



INVERTER HP's



PV Integration
compatible



Mitsubishi Compressor inside



Operation, installation & maintenance NZ AU.

IQ AS7V1Ph IQ AS10V /1Ph IQ AS15V /1Ph IQ AS20V /3Ph

Installation of this unit must adhere to Local NZ AU
Building Codes and Standards.

Read this manual before installing and or operating the appliance

Please pay particular attention to the sections *

Leave the manual with the end user/appliance

Sectional index

* Pre installation	
* System configurations	
* Working principal	
* Plumbing and electrical connections	
User instruction	
Engineer and manufacture settings	
Detailed operation principals	
Maintenance and alarms	
Technical information	
Sensor resistance tables	
Parts identification	
Service record	

Important note for installers

Compressor crankcase heater

- This unit is equipped with a compressor crankcase heater which heats the compressor oil and evaporates dissolved refrigerant before start-up when the outdoor temperature is low.
- When the outdoor temperature is above 5° and below 10°, The unit must be in a standby state for 1 to 2 hours before the unit is run for the first time, if the temperature is below 5° for 3 hours and below 2° for at least 6 hours. This ensures compressor crankcase heater has the compressor oil is at the correct temperature before the FIRST start, ensuring that no damage is done to the new compressor.

Remember The time you take, and the attention to detail you apply at the time of installation and commissioning is the key to reliable long term operational service this appliance,

Once you complete the installation, Take some time to show your customer how to use this heating system this appliance and the associated control devices.

User Maintenance Requirements

To ensure the optimal performance periodic maintenance is essential. Failure to undertake basic maintenance can reduce the unit performance and shorten the life of the appliance.

1. **Make regular checks throughout the year to ensure the inlet grill is not blocked or clogged by leaves, snow or any other form of restriction.**
2. **During colder periods check that there isn't excessive frost or ice building up on or around the unit.**
3. **Visually check for loose, damaged or broken parts. If such faults are found contact your installer.**
4. **To maintain the cabinet wipe the surface down regularly with a damp cloth the apply silicone spray or car body wax**
5. **During the cleaning process, isolate the electrical supply to the appliance.**



Important Safety considerations - Please read before working on this appliance

To avoid issues that could damage to the appliance or cause injury this appliance must be installed by a suitably qualified competent contractor. All electrical wiring associated with the appliance must be completed by a licensed electrical contractor in accordance with NZ / AU Standards.

To reduce the risk of electrical shock. first make the water connections, then electrical connections. If the unit is to be removed first disconnect the electrical connections, then the water connections

Disconnect at the main power supply before exposing any internal parts of the appliance. In case of malfunction turn the unit off, isolate the mains power supply and contact a qualified service engineer.

Defects found during installation must be rectified before commissioning. If repairs are carried out then the operation of relevant safety devices & parameters must be rechecked.

If a refrigerant leak occurs, remove the complete charge using a recovery unit & store the refrigerant in a suitable for purpose mobile container. When a leak is rectified recharge the unit with the correct filling weight and Gas type. This can be found on the appliance data plate.

Ensure the correct refrigerant gas is used to recharge the unit as incorrect gas will cause severe damage to the compressor. Care should be taken as refrigerant can breakdown due to high temperature, these refrigerants by-products are dangerous.

Do not use oxygen to purge refrigerant lines or to pressurize under any circumstance Oxygen gas reacts violently with oil, grease and other common substances. Use only dry nitrogen for testing and never exceed the specified maximum operating pressures.

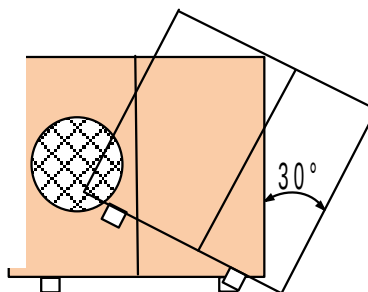
Do not un-weld or flame cut refrigerant lines or refrigerant circuit components until the entire refrigerant (liquid and vapour) is removed from unit. Traces of vapour should be displaced with dry nitrogen. Do not siphon refrigerant. **Refrigerant in contact with an open flame will produce toxic gases.**

Ensure that the necessary safety protection equipment is available. Have an appropriate fire extinguisher to hand when working on this appliance.

Take care with refrigerant Avoid spilling liquid refrigerant onto skin or splashing it into the eyes. Use safety goggles. 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 seek urgent medical advice

Movement and Storage prior to installation

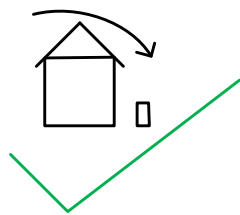
This appliance must not be transported, moved or stored at an angle greater than 30° from the upright position. Store the unit in a dry area prior to installing.



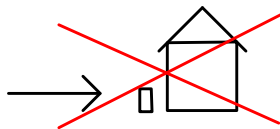
Installation Location

- This appliance must be installed outside on a concrete pad foundation not connected to the house foundation.
- If operating in temperatures below 0°C for prolonged periods or locations where the snow may fall the base must be raised. we recommend 200 mm above ground to avoid ice build-up on the unit's chassis.
- The unit should ideally be placed so that it is well away from bedrooms or noise sensitive areas including neighbour's section boundaries. (The unit may produce noise that exceeds a 45 decibel rating).
- A North facing location aspect will give higher efficiency than a South facing aspect.
- Make sure discharge water cannot run out onto paths as it may cause ice or slime to build up which is a Hazard. **(The unit is fitted with a collection tray and outlet spigot for waste discharge connection)**
- Avoid locations exposed to machine oil vapour, salt air, thermal springs, sulphur gases or other harsh substances. In areas with exposure to the above additional treatments must be applied by the installer to protect the appliance. This will form part of the on-going maintenance regime, the effects of a harsh Coastal or Geothermal atmosphere are not covered by warranty and may shorten the working life.
- Locations exposed to strong winds should be avoided otherwise baffles may be necessary to deflect strong winds. Baffles must not restrict air flow & should be at least 2m from the appliance. A baffle is better if it is not a flat face as this may magnify sound e.g.: a bush is better than a wall
- The unit must be installed level in both axes (less than 2mm tolerance per meter)

Indirect offshore wind

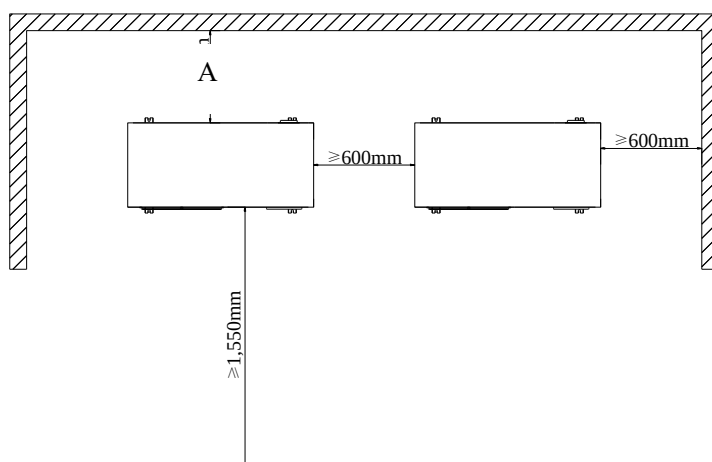


Direct offshore wind



- Keep a suitable distance between the unit and the building to ensure normal operation of the appliance and provide enough room for maintenance.

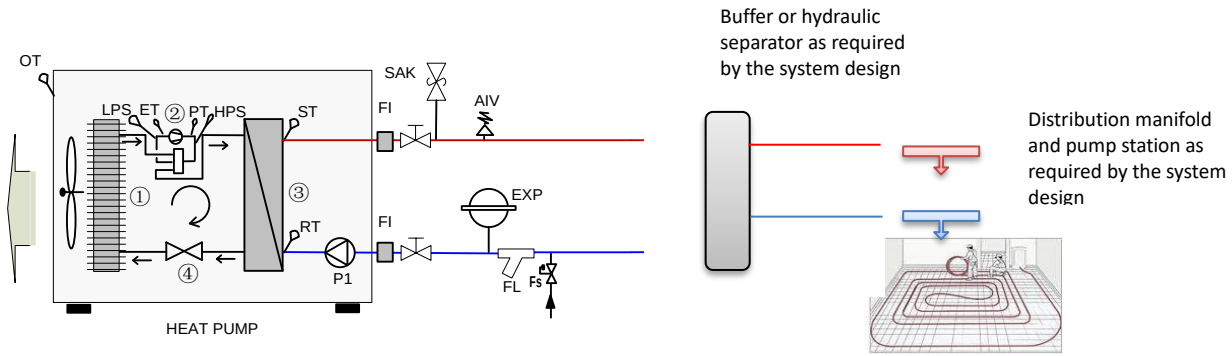
Clearances



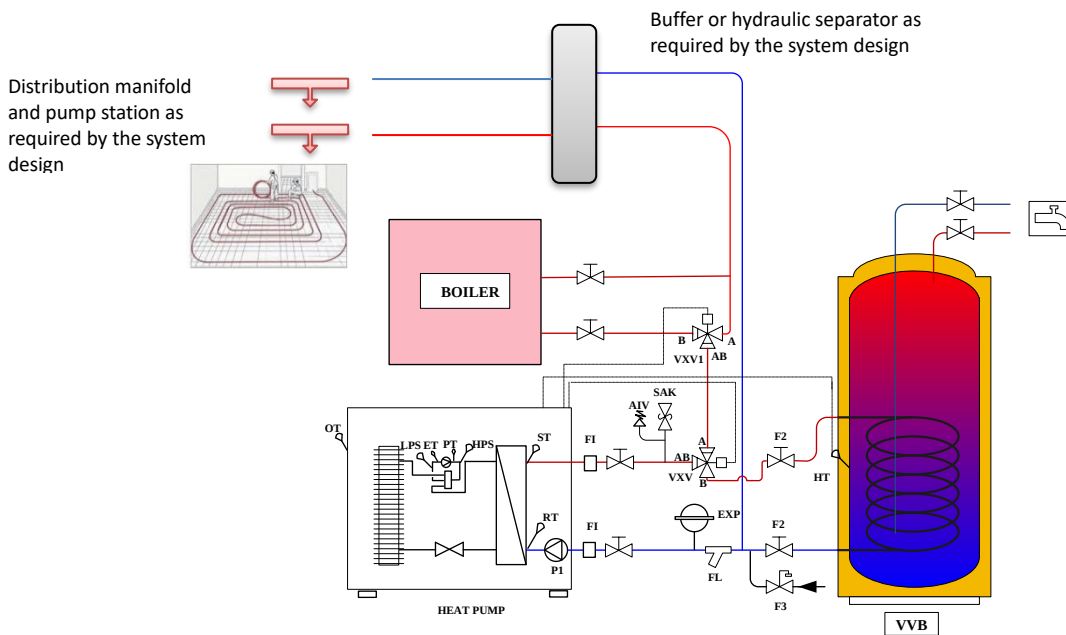
A=
AS7/10V 200mm
/AS15V 220mm

System configuration

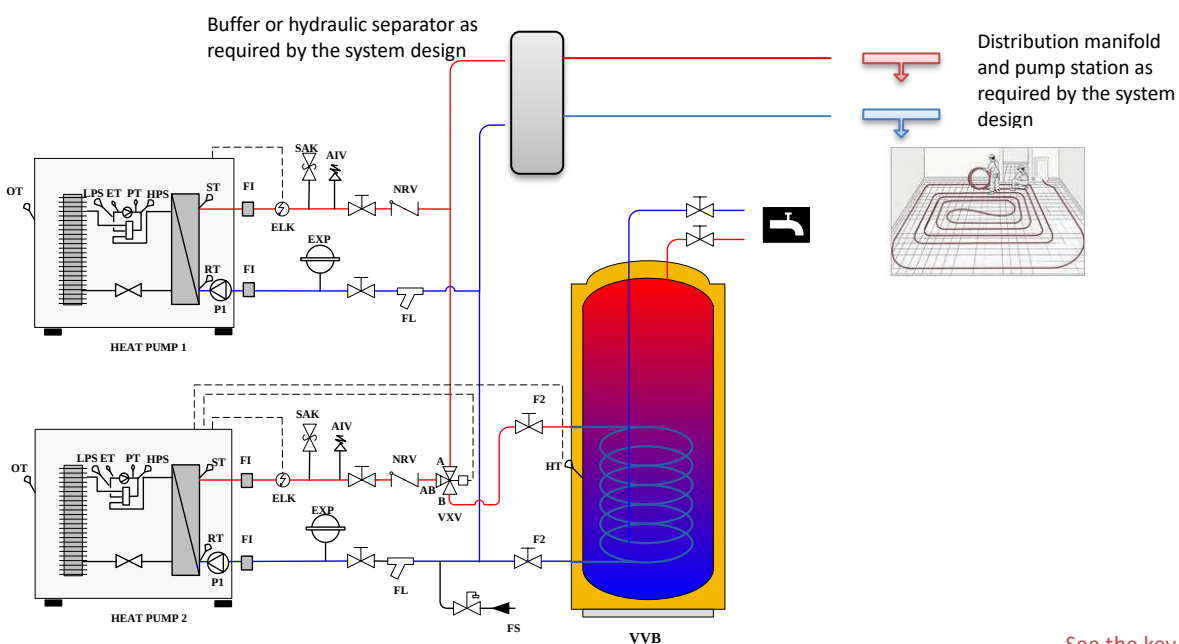
System Overview 1: Under-floor heating only.



System Overview 2: Heating, Cooling DHW Production and Boiler back up.



System Overview 3: Multiple Units in Series Cascade Connection.



See the key to icons and working principals for each schematic set out on next two pages.

Nam	Description	Included ?	Nam	Description	Include
P1	Circulation pump	Internal	RT	Inlet water temperature sensor	Internal
VXV	3 way Valve	External	ST	Outlet water temperature sensor	Internal
VVB	Hot water tank	External	OT	ambient temperature sensor	Internal
FI	Soft joint	External	HT	Domestic hot water temperature	Internal
F2	Shut-off valve	External	PT	Discharge gas temperature	Internal
SAK	Safety valve	External	ET	Suction gas temperature sensor	Internal
FL	Filter	External	HP	High pressure transducer	Internal
NRV	Non-return valve	External	LP	Low pressure transducer	Internal
ELK	Electric heater	External	EXP	Diaphragm expansion vessel	External
AIV	Air vent valve	External	FS	Automatic water supplement	External

System operation Overview 1 heating only

Heating Mode Working Principle: Same As overview 2 below but there is no three way valve (VXV)

System operation Overview 2 Heating/Cooling/DHW production

Heating mode working principle

When In heating mode, the 3 way valve (VXV) will be in the default open to heating position.

In heating mode, **Compressor is On** : When the RT sensor drops below (heating set point ST02) by (differential ST04) - **Then** - The compressor will turn **Off**: when the RT sensor is ST02 + 2°C and running frequency of the compressor has reduced to Minimum for 120s.

T (heating) calculation:

Default ST02 = 35, ST06 = 0.6

1.) When SF04 = No, there is no heating curve. T (heating) = ST02. 2.) When SF04 = Yes, heating curve is activated, T (heating) = ST02 + (20 - OT) X ST06. If calculated T (heating) is higher than ST14, ST14 would be T (heating). Refer to chapter "Heating compensation curve setting".

Auxiliary Electric backup element, or boiler control (Element included as default in NZ appliances)

The integral auxiliary backup element can only be **ON** when all of conditions below are met.

- 1.) Heating mode is operational and the compressor has been running on the maximum workable frequency.:
- 2.) The compressor has run for over 300s
- 3.) OT Sensor is below ST07
- 4.) RT sensor is ST02 is -ST04-2;

The auxiliary backup element is **OFF** when either of these conditions are met. 1.) A/C flow alarm. -Or- 2.) RT is ST02 - 2

Cooling mode, working principle:

In cooling mode, the 3 way valve (VXV) will open in the default heating position. (Where only part of the overall system is used for cooling there may be a requirement for further motorised control valve/s to be includes in the system design, these are not covered in this manual)

The compressor is **ON** when: the RT sensor is over ST01 + ST03 (ST01 is the control water temperature in cooling mode)

The compressor is **Off**: when the RT Sensor is below ST01 by 1.5° & running frequency of the compressor has reduced to minimum for 120s.

T (cooling) calculation:

Default ST01 = 13, ST08 = 0.6

- 1.) When SF04 = No, there is no cooling curve. T (cooling) = ST01.
 - 2.) When SF04 = Yes, cooling curve is activated, T (cooling) = ST01 + (35-OT) X ST08
- If calculated T (cooling) is lower than ST11 then ST11 would be T (cooling).

Domestic Hot water production working principle:

In hot water mode, the 3 way valve (VXV) will open to feed the hot water cylinder coil, closing the heating port.

- 1.) When ST09 is set below ST20

Compressor is turned ON when HT sensor reads ST09-ST10 then - The compressor will turn Off when HT sensor reaches ST09

- 2.) When ST09 is set higher than ST20

Compressor is turned ON when the HT sensor is below ST20 by ST10 then- The compressor will turn off when HT sensor reaches ST20

So: when DHW set point ST09 is lower than ST20, only the compressor is switched on to produce DHW.

Or: When DHW set point ST09 is higher than ST20, DHW will be heated to ST20 by the compressor, then the managed electric element in the DHW cylinder will be switched on to raise the DHW up to the ST09 set point.

System operation overview 3: Multiple Units in Series Cascade Connection

Heating working principle

To set two units in parallel operation, set the primary unit to the required parameters, and the other to have a 2~5°C difference of the ST01 and ST02 parameters to allow for energy stage control.

INSTALLATION

Pipe - system connections

It is important that you follow the installation information provided here.

Pipework and valve train requirements must be in line with the schematics on page 4 or as prescribed in the system design provided by the distributor.

1. Installation must adhere to NZ Building & Plumbing Codes, including any local council requirements.
2. Ensure that flow and return pipework is correctly sized for the system and appliance and that they are not reversed. Reversing the water flow will reduce the output of the unit; refer to the labels on the unit for the correct water flow direction.
3. Pipe connections must avoid any radial or axial forces to the heat exchanger. Allow some pipe flexibility between the unit and the structure to reduce any stresses and vibrations issues. Flexible union connections with rubber gaskets should be used where possible to reduce potential for vibration transmission.
4. Pipework installation must be run to minimise the use of elbows as they can restrict flow. Use bends in pipework rather than elbows wherever practical to do so.
5. It is essential to insulate all of the system Flow and Return pipe work including HP connections and pipework within the building, including fittings. This is to protect against both thermal heat loss, impact from frost and importantly to prevent condensation on chilled pipes where cooling is adopted.
6. Protection devices must be included to protect the appliance from operating outside of its parameters these must include, air relief valve/s, a 3 bar safety valve, a particulate (Y) strainer on the return and a correctly sized expansion vessel. Failure to provide any of the above items will void the warranty on this appliance.
7. Isolation service valves must be fitted at the heat pump to facilitate future service requirements. A drain connection at a low point in the pipework is required to allow the system to be drained if required.
8. Water to fill the system must be clean, and must not contain heavy metals or minerals that could cause harm to the unit.

Note it is important to ensure that any new heating system installation attached to this appliance is thoroughly flushed, before connection to this appliance. A system cleaner product such as Kamco Hyper flush must be used to flush any pre, existing system that this appliance may be attached to.

9. Water within the system must be treated with an approved inhibitor to prevent corrosion, fouling and deterioration of the system. The inhibitor level should be tested annually, and the dosage maintained. Kamco System-safe DM & Fernox are approved. Please confirm suitability if you wish to use an alternative product. Failure attributable to a lack of inhibitor will not be covered by the appliance warranty.
10. A filling loop with braided filling hose, a pressure limiting valve set to 1.3 Bar and gauge should be provided, such that it will allow the user to easily top up the system pressure. This assembly should not be permanently connected and active and must include a check valve.

11. For appropriate sizing and set out of A DHW cylinder refer to page 11

Warranty extends to the use of this appliance as prescribed for the purpose for which it is supplied only. Warranty is void where the appliance is incorrectly installed and or operated.

Electrical connections

All voltage connections must only be carried out by a suitably qualified electrician.

Note The Carel HP user interface and RJ10 connection cable are shipped within the HP Cabinet

An additional cable can be ordered separately from the regional distributor for install at pre wire.

