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. Expansion vessel

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

Figure 8: Hydraulic module equipped with variable speed single pump low available pressure



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. 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	110 kPa (1,1 bar)	300 kPa (3 bar).

2.4 - Electrical connections

Please refer to the certified wiring drawings, supplied with the unit appliance shall be installed in accordance with national wiring regulations.

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:

As a standard protection, it is mandatory to install a disconnect switch to be able to disconnect the power supply of the unit.

Make sure to respect the wiring order to avoid electrical shock.

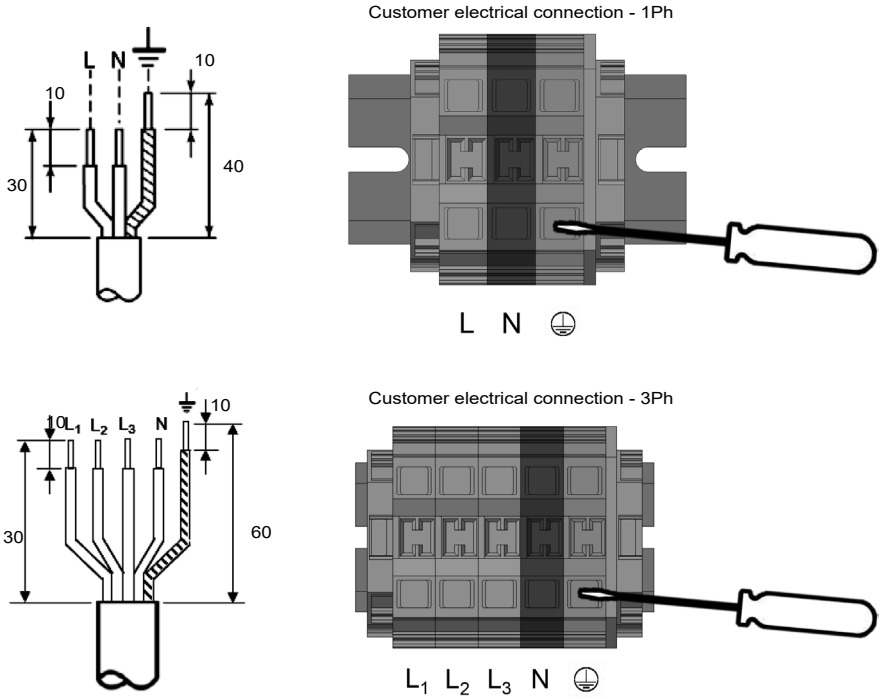
The use of an ATEX disconnect switch is mandatory if it is installed at less than one meter of the unit.

During the installation of the unit, only the side panel must be removed. The top panel shall not be removed at any time.

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), water circuit and water heat exchanger must be drained.

This unit is equipped with electrically powered safety measures. To be effective, the unit must be electrically powered at all times after installation, other than when servicing.

Figure 9: Power supply connection



Note: Recommended scredrivers for wiring
- 5 x 1 mm flat scredriver (power terminal block)
- 2 x 0.5 mm flat scredriver (control terminal block)

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 (see the tables of electrical data for the unit).

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-P units

30AWH-P	Max. connectable section(1)	Calculation favourable case: - Suspended aerial lines (standardised routing No. 17) - XLPE insulated cable			Calculation unfavourable case: - Conductors in conduits or multi-conductor cables in closed conduit (standardised routing No. 41) - PVC insulated cable, if possible		
	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	-
004 (1Ph)	3G10²	3G2.5²	50	H07RNF	3G2.5²	50	H07RNF
006 (1Ph)	3G10²	3G2.5²	40	H07RNF	3G4²	60	H07RNF
008 (1Ph)	3G10²	3G4²	50	H07RNF	3G4²	50	H07RNF
010 (1Ph)	3G10²	3G4²	40	H07RNF	3G6²	60	H07RNF
012 (1Ph)	3G10²	3G4²	40	H07RNF	3G6²	55	H07RNF
014 (1Ph)	3G10²	3G4²	40	H07RNF	3G6²	55	H07RNF
012 (3Ph)	5G4²	5G1.5²	50	H07RNF	5G4²	150	H07RNF
014 (3Ph)	5G4²	5G1.5²	50	H07RNF	5G4²	150	H07RNF
Accessory Remote WUI	Use cables H07RN-F 4x0,75 mm² 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.

2.4.3 - Cable entry and installation

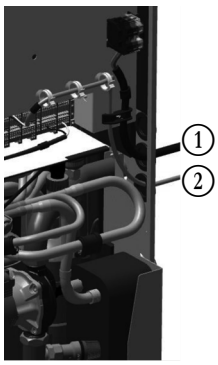
The power and customer control cables must be entered through the cable grommet from the rear panel of the unit as shown on the following illustrations.

When a ferrite is provided as an accessory, it must be installed on the main power cable, inside the unit casing, as close as possible from the cable entry.

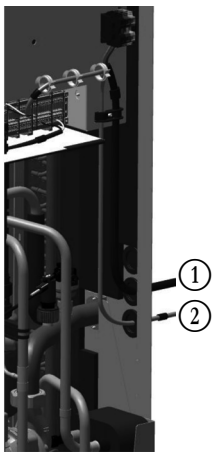
Important: take care to avoid any contact with potential sharp edges and refrigerant piping when wiring the cables. Cables must be attached in the locking system located next to the main terminal block.

Cable installation

4 - 10 kW



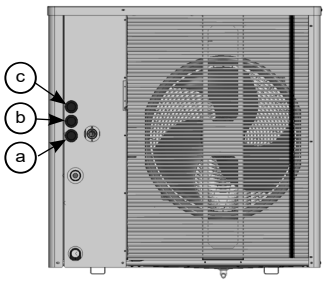
12 - 14 kW



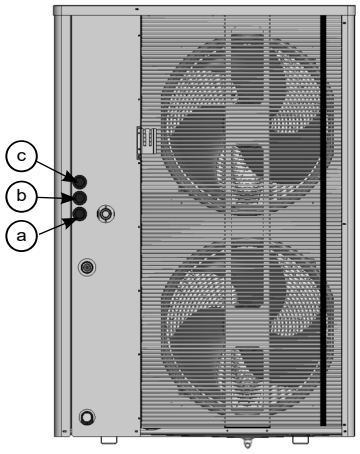
① Main power supply
② Customer external connection

Cable entries

4 - 10 kW



12 - 14 kW



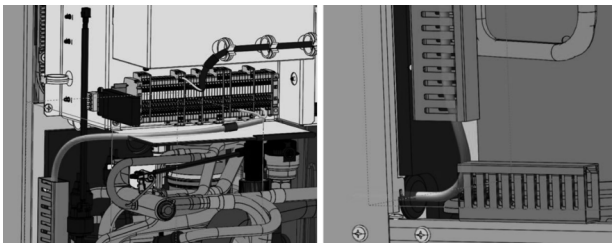
ⓐ Control cable entry
ⓑ Main power supply entry
ⓒ Additional control cable entry (if needed)

Condensate drain pan heater (Accessory)

When accessory base panel and condensate drain heater is installed, the cable must be routed inside the vertical cable trunking and through the dedicated grommet, as shown hereafter.

For wiring details, refer to the electrical drawing.

Base panel heater (cable routing)



2.4.4 - 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-P		004 (1Ph)	006 (1Ph)	008 (1Ph)	010 (1Ph)	012 (1Ph)	014 (1Ph)	012 (3Ph)	014 (3Ph)
Circuit breaker:									
Type		C	C	C	C	C	C	C	C
Current	A	16	20	25	32	32	32	20	20
Fuses:									
Type		gG	gG	gG	gG	gG	gG	gG	gG
Current	A	20	25	32	40	40	40	25	25

Electrical data and operating conditions notes:

- 30AWH-P 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.

NOTES:

- The operating environment for the 30AWH-P units is specified below:
  1. Physical environment(2). The classification of environment is specified:
  - 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.

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. All 30AWH-P 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-P 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
004	0,25	0,7	2,7
006	0,42	1,0	4,3
008	0,42	1,3	4,3
010	0,42	1,7	4,3
012	0,6	2,0	6,3
014	0,6	2,2	6,3

(1) Eurovent heating conditions

2.5.5 - Nominal system water flow control

The water circulation pumps of the 30AWH-P 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 ΔT (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°	With Variable Speed hydraulic module Adjustable constant speed	With Variable Speed hydraulic module ΔT
Cleaning procedure	**1**	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 this value to the graph of available external static pressure using the appropriate speed curve (Graphic 1).	
	4	If the flow rate corresponding is higher, decrease pump speed (1), and vice versa.	
	5	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	-
			330	Water Pump Speed	Activate the pump	0 to 100	0	100	%
			Wait approximately 2h that the hydraulic circuit is cleaned						
			330	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	-
			330	Water Pump Speed	Adjust water pump speed until obtain the expected design water flow (refer to Graphics 3 and 4).	0 to 100	0	?	%
			330	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 [P330]	%
	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	-
			329	Get Minimum Pump Speed	Launch the automatic procedure to get the minimum pump speed. Pump speed will be slowly increased until flow switch is closing. Par.567 ""Minimum Pump Speed"" will automatically be updated	0 to 1	0	1	-
			321	Quick Test enable	When the minimum pump speed is determined, exit of quick test mode	0 to 1	0	0	-

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.

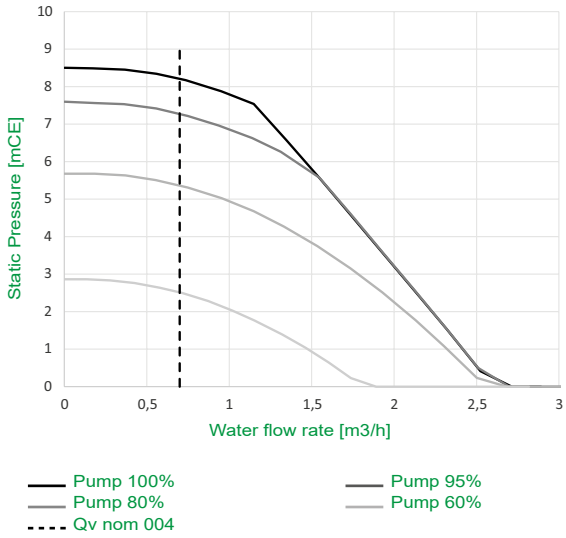
To reduce the pressure drops of the hydraulic system:

- 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.

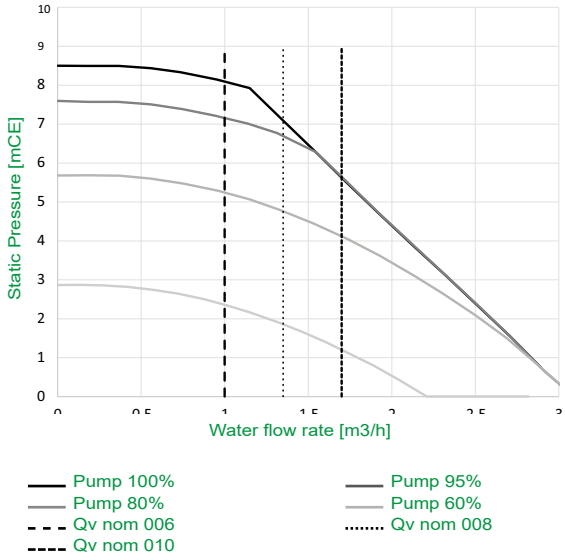
2.5.6 - Available external static pressure

Data applicable for fresh water application (20°C). If glycol is used, the maximum water flow is reduced.

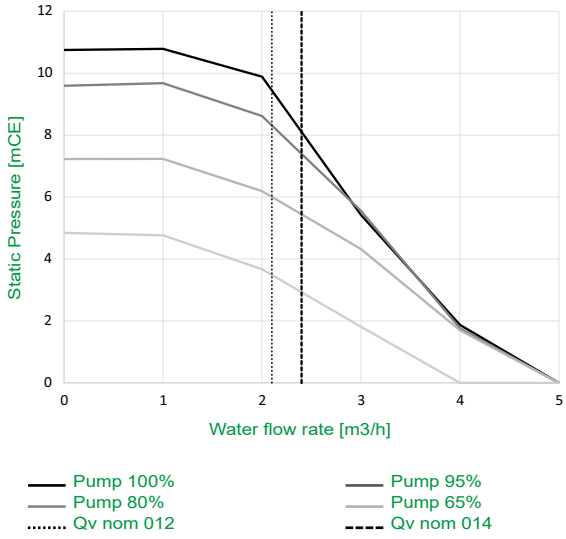
Available static pressure 30AWH004HP



Available static pressure 30AWH 006-008-010 HP



Available static pressure 30AWH 012-014 HP



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-P 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 sections 3.1 and 4.2.4)

- 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 rubber grommet.

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

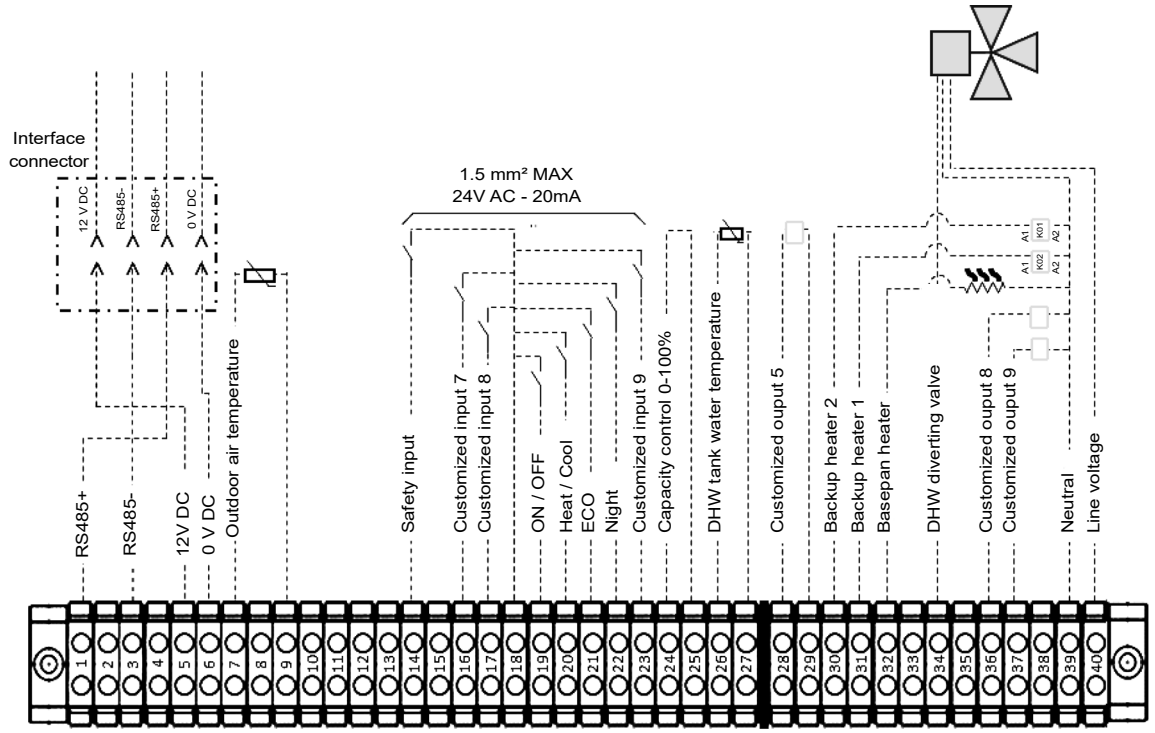
In this section, the general customer electrical connection is detailed as well as the main steps of configuration and examples of standard installation:

- 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 remote OAT sensor.

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

3.1 - General customer electrical connection on terminal block



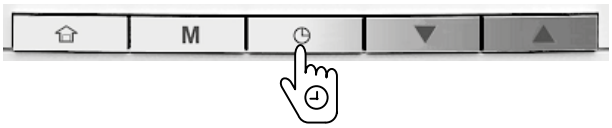
3.2 - First step of configuration: Setting the time and day

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.

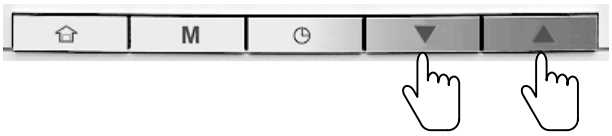
To access the time configuration menu, press and hold the **Schedule** key for 2 seconds.



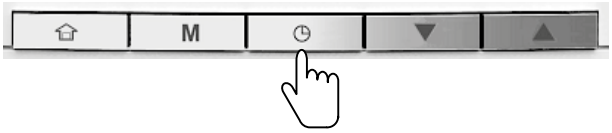
3.2.1 - Day of week setting

The current day starts flashing.

