

Installation and maintenance manual  
Manuel d'installation et de maintenance  
Installations- und Wartungshandbuch  
Manuale di installazione e di manutenzione  
Manual de instalación y de mantenimiento

# PAC HT

## 12-6 ÷ 18-9



English

Français

Deutsch

Italiano

Español



17.9kW



**Air-water Heat Pump**  
**Pompe à Chaleur air-eau**  
**Wärmepumpe Luft-Wasser**  
**Pompa di Calore aria-acqua**  
**Bomba de Calor aire-agua**

**IOM PAC HT 01-N-7GB**

Part number / Code / Teil Nummer / Codice / Código : **3990533GB**

Supersedes / Annule et remplace / Annulliert und ersetzt /

Annulla e sostituisce / Anula y sustituye : **IOM PAC HT 01-N-6GB**





**INSTALLATION INSTRUCTION**

NOTICE D'INSTALLATION

INSTALLATIONSHANDBUCH

ISTRUZIONI INSTALLAZIONE

INSTRUCCIONES DE INSTALACIÓN

English

Français

Deutsch

Italiano

Español

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## **POWER SUPPLY MUST BE SWITCHED OFF BEFORE STARTING WORK IN THE ELECTRIC CONTROL BOX**

### **GENERAL RECOMMENDATIONS**

Please read the following safety precautions very carefully before installing the unit.

#### **SAFETY DIRECTIONS**

Follow the safety rules in forces when you are working on your appliance.

The installation, commissioning and maintenance of these units should be performed by qualified personnel having a good knowledge of standards and local regulations, as well as experience of this type of equipment.

This appliance has not been designed for use by persons (including children) with reduced physical, sensorial or mental faculties or by persons without any experience or knowledge of heating systems, unless they act under the safety and supervision of a responsible person or have received prior training concerning the use of the appliance.

Children should be supervised to ensure that they do not play with the appliance.

The unit should be handled using lifting and handling equipment appropriate to the unit's size and weight.

Any wiring produced on site must comply with the corresponding national electrical regulations.

Make sure that the power supply and its frequency are adapted to the required electric current of operation, taking into account specific conditions of the location and the current required for any other appliance connected to the same circuit.

The unit must be EARTHED to avoid any risks caused by insulation defects.

It is forbidden to start any work on the electrical components if water or high humidity is present on the installation site.

#### **WARNING**

Cutoff power supply before starting to work on the appliance.

When making the hydraulic connections, ensure that no impurities are introduced into the pipe work.

**The manufacturer declines any responsibility and the warranty becomes void if these instructions are not respected.**

If you meet a problem, please call the Technical Department of your area.

If possible, assemble the compulsory or optional accessories before placing the appliance on its final location. (see instructions provided with each accessory).

In order to become fully familiar with the appliance, we suggest to read also our Technical Instructions.

The information contained in these Instructions are subject to modification without advance notice.