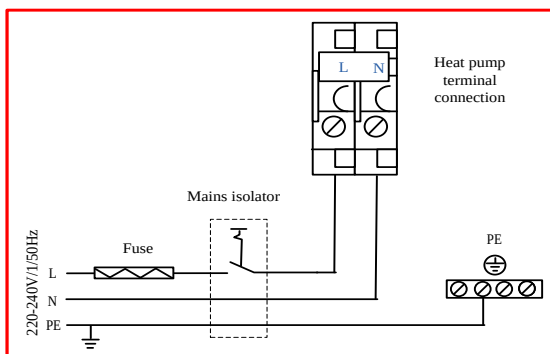
- The power supply must conform to the specification on the unit's nameplate. The supply voltage must be within the range specified in the electrical data table.
- For wiring connection, refer to the electric wiring diagram on the inside of the front panel of the unit.
- RCD breaker protection must be included at the distribution board, according to the max value stated in the nameplate attached to the appliance.
- A local isolator switch with a minimum breaking gap of 3 mm must be provided. This switch must not be mounted directly on to the appliance.

Power supply

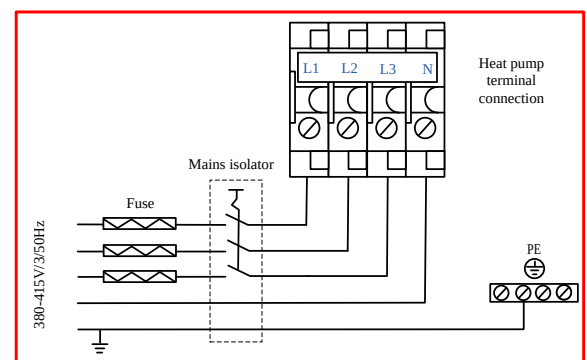
IQ AS10V AS15V Are Single Phase appliances. IQ AS20V Requires a Three Phase power supply:

Please refer to the electric wiring diagrams pasted inside the front panel.

Single phase: IQ AS10 and 15V



Three phase: IQAS20V



Controls and accessory connections

Wired User Interface

The User interface must be installed indoors. about 1.5m up from the floor, (out of reach of children.) The Standard factory delivered RJ10 Plug in connection cable is 10m. Connect the user interface using this plug in connection cable.



HW Temperature sensor ; for the hot water cylinder:

The domestic hot water sensor (B4) is pre connected to terminal positions B4 and GND on the main board. This probe must be placed into the hot water cylinder temperature sensor probe pocket if hot water is optioned.

If the domestic hot water sensor cable runs close to power cables, then a shielded cable must be used. If conduit is used then it should be sealed to avoid condensation forming in the temperature sensor probe.

Important:

Temperature sensor cables must be separated (min 200 mm) from high voltage power cables to avoid interference causing measured temperature fluctuation & incorrect operation.

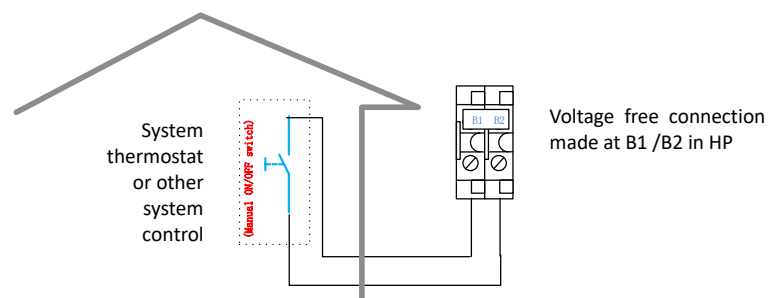
Heating function switching control connections

There are two possible methods to turn ON/OFF the **Heating** (A/C) function (settable via SF14)

If SF14 is set to, **“keyboard”** (the factory default setting). Then external system controls do not control the unit, the Carel user interface maintains control over the appliance.

If SF14 is set to **“remote”**. The Carel user interface can no longer be used to turn the **heating** On or Off. its heating time zone On/Off function is deactivated. Terminal Connections B1-B2 are now used to turn On/Off the heating, Via a volt free signal from external system controls

EG; An external signal like a timer, thermostat, or under-floor wiring centre with a volt free switch output are connected to B1-B2 to activate the unit's heating function as required. *As below*



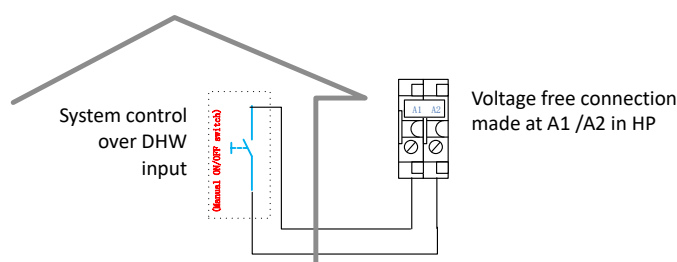
Domestic Hot water function switching control connections

There are two ways to turn ON / OFF the domestic hot water function (Settable via SF13).

If SF13 is set to by **“keyboard”** then the DHW input is fully controlled by the Carel user interface

If SF13 is set to by **“remote”** Then DHW demand is controlled by an external control. In this setting the Carel user interface cannot be used to turn On or Off the DHW and its time zone function is disabled.

If SF 13 is By remote The A1-A2 switch connection in the HP is activated to turn On or Off the hot water function via an external system control such as a timer wired to it. As below



DHW element control principal:

- 1.) If ST09 is set below ST20, DHW is only heated by the compressor. If ST09 is set above ST20, compressor stops heating DHW after HT reaches ST20 , and the element is switched on until HT reaches ST09.
- 3.) If there is a compressor fault and there is DHW demand, the element is switched on until HT reaches ST09

Legionella protection

- 4.) The Element is switched on to kill legionella bacteria until HT exceeds ST27, if HT is not over ST27 in the time interval ST26.

If ST26 = 0, Legionella function is not active. By default ST26 =360 Hr's this can be set to between 0 and 1000Hrs.

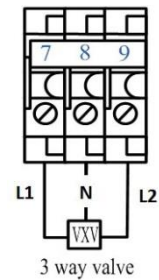
DHW Three Way Valve Connection (NO7 NC7)

Where DHW is optioned A motorised 3 way valve must be used

If the valve used is power open power close then terminals 7-8-9 at the HP are used

If the valve is power open –spring return then only terminals 8 and 9 at the HP are used.

For hydronic connection of the 3 way valve refer to "system overviews"

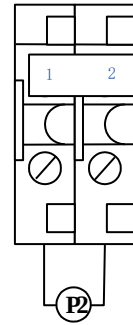


DHW Reticulation Pulse feed circulation Pump Connection option (N01)

If the domestic hot water is to be reticulated, then our optional DHW circulation pump can be installed in the domestic hot water reticulation loop connected to cylinder. The reticulation pump power supply is connected to terminals (1-2) on the terminal block.

DHW circulation pump, operating principal:

- 1.) When DHW mode is on, the reticulation pump will be switched on and run for a period of ST34 in every ST33 interval. Eg; 3 minutes every 15 minutes
- 2.) When DHW mode is switched off, The pump is off after a 3 minute delay.



Auxiliary Electric Heater, or Boiler backup.

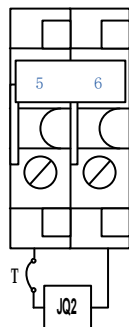
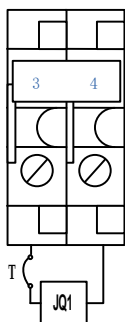
NZ/Australia all models are equipped with an integral heater (Element) as standard.

The auxiliary heating element is fitted inside the unit, it is connected to the control board via a relay

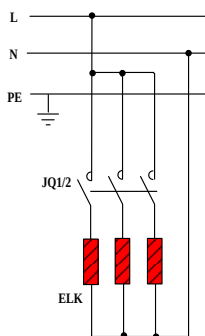
If the auxiliary element is not fitted, there is a connector on terminal block numbered (3-4) . An auxiliary electric heater or a boiler could be connected to 3-4 via a relay JQ1 for provision of heating backup. See below.

DHW Cylinder element control

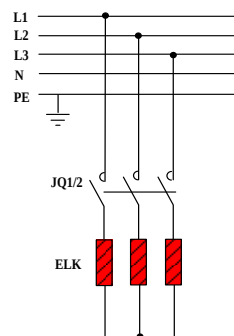
Connector (5-6) are to be used to activate and de-activate the DHW cylinder element for heating domestic hot water this output must be via a relay JQ2. (not provided)



(Single phase)



(Three phase)



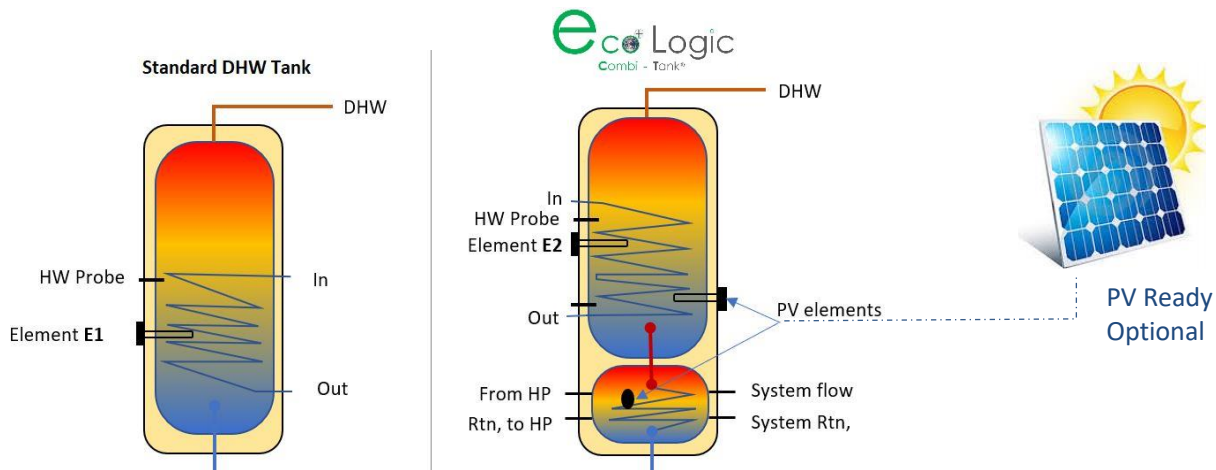
Important: do not connect elements directly to the terminal block - this will burn-out the controller.

For auxiliary heating electric heater running regulation refer to the section "system overviews"

Typical DHW cylinder set up (standard DHW cylinder or Combi-tank)

It is important to use a cylinder that is fit for purpose. A heat pump delivers coil input at a much lower temperature and transfers heat with a much lower differential between the body of water and the heating coil compared to a boiler, wetback or solar. **The coil in a cylinder used with a heat pump must have considerably larger surface area to enable effective heat transfer.** If you have a dual coil cylinder you may connect the two coils together in series for improved input performance

There is nothing to gain from over sizing a DHW cylinder in a heat pump system, a 250L cylinder would be more than adequate for most homes.



Shown above are a Typical DHW cylinder, and the Heat IQ Eco+ combi tank

Using the conventional cylinder

- The cylinder is piped via a three-way valve from the primary flow and return. these connections for the cylinder coil F/R are made in the line before the hydraulic separator or buffer tank.

Using the Eco+ Combi tank

- Designed to optimise the energy efficiency of the system in this format a buffer tank within the cylinder shell has a coil used as a pre heater for DHW. By doing so Combi-Tank® utilises the higher COP energy from the buffer reducing the requirement for lower COP input through the three way valve to cylinder coil.
- The efficient option for any system, Combi-Tank® also allows the system the option to input **solar PV** energy into both the DHW and the Heating system via elements, for even greater energy efficiency.
- Having both the Buffer tank and Cylinder within a single shell simplifies installation and keeps the system neat while using less space.
- Combi-Tank® can also be installed with the optional management module for further energy saving features and user options. (See *Combi-Tank manual/brochure*)

*When including a Combi-tank® please refer to the specific element control options in the Combi Tank installation instructions.



Commissioning



Compressor crankcase heater

This appliance is equipped with a compressor crankcase heater to heat the compressor oil and evaporates any dissolved refrigerant before start-up.

- When the outdoor temperature is above 5° and below 10°, The unit must be in a standby state for 1 to 2 hours before the unit is run for the first time, if the temperature is below 5° for 3 hours and below 2° for at least 6 hours. This ensures compressor crankcase heater has the compressor oil is at the correct temperature before the FIRST start, ensuring that no damage is done to the new compressor.

Preparations- Filling and Flushing

1. Before commissioning, ensure the whole system has been fully flushed and re filled with fresh water.
2. Check the pipe work in the associated system for leaks.
3. Vent air out the system using the air venting valves.
4. The system must be dosed with an approved inhibitor and set to the required (1.1 to 1.5 bar) pressure

We also recommend the inclusion of a biocide dose to prevent contamination of low temp systems

Start-up and Inspection

1. Start the unit by turning on the heating control system and therefore switching on the unit.
2. The water pump will start, then over a period of delay the fan motor, and finally the compressor.

Air in the System after Start-up

- Air will initially be released from the water as its heated so further venting may be required.
- If a bubbling sound can be heard from the heat pump, the circulation pump, under-floor and or radiators then the entire system will certainly require further venting.

Inclusion of a pressure limiting valve set at 1.1 bar as part of the filling loop will allow the system filling point to remain active throughout commissioning and may be left active for a few days while the system is initially used. It is also a recommended this valve remains as part of the filling point as this will avoid the potential for over pressure when topping up the system. The system filling loop should not be left as a permanently open fill point as this will mask any leaks and is non compliant **A permanently connected filling loop may void a claim under the appliance warranty.**

Once the system is stable the heating control systems can be fully set as required, and operationally tested.

Frost Protection

IMPORTANT

Local climatic conditions are to be considered by the installing contractor.

Requirements for the introduction of glycol are not covered in associated system design provided by the distributor.

It is the installer's responsibility to ensure adequate consideration is given to requirements for frost protection.

In areas where Temperatures may consistently fall below 0°C A Glycol solution may be required.

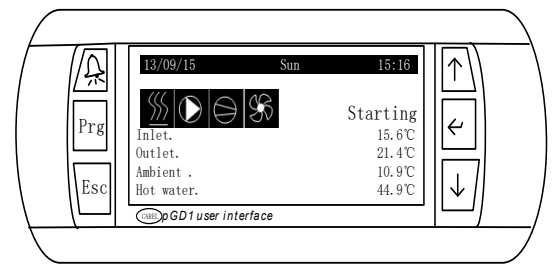
1. Add the correct percentage of suitable glycol antifreeze to the water circuit. For example You can purchase **Kamco Freezbreaker** from Heat IQ (NZ)
Freezbreaker at a dose of 12.5 % volume in the system gives protection to - 6 / 25% to -12 / 40% to – 20)
2. Power to the unit must remain on all the times in order that the appliance can start the circulation pump and auxiliary heater for the integral anti-freeze protection.

Warranty does not cover damage where inadequate frost protection is a contributing factor

(Refer also to installation location instructions)

User Guide

(User Interface - Display & buttons)



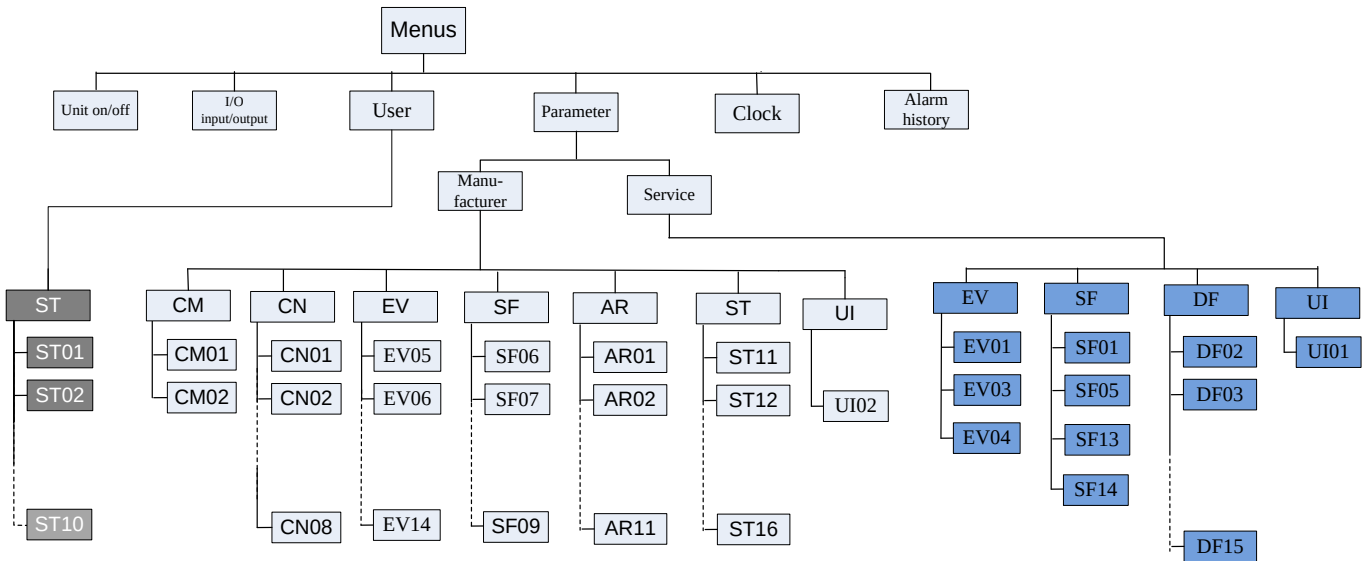
Operating buttons

Button	Name	Operation
	<Alarm>	This button will flash to indicate when an alarm occurs. Press -, to re-set manual re-set alarms, after the fault is removed.
	<Program>	Press to enter main menu
	<Esc>	In Menu /parameter setting mode, press- to return to the previous menu level.
	<Enter>	In Menu/parameter setting mode, press to enter the menu, or to save the value entered or to scroll to the next parameter data.
	<Up>	Press to scroll to another menu, or to increase a value in Menu/parameter setting mode
	<Down>	Press to scroll to another menu or to decrease a value in Menu/parameter setting mode In stop, standby or On mode, press it to read actual temp. from inlet water temp. to outlet water temp.....

Symbol explanation

	Heating mode
	Cooling mode
	Domestic hot water mode
	Domestic hot water mode + Heating mode
	Domestic hot water mode + Cooling mode
	Water pump
	Compressor
	Fan

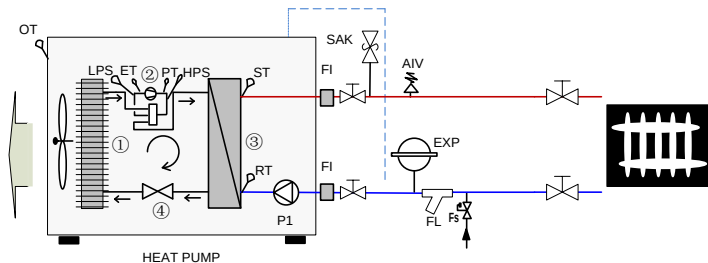
Interface Menu Tree



Code	Relates to	Code	Relates to
CM	Compressor settings	ST	Setpoints
CN	Condenser settings	UI	User interface
EV	Evaporator settings	AR	Alarm settings
SF	Special functions	DF	Defrost settings

Three access groups, with different privilege levels are applied.

Privilege Level	Main Activities, Special	All
Manufacturer	• Password required • Configure and commission applications by setting/adjusting parameter values	• View information and status • Acknowledge warnings and alarms • Heating /Cooling changeover
Service	• Password required • Configure and commission applications by setting/adjusting parameter values	
User	• No password is required • Adjust User parameters	



How it works

1. Low pressure, low temperature liquid refrigerant coming out of the expansion valve extracts heat energy from the air passing through a densely finned coil heat exchanger ① and evaporates into a gas state.
2. The gas state refrigerant is sucked into the compressor ② compressed to high pressure and high temperature gas.
3. This high pressure, high temperature gas is discharged, and the compressor releases its heat energy transferring it to water via the plate exchanger ③ as this happens the gas is condensed to liquid state.
4. The now liquid state refrigerant is expanded in thermostatic expansion valve ④ and again becomes low pressure and low temperature liquid refrigerant and the cycle repeats.

Main menu:

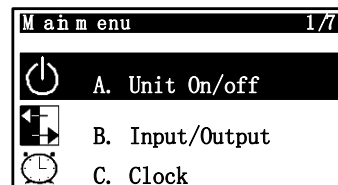
Press  button to enter main menus:

- A. Unit on/off A/C(heating) & DHW
- B. I/O input/output
- C. Clock
- D. User
- E. Service
- F. Manufacturer
- G. Alarm history

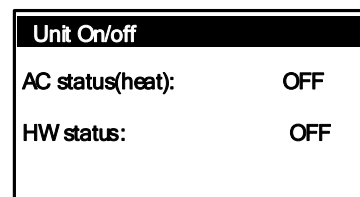
Remark: this will not appear if unit on/off for heating or hot water method is by remote.