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



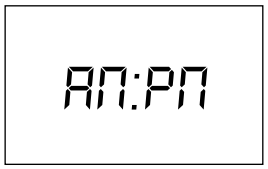
Press the **Schedule** key to confirm your selection and go to the next parameter.



3.2.2 - Time format setting

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

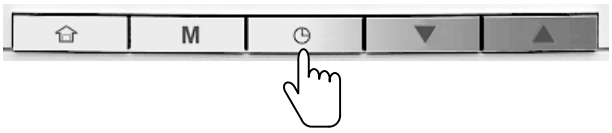
Press the **Down** key or the **Up** key to change the time format.



12-hour format

24-hour format

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



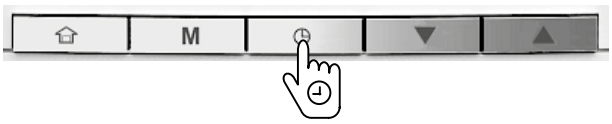
3.2.3 - Time setting

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.



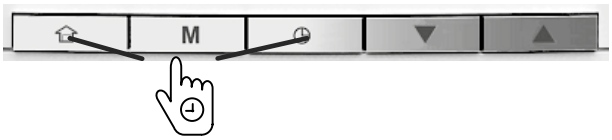
3.3 - Second step of configuration: Parameter menu

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

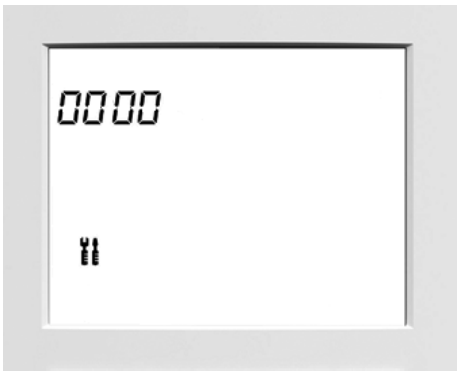
If the user interface is in standby mode, press one key to activate the WUI screen.

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



The password screen is displayed.

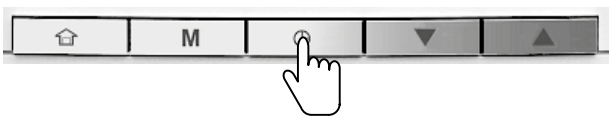
Figure 10: Password screen



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.

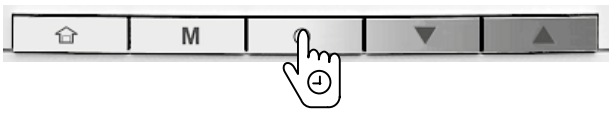
Select the Parameter Number with the **Up** or **Down** key. Scroll until the required parameter is reached.

b - Second possibility

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

3.3.3 - To change a setting

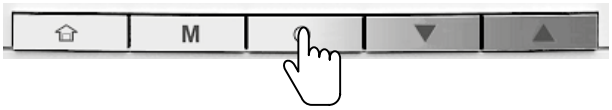
Press and hold the **Schedule** key for 2 seconds.



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.



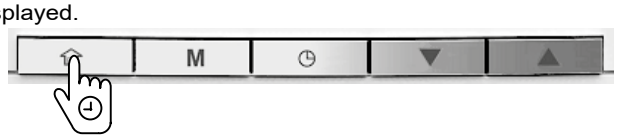
Repeat these steps for each digit of the setting.

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).

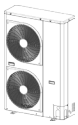
3.3.4 - To exit the parameter menu

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



3.4 - Installation with electrical booster heaters

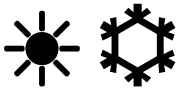
This installation could be composed of:



30AWH-P

With integrated hydraulic kit (variable speed)

With Remote User Interface

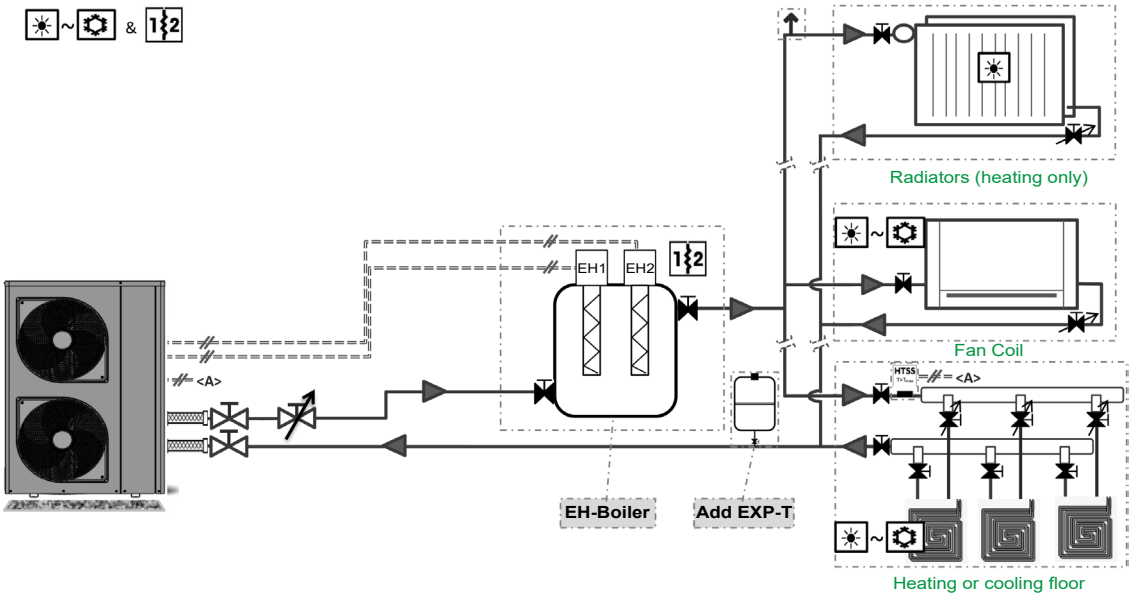


Cooling Mode
Heating Mode

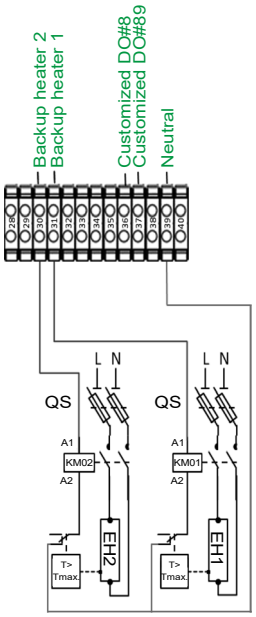
Up to three electrical booster heaters

IMPORTANT:
For more information, refer to §4.2.8 Electric Heaters.

3.4.1 - Standard installation



3.4.2 - Electrical connection



3.4.3 - Control configuration steps

Steps	Table	Par.	Designation	Description	Range	Default	Ex.	Unit
Set Booster stages	BCK_CONF	**601**	Backup Type	0 = No backup 1 = Booster by 1 Electrical Heat Stage (EH1) 2 = Booster by 2 Electrical Heat Stages (EH1/EH2) 3 = Booster by 3 Electrical Heat Stages with 2 outputs (EH1/EH2) 4 = Booster by 3 Electrical Heat Stages with 3 outputs (EH1/EH2/EH3) 5 = Backup by Oil or Gas Boiler	0 to 5	0	2	-
		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	2	°C
	GEN_CONF	**505 or 506**	Customized DO#8 Config	11: electric heater satge #3	0 to 13	0	11	-
			Customized DO#9 Config					-

3.5 - Unit with remote user interface

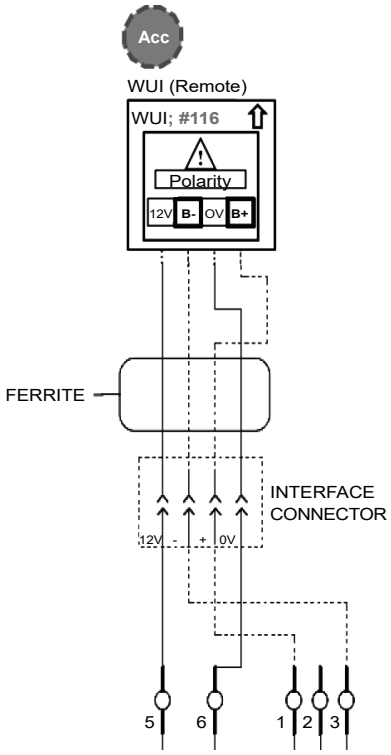
The user interface is an accessory and must be installed indoors by the installer.

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.***

3.5.1 - Electrical connection

Figure 11: Electrical connection of remote interface



3.5.2 - Control configuration steps

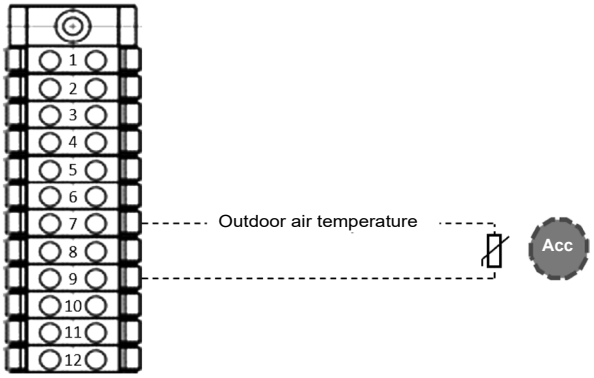
N°	Steps	Table	Par.	Designation		Description	Range	Default	Ex.	Unit	Access	Check
1	Check that the unit is configured in Remote Interface	UI_CONF	521	User Interface Type		0 = No User Interface 1 = Remote control by contacts or SUI 2 = WUI remotely installed in the house	0 to 2	0	2	-		
		Check on WUI screen 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		
			426	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	-		
			409	Heat Curv Max Stp Offset		Maximum hot 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	-		
			410	Cool Curve Min Stp Offset		Minimum cold 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 75,0	45	50	°C		
			402	Heat Sleep Offset		Water offset for heating mode when Occupancy mode = Sleep	-20,0 to 0,0	0,0	-5	°C		
			403	Heat Away Offset		Water offset for heating mode when Occupancy mode = Away	-20,0 to 0,0	-5,0	-10	°C		
			586	Cool Clim Curv Select		Cooling climatic curve select	-1 to 2	0	-1	-		✓
			404	Cool Home Setpoint		Water setpoint for cooling mode when Occupancy mode = Home	5,0 to 20,0	12	18	°C		
			405	Cool Sleep Offset		Water offset for cooling mode when Occupancy mode = Sleep	0,0 to 10,0	0	2	°C		
			406	Cool Away Offset		Water offset for cooling mode when Occupancy mode = Away	0,0 to 10,0	5	5	°C		

N°	Steps	Table	Par.	Designation	Description	Range	Default	Ex.	Unit	Access	Check
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 75,0	38	38	°C		
			409	Heat Curv Max Stp Offset	Maximum hot 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 mode 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		
			410	Cool Curve Min Stp Offset	Minimum cold 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		

3.6 - Remote OAT sensor

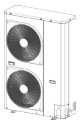
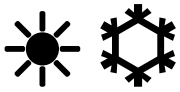
If the unit is unfavorably located, leading to incorrect reading of OAT, it is possible to install a remote outdoor air temperature sensor, located in an appropriate position, instead of the factory mounted OAT sensor. This sensor is available as an accessory (refer to §1.6 Accessories). For more details on its installation, refer to accessory document.

Figure 12: Electrical connection of OAT sensor



3.7 - Master/Slave installation

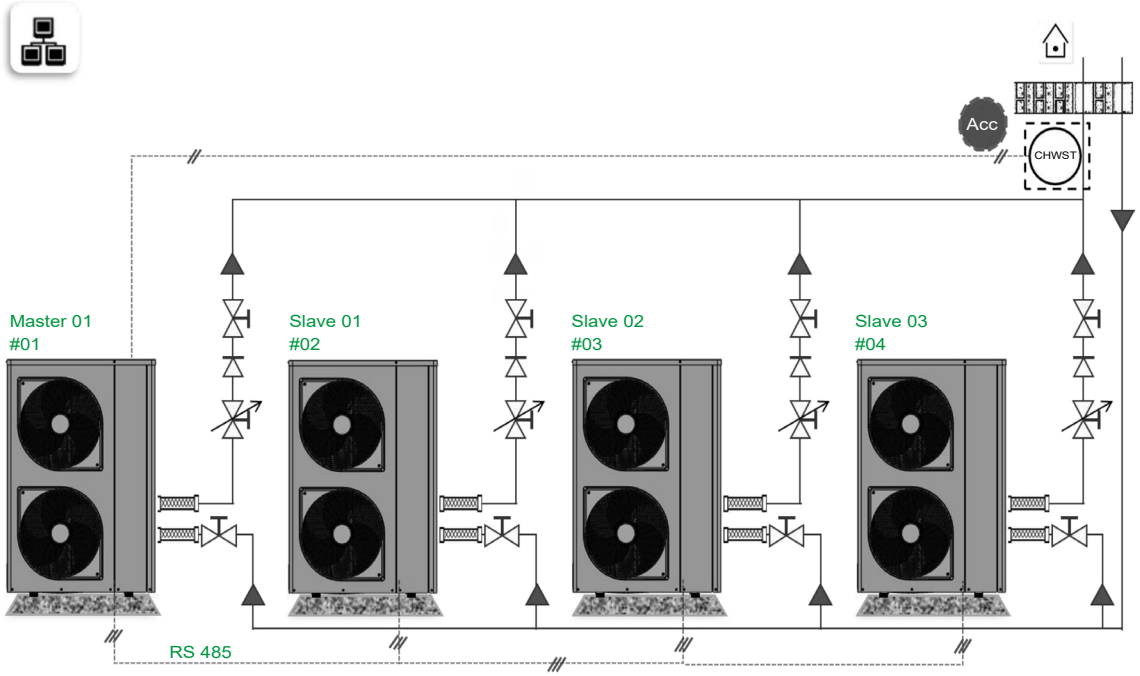
The installation could be composed of:

	30AWH-P (same size for master and slaves)
	With integrated hydraulic kit (variable speed)
	With Remote User Interface (master only)
	Cooling Mode Heating Mode
Available accessories (if ordered)	Master/Slave leaving water temperature sensor (to be connected on Master unit)

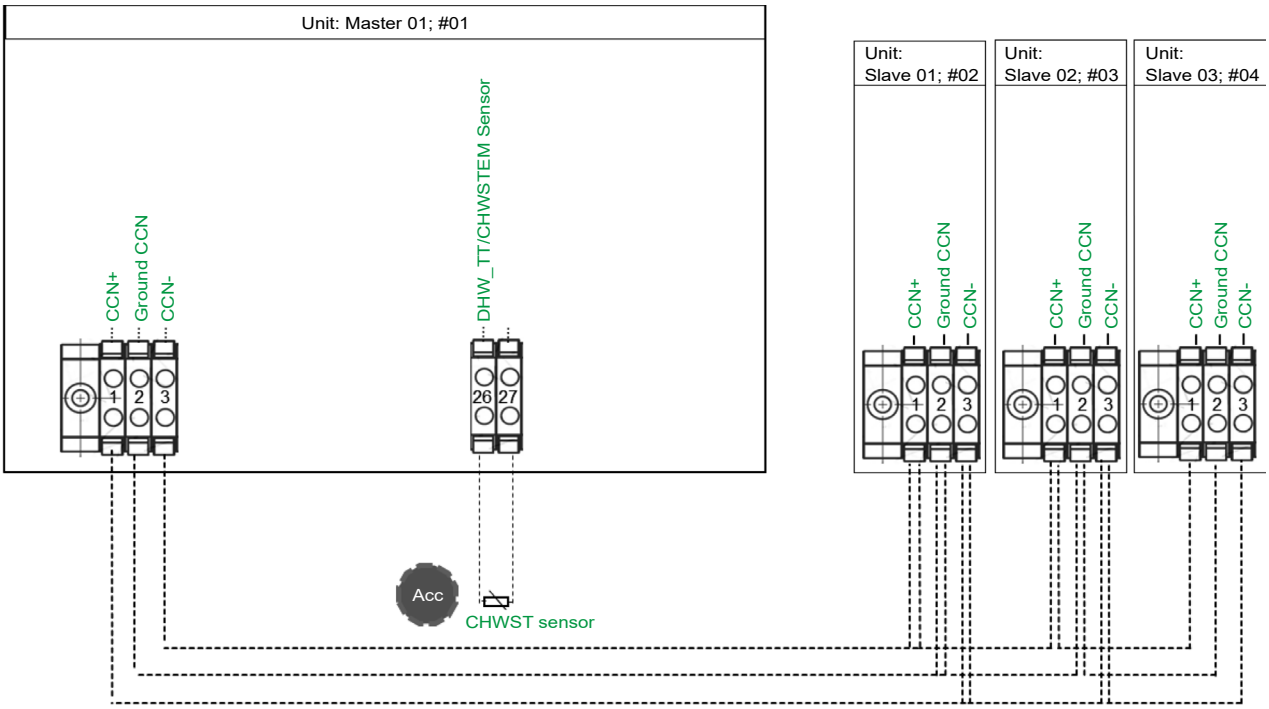
IMPORTANT:

For more information, refer to §4.2.15 Master/Slave.