Unit on/off setting. (When the appliance on/off method is by keyboard)

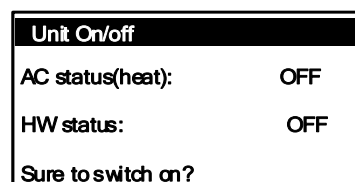
Press  button. The display shows -



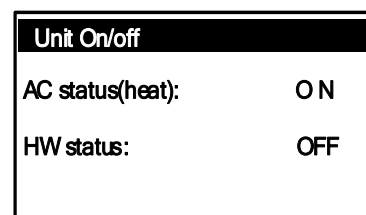
Press  button, the display shows the unit current heating (AC), and domestic hot water (DHW) On/Off status.
If the set mode is heating (not cooling), it displays AC status (heat).



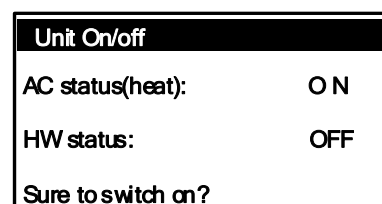
The "OFF" icon flashes on AC status (heating),
press the  button, it will display **Sure to switch on:**



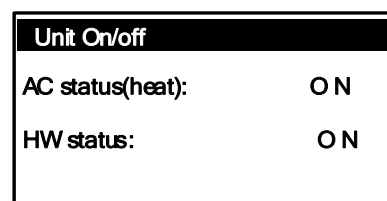
Press  button to enter.
The display indicates AC (heating) is now On:



Press  button, the "OFF" on HW status flashes,
press  button, it will display: **sure to switch on**



press  button to enter, it will now display HW On



Continues next page

A/C (Heating) and DHW are now successfully switched on. “Starting” displays on the screen, the water pump turns on and the pump symbol displays on the screen. Within some minutes of delay, the fan and compressor will turn on and their respective symbols will also display the on screen. *Switching the unit **Off** is same operation.*

The Appliance can also be switched on/off via **Remote** switches to A1-A2 (hot Water), and, B1-B2, (Heating). Refer to chapter power connections – We recommend the use of remote switching from the heating via B1 B2 as the default control method. **Note; in this format you will not able to turn AC (Heating) on or off at the User interface.**

In operation, inlet temp, outlet temp, ambient temp, etc, can be checked via pressing up and down buttons.

I/O input/output This menu displays the unit measured temperature sensors value, digital switch on/off state, components on/off state.

B1	RT	AC inlet temp
B2	ST	AC outlet temp.
B3	OT	Ambient temp.
B4	HT	Hot water temp.
B5	PT	Discharge temp.
B6	LPS	Suction pressure
B7	HPS	Discharge pressure
B8	ET	Suction temp.
B9	PWM	Pump duty ratio
DI4		AC switch
DI5		DHW switch
DI6		SG1
DI7		SG2
NO1		DHW circulation pump
NO2		Indoor pump
NO3		4-way valve
NO4		AC heater
NO5		Crankshaft heater
NO6		Inject valve
NO7		3-way valve
N08		DHW heater
N09		De-icing. heater
Y1		EC fan
Y3		Indoor pump PWM

Changing System mode – from Heating to Cooling

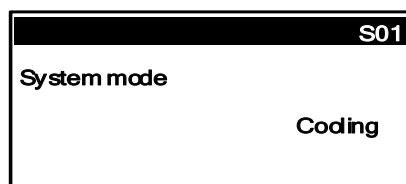
System mode can only be changed on heating/cooling units
(SF01 unit type setting = cooling + heating).

Button Operation: Prg → User → System mode

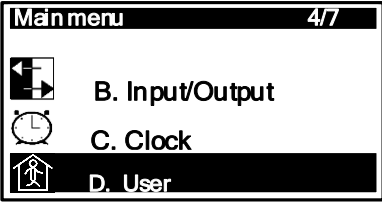
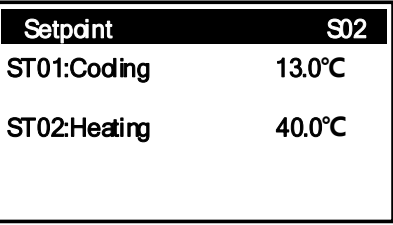
When the unit is in an off state, press “**Prg**” to enter main menu, press **up** or **down** button to User, then press Enter -, it displays:

Press the Enter button, **Heating** will flash, press the up or down button to change to Cooling,

Press the **Enter** button to confirm. - It will display:



Changing Set points (user parameters)

Display	Procedures
	Press <Prg> to display the main menu, press Down button to User, Press the Enter button, Press the Down button to the desired parameter.
	Press the Enter button, when cursor is flashing on say 13.0°C, press Up or Down button to change the value. Press Enter to confirm setting or move to the next parameter. Cursor will move to next parameter data shown here as 40.0°C , this can also be changed via use of the up or down buttons. Press Enter to confirm, Cursor will move to set point S02, When cursor is flashing on set point S02, use the down button to move to the next parameter.
Or, continuously press <Esc> to exit out of the current level and back to the desired menu level.	

User Parameter, Table.

Para-meter	Descriptions	De-fault	Min.	Max.	Unit	Res
mode	Cooling or heating	heating				
ST01	Setting temperature on Cooling mode	13	ST11	ST12	°C	0.1
ST02	Setting temperature on heating mode	35	ST13	ST14	°C	0.1
ST03	Setting temperature difference on Cooling mode	2	1	10	°C	0.1
ST04	Setting temperature difference on Heating mode	2	1	10	°C	0.1
ST06	Compensation factor for heating curve	0.6	0	3	-	0.1
ST07	Ambient temperature condition for starting the boiler or Auxiliary backup electric heater	0	-10	20	°C	0.1
ST08	Compensation factor for cooling curve	0.6	0	3	-	0.1
ST09	Setting temperature on domestic hot water mode	50	ST15	ST16	°C	0.1
ST10	Setting temperature difference on domestic hot water mode	3	1	10	°C	0.1
ST17	SG function: Cooling/heating water temperature decrement/ increment	2	1	10	°C	0.1
ST18	SG function: DHW water temperature increment	5	1	10	°C	0.1
ST33	DHW circulation pump off interval	15	0	180	min	1
ST34	DHW circulation pump running time	3	0	180	min	1
TR09	Heating (AC) time zone On/Off	disable	Disable or enable			
TR10	DHW time zone On/Off	disable	Disable or enable			
SF04	Weather compensation function	No	Yes or No			

User parameters can be adjusted when the unit is either in an ON or OFF state.

Time-zone on/off

Timezone on/off	S08
TR09:AC timezone	Disable
TR10:HW timezone	Disable

The time-zone function activates the pre-set timer programs. A time-zone function is only valid when unit on/off method is "by keyboard".

TR10: HW time-zone is for domestic hot water. When TR10 is enabled, two different time periods are available to set in every day from Sunday to Saturday.

After setting for Mondays times scroll to "Monday" and press up or down button to change to Tuesday to set its timer, and so on. If the ON and OFF data are set the same, the timer function is not activated.

Timezone on/off	S09
Monday	
	ON OFF
HW-1	00: 00 00: 00
HW-2	00: 00 00: 00

Timezone on/off	S09
Monday	
	ON OFF
AC-1	00: 00 00: 00
AC-2	00: 00 00: 00

TR09:AC timer-zone is for A/C (Heating) When TR09 is set to Enable, two different time periods for each day from Sunday to Saturday. Typically Heating control is by from the system (by remote) so Heating timing is not required.

If every day's time-zone setting is to be the same, you do not need to set day by day, just go to

Timezone on/off
Monday:
Copy from Monday
Confirm: NO

Change Monday to Tuesday, and change "No" to "Yes", then Tuesday's time-zone setting will be same as Monday. Use the same method to change Wednesday, etc.

If the unit is manually turned on by the user at the keyboard before the automatic turning on by the timer, this timer ON program is implemented and unit will be turned off automatically when the time setting reaches the next programmed off time. (The same applies to manually turning off)

S19 Displays the total compressor operating hours.

S20 Allows the re setting of the **user settings back to the factory default** – To action Change no to yes press enter

Compressor	S19
Operating hours	
	0 hour

	S20
Insert user default	
	NO

Weather compensation

Heating – Weather compensation curve setting

Note this function is not appropriate in all applications

Users: Seek professional advice before attempting to set weather compensation

There are two methods for temperature control: **fixed** and **changeable** temperature. Fixed temperature is a fixed value and directly set by the user from the settings area. Changeable (Compensated) temperature is determined by the values of ST02, ST06 and the actual outdoor temperature measured by the OT sensor probe.

The Changeable (Weather compensated) function is selected using SF04:

When SF04: ENABLE COMPENSATION = NO, it is fixed temperature;

When SF04: ENABLE COMPENSATION = YES, it is weather compensated changeable temperature.

Set temperature at heating = $ST02 + ST06 * (20 - OT)$.

- ST02 is the indoor temperature that the user requires to feel comfortable.
- ST06 is the heating compensation coefficient curve factor that you select for the heat pump to work with. Increasing the ST06 set point will increase the compensation temperature and RT will increase relatively. ST06 is adjustable in a range from 0.6 to 3.0 Degrees.
- OT is the current outside temperature.

The calculated temperature can be used for the control reference, but the maximum data must not exceed ST14

For example:

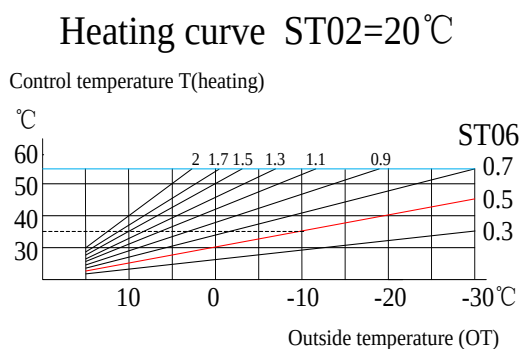
If you set the heating compensation coefficient ST06 = 0.5 Deg, ST02 = 20Deg

1.) When outdoor temperature is 0°C, the control temperature is $ST02 + ST06 * (20 - OT) = 20 + 0.5 * (20 - 0) = 30^\circ\text{C}$;

2.) When outdoor temperature is -10°C, the control temperature is $ST02 + ST06 * (20 - OT) = 20 + 0.5 * (20 - (-10)) = 35^\circ\text{C}$;

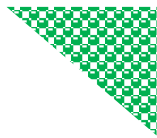
3.) When outdoor temperature is -20°C, the control temperature is $ST02 + ST06 * (20 - OT) = 20 + 0.5 * (20 - (-20)) = 40^\circ\text{C}$;

Calculated result as above could be checked from curve below.



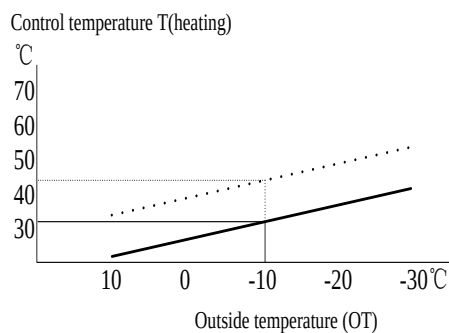
With a drop of the outdoor temperature, the control temperature becomes higher to meet the larger heating requirement.

With the increase of the outdoor temperature, the control temperature becomes lower, so that the heat pump works at a lower pressure reducing energy consumption.

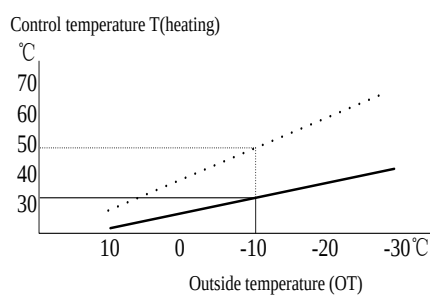


Changing either ST02 or ST06 will change the heating curve.

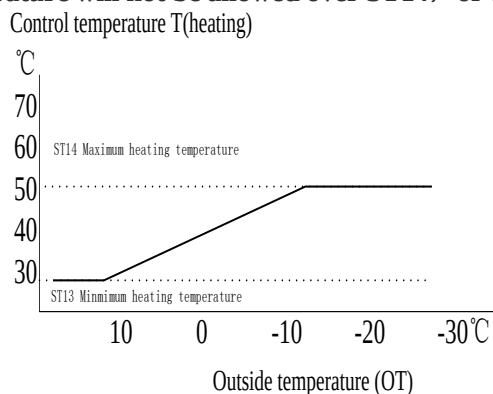
Increasing ST02 will lift up the curve



Increasing ST06 will increase the grade of the curve



The calculated control water temperature will not be allowed over ST14, or under than ST13.



Cold weather conditions

- When the room temperature is too low, you could increase ST06.
- When the room temperature is too high, you could decrease ST06.

Warm weather conditions

- If the room temperature is too low, you could increase ST02.
- If the room temperature is too high, you could decrease ST02.



NOTE: The temperature of a room with floor heating requires a long time to stabilize. After making any ST02 ST06 adjustment, wait 24 hours to assess before making further adjustments.

◆ Setting up the heating compensation curve

Heat compensate S16	
ST06	0.6
OT:	-5.0°C
Actual setp:	44.0°C

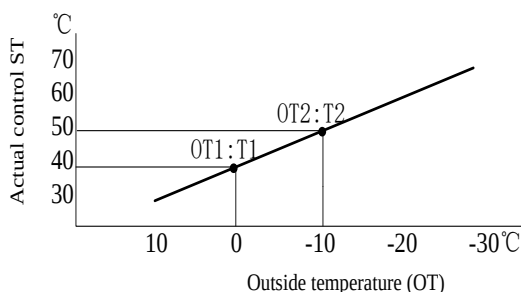
Press  to change ST06, (OT the actual measured ambient outdoor temp, is displayed).
Actual Heating Control temp. RT is also displayed.

Press  to menu :

Heat compensate S17	
OT:	-1.0°C
Heat setp:	47.6°C

You can input any OT value, and press  and relative heating control temp. will be calculated.
So for example, If OT = -1.0°C, actual control temp. is shown as 47.6°C

If you have your own curve, say you want to have RT = 40°C (T1) when OT = 10°C (OT1) and RT = 50°C (T2) when OT = -5°C (OT2)

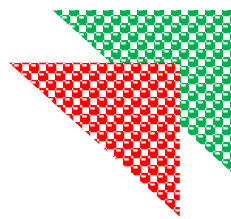


Then adjust the desired T1, T2, OT1 and OT2 in the S18 menu and it will help to find out relative ST02 and ST06 setting for desired control inlet water temp at a certain OT point.

Heat compensate S18	
T1: 40°C	OT1: 10.0°C
T2: 50°C	OT2: -5.0°C
ST02=33.3	ST06 = 0.7

So as the above example, ST02 = 33.3 & ST06 = 0.7, so you could go to the relative menu and input the checked ST02 and ST06 parameter and you will have the desired weather compensation setting.

The User setting ST01, for Cooling mode compensation must remain set at 13 Deg C, (the factory Default)



Smart Grid UK-EU - SG READY – (Smart Grid)

Some EU countries and other jurisdictions adopt smart meters, providing varying electricity tariff rates. This appliance is approved for use with, and can be applied to these systems.

(This option may not currently be applicable for New Zealand, Australia)

1.) Connectors D3-D4 (DI6) is connected to SG1 and D1-D2 (DI7) is connected to SG2 of the electric meter SG signal.

2.) TR12 parameter in Service menu are used to turn on / off unit SG function.

When TR12 is disabled, SG function is invalid.

When TR12 is enabled, SG function is valid. "SG mode" display on user interface. SG1 SG2 signal status display on I/O menu.

1.) SG1 =1, SG2=0: switch off command

Unit has to stop. but anti-freezing function is still valid so water pump could be switched on if anti-freezing circulation is needed.

2.) SG1 =0, SG2 =0: normal operation.

unit runs in normal program regulation.

3.) SG1 =0, SG2 =1: switch-on recommendation: cheap electricity mode;

A) In heating mode, heating control water temperature automatically increases ST17 to store heating energy. but the maximum heating control water temp. is limited by ST14.

B.) In DHW mode, DHW control temperature automatically increases ST18 to store DHW energy, but the maximum DHW control temperature is limited by ST16.

C) In cooling mode, cooling control water temperature automatically decrease ST17 to store cooling energy, but the minimum cooling control water temperature is limited by ST11.

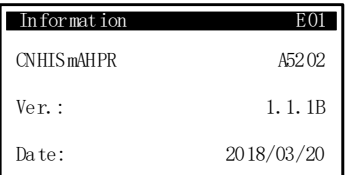
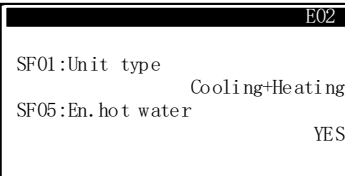
4.) SG1 =1, SG2 =1: switch-on command; Discounted electricity mode

A) In heating mode, heating control water temperature automatically increases ST17+2 to store more heating energy. but the maximum heating control water temperature is limited by ST14.

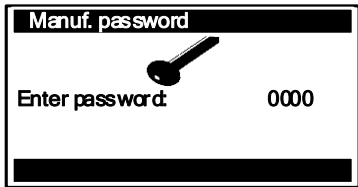
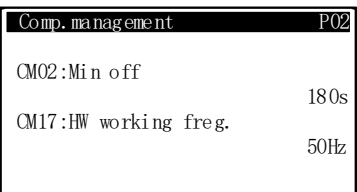
B.) In DHW mode, DHW control temperature automatically increases to ST16 to store maximum DHW energy. DHW electric heater (if installed) is switched on after compressor stops when DHW temperature reaches ST20 until DHW temperature reaches ST16.

C) In cooling mode, cooling control water temperature automatically decrease ST17-2 to store more cooling energy. but the minimum cooling control water temp. is limited by ST11.

Accessing **service engineer** level parameters/ data (password protected)

Display	Procedures
	press <Prg> to access the main menu, press the Down button to Parameter, Press Enter button, Press Enter and 0 will flash, press the up or Down buttons to the correct figure, and press Enter to confirm. Likewise, set the remaining 3 figures. After 4 correct figures are inputted, The display will enter Service level parameters.
	Press the Enter button, It will display controller version information.
	Press the Down button, you will move to Unit type setting. Press Enter to confirm, When Cooling + heating is flashing, press the Up or Down button if you want to change the format. Then Press Enter to confirm. The cursor will then move to E02 When E02 is flashing, you can press the Down button to move to the next parameter and so on.
Or, continuously press <Esc> to exit out of the current level and go back to the desired menu level.	

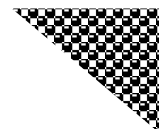
Accessing **manufacturer** level parameters (password protected)

Display	Procedures
	press <Prg> to enter the main menu, press the Down button to Manufacture, Press Enter button, Press Enter and 0 will flash, press Down button to set the correct figure, press Enter to confirm. Likewise, change the other 3 figures. after 4 correct figures are inputted, The screen will enter Manufacturer settings.
	Press Down button, it displays parameter and data. Press Enter to confirm, when data is flashing, press Up or Down button to change the value. Press Enter to confirm. Cursor will move to P02 When P02 is flashing, you can press the Down button to move to next parameter and so on.
Or, continuously press <Esc> to exit out of the current level and back to the desired menu level.	

Manufacturer parameters are related to the unit's safe running and reliability. These settings are not to be changed without manufacturer or regional distributor's authority. Any changes may cause the unit to fail and will automatically void the appliance warranty.

Access to Manufacturer level parameters requires you to seek the passcode from your Regional supplier.

Tradepoint Ltd, (heat IQ) for NZ and AU Customers, 0064 6 3447392



Service engineer level Parameters:

Parameter	Descriptions	De- fault	Min.	Max.	Unit	Res
Information	Software version	A5202				
EVO1	Pump by regulation	1	0	1		
EV03	Inlet/outlet water temperature difference setting for cooling mode	5	1	10	°C	0.1
EV04	Inlet/outlet water temperature difference setting for heating mode	5	1	10	°C	0.1
SF01	Unit type		Only heating or Cooling + Heating			
SF05	Enable domestic hot water function	YES	YES or NO			
SF13	HW On/Off way	Keyboard	Keyboard or remote(via system controls)			
SF14	AC On/Off way	Keyboard	Keyboard or remote(via system controls)			
TR12	SG function	disable	Disable or enable			
DF02	Defrost start LPS	-2	-10	10	°C	0.1
DF03	Defrost start outdoor temperature	12	3.0	20.0	°C	0.1
DF04	Defrost temperature differential	14	8	20	°C	0.1
DF05	DF04 condition lasting time	300	1	1000	Sec	1
DF06	Minimum defrost interval	30	15	90	Min	1
DF09	Defrost end HPS temperature	35	5	60	°C	0.1
DF10	Max. defrost time	480	1	1000	Sec	1
DF11	DF02 condition lasting time	900	1	1000	Sec	1
DF13	Fan start HPS	25	5	60	°C	0.1
DF15	De-icing heater start ambient temp	0	-10	10	°C	0.1
DF16	Compulsive defrost running interval	120	60	180	Min.	1
AR04	Pump flow detect delay time	120	1	120	s	1
ST26	DHW bacteria killing interval	360	0	1000	h	0.1
ST27	DHW bacteria killing temp.	65	50	70	°C	0.1
UI01	Service password		0000	9999	-	1

Service parameters are code protected and only able to be adjusted when DHW and Heating are OFF.