3.7.1 - Standard installation

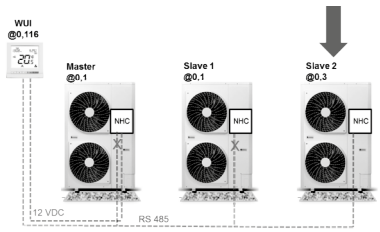
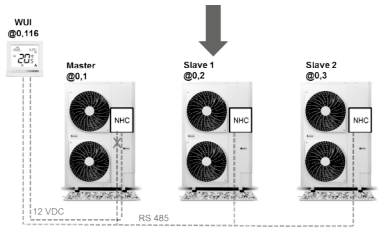
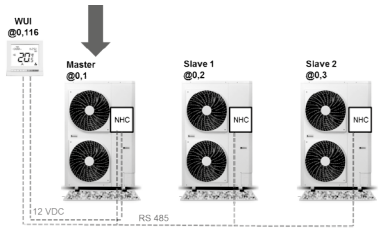
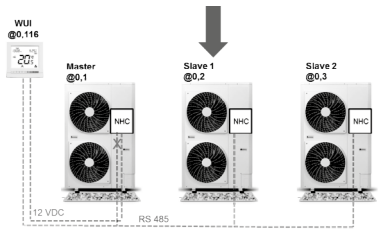


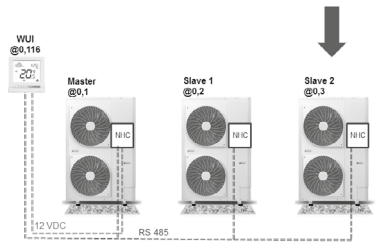
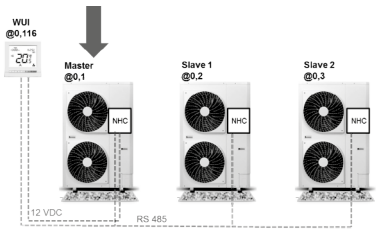
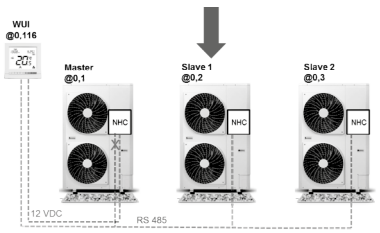
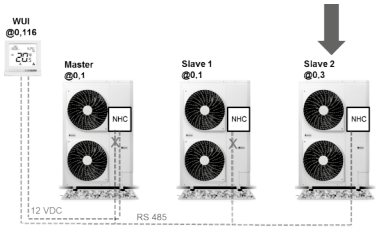
3.7.2 - Electrical connection



3.7.3 - 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)	0 to 2	0	1	-

N°	Steps	Figure	Table	Par.	Designation	Description	Range	Default	Ex.	Unit
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)	0 to 2	0	1	-
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 § 3.7.3-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.

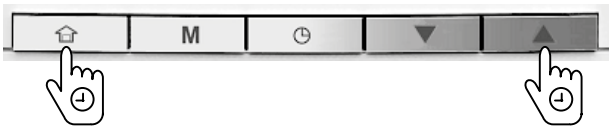
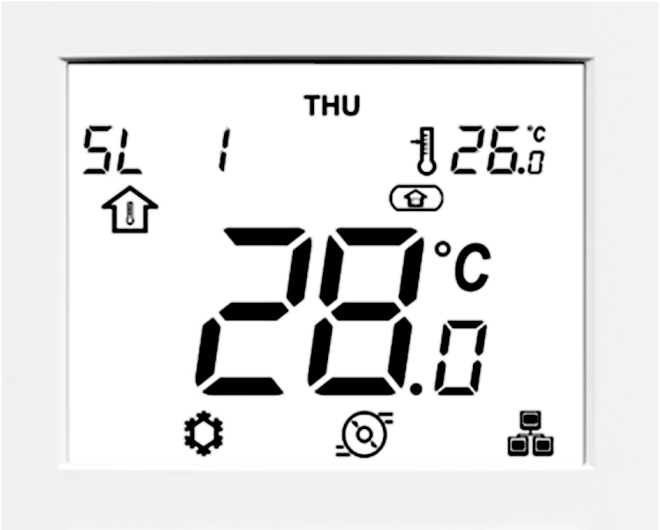


Figure 17: WUI screen for Slave 1

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



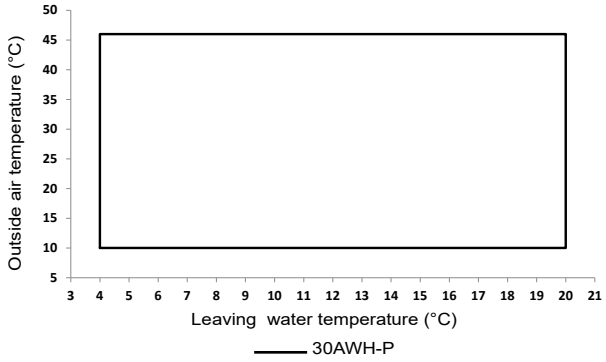
To finish the commissioning, it is necessary to configure setpoint according to the user interface configuration

4.1 - Unit range - 30AWH-P

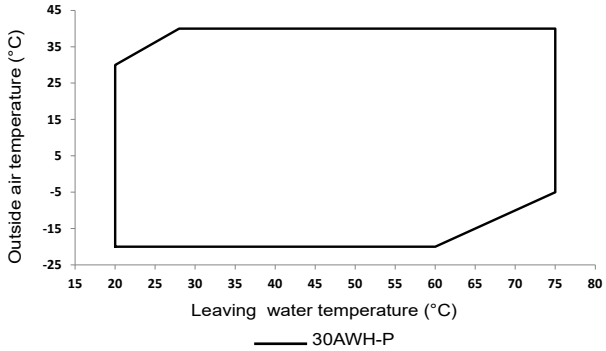
Cooling Cycle			
Evaporator Water Temperature	**°C**	**Minimum**	**Maximum**
Entering water temperature at start-up		7	30
Leaving water temperature during operation		4	20
Condenser Air Temperature	**°C**	**Minimum**	**Maximum**
Standard unit		10	46
Heating Cycle			
Condenser Water Temperature	**°C**	**Minimum**	**Maximum**
Entering water temperature at start-up		15	70
Leaving water temperature during operation		20	75
Evaporator Air Temperature	**°C**	**Minimum**	**Maximum**
Standard unit		-20 (1)	40

(1) 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.

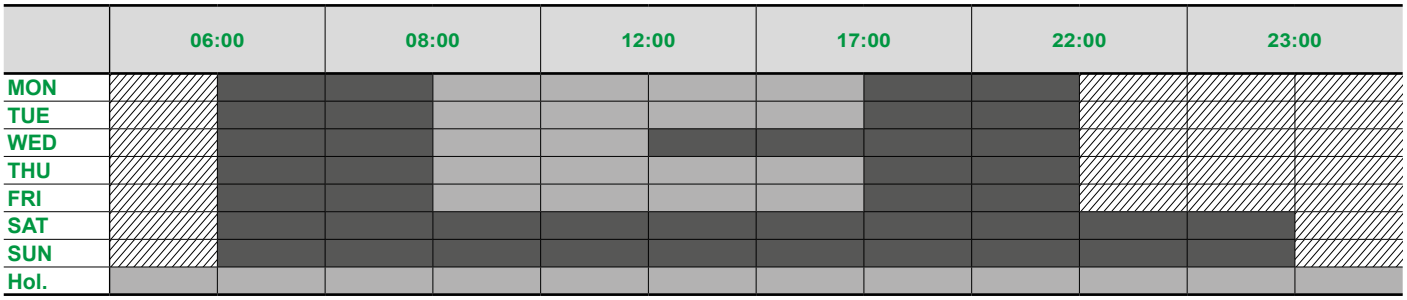
The unit may operate in HOME, SLEEP, or AWAY mode. The occupancy can be set manually by the user or automatically according to the schedule (refer to WUI end user manual or Ocuppancy schedule parameters (P670 to P696, see § 7.1).

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.

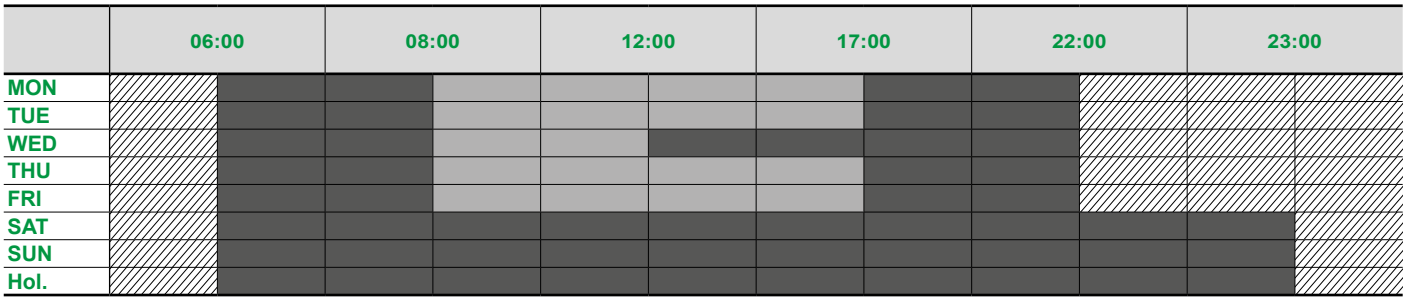
Example #1 of Occupancy scheduling

Step nb	Day of week and holyday								Start time	Occupancy		
	MON	TUE	WED	THU	FRI	SAT	SUN	Hol.		Home	Sleep	Away
1	X	X	X	X	X	X	X		02:30	X		
2	X	X	X	X	X				15:00			X
3			X						12:00	X		
4	X	X		X	X				17:00	X		
5	X	X	X	X	X				22:00		X	
6						X	X		23:00		X	
7								X	00:00			X
8									00:00			



Example #2 of Occupancy scheduling

Step nb	Day of week and holyday								Start time	Occupancy		
	MON	TUE	WED	THU	FRI	SAT	SUN	Hol.		Home	Sleep	Away
1	X	X	X	X	X	X	X	X	06:00	X		
2	X	X	X	X	X				08:00			X
3			X						12:00	X		
4	X	X		X	X				17:00	X		
5	X	X	X	X	X				22:00		X	
6						X	X	X	23:00		X	
7									00:00			
8									00:00			



Home
Away
Sleep

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 increased compressor frequency.
- **Purge**: Water pump is requested to run in order to purge the hydraulic circuit.

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.

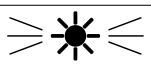
In the following sections of this document,the configuration steps are the same for all of these three communication methods, except when the configuration is described with WUI direct access.

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 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 closed - Heating mode = contact opened
Normal/Eco (remote)	Used to select (if no user interface): - Home mode = contact opened - Away mode = contact closed
Day / Night (remote)	Used to select (if no user interface): - Day mode = contact opened - Night mode = contact closed
Safety Switch	This contact should be a 'normally closed' type
Power limitation Contact (1)	Used to reduce the compressor maximum frequency to avoid noise or lower consumption
Off Peak Contact (1)	This switch is to close when the rate electricity price is high (Electric Heat Stages are not allowed)
Loadshed Request Switch (1)	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 (1)	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 (1)	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) (1)	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
DHW Timed Override Button (1)	DHW Timed Override Hour [P720] is increased of one hour at each pulse (falling edge). If value exceeds 24 hours, it returns to 0. If switch remains active for more than 5 seconds, DHW is allowed to run regardless of schedule
Anti-Legionella Cycle Request Button (1)	When the status of this input goes from open to closed, the Domestic Hot Water production is requested with the Anti-Legionella setpoint
External Alarm Indication Input (1)	When this input is opened, alarm is tripped. This alarm is for information only, it does not affect the unit operation.
Boost Mode Request Switch (1)	When the status of this input goes from open to closed, the unit is switched to boost mode

(1) Customized input (DI#07 to #09), parameters [P501] to [P503]

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)

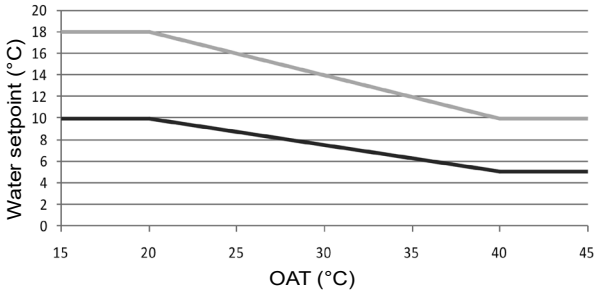
1/ Predefined climatic curves

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

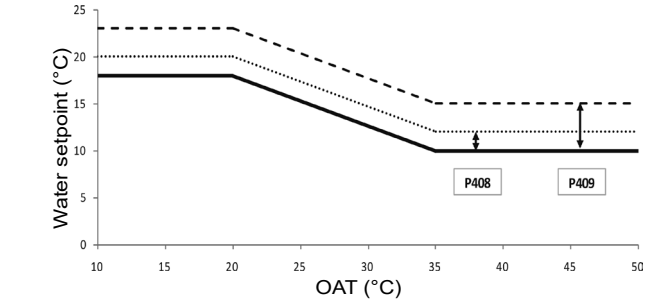
Cooling Climatic Curves



- 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 [P425] and Cool Away Offset [P426]:

Cooling Climatic Curve in function of occupancy mode



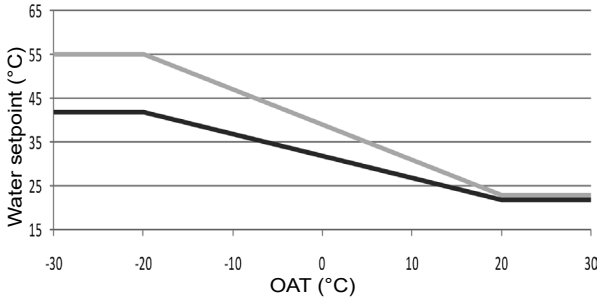
HEATING: If the heating climatic curve [P581] is configured to a parameter from "1" to "12", the water setpoint will be calculated according to the selected heating climatic curve.

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)

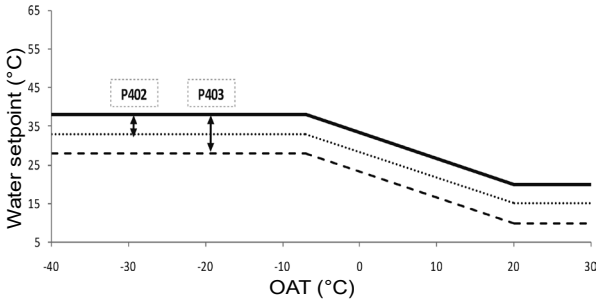


K7
K8

- 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 [P422] and Heating Away Offset [P423]:

Heating Climatic Curve in function of occupancy mode



Home
Sleep
Away

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 20°C	Cool Home Setpoint [P404]	5 to 20°C
	Cool Sleep Setpoint		Cool Sleep Offset [P405]	0 to 10°C
	Cool Away Setpoint		Cool Away Offset [P406]	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 75°C	Heat Home Setpoint [P401]	20 to 75°C
	Heat Sleep Setpoint		Heat Sleep Offset [P402]	-10 to 0°C
	Heat Away Setpoint		Heat Away Offset [P403]	-10 to 0°C

3/ Custom climatic curve

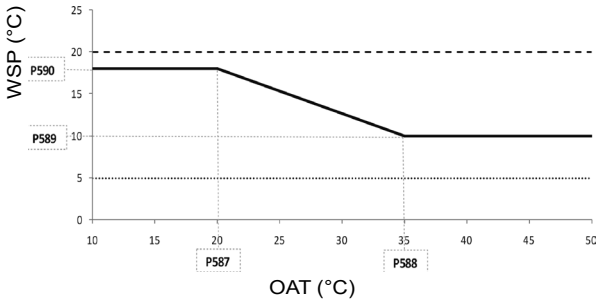
COOLING: If the cooling climatic curve [P586] is configured to “0”, the water setpoint will be calculated according to the custom cooling climatic curve.

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	20°C
P590	Custom Maximum Water Temp	18°C	5°C	20°C

Example:

Custom Cooling Climatic Curve



Default
min
max

- 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].

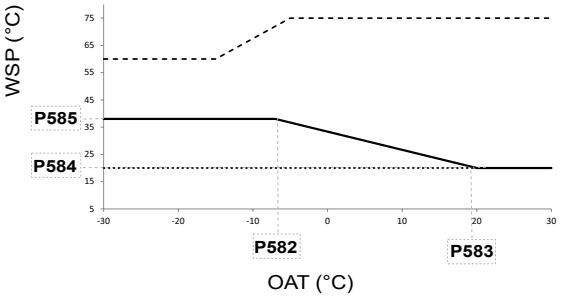
HEATING: If the heating climatic curve [P581] is configured to “0”, the water setpoint will be calculated according to the custom heating climatic curve.

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	75°C

Example:

Custom Heating Climatic Curve



Default
min
max

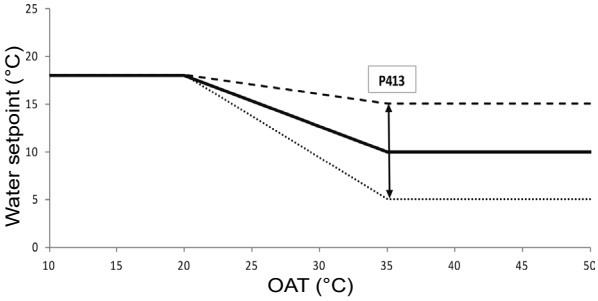
- If OAT is invalid, the Water Setpoint is equal to the Custom Max. Water Temp [P585].
- If OAT is above the current Maximum OAT threshold, the Water Setpoint is equal to the Custom Min. Water Temp [P584].
- If Min. OAT is greater or equal to Max. OAT threshold, the Water Setpoint is equal to the Custom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

4/ Offset on climatic curves (predefined and customer)

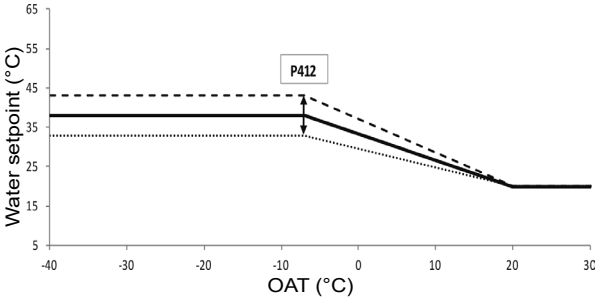
Two other parameters are also configurable to adjust water setpoint to suit customer needs:

- For cooling curve, Cool Minimum Water Setpoint [P589]can be offsetted by an offset on foot of the curve (Cool Curve Min Stp Offset [P410])
- 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 [P409])

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-P, 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) [P514] + 6°C, the pump runs for 1 minute every 15 minutes at maximum speed.
- If OAT goes below AntiFreezeDeltaSetpoint(1) [P514] + 6°C and EWT or LWT goes below AntiFreezeDeltaSetpoint(1) [P514] + 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 and for 1 minute after defrost end.
- The electric heaters are energized if OAT is below the AntiFreezeDeltaSetpoint(1) [P514] + 6.0 °C and if either EWT or LWT are lower than AntiFreezeDeltaSetpoint(1) [P514] + 4.0 °C.
- The electric heaters are de-energized if OAT is above the AntiFreezeDeltaSetpoint(1) [P514] + 7.0 °C or if both EWT (if configured) and LWT are higher than AntiFreezeDeltaSetpoint(1) [P514] + 4.5 °C.
- The electric heaters are energized if either alarm #50 or alarm #51 is active and can still automatically be reset

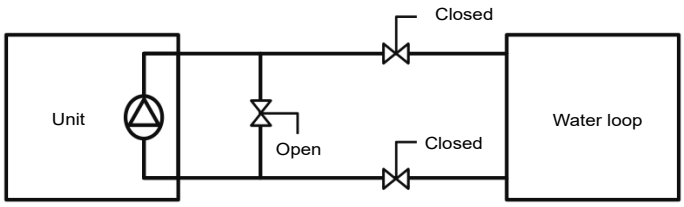
(1) Modifying the pre-configured value is at the user's responsibility.

Steps	Table	Par.	Designation	Description	Range	Default	Ex.	Unit
Define the criteria to activate the water freeze protection	GEN_CONF	**514**	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 13: Winter position for unit with 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.***
- ***The manipulation of glycol must be done according to the best practices. Be sure to wear clothing protection while manipulation glycol.***
- ***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 - Electric Heaters

NOTE:

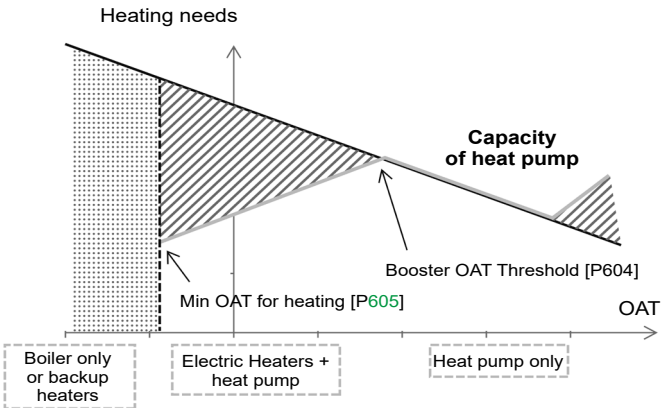
The installer is responsible for ensuring that the installation complies with the applicable legislation in terms of electrical and thermal safety.

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 [P605] (backup OAT Threshold), the heat pumps is stopped, and the electric heaters can be activated.

Figure 14: 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 discrete output: EH1.
- Two electric heat stages with two discrete outputs: EH1 and EH2.
- Three electric heat stages with two discrete outputs: EH1 and EH2.
- Three electric heat stages with three discrete outputs: EH1 and EH2 and EH3.

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

4.2.9 - 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 [P605] or in case of heat pump failure.

Characteristics (for DO#08/#09)	Contactor Coil: 230 VAC 50Hz
Characteristics (for DO#05)	Free potential contact

4.2.10 - 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.

4.2.11 - 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.

4.2.12 - 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.

4.2.13 - 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	%
		515	Night Mode Start Time	Hour of starting up of night mode	00:00 to 23:59	0:00	23:00	hh:mm
	GEN_CONF	**516**	Night Mode Stop Time	Hour of stop of night mode	00:00 to 23:59	0:00	7:00	hh:mm

4.2.14 - Domestic Hot Water

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.

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 [P705].

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 parameter must be set:

- Anti-Legionella Setpoint [P412] (anti-legionella protection is stopped when the water temperature reaches the pre-set temperature)

e - DHW limitation mode

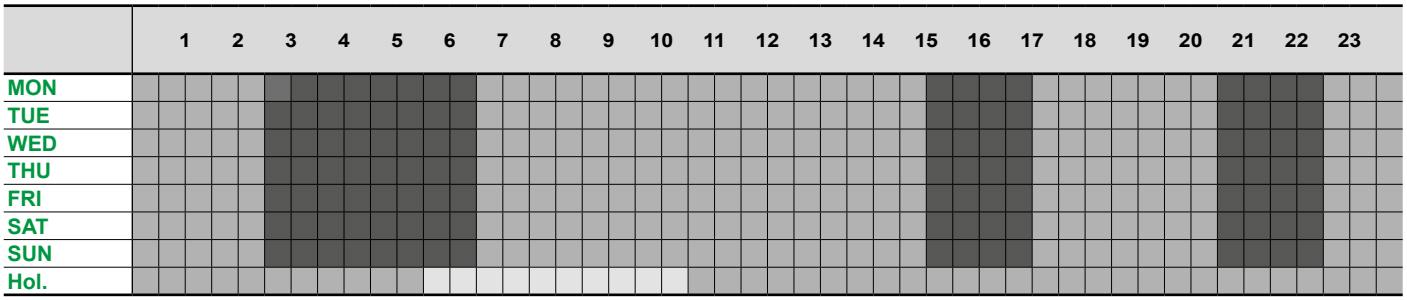
DHW limitation mode [P543] reduces noise levels, by reducing the compressor frequency when DHW mode is active.

f - DHW schedule

Refer to WUI end user manual or DHW schedule parameters (P720 to P732, see § 7.1)

Example of DHW scheduling

Step nb	Day of week and holyday								Start time	End time
	MON	TUE	WED	THU	FRI	SAT	SUN	Hol.		
1	X	X	X	X	X	X	X		02:30	06:30
2	X	X	X	X	X	X	X		15:00	17:00
3	X	X	X	X	X	X	X		20:30	22:30
4								X	06:00	10:00



DHW regular setpoint
DHW Eco Setpoint
Anti-legionella
Space heating/cooling

4.2.15 - 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 4 kW units or all 12 kW units, but not a mix of different sizes).

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 § 3.7 Master/Slave installation
Configuration	- Refer to § 3.7 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.

4.2.16 - Pump configuration

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

Different control logic for main pump

Par.	Definition	Value	Off Mode	Cool/Heat Satisfied	Cool/Heat Demand
510	Control On Air	Yes	Off	According to IAT vs Air Setpoint	On
561	Pump On When Satisfied	No			
510	Control On Air	Yes	Off	On	On
561	Pump On When Satisfied	Yes			
510	Control On Air	No	Off	Off (On for water sampling)	On
561	Pump On When Satisfied	No			
510	Control On Air	No	Off	On	On
561	Pump On When Satisfied	Yes			

If a secondary hydraulic loop is used, this will have its own additional pump. A discrete output can control a contactor (not supplied with unit)

Characteristics	Contactor coil: 230VAC - 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).

Different control logic for additional pump

Additional Pump Logic [P572]	OFF Mode	Cool/Heat		Boiler		DHW	
		Satisfied	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.

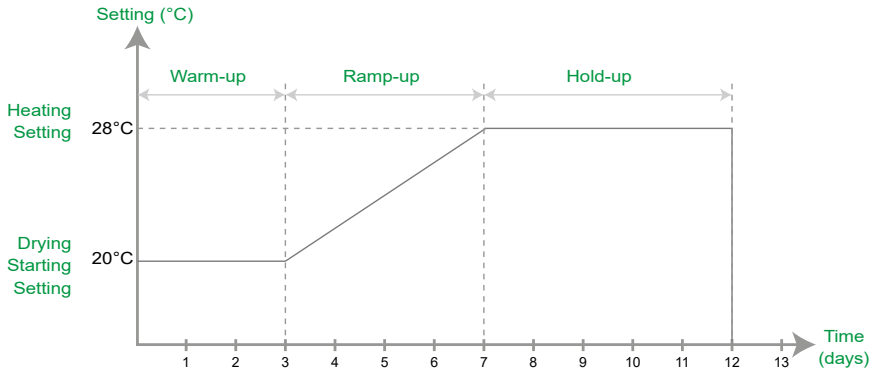
4.2.17 - Drying mode

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 15: Activation and configuration for drying mode

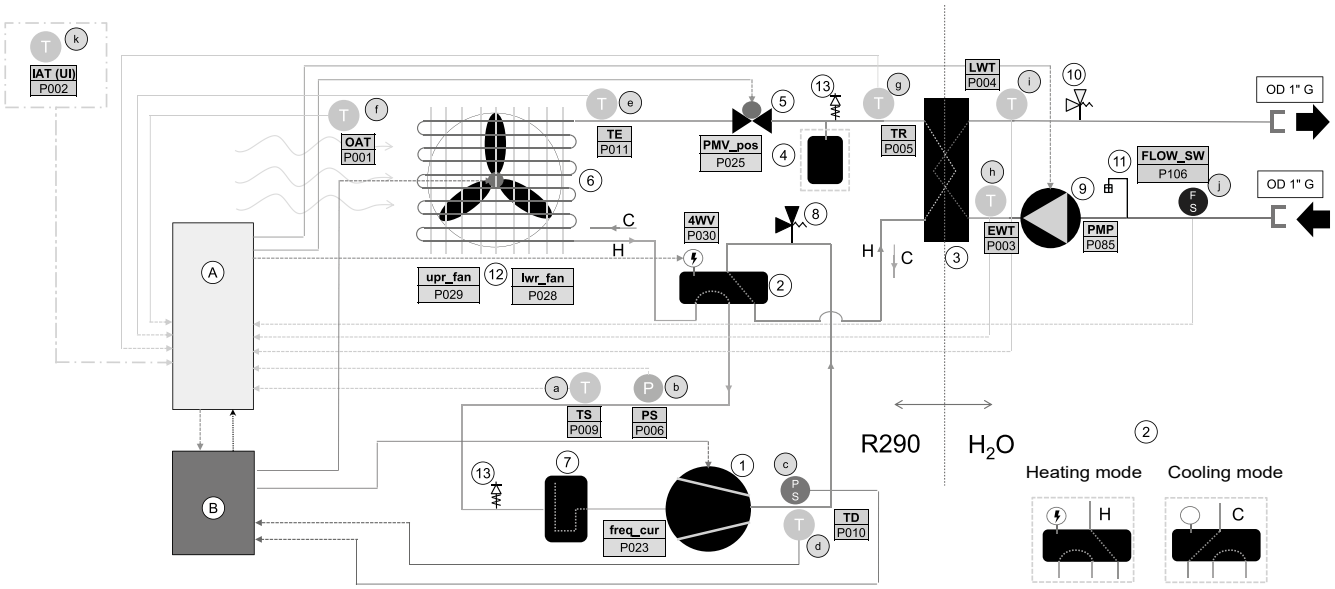


The Drying Mode will be deactivated after 12 days and the unit will switch to Off Mode.

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)				

4.3 - Major system components

4.3.1 - General – Refrigerant part



Components

1. Twin rotary compressor
2. 4-Way valve
3. Brazed Plate Heat Exchanger
4. Receiver (008-010-012-014)
5. Electronic expansion valve
6. Round Tube Plate Fin coil
7. Accumulator
8. Burst disk
9. Variable-speed water pump circulator
10. Safety valve
11. Air vent
12. Fan (one or two)
13. Schrader valve (1/2 UNF)

Electronics Boards

A NHC (Carrier main control board)
B Inverter

Sensors & Safety devices

a TS Suction temperature sensor
b Low pressure transducer
c HP switch
d TD (discharge) (connected to inverter input)
e TE (defrost temp)
f OAT (outside ambient temperature)
g TR
h Entering water temperature
i Leaving water temperature
j Flow switch
k IAT (indoor ambient temperature, if applicable)

IAT Software point
P001 Value read under “parameter number”

4.3.2 - Compressors

30AWH-P 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.

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-P 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 applicable regulation, the table below shows the Ecodesign requirements for fans driven by motors with an electric input power between 125 W and 500 kW

30AWH-P		008 - 010 - 012 - 014
Overall efficiency	%	41,3
Measurement category		A
Efficiency category		Static
Target efficiency level ERP2015		N(2015) 40
Efficiency level at the optimum efficiency point		52,6
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		UM100570A
Nominal power of the motor	kW	0,16
Flow rate	m^3/s	0,97
Pressure at optimum energy efficiency	Pa	58,6
Nominal speed	rpm	950
Specific ratio		1,001
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-P 004 and 006 models are not concerned with this table because their fans have an input power lower than 125 W.

4.3.5 - Pulse Motor Expansion Valve (PMV)

The PMV is equipped with a stepper motor (0-500 pulses).

4.3.6 - 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 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 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.**

4.3.7 - Refrigerant

30AWH-P units operate with refrigerant R-290.

4.3.8 - Receiver

30AWH-P 012 and 014 units are equipped with mechanically welded storage tanks that stores the excess refrigerant when the unit operates in heating mode.

4.3.9 - Four-way valve

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

4.3.10 - Inverter subassembly for compressor and fans

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

4.3.11 - Accumulator

The 30AWH-P 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.

5.1 - 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.

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 (electronic leak detector). 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.

Ensure that the outlet of the vacuum pump is not close to any potential ignition source and that ventilation is available.

It is also mandatory to flush the circuit twice with dry nitrogen to evacuate all the remaining refrigerant.

Before starting the maintenance operation, make sure to have a proper lightening of the entire unit. It is also mandatory to conduct a leak detection before opening any panel and a leak detection after opening the panels.

Make sure that the fan grid protection and top panels are properly installed and attached before powering up the unit.

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.

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 (cable wear, rust, plugged water drain...),

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 verify that the power circuit electrical connection are well attached with the spring connector.
- Check and verify that the control/command electrical connection are well attached with the spring connector.
- 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.
- Check continuity of earth bonding
- Check that cabling is not subject to wear

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 water pump bearing after 17500 hours of operation with water and the water pump 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.
- 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.

Always note that any contact with refrigerant can lead to a cold burn.

Any detected leaks must be repaired immediately.