E16 Insert service default This function is to restore service settings to factory defaults. Change “NO” to “YES”, press <Enter>, it will display “Operation succeed”.

Service	E16
Insert service default	
NO	

Initialization
Alarm initialization
Delete alarm logs?
NO

Alarm initialization allows you to clear the alarm log History

Manufacturer level parameters Access restricted see note on P23

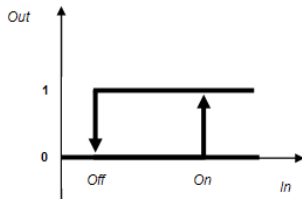
Parameter	Descriptions	De-fault	Min.	Max.	Unit	Res
CM02	Compressor minimum OFF time	180	1	1000	Sec.	1
CM11	Rated cooling speed	60 (AS07V) 70 (AS10V AS15V AS20V)	CM13	CM12	HZ	1
CM12	Max cooling speed	70 (AS07V) 75 (AS10V AS15V AS20V)	20	100	HZ	1
CM13	Min cooling speed	30	20	100	HZ	1
CM14	Rated heating speed	60 (AS07V) 70 (AS10V AS15V AS20V)	CM16	CM15	HZ	1
CM15	Max heating speed	70 (AS07V) 75 (AS10V AS15V AS20V)	20	100	HZ	1
CM16	Min heating speed	30	20	100	HZ	1
CM17	DHW max speed	70	30	80	HZ	1
CM18	DHW min. speed	30	30	80	HZ	1
HSVR	Software version number	A5202				
CN01	EC fan Max. speed	AS07V: 3.7; AS10V:4.0 AS15V: 4.2; AS20V:4.2	1	10	V	0.1
CN02	EC fan Min. speed	2.8	1	10	V	0.1
CN03	EC fan max speed limit	4.2	1	10	V	0.1
CN05	EC fan Max. speed HPS. (cooling)	28	0	50	bar	0.1
CN06	EC fan Min. speed HPS. (cooling)	16.5	0	50	bar	0.1
CN07	EC fan Max. speed HPS. (heating)	9.5	0	50	bar	0.1
CN08	EC fan Min. speed HPS. (heating)	5.5	0	50	bar	0.1
EV05	pump PWM Max. speed	100%	0%	100%	0.1%	0.1
EV06	pump PWM Min. speed	60%	0%	100%	0.1%	0.1
EV07	Min. flow feedback	0.5	0	10	m3/h	0.1
EV11	EEV valve opening at start-up (OT<10°C)	AS07V AS10V: 230 AS15V AS20V: 260	0	480		1
EV12	EEV valve opening at start-up (10°C ≤ OT ≤ 20°C)	AS07V AS10V: 300 AS15V AS20V: 330	0	480		1
EV13	EEV valve opening at start-up (OT > 20°C)	AS07V AS10V: 380 AS15V AS20V: 410	0	480		1
SF06	Antifreeze start ambient temp.	2	0	10	°C	0.1
SF08	Antifreeze start inlet water temp.	10	1	20	°C	0.1
SF09	Antifreeze end inlet water temp. difference.	2	1	10	°C	0.1
SF15	Compressor PID control factor :KP cooling	6.0	0	50.0	-	0.1
SF16	Compressor PID control factor: TI cooling	40	0	100	-	1
SF17	Compressor PID control factor: TD cooling	0	0	5	-	1
SF18	compressor PID control: sampling interval	10	0	100	s	1
SF19	compressor PID: frequency sampling	10	0	100	s	1
SF20	compressor PID control factor :KP heating	6.0	0	50.0	-	0.1
SF21	compressor PID control factor: TI heating	40	0	100	-	1
SF22	compressor PID control factor: TD heating	0	0	5	-	1

Manufacturer parameters continued

SF25	PWM pump PID control factor :KP	6.0	0	50.0	-	0.1
SF26	PWM pump PID control factor: TI	40	0	100	-	1
SF27	PWM pump PID control factor: TD	0	0	5	-	1
SF28	PWM pump PID control: sampling interval	10	0	100	s	1
SF29	PWM pump PID: frequency sampling interval	10	0	100	s	1
SF30	EVI valve open set temp. difference	30	0	99	°C	0.1
SF31	EVI valve off set temp. difference	25		99	°C	0.1
SF32	Enable EVI valve	Disable	Enable or Disable			
SF34	EEV defrost steps	480	0	480	step	1
SF35	Circulation pump model selection	AS15V AS20V:UPML/UPMXL AS07V AS10V:UPM3K	UPM3K or UPML/UPMXL			
SF40	compressor PID control factor :KP DHW	6.0	0	50.0	-	0.1
SF41	compressor PID control factor: TI DHW	40	0	100	-	1
SF42	compressor PID control factor: TD DHW	0	0	5	-	1
SF51	Aux heater used in defrost	no	N	Y		
SF52	Manual heater (No hf SF51=Yes)	no	N	Y		
Kp	EEV PID	5.5				
Ti	EEV PID	80				
Td	EEV PID	1				
AR01	Low outlet water temperature protection	5	1	20	°C	0.1
AR03	High outlet water temperature protection	62	1	100	°C	0.1
AR06	Low pressure alarm times in 24 hours	4	1	10	-	1
AR07	High pressure alarm times in 24 hours	6	1	10	-	1
AR08	low evaporation temperature protection	-2	-10	10	°C	0.1
AR09	LP protection start-up delay time	300	10	1000	Sec.	1
AR13	High Discharge gas temperature protection	115	100	130	°C	0.1
AR14	Disch, gas temperature protect differential	20	1	30	°C	0.1
AR16	Low evaporation temp alarm x in 24 hours	2	1	20	-	1
AR29	Antifreeze detect interval	30	1	1000	Min.	1
AR31	Low pressure protection set point	1	0.5	6	bar	0.1
AR32	Low pressure protection differential	1	0.5	6	bar	0.1
AR33	High pressure protection set point	38	30	50	bar	0.1
AR34	High pressure protection differential	3	1	10	bar	0.1
ST11	Minimum settable cooling temperature	12	0	ST12	°C	0.1
ST12	Maximum settable cooling temperature	40	ST11	60	°C	0.1
ST13	Minimum settable heating temperature	20	0	ST14	°C	0.1
ST14	Maximum settable heating temperature	50	ST13	80	°C	0.1
ST15	Minimum settable DHW temp	20	0	ST16	°C	0.1
ST16	Maximum settable DHW temp	65	ST15	80	°C	0.1
ST20	Max.DHW temperature made by compressor	50	ST15	ST16	°C	0.1
ST21	Outlet water temperature DHW PID setup	55	0	58	°C	0.1
UI02	Manufacturer password	Contact distributor	0000	9999	-	1

Detailed Principal of Operation, - Guide for engineers

Cooling demand



In: RT

On: $RT > T(\text{cooling}) + ST03$ ($T(\text{cooling})$ is the control water temperature on cooling mode)

Off: $RT < T(\text{cooling}) - 1.5^\circ\text{C}$ and running frequency of the compressor has reduced to Minimum and lasts for 120s.

T (cooling) calculation:

Default ST01= 13, ST08=0.6

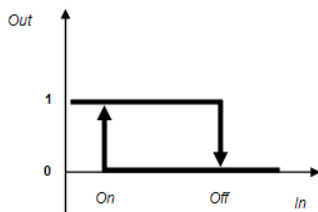
1.) When SF04= No, there is no cooling curve. $T(\text{cooling}) = ST01$.

2.) When SF04= Yes, cooling curve is activated,

$$T(\text{cooling}) = ST01 + (35 - OT) \times ST08$$

If calculated $T(\text{cooling})$ is lower than ST11 and ST11 would be $T(\text{cooling})$.

Heating demand



In: RT

On: $RT < T(\text{heating}) - ST04$ ($T(\text{heating})$ is the control water temperature on heating mode)

Off: $RT > T(\text{heating}) + 2^\circ\text{C}$ and running frequency of the compressor has reduced to Minimum and lasts for 120s.

T (heating) calculation:

Default ST02 = 35, ST06 = 0.6

1.) When SF04= No, there is no heating curve. $T(\text{heating}) = ST02$.

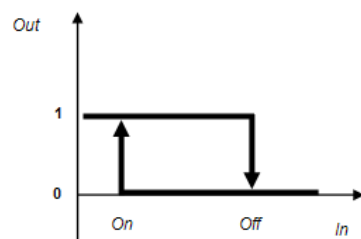
2.) When SF04= Yes, heating curve is activated

$$T(\text{heating}) = ST02 + (20 - OT) \times ST06$$

If calculated $T(\text{heating})$ is higher than ST14, ST14 would be $T(\text{heating})$.

Refer to chapter "Heating compensation curve setting".

Domestic hot water demand



In: HT

1.) When $ST09 \leq ST20$

Compressor ON: $HT \leq ST09 - ST10$

Compressor Off: $HT > ST09$

2.) When $ST09 > ST20$

Compressor On: $HT \leq ST20 - ST10$

Compressor Off: $HT > ST20$

Remarks: when DHW set point ST09 is lower than ST20, only compressor is switched on to produce DHW.

When DHW set point ST09 is higher than ST20, DHW will be heated to ST20 by the compressor and then the electric heater will be activated on to heat DHW to set point (ST09).

Control process

Turn on process for heating mode

- 1.) Water pump Starts, - checks water flow.
- 2.) if water flow meets the requirement and there is heating demand, - fan and compressor start.

Turn off process for heating mode

- 1.) Compressor switches off.
- 2.) After 5 second's delay, fan motor switches off.
- 3.) After 30 seconds' delay, water pump switches off.

Turn on process for cooling mode

- 1.) Start water pump starts 4 way valve shifts, -checks water flow
- 2.) If water flow meets the requirement and there is cooling demand, - the fan and compressor start.

Turn off process for cooling mode

- 1.) Compressor switches off.
- 2.) After 5 seconds' delay, fan motor switches off.
- 3.) After 30 seconds' delay, water pump switches off.
- 4.) After 120 seconds' delay, 4 way valve switches off.

Turn on process for hot water mode

- 1.) 3 way valve in system opens and water pump starts, - checks water flow.
- 2.) If water flow meets the requirement, the fan and compressor start.

Turn off process for hot water mode

- 4.) Compressor Switches off
- 5.) After 5 seconds' delay, the fan motor switches off
- 6.) After 30 seconds' delay, the water pump switches off and system 3 way valve closes.

Domestic Hot water has priority:

- When the unit is providing heating output and there is a call for hot water, the 3 way valve opens to hot water mode and will revert back to heating mode after the hot water reaches the preset temperature. (ST20)
- If the unit is providing cooling and there is a call for hot water, the compressor stops and then re starts in hot water mode, the compressor stops again when hot water reaches the pre set temperature (ST20) before reverting s back to cooling mode.

Water pump control

- The Circulation pump is switched on when cooling, heating or DHW mode is turned on. and continues to run when cooling, heating or DHW mode is active.
- In cooling mode and compressor is ON, circulation pump PWM signal output is 100% for the first 3 minutes, and then runs PID control to achieve $(CMF-CM13) / (CM12-CM13) * (EV05-EV06) + EV06 = EV03$. CMF is current compressor running frequency. When the cooling set point is met and the compressor is OFF, the circulation pump continues to run to keep current flow rate.
- In heating mode when the compressor is ON, the circulation pump PWM signal output is 100% for the first 3 minutes, then it runs PID control to achieve $(CMF-CM16) / (CM15-CM16) * (EV05 - EV06) + EV06 = EV04$. When the heating set point is met the compressor is OFF, the pump continues to run to maintain the current flow rate

During defrosting periods and 3 minutes after the end of defrosting, the circulation pump PWM signal output is 100%.

If the circulation pump is dormant it is switched on every 24 hours and runs for 3 minutes. The PWM signal output is 60%. This function is to prevent the pump from seizing.

When the circulation pump is switched on for cooling, heating or DHW demand, after AR05 time delay, the unit will check the water flow rate feedback. If the feedback flow rate is smaller than $EV06*0.8$, the compressor is not allowed to switch ON until the flow rate is higher than $EV06*0.8$ for 5 seconds.

If the feedback pump duty ratio is smaller than 5% after the pump is switched on more than AR05 time delay, the pump is diagnosed as idle running. After 10 minutes' continual running, if feedback pump duty ratio is still less than 5%, pump will be switched off. **The Pump can only be switched on again after the unit power is switched off and turned on again.**

All faults relative to the circulation pump (feedback ratio is smaller than 8% or higher than 75%) are activated as AL76 alarm.

Duty ratio feedback (between 0~70%) is linear relation to water flow rate feedback EVQ , duty ratio=EVQ/0.057

Compressor running control

- 1.) In cooling mode, when $RT \leq T(\text{cooling}) - 0.5^{\circ}\text{C}$, compressor runs with minimum frequency.
When $RT \leq T(\text{cooling}) - 1.5^{\circ}\text{C}$, after running for 120 seconds with minimum frequency, compressor is switched off.
When $ST \leq 7^{\circ}\text{C}$ The compressor runs with minimum frequency. When $ST \geq 8^{\circ}\text{C}$. The compressor runs with normal PID control.
- 2.) In heating mode, when $RT \geq T(\text{heating}) + 0.5^{\circ}\text{C}$, compressor runs with minimum frequency.
When $RT \geq T(\text{heating}) + 2^{\circ}\text{C}$, after running for 120 seconds with minimum frequency, compressor is switched off.
- 3.) Compressor running frequency is adjusted in every SF19 time.
The first time compressor is switched on for heating or cooling, it runs 2 minutes with 45Hz and then runs with PID control.
When the compressor is switched on again from a standby state, it runs with minimum frequency for 2 minutes and then runs with PID control.

4.) DHW running

The compressor runs with outlet water PID control with ST21 as control target.
In DHW operation, when $ST \geq ST21 + 1^{\circ}\text{C}$, the compressor runs with min. frequency.

5.) Oil return running

- 1.) If the accumulated compressor running time is over 120 minutes with a running frequency lower than 40Hz or higher than 60Hz, an oil return running is activated. On the compressor running accumulated counting process, if compressor running frequency is over 40Hz or lower than 60Hz for a continual 2 minutes, the accumulated counting data is reset to 0 and accumulated counting starts again.
- 2.) Oil return running process: Compressor runs 60 seconds with running frequency 50Hz and then returns to previous running frequency. During this process and within 60 seconds from the end of this process, circulation pump runs with EV05 PWM speed. During this process, if low outlet water temperature protection or high outlet water temperature protection alarm is activated, the compressor is switched off but this alarm does not display on user interface.

7.) High frequency running limit

After the first time switching on, if the compressor runs with the maximum running frequency for over 30 minutes, the running frequency will be limited to lower than rated running frequency for the next 30 minutes.
Except in the conditions below, it will not run with frequency higher than rated.

- Re-start after power cut out and cut in again.
- Switching on from off state
- switching on from stop state after a fault

8.) Reduced running frequency to protect the compressor.

A.) pressure protection

When system pressure is higher than 36Bar for over 5 seconds, the compressor running frequency reduces by 10Hz, after 10 seconds:

- a.) If the system pressure is still higher than 36Bar for a further 5 seconds, the compressor running frequency reduces by a further 10Hz - and so on until the system pressure is no longer higher than 36Bar for a continual 5 seconds.
- b.) If system pressure is lower than 36Bar after a continual 5 seconds, it keeps current running frequency. Until system pressure reduces to lower than 34Bar for a continual 5 seconds, then it will restore to PID control running.

If the compressor running frequency reduces to 40Hz and system pressure is not higher than 38Bar, compressor runs with 40Hz. If system pressure still goes up to over the alarm setting limit for a continual 5 seconds, the compressor is switched off and is re-switched on after a 3 minute' delay.

B.) Discharge gas temperature protection

If Discharge gas temperature $PT \geq 100^{\circ}\text{C}$ for a continual 5 seconds, the compressor running frequency reduces 10Hz in every 10 seconds until $PT \leq 95^{\circ}\text{C}$ for a continual 5 seconds, then compressor running speed will store to PID control.

C.) IPM module temperature protection.

If IPM module temperature $\geq 80^{\circ}\text{C}$ for a continual 5 seconds, the compressor running frequency will be reduced by 10Hz every 10 seconds until $PT \leq 75^{\circ}\text{C}$ for a continual 5 seconds, then compressor running speed will store to PID control.

D.) Compression ratio protection

After the compressor has run 10 minutes, if the compression ratio $((HPS+1\text{Bar})/(LPS+1\text{Bar}))$ is more than 8 in a continual 5 seconds, the compressor running frequency will reduce 10Hz, 10 seconds later:

- 1.) If compression ratio is no more than 8 for a continual 5 seconds, it keeps the current running frequency.
- 2.) If compression ratio is still more than 8 in continual 5 seconds, the compressor running frequency reduces 10Hz more and so on until compression ratio is no more than 8 for a continual 5 seconds. then it keeps current running frequency.

If the compression ratio is less than 7 over a continual 5 seconds, it will restore to PID control speed running. **CONTINUED**

If the compressor running frequency reduces to 40Hz and the compression ratio is no more than 8 for a continual 5 seconds, the compressor runs with 40Hz. If the compression ratio is still more than 8 in a continual 5 seconds, the compressor is switched off and re-switched on again after 3 minutes' delay.

4 way refrigerant valve control

The 4 way valve is OFF under any of below conditions. It is ON under any other conditions.

- 1.) Heating mode, hot water mode, or heating + hot water mode
- 2.) Producing hot water on cooling + hot water mode.

Auxiliary Electric backup heater or boiler control

The auxiliary backup heater can only be active when **all** of conditions below are met.

- 1.) Heating mode running and compressor has been running with the maximum workable frequency.
- 2.) Compressor has run over 300s.
- 3.) $OT \leq ST07$;
- 4.) $RT \leq T(\text{heating}) - ST04 - 2$;

The Auxiliary backup heater is switched off when **any** of conditions below is met.

- 1.) A/C flow alarm.
- 2.) $RT \geq T(\text{heating}) - 2$;
- 3.) Unit is switched off

Crankcase heater running control

When **all** of the conditions below are met, compressor crankcase heater is switched on

- 1.) Compressor is OFF;
- 2.) $OT \leq 10^{\circ}\text{C}$

When any of conditions below are met, compressor crankcase heater is switched off

- 1.) Compressor is ON;
- 2.) $OT \geq 11^{\circ}\text{C}$

3 way valve control

The System 3 way valve is ON when there is DHW demand. Otherwise, it is OFF.

DHW Reticulation - circulation pump output control

- 1.) When DHW mode is switched on, DHW circulation pump will be switched on and run ST34 in every ST33 interval.
- 2.) When DHW mode is switched off, DHW circulation pump is switched off after 3 minutes' delay.

DHW supplemented by the Cylinder element - control

- 1.) If $ST09 < ST20$, then DHW is only heated by the compressor. If $ST09 > ST20$, the compressor stops heating DHW after $HT \geq ST20$, the DHW electric heater is switched on until $HT \geq ST09$.
- 2.) If the unit has a compressor fault and there is DHW demand, the DHW heater is switched on until $HT \geq ST09$

DHW Legionella Protection function

The DHW cylinder element is switched on to kill bacteria until $HT \geq ST27$, if HT is not over $ST27$ in $ST26$ time interval. If $ST26 = 0$, bacteria killing function is not active. by default $ST26 = 0$ hours.

Integral Circulating pump Control

If $EVO1 >$ is set "work by regulation" the circulating pump only runs if the HP compressor is running.

The EC fan running control

In cooling mode, EC fan motor speed is regulated by HPS and adjusted in every 10 seconds.

- 1.) When $HPS \leq CN06$, fan speed voltage = $CN02$
- 2.) When $CN06 < HPS < CN05$, fan speed voltage = $CN02 + (HPS - CN06) / (CN05 - CN06) * (CN01 - CN02)$.
- 3.) When $HPS \geq CN05$, fan speed voltage = $CN01$
- 4.) When $HPS \geq 37\text{bar}$, fan speed voltage = $CN03$

In heating mode, EC fan motor speed is regulated by LPS and adjusted in every 10 seconds.

- 1) When $LPS \geq CN07$, fan speed voltage = $CN02$
- 2) $CN08 < LPS < CN07$, fan speed voltage = $CN02 + (CN07 - LPS) / (CN07 - CN08) * (CN01 - CN02)$
- 3) $LPS \leq CN08$, fan speed voltage = $CN01$

If feedback IPM temperature is over 90°C , EC fan motor runs with $CN03$ speed. After IPM temperature $\leq 85^{\circ}\text{C}$, it returns to run as the formula calculation speed.