Do not overfill cylinders (no more than 80% volume liquid charge)

Do not exceed the maximum working pressure of the cylinder, even temporarily. In case of decomissioning, recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.

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.

If a fault exist that could compromise safety, then no electrical supply shall be connected to the circuit until it is repaired. Before recharging the system, it shall be pressure-tested with the appropriate purging gas. A follow up leak test shall be carried out prior to leaving the site. Always charge the system with the refrigerant mass indicated on the nameplate.

NOTE:

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimised. For repair to the refrigerating system, the following points shall be completed prior to conducting work on the system.

Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants.

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO_2 fire extinguisher adjacent to the charging area.

No person carrying out work in relation to a refrigerating system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

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

Every electrical connection use a spring terminal block meaning that there is no tightening torque specification, excepted those given below.

Be sure to use ferrules at the end of every clable to avoid any short circuits.

Screw Type	Utilisation	Value (N.m)
Protective earth screw and grounding	DIN rails (x4) and PE cables (x2)	3,0
Transformer 230/24Vac	Primary and secondary connections	0,5
Self tapping screw	Sheet metal parts, deflector assembly on front panel & electrical components	3,0
Plastic screw	Plastic grid	5
Nut M5 left thread	Fan propellers assembly on fan motor	5
Screw M5x30	fan motor	5
Nut M6	BPHE (single-fan units)	45
Nut M8	BPHE (dual-fan units) & Receiver fixing	45
Nut M8	Compressor fixing to base pan	10,5
Nut M5	Compressor terminal plug	1,5
Obus schrader valve	Piping	0,35
Cap schrader valve	Piping	2
Nuts water piping	Water pump inlet and outlet pipe connections	40

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:

- 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 most 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. After the 5 minutes, check that there are no of the inverter LED are lit before working on the VFD. 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-P 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-290

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	143	12	572	44	1399
-19	152	13	591	45	1433
-18	161	14	610	46	1468
-17	171	15	630	47	1503
-16	180	16	650	48	1539
-15	190	17	671	49	1575
-14	200	18	692	50	1612
-13	211	19	713	51	1650
-12	222	20	735	52	1688
-11	233	21	757	53	1727
-10	244	22	780	54	1766
-9	256	23	803	55	1806
-8	267	24	827	56	1847
-7	280	25	851	57	1888
-6	292	26	875	58	1930
-5	305	27	900	59	1972
-4	318	28	926	60	2015
-3	331	29	951	61	2059
-2	345	30	978	62	2104
-1	359	31	1005	63	2149
0	373	32	1032	64	2195
1	388	33	1060	65	2242
2	403	34	1088	66	2289
3	418	35	1117	67	2337
4	434	36	1146	68	2386
5	450	37	1176	69	2435
6	466	38	1206	70	2485
7	483	39	1237	71	2536
8	500	40	1268	72	2588
9	517	41	1300	73	2641
10	535	42	1332	74	2694
11	553	43	1365	75	2748

The units use high-pressure refrigerant (compatible with the use of propane R-290). Special equipment must be used when working on the refrigerant circuit (pressure gauge, charge transfer, etc.).

The units use high pressure R-290 refrigerant (propane). The unit operating pressure is above 20 bar when the outside air temperature is 35 °C.

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-290 into atmosphere.**

6.1 - Alarm listing

The following tables of alarms list their probable cause and the likely effect on the unit, as well as the reset type. Proposed investigations and corrective actions shall be performed by fully qualified technician.

Table 6: Alarms listing

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.
10	Discharge Temperature (TD) sensor failure	Stop	X	X	Error becomes definite after retrying operation for 4 times.	1. Check discharge temp. sensor (TD). 2. Check inverter connection
11	Air Exchanger Temperature (TE) sensor failure	Stop	X	X	Error becomes definite after retrying operationfor 4 times.	1. Check temp. sensor (TE).
14	Suction Temperature (TS) Sensor failure	Stop	X	X	Error becomes definite after retrying operation for 4 times.	1. Check suction temp. sensor (TS).
16	TE & TS sensors wrongly connected or PMV failure	Stop	X	X	Error becomes definite after retrying operation for 4 times.	1. Check temp. sensor (TE, TS) 2. Check PMV (expansion valve) electrical connexion
17	Suction Pressure transducer failure	Stop	X	X	Error becomes definite after retrying operation for 4 times.	1. Check suction pressure. sensor (PS).
20	Loss of communication with UI	Continue	X		When a new message is received from the UI	
21	Loss of communication with Inverter	Stop	X		When a new message is received from the Inverter	
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	Stop	X		When Safety Input is closed	
32	Flow Switch failure	Stop		X	Error becomes definite after retrying operation for 5 times.	
33	High Pressure Switch failure	Stop	X		Error becomes definite after retrying operation for 3 times.	1. Ensure that water flow rate is sufficient and fan operation is normal 2. Check PMV operation 3. Check high pressure switch electrical connection
40	Leak detection alarm		X		When value returns within correct range	
41	Low Superheat failure	Stop	X		When value returns within correct range	
42	Compressor not started	Stop	X			1. Stop and disconnect the unit 2. Check compressor connection
43	Drive unconfigured	Stop	X		Drive configuration completed	
44	Four-way Valve failure	Stop	X		When value returns within correct range	1. Check operation of 4-way valve 2. Check 4-way valve coil and connection 3. Check TE, TS, TR, EWT and OAT sensors
45	Lower Fan not started	Stop	X		Power cycle after more than 5 occurrences in 1 hour	1. Stop and disconnect the unit 2. Check fan motor connection 3. Check if impeller is not blocked
46	Upper Fan not started	Stop	X		Power cycle after more than 5 occurrences in 1 hour	1. Stop and disconnect the unit 2. Check fan motor connection 3. Check if impeller is not blocked

6 -ALARM DESCRIPTION

Current Alarm [P350] to [P354] Past Alarm [P360] to [P364]	Description	Unit Status	Reset type			Investigation / corrective actions
			Automatic	Power cycle	Comment	
47	Machine Overcurrent	Stop	X		Inverter absorbed current below Par.517 Maximum Input Current limit	1. Ensure that water flow rate is sufficient and fan operation is normal 2. Check main power supply voltage
48	Compressor Envelope Protection - Low TE in Cooling	Stop	X			1. Check that ambient temperature (OAT) is within the operating map 2. Check TE sensor
49	Compressor Envelope Protection - High TE in Cooling	Stop	X			1. Check that ambient temperature (OAT) is within the operating map 2. Check coil cleanliness 3. Check if fan operation is normal 4. Check TE sensor
50	Exchanger Freeze Protection on Water Temp (in Cooling)	Stop	X		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	1. Ensure that water flow rate is sufficient 2. Check PMV operation
52	Compressor Envelope Protection - High SST in Cooling	Stop	X			
54	Compressor Envelope Protection - High TD	Stop	X			1. Ensure that fan operation is normal 2. Check if coil is not fouled and minimum installation clearances are respected 3. Check PMV operation 4. Inspect unit (oil / refrigerant leaks)
55	Exchanger High Temp Protection - High LWT/TR in Heating	Stop	X		Heating Mode and LWT above 75°C or TR above 70°C. Force pump to run while alarm is active	
56	Compressor Envelope Protection - Low LWT/TR in Heating	Stop	X			1. Check if water flow rate is not too big (if external pump is used)
57	Compressor Envelope Protection - High SST in Heating	Stop	X			
58	Compressor Envelope Protection - Low SST in Heating	Stop	X			1. Ensure that fan operation is normal 2. Check if coil is not fouled and minimum installation clearances are respected 3. Check PMV operation 4. Inspect unit (oil / refrigerant leaks)
59	Compressor Envelope Protection - High Inverter Current	Stop	X			1. Ensure that water flow rate is sufficient and fan operation is normal 2. Check main power supply voltage
60	Inverter Fault - Compressor current sensor error	Stop		x		
61	Inverter Fault - DC Link sensor error	Stop		x		
62	Inverter Fault - PFCM current A error	Stop		x		
63	Inverter Fault - PFCM current B error	Stop		x		
64	Inverter Fault - Input voltage sensor error	Stop		x		
65	Inverter Fault - Discharge FET error	Stop		x		
66	Inverter Fault - Software Compressor overcurrent	Stop		x		1. Ensure that water flow rate is sufficient and fan operation is normal
67	Inverter Fault - Hardware Compressor overcurrent	Stop		x		1. Ensure that water flow rate is sufficient and fan operation is normal
68	Inverter Fault - Estimator fault	Stop		x		
69	Inverter Fault - Compressor starting error	Stop		x		
70	Inverter Fault - Fan Motor error (lower)	Stop		x		1. Stop and disconnect the unit 2. Check fan motor connection 3. Check if impeller is not blocked
71	Inverter Fault - Fan Motor error (upper)	Stop		x		1. Stop and disconnect the unit 2. Check fan motor connection 3. Check if impeller is not blocked
72	Inverter Fault - Wire miss	Stop		x		1. Check compressor cable connection
73	Inverter Fault - Communication error	Stop		x		1. Check NHC/inverter communication cable
74	Inverter Fault - DC under voltage	Stop		x		

6 -ALARM DESCRIPTION

Current Alarm [P350] to [P354] Past Alarm [P360] to [P364]	Description	Unit Status	Reset type			Investigation / corrective actions
			Automatic	Power cycle	Comment	
75	Inverter Fault - DC over voltage	Stop		x		
76	Inverter Fault - Heatsink over temperature	Stop		x		1. Stop and disconnect the unit 2. Check coil cleanliness 3. Check inverter heatsink cleanliness
77	Inverter Fault - AC under voltage	Stop		x		1. Check main input power voltage
78	Inverter Fault - PFC over current	Stop		x		
79	Inverter Fault - AC over voltage	Stop		x		1. Check main input power voltage
80	Inverter Fault - PFC unbalanced current	Stop		X		
81	Inverter Fault - Stator over heat	Stop		X		
82	Inverter Fault - Printed board over temp	Stop		X		1. Stop and disconnect the unit 2. Check coil cleanliness 3. Check inverter heatsink cleanliness
83	Inverter Fault - IPM temp sensor error	Stop		X		
84	Inverter Fault - Input Wire Miss (three-phases)	Stop		X		1. Stop and disconnect the unit 2. Check main input power connection (L1/L2/L3)
88	Inverter Fault - Other Inverter alarm	Stop		X		
89	Real Time Clock corrupted	Continue	X			
90	Invalid configuration	Stop	X		When correct configuration detected	
91	Invalid configuration - Wrong Unit Type	Stop	X		When correct configuration detected	
92	Invalid configuration - Wrong Unit Type	Stop	X		When correct configuration detected	
93	Invalid configuration - Wrong Supply Type	Stop	X		When correct configuration detected	
95	Invalid configuration - Wrong Inverter Model	Stop	X		When correct configuration detected	
96	Invalid configuration - Wrong Hydronic configuration	Stop	X		When correct configuration detected	1. Check pump parameter settings
97	Invalid configuration - Compressor Map Failure	Stop	X		When correct configuration detected	
98	Invalid configuration - Configuration not allowed for Master/Slave	Stop	X		When correct configuration detected	1. Check Master / Slave settings
99	Invalid configuration - Master/Slave Wrong Addressing	Stop	X		When correct configuration detected	1. Check Master / Slave settings
100	Emergency Stop	Stop	X			
101	External alarm	Continue	X			
200	Inverter Minor Fault - Compressor Current Limit	Continue	x			
201	Inverter Minor Fault - ID Current Limit	Continue	x			
202	Inverter Minor Fault - PFCM temp sensor error	Continue	x			
203	Inverter Minor Fault - IMP temp sensor error	Continue	x			
204	Inverter Minor Fault - Input Current Limit	Continue	x			
205	Inverter Minor Fault - PFC over current	Continue	x			
206	Inverter Minor Fault - AC over voltage	Continue	x			
210	TD inconsistent value	Continue	X			1. Check TD sensor and its connection
213	TR inconsistent value	Continue	X			1. Check TR sensor and its connection
214	TS inconsistent value	Continue	X			1. Check TS sensor and its connection
232	Flow Switch alert	Continue	X			1. Check if water loop installation is correct (air venting, valve position…) 2. Check water static pressure 3. Check if water filter is not clogged 4. Check Flow switch connection and operation
240	Leak Detection Alert	Continue	X			
245	Lower Fan running at wrong speed	Continue	X			1. Check that impeller rotation is not impeded 2. Check if coil is not fouled
246	Upper Fan running at wrong speed	Continue	X			1. Check that impeller rotation is not impeded 2. Check if coil is not fouled

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

Par.	Jbus	Mnemonic	Description	Min	Max	Range	Default	Unit	Table
001	**0001H**	OAT	Outdoor Air Temperature	-40	115,6			°C	GENUNIT
002	**0002H**	IAT	Indoor Air Temperature	-40	115,6			°C	GENUNIT
003	**0003H**	EWT	Entering Water Temperature	-40	115,6			°C	GENUNIT
004	**0004H**	LWT	Leaving Water Temperature	-40	115,6			°C	GENUNIT
005	**0005H**	TR	Refrigerant Temperature	-40	115,6			°C	GENUNIT
006	**0006H**	PS	Suction Pressure	0	999			KPa	GENUNIT
007	**0007H**	roomtemp	Room Temperature	-40	115,6			°C	GENUNIT
008	**0008H**	sst	Saturated Suction Temp	-40	30			°C	GENUNIT
009	**0009H**	ts	Suction Temperature	-40	115,6			°C	GENUNIT
010	**000AH**	td	Discharge Temperature	-40	200			°C	GENUNIT
011	**000BH**	te	Lower Air Exchanger Temp	-40	115,6			°C	GENUNIT
015	**000FH**	sh	Superheat Temperature					K	GENUNIT
016	**0010H**	sh_targ	Superheat Target Temp					K	GENUNIT
017	**0011H**	td_targ	Discharge Target Temp					°C	GENUNIT
020	**0014H**	freq_min	Actual Min Compr. Freq					Hz	GENUNIT
021	**0015H**	freq_max	Actual Max Compr. Freq					Hz	GENUNIT
022	**0016H**	FREQ_REQ	Requested Compr. Freq	0	120			Hz	GENUNIT
023	**0017H**	freq_cur	Actual Compressor Freq	0	120			Hz	GENUNIT
024	**0018H**	PMV_REQ	PMV Command	-20	120			%	GENUNIT
025	**0019H**	pmv_pos	PMV Actual Position	0	500			step	GENUNIT
026	**001AH**	fan1_req	Lower Fan Speed Request	0	1000			rpm	GENUNIT
027	**001BH**	fan2_req	Upper Fan Speed Request	0	1000			rpm	GENUNIT
028	**001CH**	fan1_spd	Lower Fan Actual Speed	0	1000			rpm	GENUNIT
029	**001DH**	fan2_spd	Upper Fan Actual Speed	0	1000			rpm	GENUNIT
030	**001EH**	comp_htr	Compressor DC injection heating status	0	50			W	GENUNIT
031	**001FH**	4wv_req	Reverse Valve command	0	1			-	GENUNIT
032	**0020H**	BASE_HTR	Base panel (drain) Heater	0	1			-	GENUNIT
033	**0021H**	BOILER	Boiler Output	0	1	[Off/On]		-	GENUNIT
034	**0022H**	EHS	Electrical Heat Stages	0	3	[Off/On]		-	GENUNIT
035	**0023H**	CUST_DO5	Customized DO#5	0	1	[Off/On]		-	GENUNIT
036	**0024H**	CUST_DO8	Customized DO#8	0	1			-	GENUNIT
037	**0025H**	CUST_DO9	Customized DO#9	0	1	0 = Away (unoccupied), 1 = Sleep (occupied), 2 = Home (occupied)		-	GENUNIT
041	**0029H**	CHIL_OCC	Occupancy Mode	0	2	[No/Yes]		-	STATUS
043	**002BH**	nightmod	Night Mode	0	1	[No/Yes]		-	STATUS
044	**002CH**	MOD_REQ	System Mode Request	0	9	0 = Off, 1 = Cool, 2 = Heat, 4 = DHW (Only), 5 = Booster Cool, 6 = Booster Heat, 7 = Defrost, 8 = Purge, 9 = Drying		-	STATUS

7 -PARAMETERS OVERVIEW

Par.	Jbus	Mnemonic	Description	Min	Max	Range	Default	Unit	Table
045	**002DH**	MOD_STAT	System Mode Status	0	109	0=Off, 1 = Cool, 2 = Heat, 4 = DHW, 5 = Booster Cool, 6 = Booster Heat, 7 = Defrost, 8 = Purge, 9 = Drying, 20 = Home Anti-Freeze, 21 = Cool Satisfied, 22 = Heat Satisfied, 24 = DHW Satisfied, 29 = Drying Satisfied, 100 = Off Fail, 101 = Cool Fail, 102 = Heat Fail, 104 = DHW Fail, 105 = Booster Cool Fail, 106 = Booster Heat Fail, 107 = Defrost Fail, 108 = Purge Fail, 109 = Drying Fail		-	STATUS
047	**002FH**	mod_ovr	System Mode Override	0	12	0 = No override, 1 = Home Anti-Freeze Protection, 2 = Water Loop Freeze Protection, 3 = Water sampling, 4 = Compressor Heating (due to long stop period), 11 = Off Peak Requested, 12 = Solar Mode Active		-	STATUS
048	**0030H**	setpoint	Current Setpoint	5	60	N.A.	0	°C	STATUS
049	**0031H**	RESET	User Adjust Temperature	-5	5	N.A.	0	K	STATUS
050	**0032H**	IAT_OFF	IAT Offset	-4	4	N.A.	0	K	STATUS
051	**0033H**	CTRL_PNT	Control Point	5	60	N.A.	0	°C	STATUS
052	**0034H**	CTRL_TMP	Control Temp	-40	115,6	N.A.	0	°C	STATUS
053		ui_init	User Interface Init Req.	0	1	N.A.		-	STATUS
061	**003DH**	cmp_req	Compressor Mode Request	0	50	0 = Off, 1 = Cool, 2 = Heat, 4 = DHW, 7 = Defrost, 20 = Anti-Freeze, 21 = Cool Satisfied, 22 = Heat Satisfied, 24 = DHW Satisfied, 50 = Stator Heating		-	LOADFACT
064	**0040H**	cap_ovr	Capacity Override	0	204	0 = No override, 1 = Power Up Delay, 2 = Compressor Minimum On time 3 = Compressor Minimum Off time, 4 = Mode Change Delay, 5 to 8 = Compressor Starting Sequence, 9 = Compressor Stopping Delay, 10 = Null Demand Limit 11 = Frequency Reduction active, 12 = Maximum Power Exceeded, 13 = Maximum current exceeded, 14 = Inverter overcurrent or overtemp, 15 = Compressor stator heating after long stop 16 = Compressor stator heating on, 19 = PMV Control on TD at warmup, 20 = Defrost, 21 = Free Defrost, 22 = Post-defrost, 30 to 34 = Envelop protection in heating, 39 = Minimum OAT for Heating, 42 to 48 = Envelop protection in heating, 52 to 54 = Envelop protection in cooling, 57 to 58 = Freeze Protection in Cooling, 60 to 64 = Envelop protection in cooling, 70 = Water Flow Protection, 100 = System Alarm, 101 = Compressor or Inverter Alarm, 102 = Configuration Error (Factory), 201 = Rating Cool, 202 = Rating Heat, 203 = Rating Ramp Cool, 204 = Rating Ramp Heat		-	LOADFACT
065	**0041H**	cap_tmr	Capacity Timer					s	LOADFACT
066	**0042H**	CAP_T	Total Capacity	0	100			%	LOADFACT
067	**0043H**	DEM_LIM	Demand Limit	0	100			%	LOADFACT
068	**0044H**	FREQ_RED	Frequency Reduction Mode	0	1	[No/Yes]		-	LOADFACT
069	**0045H**	RUNNING	Unit Running Status	0	1	[No/Yes]		-	LOADFACT
071	**0047H**	pmv_ovr	PMV Override	0	99	0 = No override, 3 = SST too high, 4 = SST too low, 5 = SH too low, 6 = SH too high, 7 = Compressor Frequency steady, 98 = Closing overrun, 99 = Recalibration		-	LOADFACT
072	**0048H**	fan_ovr	Fan Override	0	50	0 = no override, 1 = pre-start ventilation, 2 = post-ventilation, 11 = High OAT in Cooling, 21 = High SST in Heating, 50 = Anti-sticking		-	LOADFACT
073	**0049H**	cmp_ovr	Compressor Override	0	50	0 = No override, 1 = Ramp down, 2 = Ramp up, 50 = Stator Heating		-	LOADFACT

Par.	Jbus	Mnemonic	Description	Min	Max	Range	Default	Unit	Table
081	0051H	pmp_ovr	Pump Override	-1	100	-1 = Pump Control disabled, 0 = No override, 1 = Compressor Still Running, 2 = Flow Switch Failure, 3 = Pump Stopping Delay, 4 = Anti-Sticking, 5 = Low OAT 6 = Very Low OAT, 7 = Defrost Active, run the pump at maximum speed, 8 = Boiler Active (compr. stopped), stop the pump, 9 = DHW Active, 10 = Master/ Slave active 11 = Water Sampling, 12 = Purge Mode, 13 = Freeze protection alarm #50/52, run the pump, 14 = Pump stopped due to Compr. or Inverter failure, 15 = DHW Valve moving, run the pump, 16 = Water Control Point reached, control pump on CTRL_PNT, 17 = Pump stopped due to M/S communication failure , 18 = High LWT in Heating, 19 = Low LWT in Heating, 20 = Power up delay, 21 = High Temp protection, 22 = High SST in cooling, 100 = Emergency stop		-	PMP_STAT
082	0052H	flow_err	Water Flow Failure	0	1	[Normal/Alarm]		-	PMP_STAT
083	0053H	dtstp	Current DeltaT Setpoint			N.A.		K	PMP_STAT
084	0054H	delta_t	Water Delta Temperature			N.A.		K	PMP_STAT
085	0055H	PMP	Water Pump Speed	0	100	N.A.		%	PMP_STAT
088	0058H	ADD_PMP	Additional Pump status	0	1			-	PMP_STAT
091	005BH	back_ovr	Backup Override	-1	100			-	BCK_STAT
092	005CH	back_flg	Backup Authorized flag	0	1	[No/Yes]		-	BCK_STAT
093	005DH	warmtime	Booster Warm Up timer	0	1800	N.A.		s	BCK_STAT
094	005EH	BACK_CAP	Backup Capacity	0	100	N.A.		%	BCK_STAT
101	0065H	ONOFF_SW	Heat/Cool Switch Status - Heat = contact opened - Cool = contact closed	0	1	[Open/Close]		-	INPUT
102	0066H	HC_SW	Heat/Cool Switch Status - Heat = contact opened - Cool = contact closed	0	1	[Open/Close]		-	INPUT
103	0067H	ECO_SW	Eco/Normal Switch Status - Normal = contact opened - Eco = contact closed	0	1	[Open/Close]		-	INPUT
104	0068H	NIGHT_SW	Day/Night Switch Status - Day = contact opened - Night = contact closed	0	1	[Open/Close]		-	INPUT
105	0069H	SAFE_SW	Safety Switch Status	0	1	[Open/Close]		-	INPUT
106	006AH	FLOW_SW	Flow Switch Status	0	1	[Open/Close]		-	INPUT
107	006BH	CUST_DI7	Customized DI#7 Status	0	1	[Open/Close]		-	INPUT
108	006CH	CUST_DI8	Customized DI#8 Status	0	1	[Open/Close]		-	INPUT
109	006DH	CUST_DI9	Customized DI#9 Status	0	1	[Open/Close]		-	INPUT
110	006EH	RED_SW	Power Limitation Switch	0	1	[Open/Close]		-	INPUT
111	006FH	OPEAK_SW	Off Peak Hour Switch	0	1	[Open/Close]		-	INPUT
112	0070H	LSHED_SW	Loadshed Request Switch	0	1	[Open/Close]		-	INPUT
113	0071H	SOLAR_SW	Solar Input Switch	0	1	[Open/Close]		-	INPUT
114	0072H	DHW_THSW	DHW Thermal Sw. (tank)	0	1	[Open/Close]		-	INPUT
115	0073H	DHW_TOVR	DHW Timed Override Switch	0	1	[Open/Close]		-	INPUT
116	0074H	DHW_ANTI	DHW Anti-Legionella Req.	0	1	[Open/Close]		-	INPUT
117	0075H	DHW_SW	DHW Priority Switch	0	1	[Open/Close]		-	INPUT
118	0076H	EXALM_SW	External Alarm Switch	0	1	[Open/Close]		-	INPUT
119	0077H	BOOST_SW	Boost Mode Request Sw.	0	1	[Open/Close]		-	INPUT
120	0078H	inv_type	Inverter Model Number	0	65535			-	INV_MISC
121	0079H	inv_soft	Inverter Soft version	0	65535	Integer format. Example 41488 (0xA210)		-	INV_MISC
122	007AH	inv_sofb	Inverter Soft version B	0	65535	Integer format. Example 45569 (0xB201)		-	INV_MISC

Par.	Jbus	Mnemonic	Description	Min	Max	Range	Default	Unit	Table
141	008DH	inv_comm	Comm. with Inverter			[Normal/Alarm]		-	INV_STAT
143	008FH	inv_trip	Inverter Fault Trip Code					-	INV_STAT
144	0090H	inv_stat	Inverter Operating State					-	INV_STAT
145	0091H	inv_alt	Inverter Alert Status	0	1	[Off/On]	0	-	INV_STAT
146	0092H	inv_alm	Inverter Alarm Status	0	1	[Normal/Alarm]	0	-	INV_STAT
147	0093H	pfc_stat	PFC Status	0	1	[Off/On]	0	-	INV_STAT
148	0094H	cmp_stat	Compressor Status	0	1	[Off/On]	0	-	INV_STAT
149	0095H	htr_stat	Stator Heater Status	0	1	[Off/On]	0	-	INV_STAT
150	0096H	pwr_stat	Power Save Status	0	1	[Off/On]	0	-	INV_STAT
151	0097H	dc_stat	DC Discharge Status	0	1	[Off/On]	0	-	INV_STAT
152	0098H	cfg_stat	Config. Request Status	0	1	[Off/On]	0	-	INV_STAT
153	0099H	cmp_spd	Compressor Speed	0	7200		0	rpm	INV_STAT
154	009AH	fan1_spd	Lower Fan Speed	0	1000		0	rpm	INV_STAT
155	009BH	fan2_spd	Upper Fan Speed	0	1000		0	rpm	INV_STAT
156	009CH	dc_volt	DC Link Voltage					V	INV_STAT
157	009DH	ac_volt	AC Line Voltage					V	INV_STAT
158	009EH	ac_curr	AC Line Current					A	INV_STAT
159	009FH	ac_powr	AC Line Power					KW	INV_STAT
160	00A0H	cmp_curr	Compressor Phase Current					A	INV_STAT
161	00A1H	fluxcurr	Flux Weakening Current					A	INV_STAT
162	00A2H	torqcurr	Torque Current					A	INV_STAT
163	00A3H	pfc_temp	PFC Module Temperature					°C	INV_STAT
164	00A4H	ipm_temp	IPM Module Temperature					°C	INV_STAT
165	00A5H	fan1_sig	Lower Fan Control Signal					V	INV_STAT
166	00A6H	fan2_sig	Lower Fan Control Signal					V	INV_STAT
167	00A7H	htr_volt	Stator Heating Voltage					V	INV_STAT
168	00A8H	htr_time	Stator Heater Timer					s	INV_STAT
169	00A9H	pcb_temp	Circuit Board Temperature					°C	INV_STAT
170	00AAH	inv_td	Discharge Temperature					counts	INV_STAT
180	00B4H	cmp_dem	Compressor Speed Demand	0	7200			rpm	INV_STAT
181	00B5H	cmph_dem	Stator Heater Demand	0	8200			mA	INV_STAT
182	00B6H	fan1_dem	Lower Fan Speed Demand	0	1000			rpm	INV_STAT
183	00B7H	fan2_dem	Upper Fan Speed Demand	0	1000			rpm	INV_STAT
184	00B8H	DC_DISCH	DC Link Discharge Command	0	1	[Off/On]		-	QCK_TEST
190	00BEH	max_pwr	Maximum Allowed Power					KW	POWER
191	00BFH	watercap	Water Capacity					KW	POWER
192	00C0H	elec_pwr	Electric Absorbed Power					KW	POWER
193	00C1H	cop_eer	Efficiency (COP/EER)					KW	POWER
194	00C2H	boost_c	Boost Mode Time Credit	-1	120			min	POWER
201	00C9H	DHW_MODE	DHW Mode	0	2	0 = Eco, 1 = Anti-Legionella, 2 = Regular		-	DHW_STAT
202	00CAH	dhw_ovr	DHW Override	-1	100	-1 = DHW disabled, 0 = DHW Operating , 1 = DHW Not Operating (SHC Mode or No demand), 2 = DHW Valve moving, 3 = DHW Operating with EHS Only, 10 = No SHC Demand checking, 50 = Heat Mode not allowed, 51 = DHW not allowed due to Loadshed, 52 = DHW not allowed due to Solar production, 100 = DHW Fail		-	DHW_STAT
203	00CBH	dhw_dem	DHW Demand from Tank	0	1	[No/Yes]		-	DHW_STAT

Par.	Jbus	Mnemonic	Description	Min	Max	Range	Default	Unit	Table
204	**00CCH**	dhw_cond	DHW Conditions	0	1	[False/True]		-	DHW_STAT
205	**00CDH**	DHW_CTLP	DHW Control Point	30	75	N.A.		°C	DHW_STAT
206	**00CEH**	DHW_TT	DHW Tank Temperature	-40	115,6	N.A.		°C	DHW_STAT
207	**00CFH**	shc_time	Current SHC Runtime			N.A.		min	DHW_STAT
208	**00D0H**	dhw_time	Current DHW Runtime			N.A.		min	DHW_STAT
209	**00D1H**	dhw_schd	DHW Schedule Status	0	1	[Off/On]		-	DHW_STAT
210	**00D2H**	DHW_VLV	DHW Diverting Valve	0	1	[Off/On]		-	DHW_STAT
211	**00D3H**	DHW_EHS	DHW Elec Heat Stage	0	1	[Off/On]		-	DHW_STAT
212	**00D4H**	DHW_RUN	DHW Running Status	0	1	[No/Yes]		-	DHW_STAT
221	**00DDH**	CHWSTEMP	Chiller Water System Temp	-40	115,6	N.A.		°C	MSL_STAT
222	**00DEH**	MS_CAP	Mast/Slv Overall Capacity	0	100	N.A.		%	MSL_STAT
223	**00DFH**	mst_req	Master Request Capacity	0	100	N.A.		%	MSL_STAT
224	**00E0H**	slv1_req	Slave #1 Request Capa.	0	100	N.A.		%	MSL_STAT
225	**00E1H**	slv2_req	Slave #2 Request Capa.	0	100	N.A.		%	MSL_STAT
226	**00E2H**	slv3_req	Slave #3 Request Capa.	0	100	N.A.		%	MSL_STAT
228	**00E4H**	ms_activ	Mast/Slv Active Flag	0	1	[False/True]		-	MSL_STAT
229	**00E5H**	MS_STAT	Mast/Slv Overall Status	-1	22			-	MSL_STAT
230	**00E6H**	mast_sta	Master Status	-1	109			-	MSL_STAT
231	**00E7H**	slv1_sta	Slave #1 Status	-1	109			-	MSL_STAT
232	**00E8H**	slv2_sta	Slave #2 Status	-1	109			-	MSL_STAT
233	**00E9H**	slv3_sta	Slave #3 Status	-1	109			-	MSL_STAT
234	**00EAH**	MS_LIM	Mast/Slv Demand Limit	0	100	N.A.	100	%	MSL_STAT
235	**00EBH**	ms_power	Mast/Slv Available Power					kW	MSL_STAT
236	**00ECH**	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…	0	-	MSL_STAT
300	**0x0137**	def_ovr	Defrost Override	0	25	0 = No override, 1 = Waiting for first Mechanical Defrost, 2 = Waiting for Delta Temp Reference, 11 = Mechanical Defrost - Init, 12 = Mechanical Defrost - Reduce compr. speed, 13 = Mechanical Defrost - Move 4WV to cool position 14 = Mechanical Defrost - Stop fans, 15 = Mechanical Defrost - Running, 16 = Mechanical Defrost - Reduce compr. speed back, 17 = Mechanical Defrost - Move 4WV to heat position, 18 = Mechanical Defrost - Completed, 21 = Free Defrost - Init, 22 = Free Defrost - Reduce compressor speed, 23 = Free Defrost - Stop compressor, 24 = Free Defrost - Running, 25 = Free Defrost - Completed	0	-	DEF_STAT
301	**012DH**	fd_ena	Free Defrost allowed	0	1	[No/Yes]	N.A.	K	DEF_STAT
302	**012EH**	DEF_DT0	Ref Defrost DeltaT	0	30	N.A.	N.A.	K	DEF_STAT
303	**012FH**	def_dt	Actual Defrost DeltaT			N.A.	N.A.	K	DEF_STAT
304	**0130H**	def_fact	Frost Factor	0	100	N.A.	N.A.	%	DEF_STAT
305	**0131H**	md_nb	Meca Defrost Number			N.A.	0	-	DEF_STAT
306	**0132H**	def_nb	Free Defrost sessions number			N.A.	0	-	DEF_STAT
307	**0133H**	def_time	Free Defrost duration			N.A.	N.A.	s	DEF_STAT
308	**0134H**	md_last	Time since last MD			N.A.	N.A.	min	DEF_STAT
309	**0135H**	fd_last	Time since last FD			N.A.	N.A.	min	DEF_STAT
310	**0136H**	heattime	Time in Heating			N.A.	N.A.	min	DEF_STAT