EC fan input control voltage and speed table

Series No.	Input control Voltage	Speed (rpm)
1	2.8V	300
2	2.9V	342
3	3.0V	374
4	3.1V	414
5	3.2V	447
6	3.3V	478
7	3.4V	510
8	3.5V	540
9	3.6V	564
10	3.7V	590
11	3.8V	617
12	3.9V	642
13	4.0V	665
14	4.1V	690
15	4.2V	714
16	4.3V	735
17	4.4V	754
18	4.5V	775
19	4.6V	792

De-icing heater running control

When all of conditions below are met, the de-icing heater is switched on

1.) Compressor is ON; 2.) Heating or DHW mode running 3.) Ambient temperature $OT \leq DF15$

When any of conditions below are met, de-icing heater is switched off

1.) Compressor is OFF; 2.) Ambient temperature $OT > DF15+2$;

The pump PWM running control (Y3)

1.) **in cooling mode**, when the compressor is on, pump PWM runs as EV05 for 3 minutes, then runs with (Inlet temperature-Outlet temperature) =EV03 as target via PID control . when compressor is off, pump PWM runs as EV06.

2.) **In heating mode**, when compressor is on, pump PWM runs as EV05 for 3 minutes, then runs with (outlet temperature - Inlet temperature) =EV04 as target via PID control; when compressor off, pump PWM runs as EV06.

3.) **In DHW mode**, pump PWM runs as EV05. After DHW temperature reaches preset temperature, if the unit does not need to do cooling or heating, the pump PWM is off.

4.) The pump PWM runs as EV05 When defrosting.

5.) When the pump is on, PWM is EV06, PWM is off when pump is off.

6.) The Pump PWM will start - running for 3minutes when pump has been off for 24 hours to avoid seizure.

Defrosting control

The unit is equipped with hot gas defrosting. When the conditions of defrosting are met,

1.) The compressor speed begins to go down.

2.) After the compressor speed reduces to 30Hz for 60 seconds, the 4 way valve is switched on, the fan motor is switched off and it begins to count defrosting time. Hot gas flows out to the finned coil heat exchanger .

3.) 10 seconds after the 4 way valve is switched on, the compressor speed increases to rated cooling speed.

4.) When $HPS \geq DF13$, the fan motor is switched on and runs at CN02 speed for 10 seconds to blow off the condensed water.

5.) After the conditions for ending defrosting are met, the compressor speed reduces and it stops counting defrost time.

6.) After the compressor reduces to 30Hz for 10 seconds, the 4 way valve is switched off and the fan motor is switched on. The hot gas flows into plate heat exchanger and the unit returns to heating mode operation.

7.) 60 seconds after 4 way valve is switched off, the compressor recovers to run with the speed as PID control.

Defrosting mode activation conditions (1) (all must be met)

- a.) The unit running time after previous defrosting must be $\geq DF06$
- b.) Temperature differential OT minus LPS $\geq \Delta T$ and last for DF05 time period .
 $\Delta T = DF04 - 4 * (CM15 - CMF) / (CM15 - CM16)$, (CMF is current compressor running frequency)
- c.) LPS $\leq DF02$ and lasts for DF11 time.
- d.) The compressor has run for more than 5 minutes.
- e.) Ambient temperature OT is below DF03

Defrosting mode activation conditions (2) (all must be met)

- f.) The accumulated compressor running time is over DF16 after LPS $\leq DF02$ and compressor has run more than 5 minutes.

When Defrosting conditions (1) or (2) are met, the unit will start to defrost.

Defrosting ends condition (any of the following conditions are met)

- A.) High pressure HPS $\geq AR33$ lasts for 5 seconds.
- B.) HPS $\geq DF09$ and lasts for 10 seconds
- C.) AL17 flow alarm is presented
- D.) ST $\leq 7^{\circ}\text{C}$ and lasts for 5 seconds.
- E.) Defrost time $\geq DF10$ is achieved

Automatic optimizing defrosting parameter data

Optimization solution (1) (if the last defrosting is activated by condition one as above)

- 1.) If the previous defrosting time is less than 3 minutes and defrosting is terminated by above condition A or B. It means that there was little frost on the evaporator when unit started defrosting. On the next defrosting, DF04 will add 1°C . - After this optimization, the next time defrost will be activated a little later.
- 2.) If the previous defrosting time is between 3 to 5 minutes, then the next time defrosting, DF04 does not change.
- 3.) If the previous defrosting time was over 5 minutes and defrosting was terminated by above condition A or B. If the previous defrosting activation, DF06 is the last condition to be met, then DF04 does not change in next defrost. Otherwise, DF04 value will reduce 1°C in next defrosting.

DF04 optimized valued is limited by its max setting and min setting value.

Optimization solution (2) (if the last defrosting was activated by condition two mentioned above)

- 1.) If the previous defrosting time was less than 3 minutes and defrosting is terminated by above condition A or B. It means that there is little frost on the evaporator when unit started defrosting. so on the next time defrosting, DF16 will add 10 minutes. After this optimization, the next defrost will be activated a little later.
- 2.) If the previous defrosting time is between 3 to 5 minutes, then next time defrosting, DF16 does not change.
- 3.) If the previous defrosting time is over 5 minutes and defrosting is terminated by above condition A or B. It means that there was too much frost on the evaporator when the previous defrosting was activated. DF16 value will reduce by 10 minutes for the next defrost. After this optimization, the next defrost will then be activated a little earlier.

DF16 optimized valued is limited by its max setting and min setting value.

Temperature sensor offset.

If the temperature sensor readings have an error. Service parameter display presents **sensor offset function. To rectify**

CN01 Max. EC motor speed should not be over 4.6V to avoid overheating.

Routine maintenance.

Unit Refrigerant Checks

1. Check the operation of the high-pressure and low pressure transducers. Replace if there is a fault.
2. Check for fouling of the filter (by checking the temperature difference in the copper piping either side). Replace it if necessary.

Full-load operating test verify the following values:

- A. Compressor high-pressure side discharge pressure
- B. Compressor low-pressure side suction pressure
- C. Verify the charge status by checking the super heat and sub-cooling.
- D. Temperature difference between the heat exchanger water inlet and outlet temperature
- E. Actual liquid sub-cooling, overheating at the expansion device on heat pump verify correct defrost of the air heat exchanger

If there is not enough refrigerant in the system, The HP will have reduced performance.

If the refrigerant charge is significantly low, the suction pressure drops, then the compressor suction superheat will also be high. Identify the leak and completely drain the system with a refrigerant recovery unit. Carry out the repair, leak test and then recharge the system.

Note:

After the leak has been repaired, the circuit must be tested, without exceeding the maximum low-side operating pressure shown on the unit Data plate. Refrigerant must always be recharged in the liquid state, into the liquid line.

The refrigerant cylinder must always contain at least 10% of its initial charge. For the refrigerant quantity per unit, refer to the units data plate.

Electrical Maintenance

1. Check for correct termination tension of the electrical connections, contactors, isolation switch and transformer.
2. Check the condition of the contactors, fuses and capacitors,
3. Check the condition of the electrical cables and their insulation.
4. Carry out an operating test of tray de-icing heater, compressor oil heater, refrigerant valve and expansion device.
5. Check the phase/earth insulation of the compressors, fans and pumps.
6. Check the compressor, fan and pump winding status.

Mechanical Maintenance

1. Check the tension of the fan motor, fan wheel, compressor and control box fixing bolts.
2. Check that no water has penetrated into the control box.

Evaporator Coil

It is recommended that the finned coils are inspected regularly to check the degree of fouling. This depends on the environment where the unit is installed, areas by the sea can cause increased corrosion and an approved sprayed film coating is recommended. For coil cleaning proceed as follows:

1. Remove fibre and dust collected on the evaporator face with a soft brush (or vacuum cleaner).
2. Clean the coil with the appropriate cleaning agents

Water Circuit Checks

1. Clean the water filter/strainer on the HP inlet from the system.
2. Check the status of the pipework and associated thermal pipe insulation.
3. Check the water flow by checking the water inlet and outlet temperature difference.
4. Check the system corrosion inhibitor level is adequate.
5. If frost protected. Check the concentration of the anti-freeze protection solution if applicable (ethylene glycol or polyethylene glycol - food safe glycol required where DHW coil is heated).
6. Check the expansion tank for signs of excessive corrosion or pressure loss and replace it, if necessary.
7. Check that the water pressure 3 bar safety valve and any auto air vents in the system are not leaking.

Alarms.

Alarms are divided into two groups : **Auto reset alarms**, & **Manual reset alarms**.

1. For auto reset alarms, the user is not required to acknowledge the alarm or reset the appliance.
2. The corresponding device will be automatically be restarted once the alarm status disappears.
3. Once a manual reset alarm is detected, the system will stop automatically. The user should note the alarm code in case they need contact the installer for instruction or advice.
4. In some instances You may need to ensure that a fault has been fixed before a manual alarm is able to be reset.

When an alarm is detected:

- The  icon will continuously flash. An alarm code will be displayed on the screen.
- If more than one alarm is detected, the alarm codes will be displayed successively on the LCD screen. These will be seen by using the  or  buttons, or they are manually acknowledged or reset (only for manual reset alarms).

Acknowledging and Resetting Manual Reset Alarms

Any alarm detected by the system, either an auto reset alarm or a manual reset alarm will be displayed on the LCD. However, only manual reset alarms require user acknowledgement and reset.

- To clear the alarm press  to acknowledge the alarm.

If the alarm status is cleared, the corresponding device icon and alarm icon  that is flashing will accordingly disappear.

Manual Reset Alarms The following are codes for manual reset alarms with their meanings.

Codes	Meaning
AL18	Low pressure alarms times within 24 hours is over the limit
AL19	High pressure alarms times within 24 hours is over the limit
AL31	Low evaporation temperature alarm times within 24 hours is over the limit
AL98	Inverter alarm

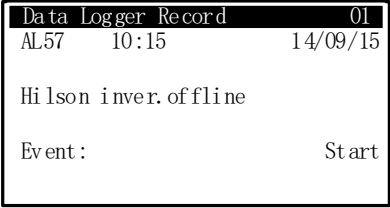
Auto Reset Alarms The following are codes for auto reset alarms with their meanings.

Codes	Meaning
AL01	Low pressure
AL02	High pressure
AL03	Low outlet water temperature (ST<AR01)
AL05	High outlet water temperature (ST>AR03)
AL17	Water flow is short
WN01	Antifreeze
AL20	Low evaporation temperature (only cooling mode)
AL21	High discharge gas temperature
AL57	Hilson inverter offline
Display offline	User interface and main board communication trouble.

Alarms relating to inverter board (auto reset)

AL100	IPM overcurrent
AL101	Compressor. drive failure
AL102	Compressor. overcurrent
AL103	Power phase loss
AL104	IPM current sampling error
AL105	Radiator overheat
AL106	Pre-charging failure
AL107	DC bus overvoltage
AL108	DC bus under voltage
AL109	AC input under voltage
AL110	AC input overcurrent
AL111	Voltage sampling error
AL113	Temperature. sensor error
AL115	Communication fault
AL116	Compressor. overcurrent
AL117	Compressor. field weakening
AL118	Parts overheat
AL120	AC input overcurrent
AL121	EEPROM alarm

Viewing the alarm history

Display	Procedures
Press <Prg> button , then then press down button to Alarm Logs, press <Enter> to confirm.	
	Press <up> or <down> to view other alarms
	If no alarm is generated, the word "No alarm!" will be displayed.

Alarms in detail

1.) Low pressure protection (Code: AL01)

After starting the compressor, it checks the low pressure after AR09 delay. If $LPS \leq AR31$ in continual 120 seconds, then compressor is switched off, 5 seconds later, fan motor is switched off, other parts keep their original state. Alarm code AL01 display on the user interface. After $LPS \geq AR31 + AR32$ in continual 10 seconds, the unit returns to normal operation.

2.) High pressure protection (Code: AL02)

It does not trigger high pressure protection on defrosting process and within 10 seconds after end of defrosting .

At other time if $HPS \geq AR33$ in continual 5 seconds , the compressor is switched off ,after 5 seconds' delay, the fan motor is switched off, other parts keep their original state. Alarm code AL02 display on the user interface. After $HPS \leq AR33 - AR34$, the unit re turns to normal operation.

3.) Low pressure protection (serious) (Code: AL18)

In 24 hours' time, if AL01 is triggered over AR06 times, manual reset alarm AL18 is triggered, then compressor is switched off, 5 seconds later, fan motor is switched off, other parts keep their original state. Alarm code AL18 display on the user interface.

4.) High pressure protection (serious) (Code: AL19)

In 24 hours' time, if AL02 is trigger over AR07 times, manual reset alarm AL19 is triggered, the compressor is switched off, 5 seconds later, fan motor is switched off, other parts keep their original state. Alarm code AL19 displays on the user interface.

5.) Water flow protection (Code: AL17)

A.) AR04 time delay after circulation pump is switched on and circulation pump PWM output is 100% in continual 5 seconds, if feedback pump flow is lower than $EV06 * 0.8$ in continual 5 seconds, AL17 alarm is triggered.

B.) On the running process, when pump PWM output is 100% , if feedback pump flow is lower than $EV06 * 0.8$ in continual 5 seconds, AL17 alarm is triggered.

The compressor is switched off, 5 seconds later, fan motor is switched off, other parts keep their original state. Alarm code AL17 displays on the user interface. Unit will retutn to normal operation if feedback pump flow is over EV06 for 5 seconds.

6.) Indoor circuit anti-freezing protection (code: WN01)

1.) If pump has been switched off over AR29 times and $OT < SF06$, pump is switched on and runs with PWM 100%. 180 seconds later, if $RT > AR01$, pump is switched off. If $RT < AR01$, WN01 warning is triggered and the unit is switched on to run on heating mode until $RT > 20^{\circ}\text{C}$,then warning is reset.

2.) If RT sensor is faulted, ST is used instead of RT for anti-freezing protection water temperature reference. If ST sensor is faulted too when $OT < SF06$, pump runs continually with PWM 100% .

7.) High discharge gas temperature protection (code: AL21)

If Discharge gas temperature $PT > AR13$ is continual for 5 seconds, high Discharge gas temperature protection alarm AL21 is triggered, the compressor is switched off, 5 seconds later, fan motor is switched off, other parts keep their original state. Alarm code AL21 displays on the user interface.

It will return to normal operation if $PT < AR13 - AR14$ over 5 seconds.

8.) Low evaporation temperature protection (Code: AL20)

The protection function will be valid on COOLING mode .AL20 low evaporation temperature protection is triggered when one of the following is met: **1.)** $LPS \leq AR08$ for continual 60 seconds; **2.)** $LPS \leq AR08 - 2$ for continual 40 seconds; **3.)** $LPS \leq AR08 - 4$ for continual 10 seconds; **4.)** Outlet water temp. $< 8^{\circ}\text{C}$ The compressor is switched off, 5 seconds later, fan motor is switched off, other parts keep their original state. Alarm code AL20 displays on the user interface. It will return to normal operation 5 minutes later.

9.) Low evaporation temperature protection (serious) (Code: AL31)

In 24 hours' time, if AL20 is triggered over AR16 times, then manual reset alarm AL31 is triggered, the compressor is switched off, 5 seconds later, fan motor is switched off, other parts keep their original state. Alarm code AL31 displays on the user interface.

10.) Low outlet water temperature protection (Code: AL03)

If $ST \leq AR01$ & $LPS < 0^{\circ}\text{C}$ for 5 seconds, the compressor is switched off ,after 5 seconds' delay, the fan motor is switched off, water pump runs with PWM 100%, other parts keep their original state. Alarm code AL03 displays on the user interface. It records the instant inlet water temperature RT1 when unit just stops & returns to normal working after inlet water temperature $RT \geq RT1 + ST03$.

11.) High outlet water temperature protection (Code: AL05)

If $ST \geq AR03$ in continual for 5 seconds, the compressor is switched off , after 5 seconds delay, the fan motor is switched off, water pump runs with PWM 100% ,other parts keep their original state. Alarm code AL05 display on user interface. It records instant inlet water temperature RT2 when unit just stops and returns to normal working after inlet water temperature $RT \leq RT2 - ST04$.

12.) Display offline - User interface and main board communication trouble.

If this happens, the unit may still work normally but the user interface cannot be used to operate the unit.

Temperature Sensor faults (B1-B8 fault are auto reset)

If temperature sensors B1 to B8 are below -35C or higher than 120C, a sensor fault is triggered.

sensor	code	Unit's actions to deal with the fault
B1 (RT)	AL71	ST replaces RT as temperature control reference. control water temperature +5C on heating mode, -5C on cooling mode. If ST sensor faulted too, unit is switched off.
B2 (ST)	AL72	Cooling mode is invalid Heating and DHW mode is valid, no high outlet water temperature protection and pump PWM = 100%.
B3 (OT)	AL73	T(cooling)=ST01. T(heating)=ST02 Aux. electric backup heater, crankcase heater and anti-freezing function etc works without OT condition limitation.
B4 (HT)	AL74	Hot water mode is invalid. Alarm code does not display if SF05=0.
B5 (PT)	AL75	Switch off the unit
B6 (LPS)	AL37	Switch off the unit
B7 (HPS)	AL38	Switch off the unit
B8 (ET)	AL76	Relative function is canceled.

TECHNICAL INFORMATION

Compressor oil filling quantities;

Always Confirm the below with the information on the appliance Data Plate

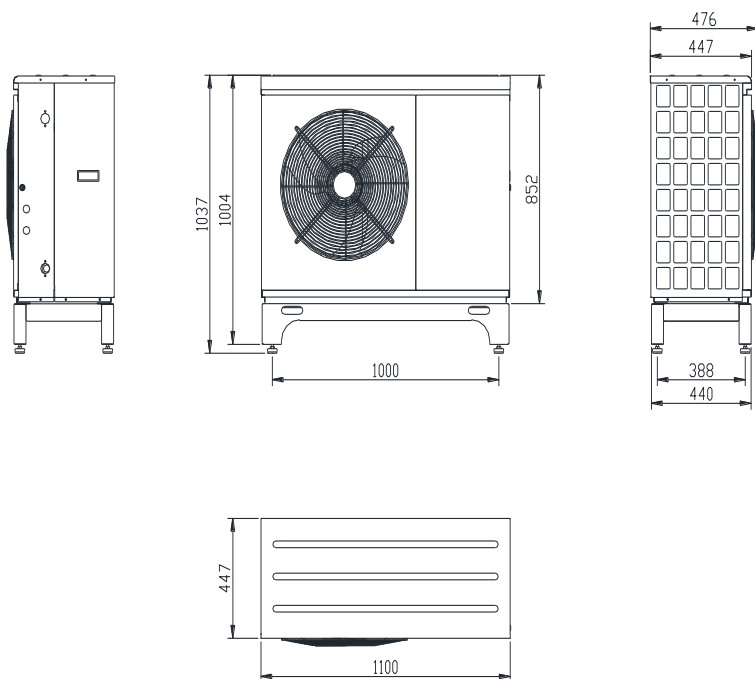
AS07V FV50S 400cm³;
AS10V FV50S 520cm³;
AS15V-QPNHE FV50S 1400cm³
AS15V-DPNHE FV50S 870cm³
AS20V FV50S 1700cm³

The attached heating system must be pressure tested and air vented completely.

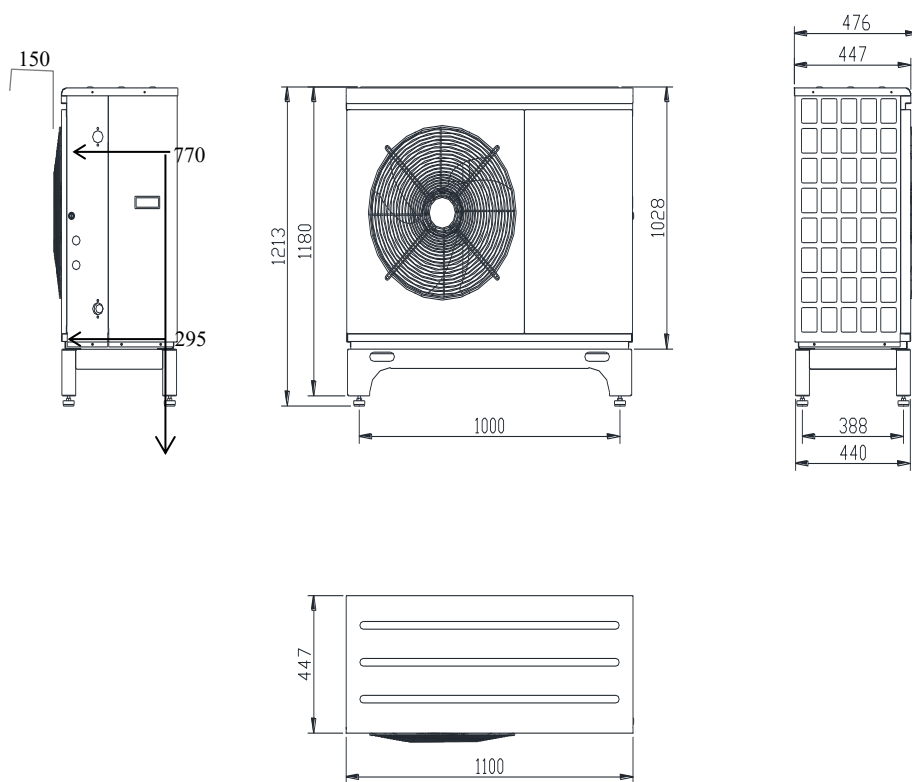
Filling water and supplemented water must be of drinking water quality (colourless, clear, free from sediments)

Filling water and supplemented water must be pre-filtered. (Max. 5um)

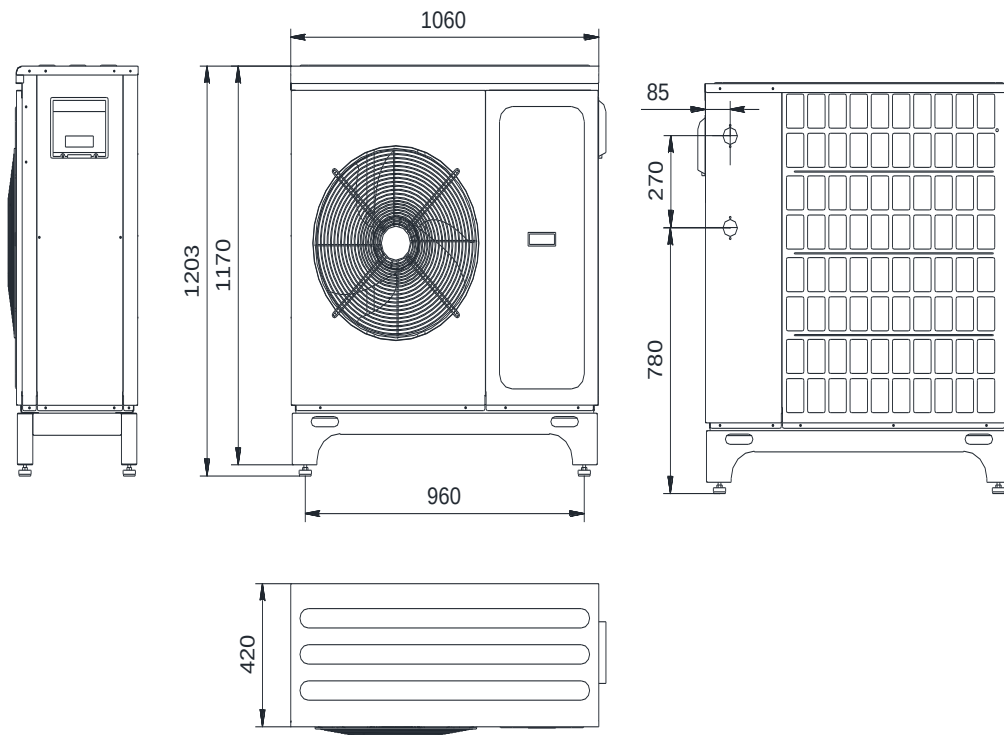
AS07V



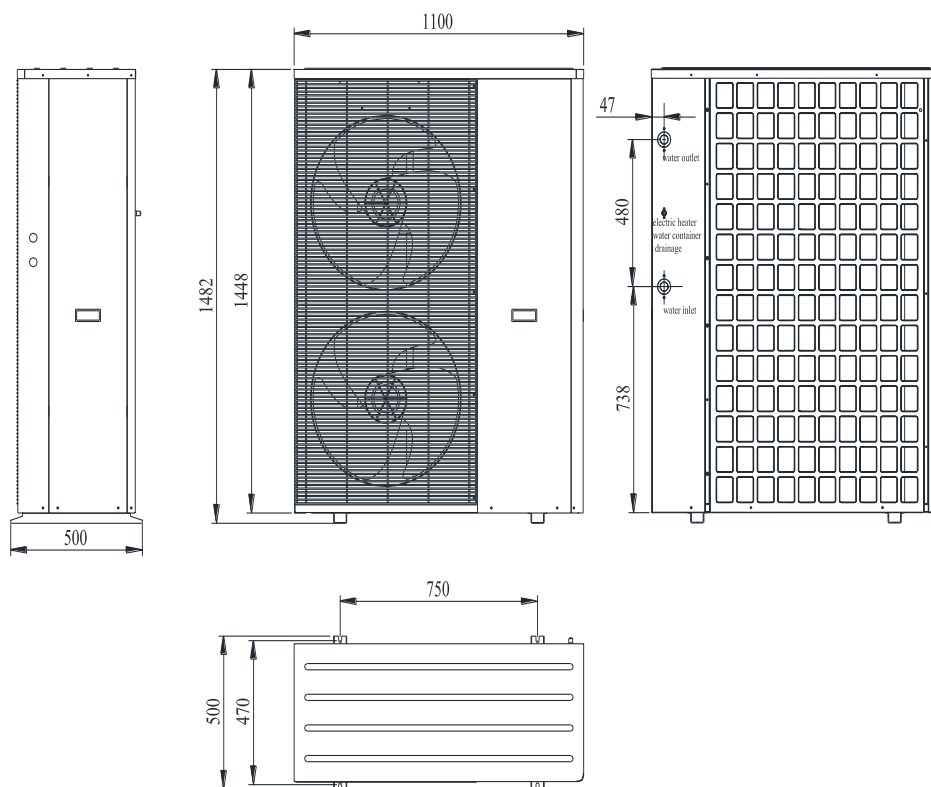
AS10V



AS15V



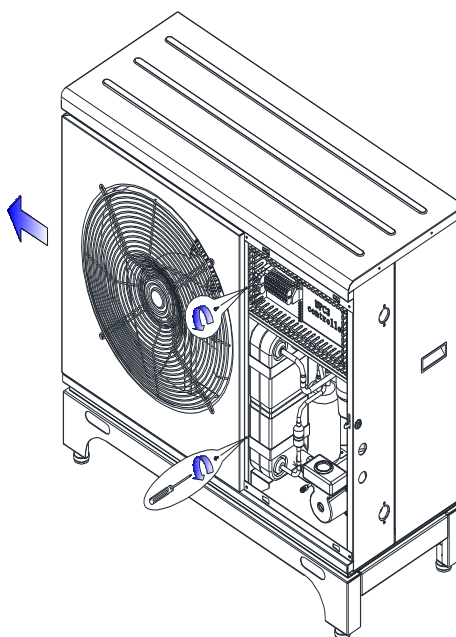
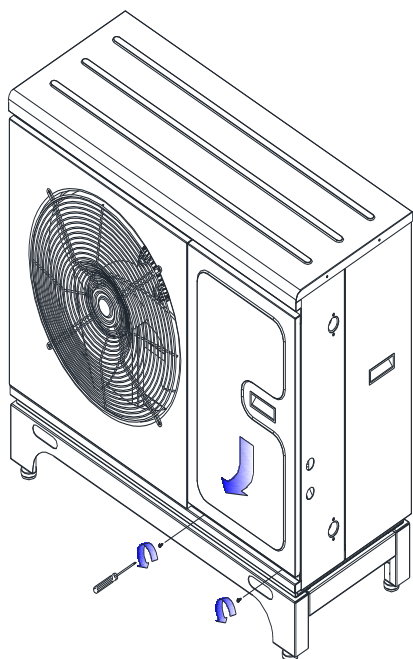
AS20V



Removing the Cabinet IQ AS7V & AS10V

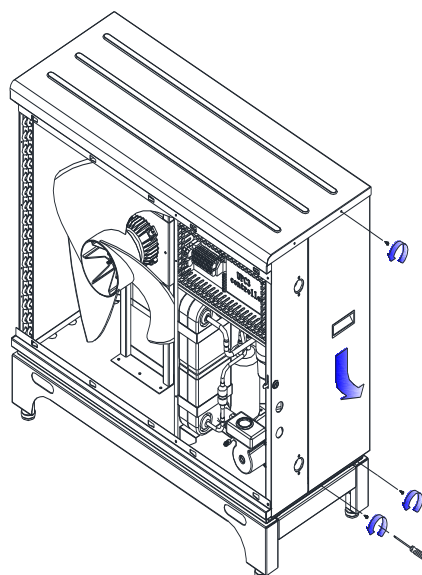
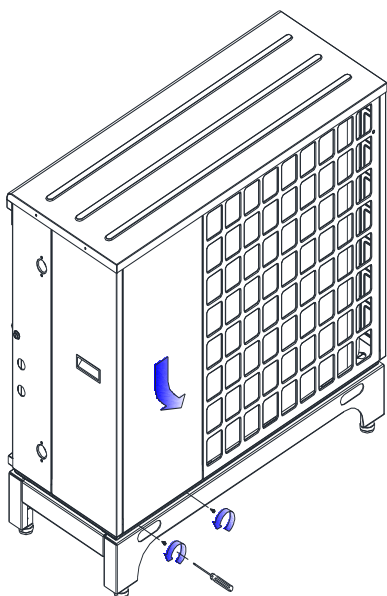
The panels must be removed as the order: front panel – back panel – right panel-top panel

1. Unscrew the screws on the right front panel (below left) panel can be removed by pushing downward.



2. Remove the screws on the left front panel (above right) and the panel can be removed by pushing the panel leftwards.

3. Unscrew the screws on the back panel (below left) The panel can now be removed by pushing downwards.



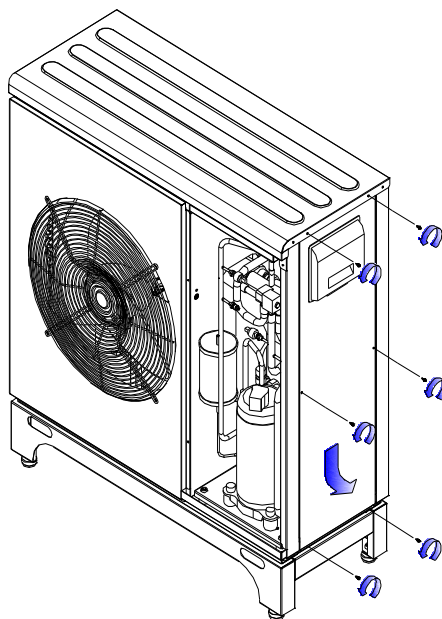
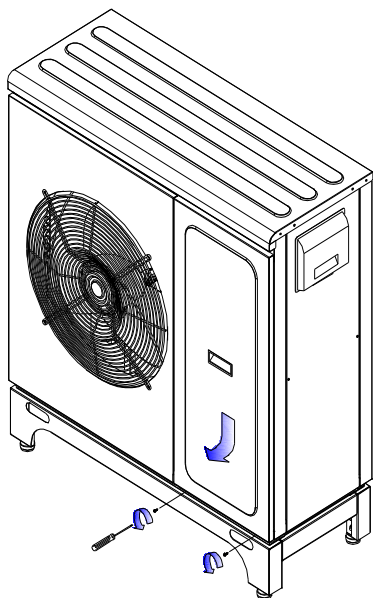
4. Remove the screws on the right panel (above right) The panel can now be removed by pushing downwards.

5. Remove the three remaining screws on the top panel. The top panel can now be lifted off. The top panel can of course be removed independently

Removing the cabinet IQAS15V

The panels must be removed in the order: front right panel – right panel - fan panel - top panel

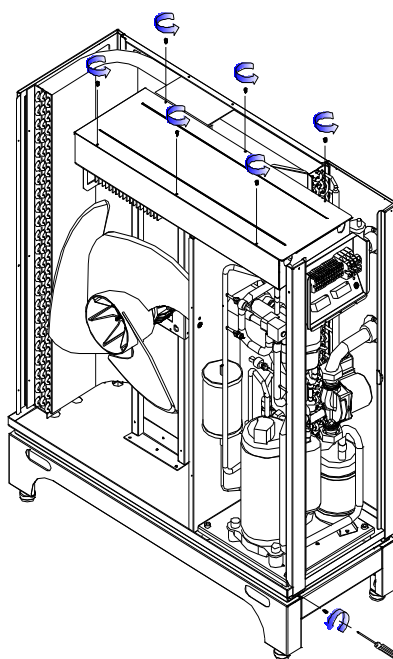
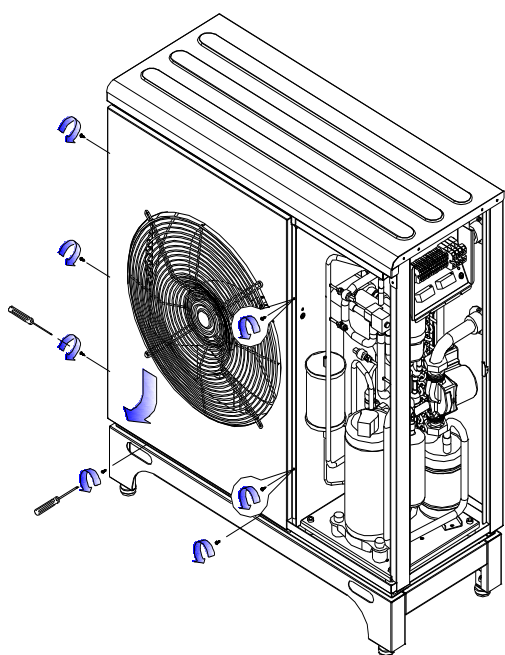
1. Unscrew the screws on the right front panel (below left) and remove by pushing it downward.



2. Unscrew the screws on the right panel as (above right) and remove by pressing the panel downwards.

3. Unscrew the screws on the fan panel (below left) the Fan panel can now be removed by pushing downwards.

4. Unscrew the screws on the top panel (Not shown) The top panel can then be removed. The top panel can of course be removed independently

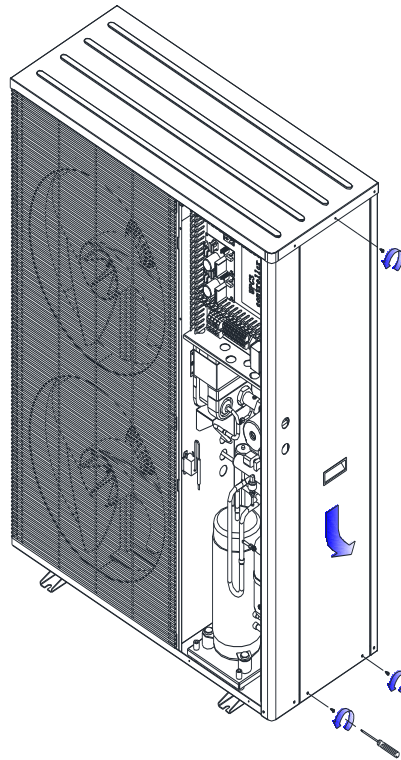
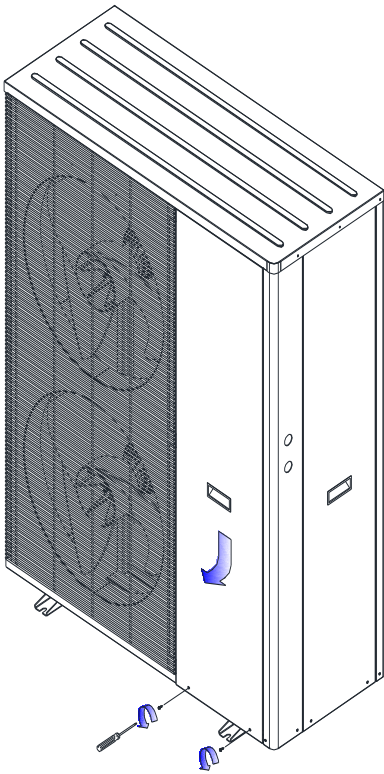


5. Unscrew the screws (Top right). The cover of internal controls enclosure can then be removed

Removing the Cabinet IQAS20V

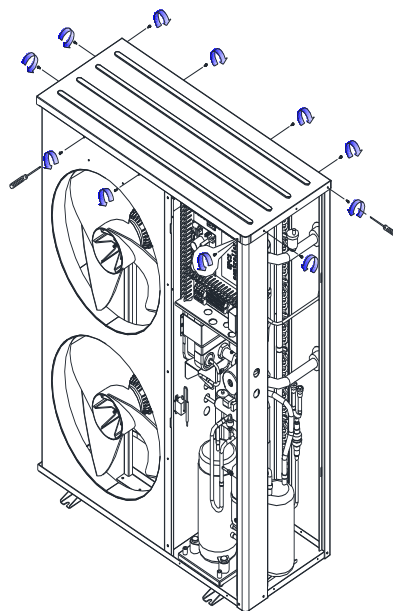
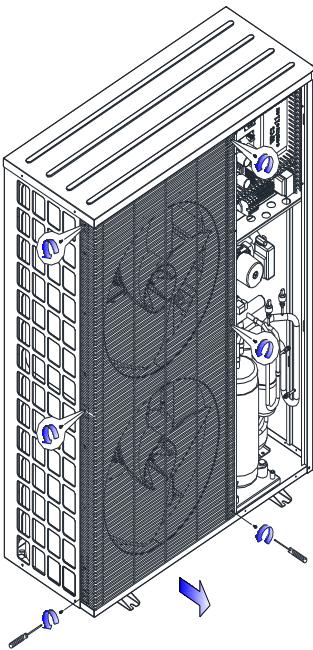
Panels must be removed in order: front right panel – right side panel – front grill - top panel – front left panel

1. Unscrew the screws at the bottom (below left) the front right panel can be taken out by pushing downwards.



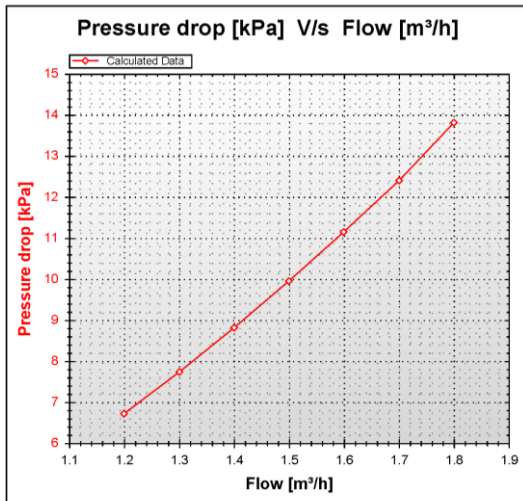
2. Remove the screws as shown (above right) the right side panel can also be taken out by pushing downwards.