7 -PARAMETERS OVERVIEW

Par.	Jbus	Mnemonic	Description	Min	Max	Range	Default	Unit	Table
311	**0137H**	DEF_REQ	Defrost Request	0	31	0 = no Defrost Request, 1 = Meca Defrost Request (manual), 2 = Free Defrost Request (manual), 11 = Meca Defrost Request due to Frost Factor, 21 = Meca Defrost Request due to repeated low SST, 31 = Meca Defrost Request due to high OAT minus SST, 12 = Free Defrost Request due to Frost Factor	N.A.	-	DEF_STAT
321	**0141H**	QCK_ENA	QT: Quick Test enable	0	1	[No/Yes]		-	QCK_TEST
322	**0142H**	_HP_TEST	QT: HP Switch Test	0	8	0 = HP Test Off, 1 = HP Test Requested, 2 = HP Test in Progress, 3 = HP Test OK, 4 = HP Test Failed (timeout), 5 = HP Test Failed (Flow Switch Failure), 6 = HP Test Failed (Low Water temp), 7 = HP Test Failed (Inverter Failure)		-	QCK_TEST
323	**0143H**	_RAT_MOD	QT: Rating Mode	0	5	0 = Rating Off, 1 = Rating Cool, 2 = Rating Heat		-	QCK_TEST
324	**0144H**	_RAT_FRQ	QT: Rating Frequency	-120	120			Hz	QCK_TEST
325	**0145H**	_FAN_LOW	QT: Lower Fan Speed	0	999	N.A.		rpm	QCK_TEST
326	**0146H**	_FAN_UPP	QT: Upper Fan Speed	0	999	N.A.		rpm	QCK_TEST
327	**0147H**	_PMV_POS	QT: PMV Position	0	999	N.A.		-	QCK_TEST
328	**0148H**	_CMP_HTR	QT: Compr Stator Heater (W)	0	50	N.A.		-	QCK_TEST
329	**0149H**	_PMP_GET	Get Minimum Pump Speed	0	1	[No/Yes]		-	QCK_TEST
330	**014BH**	_PMP	QT: Water Pump Speed	0	100	N.A.		%	QCK_TEST
331	**014CH**	_PAN_HTR	QT: Base Pan Heater	0	1	[Off/On]		-	QCK_TEST
332	**014CH**	_EH1	QT: Electric Heater #1 or Boiler	0	1	[Off/On]		-	QCK_TEST
333	**014BH**	_EH2	QT: Electric Heater #2	0	1	[Off/On]			QCK_TEST
334	**014CH**	_4WAYVLV	QT: 4-way Reverse Valve	0	1	[Off/On]		-	QCK_TEST
335	**014FH**	_DHW_VLV	QT: DHW Diverting Valve	0	1	[Off/On]		-	QCK_TEST
336	**0140H 0703H**	_CUSTDO5	QT: Customized DO#5	0	1	[Off/On]		-	QCK_TEST
337	**0151H 0704H**	_CUSTDO8	QT: Customized DO#8	0	1	[Off/On]		-	QCK_TEST
338	**0152H 0705H**	_CUSTDO9	QT: Customized DO #9	0	1	[Off/On]	0	-	QCK_TEST
339	**014CH**	_CAP_OUT	QT: Capacity Output	0	100	N.A.	0	%	QCK_TEST
340	**0154H**	ALMRESET	Alarm Reset	0	1	[No/Yes]	0	-	ALARM
341	**0155H**	ALM	Alarm Status	0	1	[Normal/Alarm]	0	-	ALARM
342	**0156H**	ALERT	Alert Status	0	1	[No/Yes]	0	-	ALARM
343	**0157H**	SHUTDOWN	Shutdown Status	0	1	[No/Yes]	0	-	ALARM
350	**015EH**	alm_01	Current Alarm #1	0	200	N.A.	0	-	ALARM
351	**015FH**	alm_02	Current Alarm #2	0	200	N.A.	0	-	ALARM
352	**0160H**	alm_03	Current Alarm #3	0	200	N.A.	0	-	ALARM
353	**0161H**	alm_04	Current Alarm #4	0	200	N.A.	0	-	ALARM
354	**0162H**	alm_05	Current Alarm #5	0	200	N.A.	0	-	ALARM
360	**0168H**	alm_01p	Past Alarm #1	0	200	N.A.	0	-	ALARM
361	**0169H**	alm_02p	Past Alarm #2	0	200	N.A.	0	-	ALARM
362	**016AH**	alm_03p	Past Alarm #3	0	200	N.A.	0	-	ALARM
363	**016BH**	alm_04p	Past Alarm #4	0	200	N.A.	0	-	ALARM
364	**016CH**	alm_05p	Past Alarm #5	0	200	N.A.	0	-	ALARM
371	**0173H**	comp1_st	Compressor Starts Nb			N.A.	0	-	RUNTIME1
372	**0174H**	comp1_hr	Compressor Run Hours			N.A.	0	h	RUNTIME1

Par.	Jbus	Mnemonic	Description	Min	Max	Range	Default	Unit	Table
373	0175H	pmp_st	Water Pump Starts Nb			N.A.	0	-	RUNTIME1
374	0176H	pmp_hr	Water Pump Run Hours			N.A.	0	h	RUNTIME1
379	017BH	wearfact	Unit Wear Factor			N.A.	0	-	N.A.
380	017CH	RUN2_RST	User Runtime Reset	0	3	0 = Do nothing, 1 = Reset Hours only, 2 = Reset Energy Counters only 3 = Reset All runtimes (hours & energy counters)	0	-	RUNTIME2
381	017DH	comp_hr	Compressor Run Hours			N.A.	0	h	RUNTIME2
382	017EH	back_hr	Backup Running Hours			N.A.	0	h	RUNTIME2
383	017FH	cool_hr	Cooling Mode Hours			N.A.	0	h	RUNTIME2
384	0180H	heat_hr	Heating Mode Hours			N.A.	0	h	RUNTIME2
385	0181H	dhw_hr	DHW Mode Hours			N.A.	0	h	RUNTIME2
386	0182H	md_hr	Defrost Mode Hours			N.A.	0	h	RUNTIME2
387	0183H	fd_hr	Free Defrost Mode Hours			N.A.	0	h	RUNTIME2
388	0184H	nrg_heat	Energy consumed in Heat			N.A.	0	kWh	RUNTIME2
389	0185H	nrg_cool	Energy consumed in Cool			N.A.	0	kWh	RUNTIME2
390	0186H	nrg_dhw	Energy consumed in DHW			N.A.	0	kWh	RUNTIME3
391	0187H	CHIL_S_S	Unit Start/Stop	0	1	[Stop/Start]		-	AQUASMRT
392	0188H	HC_SEL	Heat/Cool Select	0	1	[Heat/Cool]		-	AQUASMRT
393	0189H	EMSTOP	Emergency Stop	0	1	[Disable/Enable]		-	AQUASMRT
401	0191H	hwoccstp	Heat Home Setpoint (Water)	20	75	N.A.	45	°C	WAT_STP
402	0192H	hwunooff	Heat Sleep Offset (Water)	-20	0	N.A.	0.0	K	WAT_STP
403	0193H	hwecooff	Heat Away Offset (Water)	-20	0	N.A.	-5.0	K	WAT_STP
404	0194H	cwoccstp	Cool Home Setpoint (Water)	5	20	N.A.	12	°C	WAT_STP
405	0195H	cwunooff	Cool Sleep Offset (Water)	0	10	N.A.	0	K	WAT_STP
406	0196H	cwecooff	Cool Away Offset (Water)	0	10	N.A.	5	K	WAT_STP
407	0197H	hw_hyst	Heat Hysteresis (Water)	0,5	2	N.A.	2	K	WAT_STP
408	0198H	cw_hyst	Cool Hysteresis (Water)	0,5	2	N.A.	1	K	WAT_STP
409	0199H	hcurvoff	Heat Curv Max Stp Offset	-5	5	N.A.	0.0	K	WAT_STP
410	019AH	ccurvoff	Cool Curv Min Stp Offset	-5	5	N.A.	0.0	K	WAT_STP
411	019BH	dhwecstp	DHW Eco Setpoint	30	75	N.A.	45	°C	DHW_STP
412	019CH	leg_stp	DHW Anti-Legionella Stp	50	75	N.A.	60	°C	DHW_STP
413	019DH	dhw_stp	DHW Setpoint	30	75	N.A.	50	°C	DHW_STP
414	019EH	dhw_hyst	DHW Hysteresis	0,5	10	N.A.	5	K	DHW_STP
421	01A5H	htoccstp	Heat Home Setpoint (Air)	12	34	N.A.	19	°C	AIR_STP
422	01A6H	htunooff	Heat Sleep Offset (Air)	-10	0	N.A.	-2.0	K	AIR_STP
423	01A7H	htecooff	Heat Away Offset (Air)	-10	0	N.A.	-4.0	K	AIR_STP
424	01A8H	cloccstp	Cool Home Setpoint (Air)	20	38	N.A.	26	°C	AIR_STP
425	01A9H	clunooff	Cool Sleep Offset (Air)	0	10	N.A.	2	K	AIR_STP
426	01AAH	clecooff	Cool Away Offset (Air)	0	10	N.A.	4	K	AIR_STP
427	01ABH	freezstp	Home AntiFreeze Setpoint	6	12	N.A.	6	°C	AIR_STP
428	01ACH	deltastp	Air Delta Setpoint	0,2	1	N.A.	0,5	K	AIR_STP
429	01ADH	iat_fact	IAT Reset Factor	0	2	N.A.	0		AIR_STP

Par.	Jbus	Mnemonic	Description	Min	Max	Range	Default	Unit	Table
501	**01F5H**	cust_di7	Customized DI#7 Config	-10	10	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 Thermal Switch (request), 6 or -6 = DHW Timed Override Button, 7 or -7 = DHW Anti-Legionella Cycle Request Button, 8 or -8 = DHW Priority Switch, 9 or -9 = External Alarm Indication, 10 or -10 = Boost Mode Request Switch Positive values correspond to Normally Open contact Negative values correspond to Normally Closed contact	1	-	GEN_CONF
502	**01F6H**	cust_di8	Customized DI#8 Config	-10	10		0	-	GEN_CONF
503	**01F7H**	cust_di9	Customized DI#9 Config	-10	10		0	-	GEN_CONF
504	**01F8H**	cust_do5	Customized DO#5 Config	0	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 = Additional Pump, 10 = Boiler command, 11 = Electrical Heater #3 (EH3), 12 = DHW Heater, 13 = Output controlled by customer (via JBus/ Modbus)	2	-	GEN_CONF
505	**01F9H**	cust_do8	Customized DO#8 Config	0	13		9	-	GEN_CONF
506	**01FAH**	cust_do9	Customized DO#9 Config	0	13		11	-	GEN_CONF
510	**01FEH**	air_ctrl	Control on Air	0	1	[No/Yes]	1	-	GEN_CONF
511	**01FFH**	ewt_ctrl	Water Control on EWT	0	1	[No/Yes]	0	-	GEN_CONF
512	**0200H**	iat_bias	IAT Sensor Bias	-5	5	N.A.	0.0	K	GEN_CONF
513	**0201H**	oat_bias	OAT Sensor Bias	-5	5	N.A.	0.0	K	GEN_CONF
514	**0202H**	freez_dt	Anti-Freeze Delta Stp	0	6	N.A.	0	K	GEN_CONF
515	**0203H**	nghtstrt	Night Mode Start Time	00:00	23:59	N.A.	00:00	hh:mm	GEN_CONF
516	**0204H**	nghtstop	Night Mode Stop Time	00:00	23:59	N.A.	00:00	hh:mm	GEN_CONF
517	**0203H**	max_curr	Max Input Current	10	40	N.A.	40	A	GEN_CONF
521	**0209H**	ui_type	User Interface Type	0	2	0 = No User Interface, 1 = Remote control by contacts, 2 = WUI	1	-	UI_CONF
523	**020BH**	ui_tmt	Interface Comm. Timeout	0	240		60	s	UI_CONF
524	**020CH**	ui_back	Backlight Timeout	0	7	0 = Backlight always off (disabled), 1 = 15sec, 2 = 30s, 3 = 1 min, 4 = 2 min, 5 = 5min, 6 = 30min, 7 = Always on	2	-	UI_CONF
525	**020DH**	ui_buzz	Buzzer on key press	0	1	[No/Yes]	No	-	UI_CONF
526	**020EH**	timebrod	Interface Time Broadcast	0	1	[No/Yes]	Yes	-	UI_CONF
527	**020FH**	ser_pass	Service Password	0	9999	N.A.	120	-	UI_CONF
528	**0210H**	usr_pass	User Password	0	9999	N.A.	0	-	UI_CONF
541	**021DH**	powr_lim	Power Limitation value	50	100	N.A.	75	%	CMP_CONF
542	**021EH**	nght_lim	Nigh Limitation value	50	100	N.A.	75	%	CMP_CONF
543	**021FH**	dhw_lim	DHW Limitation value	50	100	N.A.	100	%	CMP_CONF
560	**0230H**	flui_typ	Fluid Type	1	1	1 = Water (minimum cooling setpoint is 5°C) 2 = Medium Brine (minimum cooling setpoint is 0°C)	1	-	N.A.
561	**0231H**	pmp_satf	Pump On when Satisfied	0	1	[No/Yes]	0	-	PMP_CONF
562	**0232H**	pmp_fix	Pump Fixed Speed Control	0	1	[No/Yes]	0	-	PMP_CONF
563	**0233H**	vsp_minc	Minimum Pump Speed Cool	15	100	N.A.	19	%	PMP_CONF
564	**0234H**	vsp_minh	Minimum Pump Speed Heat	15	100	N.A.	19	%	PMP_CONF

Par.	Jbus	Mnemonic	Description	Min	Max	Range	Default	Unit	Table
565	0235H	vsp_max	Maximum Pump Speed	19	100	N.A.	100	%	PMP_CONF
566	0236H	dt_stp	Water Delta T Setpoint	2	20	N.A.	5	K	PMP_CONF
567	0237H	dt_kp	Delta T Proport. Gain	-4,5	-0,001	N.A.	-4,5	-	PMP_CONF
568	0238H	dt_ti	Delta T Integral Time	10	240	N.A.	20	s	PMP_CONF
569	0239H	dt_ts	Delta T Sample Time	10	240	N.A.	10	s	PMP_CONF
570	023AH	flw_chko	Flow Checked if Pump Off	0	1	[No/Yes]	1	-	PMP_CONF
571	023BH	pmp_ext	External Main Pump Ctrl	0	1	[No/Yes]	0	-	PMP_CONF
572	023CH	add_pmp	Additional Pump Logic	0	4	0 = No additional Pump, 1 = Always On, 2 = According to Space Temp (control on air), 3 = Always On, but Off when DHW is active, 4 = According to Space Temp (control on air), but Off when DHW is active	0	-	PMP_CONF
581	0245H	ht_curv	Heat Clim Curve Select	-1	12	-1 = No Curve / Fixed Water Setpoint 0 = Custom Climatic Curve using Par.582 to Par.585 1 = Heating Climatic Curve #1, …, 12 = Heating Climatic Curve #12	-1	-	CLIMCURV
582	0246H	ht_min_a	Heat Minimum OAT	-30	10	N.A.	-7.0	°C	CLIMCURV
583	0247H	ht_max_a	Heat Maximum OAT	10	30	N.A.	20	°C	CLIMCURV
584	0248H	ht_min_w	Heat Min Water Setpoint	20	40	N.A.	20	°C	CLIMCURV
585	0249H	ht_max_w	Heat Max Water Setpoint	30	75	N.A.	38	°C	CLIMCURV
586	024AH	cl_curv	Cool Clim Curve Select	-1	2	-1 = No Curve / Fixed Water Setpoint 0 = Custom Climatic Curve using Par.587 to Par.590 1 = Cooling Climatic Curve #1, 2 = Cooling Climatic Curve #2	-1	-	CLIMCURV
587	024BH	cl_min_a	Cool Minimum OAT	0	30	N.A.	20	°C	CLIMCURV
588	024CH	cl_max_a	Cool Maximum OAT	24	46	N.A.	35	°C	CLIMCURV
589	024DH	cl_min_w	Cool Min Water Setpoint	5	20	N.A.	10	°C	CLIMCURV
590	024EH	cl_max_w	Cool Max Water Setpoint	5	20	N.A.	18	°C	CLIMCURV
595	0253H	dry_stp	Drying Starting Setpoint	20	40	N.A.	20	°C	DRYING
596	0254H	drystep1	Drying Warm-up days	0	99	N.A.	3	-	DRYING
597	0255H	drystep2	Drying Ramp-up days	0	99	N.A.	4	-	DRYING
598	0256H	drystep3	Drying Hold-up days	0	99	N.A.	4	-	DRYING
599	0257H	dry_time	Drying Runtime (hours)			N.A.	0	hours	RUNTIME2
601	0259H	bck_type	Backup Type	0	5	0 = No backup, 1 = Booster by 1 Electrical Heat Stage, 2 = Booster by 2 Electrical Heat Stages, 3 = Booster by 3 Electrical Heat Stages with 2 outputs, 4 = Booster by 3 Electrical Heat Stages with 3 outputs, 5 = Backup by Oil or Gas Boiler	0	-	BCK_CONF
602	025AH	bck_warm	Booster Warm Up Time	0	120	N.A.	30	min	BCK_CONF
603	025BH	bck_delt	Booster Delta Temp	1	20	N.A.	5	°C	BCK_CONF
604	025CH	oatboost	Booster OAT Threshold	-20	15	N.A.	-7.0	°C	BCK_CONF
605	025DH	oat_back	Backup OAT Threshold	-20	10	N.A.	-20.0	°C	BCK_CONF
606	025EH	ehs_kp	EHS Proport. Gain	0,001	10	N.A.	2	-	BCK_CONF
607	025FH	ehs_ti	EHS Integral Time	10	240	N.A.	20	s	BCK_CONF
608	0260H	ehs_ts	EHS Sampling Time	10	240	N.A.	30	s	BCK_CONF
611	0263H	def_sel	Energy Soft select	0	1	Disable/Enable	1	-	DEF_CONF
612	0264H	fd_max	Max Free Defrost number	1	20	N.A.	3	-	DEF_CONF
613	0265H	md_time	Max time between two MD	1	18	N.A.	6	h	DEF_CONF
614	0266H	def_oat	OAT Min FD threshold	2	10	N.A.	2	°C	DEF_CONF
615	0267H	ff_corr	Frost Factor corrector	0,1	200	N.A.	70	-	DEF_CONF
641	0281H	ccn_bus	CCN Element Address	1	239	N.A.	1	-	CTRL_ID