3. Remove the screws (below left) to remove grill and then the top panel(below right) then the fan aperture panel

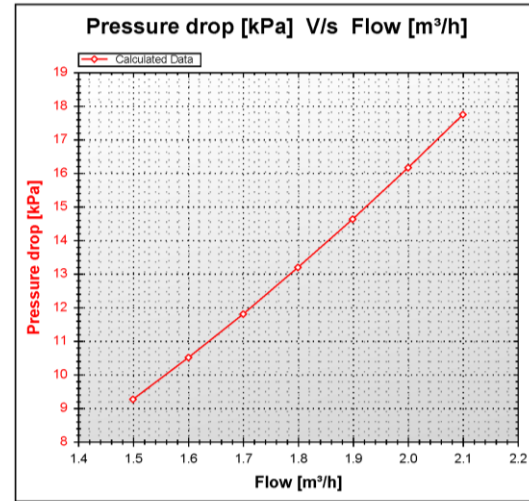


Water Pressure Plots

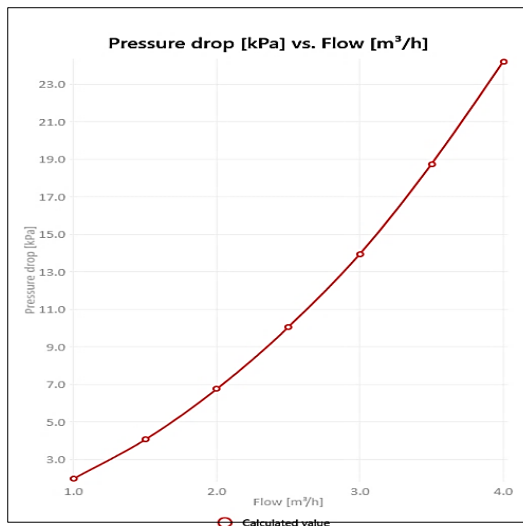
AS07V



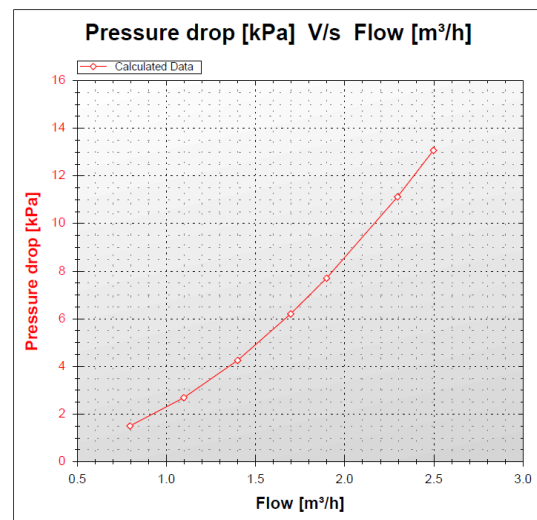
AS10V



AS15V



AS20V

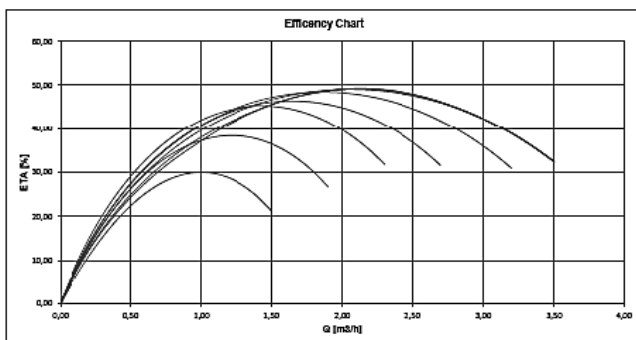
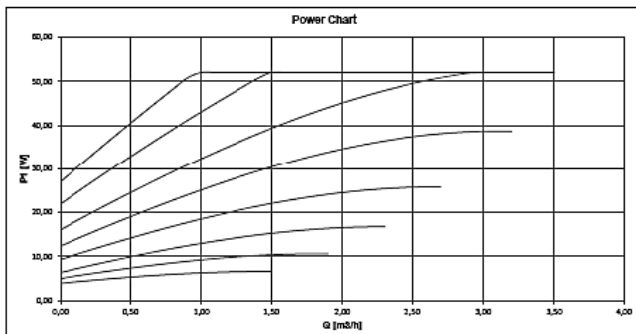
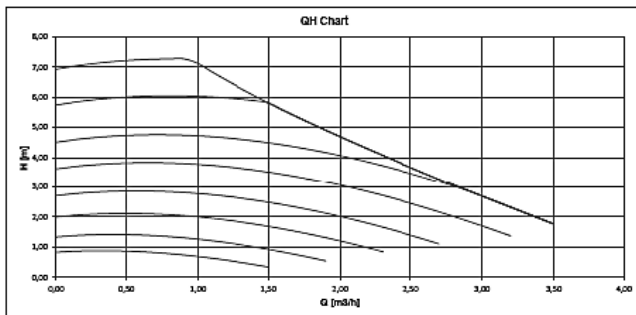


Refrigerant specification – Always confirm and default to Data-plate on the appliance

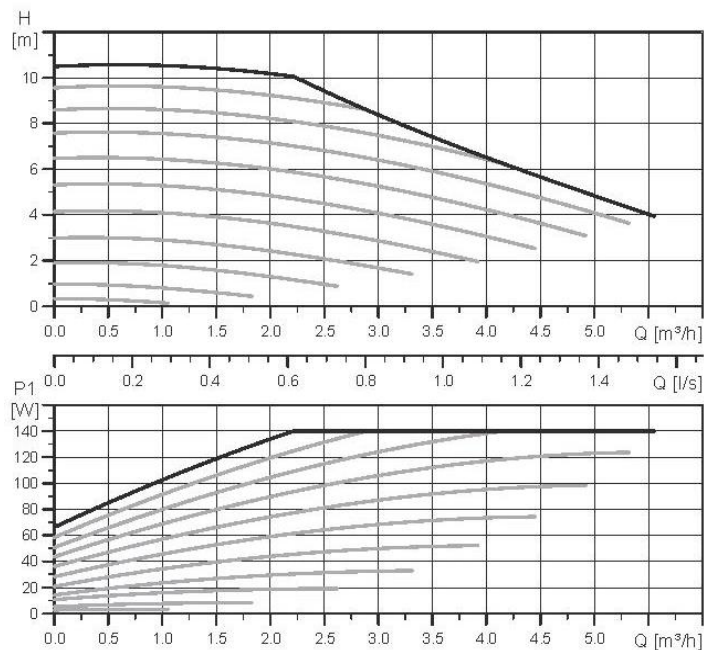
Model		AS07V	AS10V	AS15V	AS20V
The heat pump contains fluorinated greenhouse gases		R410A	R410A	R410A	R410A
R410A global warming potential		2088	2088	2088	2088
Refrigerant R410A filling weight	kg	2.1	3.2	3	3.6
CO2 equivalent	Tonnes	4.38	6.7	6.3	7.5

Internal pump curve for AS07V AS10V

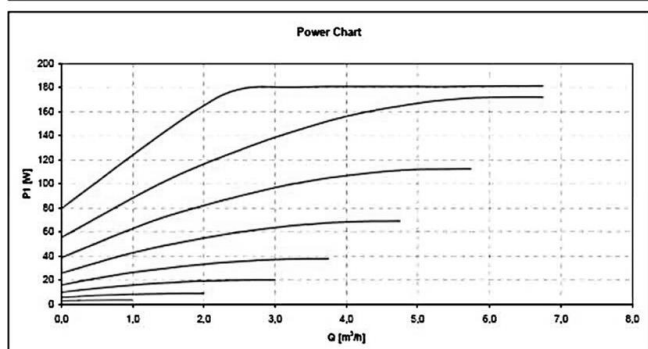
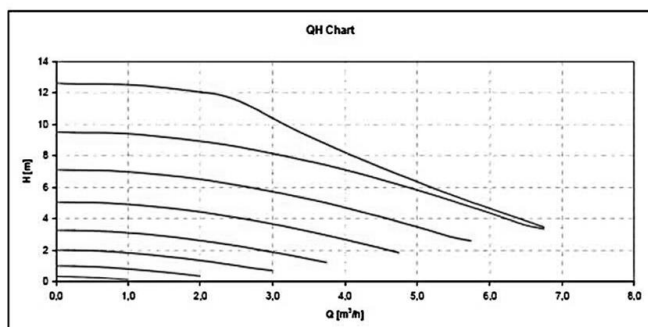
Title Test data UPM3 PWM 7.0m 13Q
Product no



Internal pump curve for AS15V



Internal pump curve for AS20V



Temperature and sensor resistance table NTC

All sensors are all NTC10K. Except B5 which is a PT sensor - see pages 47 to 49

R25 : 10.0 k Ω $\pm$ 1% B25/50: 3470K $\pm$ 1%

T (°C)	Rmin [K Ω]	Rnom [K Ω]	Rmax [K Ω]
-30	123.5	128.0	132.5
-29	117.0	121.1	125.3
-28	110.8	114.6	118.6
-27	105.0	108.6	112.2
-26	99.48	102.8	106.3
-25	94.33	97.47	100.7
-24	89.49	92.42	95.44
-23	84.92	87.66	90.47
-22	80.62	83.17	85.80
-21	76.56	78.95	81.39
-20	72.74	74.96	77.25
-19	69.12	71.20	73.33
-18	65.71	67.66	69.65
-17	62.50	64.31	66.17
-16	59.54	61.15	62.88
-15	56.58	58.16	59.78
-14	53.86	55.34	56.85
-13	51.29	52.67	54.09
-12	48.86	50.15	51.47
-11	46.56	47.77	49.00
-10	44.38	45.51	46.66
-9	42.32	43.37	44.45
-8	40.36	41.35	42.36
-7	38.51	39.43	40.37
-6	36.75	37.62	38.49
-5	35.09	35.89	36.72
-4	33.51	34.26	35.03
-3	32.01	32.71	33.43
-2	30.59	31.24	31.91
-1	29.23	29.85	30.48
0	27.95	28.53	29.11
1	26.73	27.27	27.81
2	25.57	26.07	26.58
3	24.47	24.94	25.41
4	23.42	23.86	24.30
5	22.42	22.83	23.25
6	21.47	21.86	22.24
7	20.57	20.93	21.29
8	19.71	20.04	20.38
9	18.89	19.20	19.52
10	18.11	18.40	18.69
11	17.37	17.64	17.91
12	16.66	16.91	17.16
13	15.98	16.22	16.45
14	15.34	15.56	15.78
15	14.72	14.93	15.13
16	14.13	14.32	14.51

Temperature and sensor resistance table NTC

17	13.57	13.75	13.93
18	13.04	13.20	13.37
19	12.53	12.68	12.83
20	12.04	12.18	12.32
21	11.57	11.70	11.84
22	11.13	11.25	11.37
23	10.70	10.81	10.93
24	10.29	10.40	10.50
25	9.900	10.00	10.10
26	9.522	9.621	9.721
27	9.160	9.259	9.359
28	8.814	8.931	9.012
29	8.483	8.581	8.680
30	8.166	8.264	8.362
31	7.863	7.960	8.058
32	7.573	7.669	7.766
33	7.295	7.391	7.487
34	7.029	7.123	7.219
35	6.774	6.868	6.962
36	6.529	6.622	6.716
37	6.295	6.387	6.479
38	6.071	6.161	6.253
39	5.855	5.945	6.035
40	5.649	5.737	5.826
41	5.451	5.538	5.626
42	5.260	5.347	5.433
43	5.078	5.163	5.249
44	4.903	4.987	5.071
45	4.735	4.817	4.900
46	4.573	4.654	4.736
47	4.418	4.498	4.579
48	4.269	4.348	4.427
49	4.126	4.203	4.282
50	3.988	4.064	4.141
51	3.855	3.930	4.007
52	3.728	3.802	3.877
53	3.606	3.678	3.752
54	3.488	3.559	3.632
55	3.374	3.445	3.516
56	3.265	3.334	3.404
57	3.160	3.228	3.297
58	3.059	3.126	3.194
59	2.962	3.027	3.094
60	2.868	2.933	2.998
61	2.778	2.841	2.905
62	2.691	2.753	2.816
63	2.607	2.668	2.730
64	2.526	2.586	2.647
65	2.448	2.507	2.567
66	2.373	2.431	2.490
67	2.301	2.357	2.415
68	2.231	2.287	2.343

Temperature and sensor resistance table NTC

69	2.164	2.218	2.274
70	2.098	2.152	2.207
71	2.036	2.088	2.142
72	1.975	2.027	2.080
73	1.917	1.976	2.019
74	1.860	1.910	1.961
75	1.806	1.855	1.904
76	1.753	1.801	1.851
77	1.702	1.749	1.797
78	1.653	1.699	1.746
79	1.606	1.651	1.697
80	1.560	1.604	1.650
81	1.515	1.599	1.603
82	1.472	1.515	1.559
83	1.431	1.473	1.516
84	1.391	1.432	1.474
85	1.352	1.392	1.434
86	1.315	1.354	1.395
87	1.278	1.317	1.357
88	1.243	1.282	1.321
89	1.209	1.247	1.285
90	1.177	1.213	1.251
91	1.145	1.181	1.218
92	1.114	1.150	1.186
93	1.084	1.119	1.155
94	1.055	1.089	1.125
95	1.027	1.061	1.095
96	1.000	1.033	1.067
97	0.974	1.006	1.039
98	0.948	0.9801	1.013
99	0.9234	0.9548	0.9873
100	0.8994	0.9303	0.9621
101	0.8762	0.9065	0.9378
102	0.8537	0.8834	0.9141
103	0.8318	0.8611	0.8912
104	0.8106	0.8393	0.8689
105	0.7901	0.8182	0.8473
106	0.7270	0.7806	0.8378
107	0.7085	0.7611	0.8173
108	0.6906	0.7422	0.7974
109	0.6732	0.7239	0.7781
110	0.6563	0.7061	0.7594
111	0.6399	0.6888	0.7411
112	0.6240	0.6720	0.7235
113	0.6086	0.6557	0.7063
114	0.5936	0.6399	0.6896
115	0.5791	0.6246	0.6733
116	0.5650	0.6096	0.6576
117	0.5513	0.5951	0.6422
118	0.5380	0.5810	0.6273
119	0.5250	0.5674	0.6128
120	0.5125	0.5541	0.5988

Temperature and sensor resistance table PT

Only for the PT sensor B5

R25=50K Ω $\pm$ 2% B25/50=3950K $\pm$ 2%

T (°C)	Rmin [K Ω]	Rnom [K Ω]	Rmax [K Ω]
-20	441.8	471.5	503.0
-19	417.9	445.5	474.7
-18	395.5	421.1	448.2
-17	374.4	398.2	423.4
-16	354.5	376.7	400.0
-15	335.8	356.4	378.1
-14	318.2	337.4	357.5
-13	301.6	319.4	338.1
-12	286.0	302.6	319.9
-11	271.3	286.7	302.8
-10	257.4	271.7	286.7
-9	244.3	257.6	271.5
-8	232.0	244.3	257.3
-7	220.3	231.8	243.8
-6	209.3	220.0	231.1
-5	198.9	208.8	219.2
-4	189.1	198.3	207.9
-3	179.8	188.4	197.3
-2	171.0	179.0	187.3
-1	162.7	170.1	177.8
0	154.8	161.7	168.9
1	147.4	153.8	160.5
2	140.4	146.3	152.5
3	133.7	139.2	145.0
4	127.4	132.5	137.8
5	121.4	126.2	131.1
6	115.7	120.2	124.8
7	110.4	114.5	118.7
8	105.3	109.1	113.0
9	100.4	104.0	107.6
10	95.84	99.14	102.5
11	91.49	94.55	97.68
12	87.35	90.20	93.09
13	83.43	86.06	88.74
14	79.70	82.14	84.62
15	76.16	78.42	80.71
16	72.80	74.88	77.00
17	69.60	71.53	73.48
18	66.55	68.34	70.14
19	63.66	65.31	66.97
20	60.91	62.42	63.96
21	58.28	59.69	61.09
22	55.79	57.08	58.38
23	53.42	54.60	55.79
24	51.15	52.24	53.34

Temperature and sensor resistance table PT

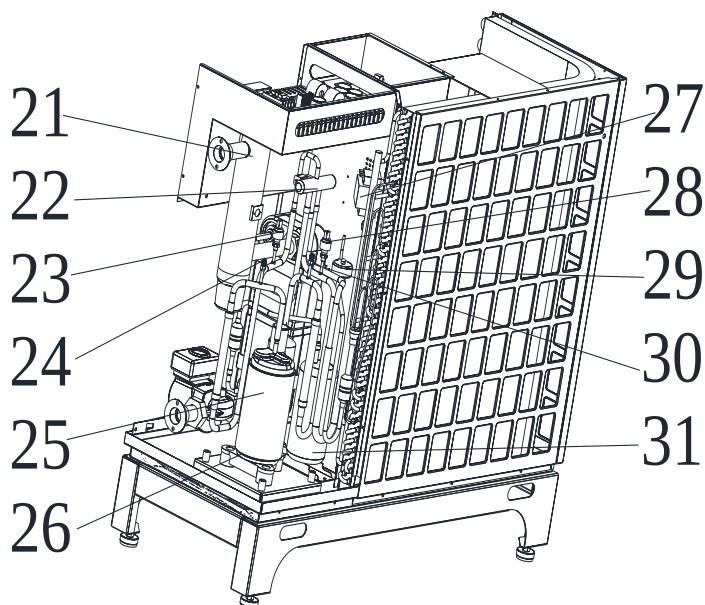
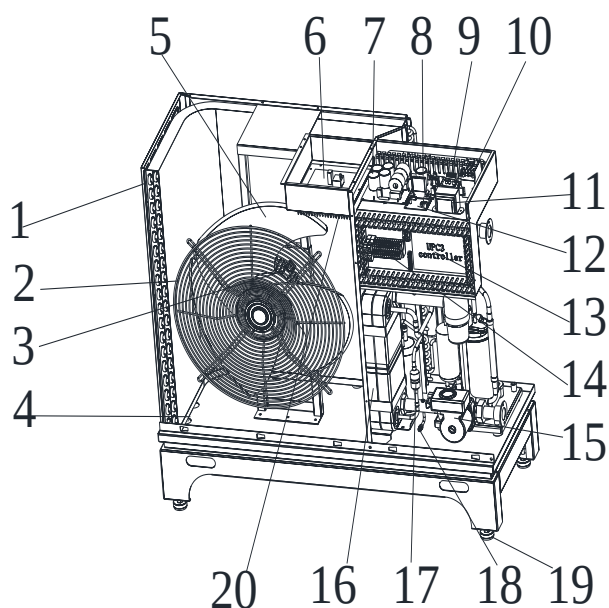
T (°C)	Rmin [K Ω]	Rnom [K Ω]	Rmax [K Ω]
25	49.00	50.00	51.00
26	46.87	47.86	48.86
27	44.83	45.83	46.83
28	42.90	43.89	44.89
29	41.06	42.05	43.04
30	39.31	40.29	41.27
31	37.64	38.61	39.59
32	36.05	37.01	37.98
33	34.54	35.49	36.45
34	33.10	34.03	34.98
35	31.72	32.65	33.58
36	30.41	31.32	32.25
37	29.16	30.06	30.97
38	27.97	28.85	29.75
39	26.83	27.70	28.59
40	25.74	26.60	27.48
41	24.70	25.55	26.41
42	23.71	24.54	25.39
43	22.77	23.58	24.42
44	21.86	22.67	23.49
45	21.00	21.79	22.60
46	20.18	20.95	21.74
47	19.39	20.15	20.93
48	18.64	19.38	20.15
49	17.91	18.64	19.40
50	17.23	17.94	18.68
51	16.57	17.27	17.99
52	15.94	16.62	17.33
53	15.33	16.00	16.70
54	14.75	15.41	16.10
55	14.20	14.85	15.51
56	13.67	14.30	14.96
57	13.16	13.78	14.42
58	12.68	13.28	13.91
59	12.21	12.80	13.42
60	11.76	12.34	12.95
61	11.34	11.90	12.49
62	10.92	11.48	12.06
63	10.53	11.07	11.64
64	10.15	10.69	11.24
65	9.791	10.31	10.86
66	9.444	9.953	10.48
67	9.110	9.608	10.13
68	8.790	9.277	9.786
69	8.483	8.959	9.457
70	8.187	8.653	9.141
71	7.904	8.359	8.837
72	7.632	8.077	8.544
73	7.370	7.805	8.262

Temperature and sensor resistance table PT

T (°C)	Rmin [K Ω]	Rnom [K Ω]	Rmax [K Ω]
74	7.119	7.544	7.991
75	6.877	7.293	7.731
76	6.645	7.051	7.480
77	6.421	6.819	7.238
78	6.207	6.595	7.005
79	6.000	6.380	6.781
80	5.801	6.173	6.565
81	5.610	5.973	6.357
82	5.426	5.781	6.157
83	5.249	5.596	5.963
84	5.078	5.418	5.777
85	4.914	5.246	5.598
86	4.756	5.080	5.424
87	4.604	4.921	5.258
88	4.457	4.767	5.096
89	4.316	4.619	4.941
90	4.180	4.476	4.791
91	4.048	4.338	4.647
92	3.922	4.205	4.507
93	3.800	4.077	4.372
94	3.682	3.953	4.242
95	3.569	3.833	4.116
96	3.459	3.718	3.995
97	3.354	3.607	3.877
98	3.252	3.499	3.764
99	3.153	3.395	3.655
100	3.058	3.295	3.549
101	2.967	3.198	3.447
102	2.878	3.105	3.348
103	2.792	3.014	3.252
104	2.710	2.927	3.160
105	2.630	2.842	3.070
106	2.553	2.760	2.984
107	2.478	2.681	2.900
108	2.406	2.605	2.819
109	2.337	2.531	2.740
110	2.269	2.460	2.665
111	2.204	2.390	2.591
112	2.141	2.323	2.520
113	2.080	2.259	2.451
114	2.022	2.196	2.384
115	1.964	2.135	2.320
116	1.909	2.076	2.257
117	1.856	2.019	2.196
118	1.804	1.964	2.137
119	1.754	1.911	2.080
120	1.705	1.859	2.025

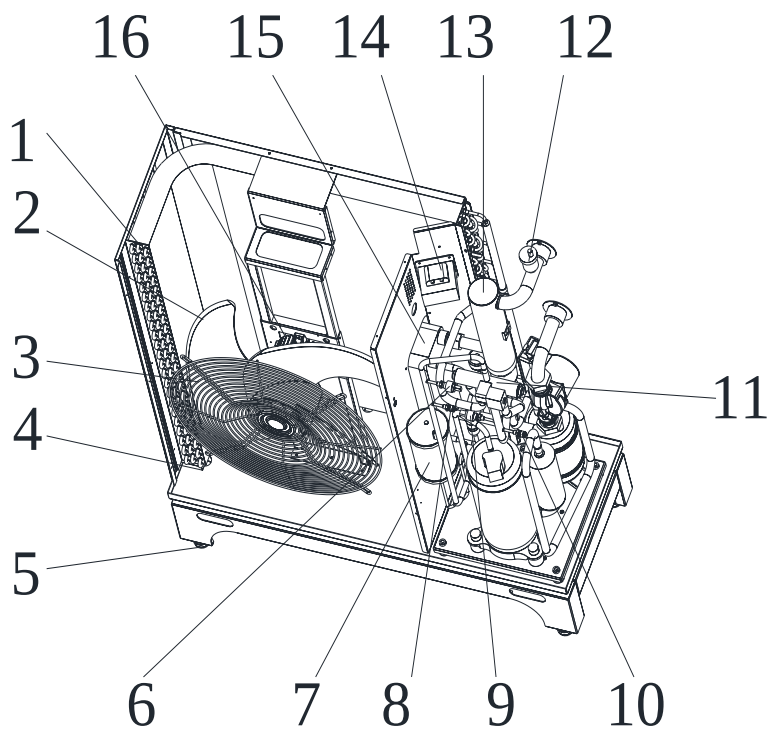
Component parts

IQ AS07V AS10V

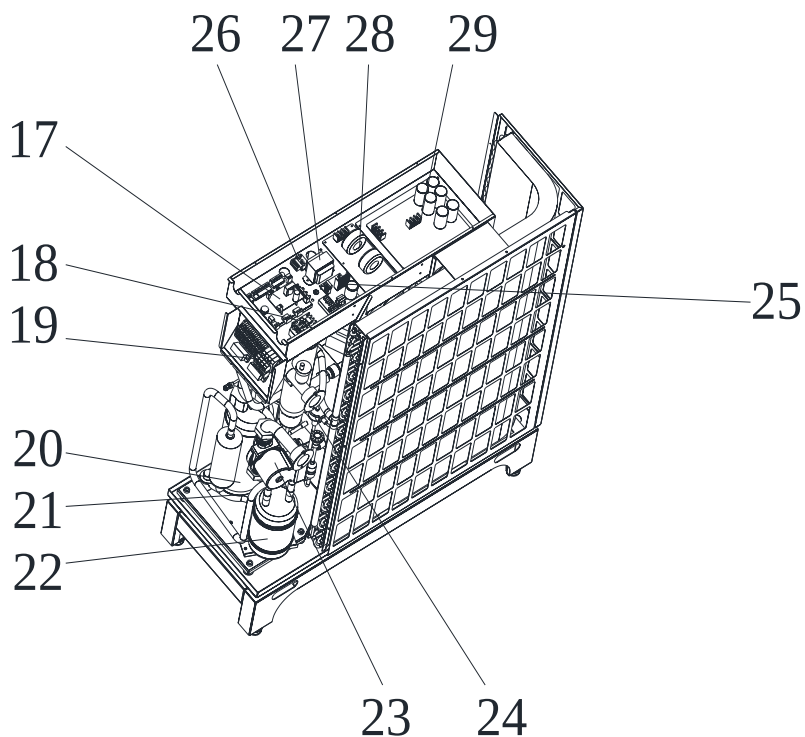


1. Finned coil heat exchanger
2. Grill
3. Panasonic EC Fan motor
4. De-icing heater
5. Fan blade
6. Inverter board
7. EMC filter
8. EC fan motor board
9. Circulation pump flow feedback
10. A/C contactor
11. Transformer
12. Modbus communication adaption board
13. Controller
14. Terminal block
15. Grundfos Circulation pump
16. Plate heat exchanger
17. Filter
18. Drain valve
19. Adjustable feet
20. Inverter board cooling radiator
21. Aux. backup electric heater
22. 4 way valve
23. HP transducer
24. HP service connection
25. Mitsubishi Compressor
26. Crankcase heater
27. Harmonic filter
28. LP transducer
29. EEV
30. LP service connection
31. Accumulator

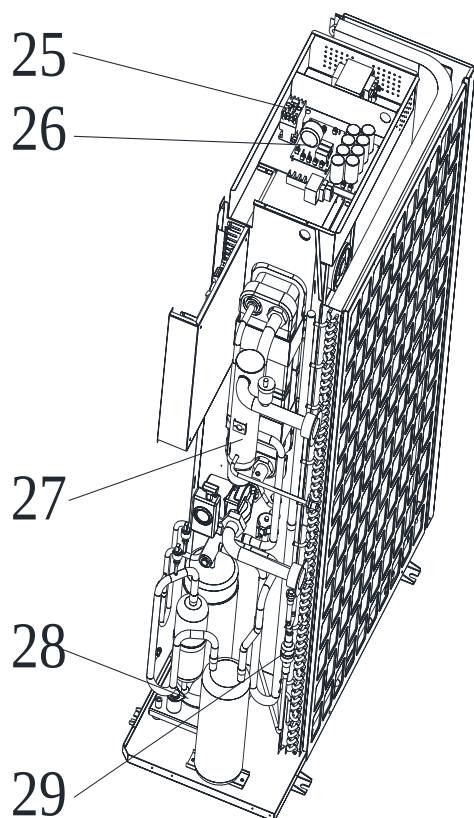
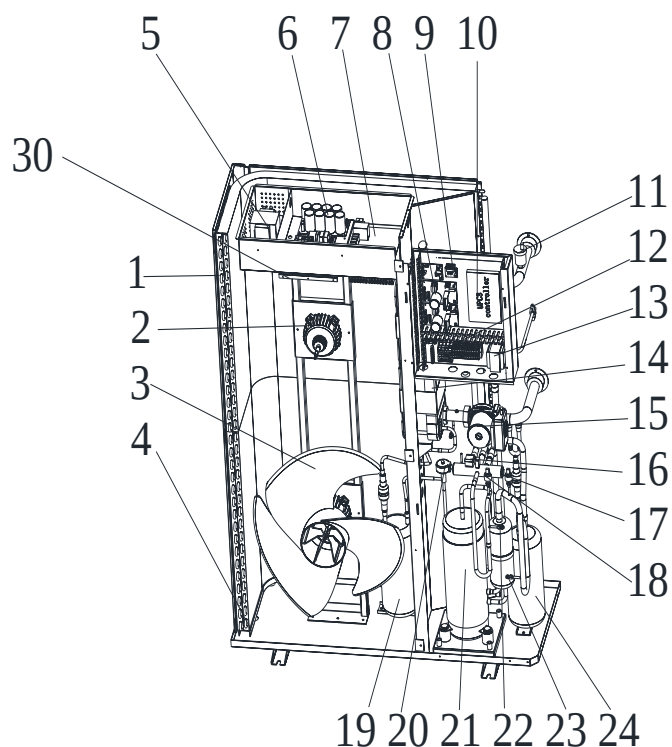
IQ AS15V



1. Finned coil heat exchanger
2. Fan blade
3. Grill
4. De-icing heater
5. Adjustable feet
6. HP transducer
7. Accumulator
8. HP service connection
9. LP transducer
10. LP service connection
11. 4 way valve
12. Air vent valve
13. Aux. backup electric heater
14. Harmonic filter
15. Plate heat exchanger
16. **Panasonic EC Fan motor**
17. Controller
18. A/C contactor
19. Terminal block
20. **Mitsubishi Compressor**
21. Crankcase heater
22. Gas-liquid separator
23. **Grundfos Circulation pump**
24. EEV
25. EC fan motor board
26. Circulation pump flow feedback
27. Transformer
28. EMC filter
29. Inverter board



IQ AS20V 3Ph



1. Finned coil heat exchanger
2. **Panasonic EC Fan motor**
3. Fan blade
4. De-icing heater
5. Harmonic filter
6. Capacitors board
7. Inverter board
8. Panasonic EC fan motor board
9. Circulation pump flow feedback board
10. Controller
11. Air vent valve
12. Terminal block
13. Transformer
14. Plate heat exchanger
15. **Grundfos Circulation pump**
16. 4 way valve
17. LP transducer
18. HP transducer
19. Accumulator
20. EEV
21. **Mitsubishi Compressor**
22. HP service connection
23. LP service connection
24. Gas-liquid separator
25. A/C contactor
26. EMC filter board
27. Aux. backup electric heater
28. Crankcase heater
29. Filter
30. Inverter board cooling radiator

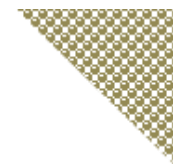
Technical Specifications, by model

Model Number		IQ AS07V (Indent Model)		
Heating performance		Min.	Nominal	Max.
Heat output/Power consumption/COP at A7/W35°C	kW	1.92/0.43/4.46	6.69/1.47/4.67	8.64/2.02/4.18
Heat output/Power consumption/COP at A2/W35°C	kW	1.39/0.44/3.13	5.54/1.62/3.42	6.32/1.92/3.30
Heat output/Power consumption/COP at A-7/W35°C	kW	3.08/1.16/2.65	4.40/1.39/3.09	5.61/1.83/2.98
Heat output/Power consumption/COP at A-10/W35°C	kW	2.76/1.12/2.46	3.92/1.37/2.86	5.10/1.79/2.85
Heat output/Power consumption/COP at A-15/W35°C	kW	2.33/1.08/2.16	3.02/1.34/2.25	4.42/1.71/2.51
Heat output/Power consumption/COP at A7/W45°C	kW	1.72/0.57/3.02	6.34/1.80/3.52	8.24/2.43/3.39
Heat output/Power consumption/COP at A2/W45°C	kW	1.24/0.53/2.33	5.15/1.92/2.68	5.76/2.20/2.61
Heat output/Power consumption/COP at A-7/W45°C	kW	2.97/1.52/1.95	4.12/1.65/2.50	5.28/2.14/2.39
Heat output/Power consumption/COP at A-10/W45°C	kW	2.64/1.42/1.86	3.87/1.60/2.42	4.96/2.11/2.35
Heat output/Power consumption/COP at A-15/W45°C	kW	2.20/1.11/1.98	2.82/1.36/2.07	4.15/2.15/1.93
Heat output/Power consumption/COP at A7/W55°C	kW	1.58/0.68/2.32	6.19/2.14/2.85	7.84/2.83/2.73
Cool output/Power consumption/EER at A35/W7°C	kW	1.67/0.63/2.65	5.2/1.84/2.82	6.1/2.23/2.73
Nominal running current at A7/W35	A	6.2		
Max operating current	A	16		
Power Supply		230V/50Hz		
Compressor		Mitsubishi Electric twin rotary		
Condenser		Brazen plate heat exchanger		
Nominal flow heating medium	m ³ /h	1.20		
Internal pressure drop at nominal flow	kPa	11		
Nominal air flow	m ³ /h	2000		
Nominal fan output	W	75		
Max outlet heating medium temperature	°C	55		
Refrigerant R410A filling weight	kg	2.1		
Dimensions (HxWxD)	mm	1037X1100X476		
Pipe connector		G1'		
Net Weight	kg	103		
Operating ambient temp. range	°C	Heating -20~35		
		DHW -20~43		
		Cooling 10~45		

The above data is tested by European Standard EN14511. A7/W35°C means air temp. 7°C, outlet water temp. 35°C

Model Number		IQ AS10V nz		
Heating performance		Min.	Nominal	Max.
Heat output/Power consumption/COP at A7/W35°C	kW	2.72/0.61/4.42	9.90/2.17/4.56	12.38/2.94/4.21
Heat output/Power consumption/COP at A2/W35°C	kW	2.29/0.76/3.01	8.38/2.36/3.54	10.21/3.02/3.38
Heat output/Power consumption/COP at A-7/W35°C	kW	2.53/1.20/2.25	6.56/2.25/2.92	8.24/2.82/2.96
Heat output/Power consumption/COP at A-10/W35°C	kW	2.25/1.16/1.94	5.66/2.25/2.51	7.25/2.86/2.53
Heat output/Power consumption/COP at A-15/W35°C	kW	2.38/1.40/1.71	4.47/2.23/2.01	6.33/2.56/2.47
Heat output/Power consumption/COP at A7/W45°C	kW	2.61/0.76/3.43	9.52/2.61/3.64	11.79/3.45/3.41
Heat output/Power consumption/COP at A2/W45°C	kW	2.20/0.79/2.76	8.06/2.68/3.0	9.66/3.40/2.84
Heat output/Power consumption/COP at A-7/W45°C	kW	2.77/1.43/1.93	6.30/2.53/2.51	7.75/3.37/2.30
Heat output/Power consumption/COP at A-10/W45°C	kW	2.47/1.42/1.74	5.42/2.52/2.15	6.90/3.39/2.03
Heat output/Power consumption/COP at A-15/W45°C	kW	2.62/1.68/1.56	4.29/2.31/1.84	6.0/3.34/1.79
Heat output/Power consumption/COP at A7/W55°C	kW	2.52/0.91/2.75	9.16/3.25/2.82	11.20/4.12/2.71
Cool output/Power consumption/EER at A35/W7°C	kW	2.02/0.72/2.80	7.85/2.60/3.02	8.89/3.12/2.85
Nominal running current at A7/W35	A	9.3		
Max operating current	A	19		
Power Supply		230V/50Hz		
Compressor		Mitsubishi Electric twin rotary		
Condenser		Braze plate heat exchanger		
Nominal flow heating medium	m ³ /h	1.72		
Internal pressure drop at nominal flow	kPa	18		
Nominal air flow	m ³ /h	3000		
Nominal fan output	W	110		
Max outlet heating medium temperature	°C	55		
Refrigerant R410A filling weight	kg	3.2		
Dimensions (HxWxD)	mm	1213X1100X476		
Pipe connector		G1'		
Net Weight	kg	109		
Operating ambient temp. range	°C	Heating -20~35		
		DHW -20~43		
		Cooling 10~45		

The above data is tested by European Standard EN14511. A7/W35°C means air temp. 7°C, outlet water temp. 35°C



Model Number		IQ AS15V nz		
Heating performance		Min.	Nominal	Max.
Heat output/Power consumption/COP at A7/W35°C	kW	3.70/ 0.79/4.68	15.90/ 3.90/ 4.08	16.5/ 4.13/ 4.00
Heat output/Power consumption/COP at A2/W35°C	kW	3.50/ 1.14/ 3.07	12.60/ 3.54/ 3.56	13.10/ 3.88/ 3.38
Heat output/Power consumption/COP at A-7/W35°C	kW	3.80/ 1.80/ 2.11	9.84/ 3.38/ 2.91	10.34/ 3.63/ 2.85
Heat output/Power consumption/COP at A-10/W35°C	kW	3.38/ 1.74/ 1.94	9.49/ 3.78/ 2.51	9.99/ 4.06/ 2.46
Heat output/Power consumption/COP at A-15/W35°C	kW	3.57/ 2.10/ 1.70	7.71/ 3.19/ 2.42	8.01/ 3.37/ 2.38
Heat output/Power consumption/COP at A7/W45°C	kW	3.92/ 1.14/ 3.44	14.28/ 4.29/ 3.33	14.80/ 4.49/ 3.30
Heat output/Power consumption/COP at A2/W45°C	kW	3.3/ 1.19/ 2.77	15.19/ 5.68/ 2.67	15.60/ 6.00/ 2.60
Heat output/Power consumption/COP at A-7/W45°C	kW	4.16/ 2.15/ 1.93	9.45/ 3.80/ 2.49	9.85/ 4.28/ 2.30
Heat output/Power consumption/COP at A-10/W45°C	kW	3.71/ 2.13/ 1.74	9.13/ 4.25/ 2.15	9.54/ 4.63/ 2.06
Heat output/Power consumption/COP at A-15/W45°C	kW	3.93/ 2.52/ 1.56	7.44/ 4.00/ 1.86	7.74/ 4.30/ 1.80
Heat output/Power consumption/COP at A7/W55°C	kW	3.78/ 1.37/ 2.76	13.83/ 5.48/ 2.53	14.33/ 5.92/ 2.42
Cool output/Power consumption/EER at A35/W7°C	kW	3.43/ 1.29/ 2.66	10.90/ 4.90/ 2.22	11.30/ 5.14 /2.20
Nominal running current at A7/W35	A	17.2		
Max operating current	A	30.5		
Power Supply		230V//1phase/50Hz		
Compressor		Mitsubishi Electric twin rotary		
Condenser		Brazed plate heat exchanger		
Nominal flow heating medium	m3/h	2.74		
Internal pressure drop at nominal flow	kPa	22		
Nominal air flow	m³/h	5000		
Nominal fan output	W	220		
Max outlet heating medium temperature	°C	55		
Refrigerant R410A filling weight	kg	3		
Dimensions (HxWxD)	mm	1203 (with stand)X1060X420		
Net weight	kg	118		
Pipe connector		G1-1/4"		
Operating ambient temp. range	°C	Heating -20~35		
		DHW -20~43		
		Cooling 10~45		

Model Number		IQ AS20V Indent appliance		
Heating performance		Min	Nominal	Max
Heat output/Power consumption/COP at A7/W35°C	kW	9.03/1.91/4.72	20.03/4.89/4.09	24.72/6.76/3.65
Heat output/Power consumption/COP at A2/W35°C	kW	7.58/1.96/3.86	17.63/4.91/3.59	21.7/6.57/3.3
Heat output/Power consumption/COP at A-7/W35°C	kW	5.69/2.2/2.58	13.4/4.72/2.83	16.23/6.25/2.59
Heat output/Power consumption/COP at A-10/W35°C	kW	4.75/1.5/3.16	12.05/4.61/2.61	15.33/6/2.55
Heat output/Power consumption/COP at A-15/W35°C	kW	4.1/2.14/1.91	10.55/4.42/2.38	13.29/5.76/2.3
Heat output/Power consumption/COP at A7/W45°C	kW	8.58/2.37/3.62	19.00/5.58/3.41	23.8/7.06/3.37
Heat output/Power consumption/COP at A2/W45°C	kW	7.2/2.38/3.03	16.98/5.58/3.04	19.68/6.95/2.83
Heat output/Power consumption/COP at A-7/W45°C	kW	7.81/3.86/2.02	13/5.58/2.33	15.92/7.04/2.26
Heat output/Power consumption/COP at A-10/W45°C	kW	6.91/4.08/1.69	11.8/5.50/2.15	13.9/6.98/1.99
Heat output/Power consumption/COP at A-15/W45°C	kW	7.07/3.88/1.82	10.38/5.25/1.98	12.15/7.27/1.67
Heat output/Power consumption/COP at A7/W55°C	kW	6.96/2.63/2.65	17.98/6.56/2.74	23.11/8.82/2.62
Cool output/Power consumption/EER at A35/W7°C	kW	6.23/2.12/2.93	15.08/5.63/2.68	17.44/6.86/2.54
Nominal running current at A7/W35	A	7.9		
Max operating current	A	22		
Power Supply		380~415V/50Hz		
Compressor		Mitsubishi Electric twin rotary		
Condenser		Brazen plate heat exchanger		
Nominal flow heating medium	m ³ /h	3.45		
Internal pressure drop at nominal flow	kPa	32		
Nominal air flow	m ³ /h	6000		
Nominal fan output	W	260		
Max outlet heating medium temperature	°C	55		
Refrigerant R410A filling weight	kg	3.6		
Dimensions (H x W x D)	mm	1482X1100X500		
Pipe connector		G1-1/2"		
Net Weight	kg	172		
Operating ambient temp. range	°C	Heating -20~35		
		DHW -20~43		
		Cooling 10~45		

The above data is tested by European standard EN14511. A7/W35°C means air temp. 7°C outlet water temp. 35°C

Service record and notes

Service date	By	

Notes

Important Care and safety information

Installation and service of the heat pump should only be done by authorized installers or competent professionals. Do not attempt to modify, repair or service this appliance yourself. Only use this appliance for the purpose intended.

Ensure the area around the appliance is kept clean, well-ventilated and free of all obstructions. .

Do not let children to play on or around this heat pump.

Do not insert fingers or any other items into the air inlet or air outlet.

Do not operate the unit or controller with wet hands.

Turn off the electrical supply to the appliance if an odour presents, or scorching is detected.

Do not keep items on top of the appliance or use it to support other appliances.

Do not under any circumstances stand on the appliance.

Drain the water circuit if power to the unit is to be switched off during very cold weather.

Periodically check the condition of any support frames for deterioration.

Do not clean the unit with, alcohol, benzene, thinners, glass cleaner, polish or powders.

In Harsh coastal or Sulphurous environments this appliance must be professionally treated with a suitable protectorant.

Under some conditions, this heat pump will defrost. Ice on the evaporator will be melted and a short cloud of condensation from the heat pump will blow out. The surface below the heat pump will become wet due to drained water from evaporator.

Thank you for purchasing this High quality Inverter Heat pump

Installed as prescribed this appliance will provide efficient and reliable service. It is essential to ensure that the unit is maintained as described within this manual a failure to do so may lead to issues that could shorten the life of the appliance.

The warranty on this appliance is conditional upon annual service inspection.



For New Zealand/

This appliance is distributed by,

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Specifications within this manual may be subject to change without notice

NZ edition

2021/10 V4

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