7 -PARAMETERS OVERVIEW

Par.	Jbus	Mnemonic	Description	Min	Max	Range	Default	Unit	Table
642	**0282H**	ccn_elm	CCN Element Bus	0	239	N.A.	0	-	CTRL_ID
646	**0286H**	sec_bdr	Secondary Baud Rate (CCN/LEN)	0	2	0 = 9600 Baud / 1 = 19200 Baud / 2 = 38400 Baud	2 [38400]	-	CTRL_ID
654	**028EH**	soft_ver	Software Version Number			Example: 32 for version 3.2		1/10	CTRL_ID
N.A.	**028FH**	N.A.	Software Major Version	0	99	Example: 3 for version 3.2		-	N.A.
N.A.	**0290H**	N.A.	Software Minor Version	0	9	Example: 2 for version 3.2		-	N.A.
N.A.	**0291H**	N.A.	Software Minor Minor Version	0	999	Example: 11 for version 3.2.011		-	N.A.
658	**0292H 0293H**	epoch	Time in sec since 1970			N.A.	0	32 bits	N.A.
660	**0294H**	gmt_off	Offset with GMT time	-720	720	N.A.	0	min	N.A.
661	**0295H**	hod	Hour of Day	0	23	N.A.	0	-	TIME
662	**0296H**	mod	Minute of Hour	0	59	N.A.	0	-	TIME
663	**0297H**	dow	Day of Week	1	7	1 = Monday … 7 = Sunday	1	-	TIME
664	**0298H**	hol_flag	Holiday Flags	00	11	Bitmap: b0 : Tomorrow is holiday, b1 : Today is holiday, b3 to 7 : unused	0	-	TIME
665	**0299H**	dom	Day of Month	1	31	N.A.	1	-	TIME
666	**029AH**	month	Month	1	12	1 = January … 12 = December	1	-	TIME
667	**029BH**	year	Year	0	99	N.A.	0	-	TIME
668	**029CH**	daylight	Dayligh Saving Time	-1	1	-1 = Disabled, 0 = Off (winter time), 1 = On (summer time)	0	-	TIME
670		LAST_HOL	Last day of holidays					dd/mm/yy	OCC_SCHD
671	**029FH**	HOL_DAYS	Nb of days of holidays	0	31				OCC_SCHD
672	**02A0H**	OCC_OVR	Timed Override Hours	-1	24	-1 = Schedule disable, 0 = Schedule enable, 1 to 24 = Timed override hours	-1	-	OCC_SCHD
673	**02A1H**	DOW1	Period 1 DOW (MTWTFSSH)	00000000	11111111	bit7 = Monday, bit6 = Tuesday …, bit1= Sunday, bit0 = Holiday	00000000	-	OCC_SCHD
674	**02A2H**	TOD1	Start from	00:00	23:59	N.A.	0	hh:mm	OCC_SCHD
675	**02A3H**	OCC1	0=Away, 1=Sleep, 2=Home	0	2	0=Away, 1=Sleep, 2=Home	0		OCC_SCHD
676	**02A4H**	DOW2	Period 2 DOW (MTWTFSSH)	00000000	11111111	see above	00000000	-	OCC_SCHD
677	**02A5H**	TOD2	Start from	00:00	23:59	N.A.	00:00	hh:mm	OCC_SCHD
678	**02A6H**	OCC2	0=Away, 1=Sleep, 2=Home	0	2	0=Away, 1=Sleep, 2=Home	0		OCC_SCHD
679	**02A7H**	DOW3	Period 3 DOW (MTWTFSSH)	00000000	11111111	see above	00000000	-	OCC_SCHD
680	**02A8H**	TOD3	Start from	00:00	23:59	N.A.	00:00	hh:mm	OCC_SCHD
681	**02A9H**	OCC3	0=Away, 1=Sleep, 2=Home	0	2	0=Away, 1=Sleep, 2=Home	0		OCC_SCHD
682	**02AAH**	DOW4	Period 4 DOW (MTWTFSSH)	00000000	11111111	see above	00000000	-	OCC_SCHD
683	**02ABH**	TOD4	Start from	00:00	23:59	N.A.	00:00	hh:mm	OCC_SCHD
684	**02ACH**	OCC4	0=Away, 1=Sleep, 2=Home	0	2	0=Away, 1=Sleep, 2=Home	0		OCC_SCHD
685	**02ADH**	DOW5	Period 5 DOW (MTWTFSSH)	00000000	11111111	see above	00000000	-	OCC_SCHD
686	**02AEH**	TOD5	Start from	00:00	23:59	N.A.	00:00	hh:mm	OCC_SCHD
687	**02AFH**	OCC5	0=Away, 1=Sleep, 2=Home	0	2	0=Away, 1=Sleep, 2=Home	0		OCC_SCHD
688	**02B0H**	DOW6	Period 6 DOW (MTWTFSSH)	00000000	11111111	see above	00000000	-	OCC_SCHD
689	**02B1H**	TOD6	Start from	00:00	23:59	N.A.	00:00	hh:mm	OCC_SCHD
690	**02B2H**	OCC6	0=Away, 1=Sleep, 2=Home	0	2	0=Away, 1=Sleep, 2=Home	0		OCC_SCHD
691	**02B3H**	DOW7	Period 7 DOW (MTWTFSSH)	00000000	11111111	see above	00000000	-	OCC_SCHD
692	**02B4H**	TOD7	Start from	00:00	23:59	N.A.	00:00	hh:mm	OCC_SCHD
693	**02B5H**	OCC7	0=Away, 1=Sleep, 2=Home	0	2	0=Away, 1=Sleep, 2=Home	0		OCC_SCHD

Par.	Jbus	Mnemonic	Description	Min	Max	Range	Default	Unit	Table
694	**02B6H**	DOW8	Period 8 DOW (MTWTFSSH)	00000000	11111111	see above	00000000	-	OCC_SCHD
695	**02B7H**	TOD8	Start from	00:00	23:59	N.A.	00:00	hh:mm	OCC_SCHD
696	**02B8H**	OCC8	0=Away, 1=Sleep, 2=Home	0	2	0=Away, 1=Sleep, 2=Home	0		OCC_SCHD
701	**02BDH**	dhw_type	Domestic Hot Water Type	0	2	0 = No DHW management, 1 = Diverting Valve, 2 = No Diverting Valve (Stand-alone DHW)	0	-	DHW_CONF
702	**02BEH**	dhw_vlvr	DHW 3-way Valve run time	0	240		30	s	DHW_CONF
703	**02BFH**	dhw_leg	DHW Anti-Legionella	0	1	[Disable/Enable]	0	-	DHW_CONF
704	**02C0H**	dhw_prio	DHW Priority Config.	0	1	[No/Yes]	0	-	DHW_CONF
705	**02C1H**	dhw_max	DHW Maximum Runtime	-1	720	N.A.	240	min	DHW_CONF
706	**02C2H**	dhw_vmin	DHW Minimum Pump Speed	19	100	N.A.	19	%	DHW_CONF
707	**02C3H**	dhw_vmax	DHW Maximum Pump Speed	19	100	N.A.	100	%	DHW_CONF
708	**02C4H**	dhw_dtsp	DHW Pump DeltaT Setpoint	2	20		7	K	DHW_CONF
709	**02C5H**	dhw_sens	DHW Tank Sensor Type	0	3	0 = Thermal Switch, 1 = DHW Sensor (thermistor 10 KΩ), 2 = DHW Sensor (thermistor 5 KΩ), 3 = DHW Sensor (thermistor 3 KΩ)	1	-	DHW_CONF
710	**02C6H**	dhw_bias	DHW Tank Sensor Bias	-5	5	N.A.	0.0	K	DHW_CONF
711	**02C7H**	dhw_bck	DHW Electric Backup	0	1	[Disable/Enable]	0	K	DHW_CONF
720	**02D0H**	DHW_OVR	Timed Override Hours	-1	24	-1 = Schedule disable, 0 = Schedule enable, 1 to 24 = Timed override hours	-1	-	DHW_SCHD
721	**02D1H**	DHW_DOW1	Period 1 DOW (MTWTFSSH)	00000000	11111111	bit7 = Monday … bit1= Sunday, bit0 = Holiday	00000000	-	DHW_SCHD
722	**02D2H**	DHW_TOD1	From	00:00	23:59	N.A.	00:00	hh:mm	DHW_SCHD
723	**02D3H**	DHW_END1	To	00:00	24:00	N.A.	00:00	hh:mm	DHW_SCHD
724	**02D4H**	DHW_DOW2	Period 2 DOW (MTWTFSSH)	00000000	11111111	see above	-1	-	DHW_SCHD
725	**02D5H**	DHW_TOD2	From	00:00	23:59	N.A.	00:00	hh:mm	DHW_SCHD
726	**02D6H**	DHW_END2	To	00:00	24:00	N.A.	00:00	hh:mm	DHW_SCHD
727	**02D7H**	DHW_DOW3	Period 3 DOW (MTWTFSSH)	00000000	11111111	see above	-1		DHW_SCHD
728	**02D8H**	DHW_TOD3	From	00:00	23:59	N.A.	00:00	hh:mm	DHW_SCHD
729	**02D9H**	DHW_END3	To	00:00	24:00	N.A.	00:00	hh:mm	DHW_SCHD
730	**02DAH**	DHW_DOW4	Period 4 DOW (MTWTFSSH)	00000000	11111111	see above	-1	-	DHW_SCHD
731	**02DBH**	DHW_TOD4	From	00:00	23:59	N.A.	00:00	hh:mm	DHW_SCHD
732	**02DCH**	DHW_END4	To	00:00	24:00	N.A.	00:00	hh:mm	DHW_SCHD
741	**02E5H**	msl_cod	Mst/Slv Activation Code			N.A.	0	-	N.A.
742	**02E6H**	ms_sel	Master/Slave Selection	0	2	0 = Disable, 1 = Master, 2 = Slave	0	-	MSL_CONF
743	**02E7H**	slv1_add	Slave #1 Address	0	239	N.A.	0	-	MSL_CONF
744	**02E8H**	slv2_add	Slave #2 Address	0	239	N.A.	0	-	MSL_CONF
745	**02E9H**	slv3_add	Slave #3 Address	0	239	N.A.	0	-	MSL_CONF
746	**02EAH**	cap_strt	Capa. To Start Next Unit	30	75	N.A.	75	%	MSL_CONF
747	**02EBH**	cap_stop	Capa. To Stop Next Unit	1	25	Reserved for future use	25	%	N.A.
751	**02EFH**	casc_typ	Cascade Type	0	2	0 = Starting Master First, then first Slave to last Slave. Stopping Last Slave to first Slave, then Master. 1 = Starting/stopping units according to wear factors. 2 = All units are started/stopped at the same time.	1	-	MSL_CONF
752	**02F0H**	ms_h_kp	M/S Heat Proport. Gain	0,001	10		6	-	MSL_CONF
753	**02F1H**	ms_h _ti	M/S Heat Integral Time	10	240		30	s	MSL_CONF
754	**02F2H**	ms_h _ts	M/S Heat Sampling Time	10	240		30	s	MSL_CONF

Par.	Jbus	Mnemonic	Description	Min	Max	Range	Default	Unit	Table
755	02F3H	ms_c_kp	M/S Cool Proport. Gain	-10	0,001		-6	-	MSL_CONF
756	02F4H	ms_c _ti	M/S Cool Integral Time	10	240		30	s	MSL_CONF
757	02F5H	ms_c _ts	M/S Cool Sampling Time	10	240		30	s	MSL_CONF
758	02F6H	ms_pmp	Master/Slave Pump Type	0	3	0 = No pump control, 1 = Common Water Pump, 2 = Individual Water Pump: running according to M/S Overrall Status (Par.229), 3 = Individual Water Pump: stopped if unit is satisfied	2	-	MSL_CONF
761	02F8H	JBUS_J6	JBus on J6 port	0	1	[No/Yes]	0 [No]	-	N.A.
762	02FAH	jbus_add	JBus Slave Address	1	255		11	-	JBUSCONF
763	02FBH	jbus_bdr	JBus Baud Rate	0	2	0 = 9600 Baud / 1 = 19200 Baud / 2 = 38400 Baud	0	-	JBUSCONF
764	02FCH	jbus_frm	JBus Frame Type	0	5	0 = No parity, 1 stop bit / 1 = Odd parity, 1 stop bit / 2 = Even parity, 1 stop bit / 3 = No parity, 2 stop bits / 4 = Odd parity, 2 stop bits / 5 = Even parity, 2 stop bits	0	-	JBUSCONF
765	02FDH	jbus_tmt	JBus Comm. Timeout	0	600		600	s	JBUSCONF
797	031DH 031EH	unlock	Software Protection Code			N.A.	0	32 bits	SOFTPROT
799	031FH	password	Current Password	0	9999		0	-	SOFTPROT

7.2 - Description of customized DI/DO configurations

Par.	Description	Range	Range description
501	Customized DI#7 Config	-10 to 10	0 = Disable 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 Thermal Switch (request) 6 or -6 = DHW Timed Override Button 7 or -7 = DHW Anti-Legionella Cycle Request Button 8 or -8 = DHW Priority Switch 9 or -9 = External Alarm Indication 10 or -10 = Boost Mode Request Switch Positive values correspond to Normally Open contact Negative values correspond to Normally Closed contact
502	Customized DI#8 Config		
503	Customized DI#9 Config		
504	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 = Additional Pump 10 = Boiler command 11 = Electric heater satge #3 (EH3) 12 = DHW Heater 13 = Output controlled by customer (via JBus/Modbus)
505	Customized DO#8 Config		
506	Customized DO#9 Config		

8 - START-UP CHECKLIST FOR 30AWH-P 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

Option / Accessory	**Yes**	**No**
Backup heater		
Water filling system		
Base panel heater		
Master / Slave sensor		
Domestic hot water management sensor		
Remote human interface		
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				
		Saturated suction temperature	P008	°C				
		Superheat temperature	P015	K				
		Superheat target temperature	P016	K				
	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	P106	-				
		Safety Switch Status	P105	-				
	Power	NetworkVoltage	-	V				
		Input Amperage	-	A				

8.5 - Maintenance checks

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

Comments:

Order No: 10707, 03.2023 - Supersedes order No: 10707, 12.2021.
Manufacturer reserves the right to change any product specifications without notice.

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