## EQUIPMENT SAFETY DATA

Safety Data	R407C
Toxicity	Low
In contact with skin	Liquid splashes or sprays may cause freeze burns. Unlikely to be hazardous by skin absorption. However, R407C may be slightly irritant and, if liquid, it has a strong degreasing effect. Flush contaminated skin areas with running water. If it comes into contact with fabrics, the liquid refrigerant will cause them to freeze and adhere to the skin. Carefully remove the contaminated clothing since it might adhere to the skin and cause freeze burns. Contact a doctor if the affected skin areas are reddened or irritated.
In contact with eyes	Vapours have no effect. Liquid splashes or sprays may cause freeze burns. In these cases rinse your eyes with running water or with a solution for eye lavages for at least 10 minutes. Immediately contact a doctor.
Ingestion	Very unlikely to occur. If this should be the case, it may cause freeze burns. Never induce vomiting. Keep the patient awake. Make him rinse his mouth with running water and make him drink about 1/4 of a litre. Immediately contact a doctor.
Inhalation	R407C: High concentration levels of its vapours in the air can produce an anaesthetic effect, including the loss of consciousness. Particularly severe exposures may cause heart arrhythmia and sometimes prove to be also fatal.  At high concentrations there is a danger of asphyxia due to a reduced oxygen content in the atmosphere. In these cases take the patient to the open air, in a cool place and keep him at rest. Administer oxygen, if required. Apply artificial respiration if breathing has ceased or if it has become irregular. In case of heart failure immediately apply cardiac massage. Immediately contact a doctor.
Further Medical Advice	A symptomatic and supportive therapy is generally suitable. A heart sensitisation has been observed in some cases, as a result of exposures to particularly high concentrations. In the presence of catecholamines (such as for example adrenaline) in the blood flow, it has increased the irregularity of the cardiac rhythm and then caused the heart failure.
Long-term exposure	R407C: A lifetime study which has been conducted on the effects inhalation may have on rats at 50,000 ppm has shown the onset of benign tumours of the testicle. These remarks suggest that there is no danger for human beings if they are exposed to concentrations below the occupational limits or equal to them.
Occupational exposure limits	R407C: Recommended limits: 1,000 ppm v/v 8 hours TWA.
Stability	R407C: Not specified.
Conditions to avoid	Use in the presence of exposed flames, red heat surfaces and high humidity levels.
Hazardous reactions	Possibility of violent reactions with sodium, potassium, barium and other alkaline substances. Incompatible materials: magnesium and all the alloys containing over 2% of magnesium.
Hazardous decomposition products	R407 C: Halogen acids deriving from thermal decomposition and hydrolysis.
General precautions	Avoid the inhalation of high concentrations of vapours. The concentration in the atmosphere shall be kept at the minimum value and anyway below the occupational limits. Since vapours are heavier than air and they tend to stagnate and to build up in closed areas, any opening for ventilation shall be made at the lowest level.
Breathing protection	In case of doubt about the actual concentration, wear breathing apparatus. It should be self-contained and approved by the bodies for safety protection.
Storage Preservation	Refrigerant containers shall be stored in a cool place, away from fire risk, direct sunlight and all heat sources, such as radiators. The maximum temperature shall never exceed 45°C in the storage place.
Protection clothes	Wear boots, safety gloves and glasses or masks for facial protection.
Behaviour in case of leaks or escapes	Never forget to wear protection clothes and breathing apparatus. Isolate the source of the leakage, provided that this operation may be performed in safety conditions. Any small quantity of refrigerant which may have escaped in its liquid state may evaporate provided that the room is well ventilated. In case of a large leakage, ventilate the room immediately. Stop the leakage with sand, earth or any suitable absorbing material. Prevent the liquid refrigerant from flowing into drains, sewers, foundations or absorbing wells since its vapours may create an asphyxiating atmosphere.
Disposal	The best procedure involves recovery and recycle. If this is not possible, the refrigerant shall be given to a plant which is well equipped to destroy and neutralise any acid and toxic by-product which may derive from its disposal.
Combustibility features	R407C: Non flammable in the atmosphere.
Containers	If they are exposed to the fire, they shall be constantly cooled down by water sprays. Containers may explode if they are overheated.
Behaviour in case of fire	In case of fire wear protection clothes and self-contained breathing apparatus.

## INSPECTION AND STORAGE

At the time of receiving the equipment carefully cross check all the elements against the shipping documents in order to ensure that all the crates and boxes have been received. Inspect all the units for any visible or hidden damage.

**In the event of shipping damage, write precise details of the damage on the shipper's delivery note and send immediately a registered letter to the shipper within 48 hours, clearly stating the damage caused. Forward a copy of this letter to the manufacturer or his representative.**

Never store or transport the unit upside down. It must be stored indoors, completely protected from rain, snow etc. The unit must not be damaged by changes in the weather (high and low temperatures). Excessively high temperatures (above 60 °C) can harm certain plastic materials and cause permanent damage. Moreover, the performance of certain electrical or electronic components can be impaired.

## WARRANTY

The units are delivered fully assembled and tested.

Any modification to the units without the manufacturer's prior approval, shall automatically render the warranty null and void.

The following conditions must be respected in order to maintain the validity of the warranty:

- Commissioning shall be performed by specialised technicians from technical services approved by the manufacturer.
- Maintenance shall be performed by technicians trained for this purpose.
- Only Original Equipment spare parts shall be used.
- All the operations listed in the present manual shall be performed within the required time limits.



**THE WARRANTY SHALL BE NULL AND VOID IN THE EVENT OF NON-COMPLIANCE WITH ANY OF THE ABOVE CONDITIONS.**

## CONTENTS OF PACKAGE

- 1 HEAT Pump PAC HT**
  - 1 Documentation pouch
  - 4 Anti-vibration pads
  - 1 Water filter kit
  - 1 stop cock
  - 1 Wired programmable ambience controller

## PRODUCT PRESENTATION

This new range of air/water **PAC HT** (High Temperature) appliances offers the special feature of producing hot water at 65° C at outdoor temperatures between +7° C and -20° C, while guaranteeing a high COP.

Consequently, this **PAC HT** system is ideally suited to replace a traditional hot water boiler in producing Domestic Hot Water (DHW) without alterations to the rest of the system.

**This technology uses two-stage compressors connected to a patented refrigeration circuit.**

This technology ensures remarkably accurate "capacity supplied/heating needs" matching due to its ability to run each compressor independently. Depending on the demand for heating capacity and the operating temperature of heat emitters (i.e. radiators, etc.) the **PAC HT** regulator selects either the small or large compressor to operate on its own or in a two-stage mode.

## ACCESSORIES

- Set of stop cocks with pressure tap
- Set of 2 flexible pipes (length 1 m)
- Hydraulic connection kit
- Water flow adjustment kit (requires the stop cocks with pressure take-off kit)
- Domestic Hot Water (DHW) tank
- 3 way valve Domestic Hot Water tank
- 140 litre buffer tank
- Anti-vibration pads
- 6kW in-line electric heater

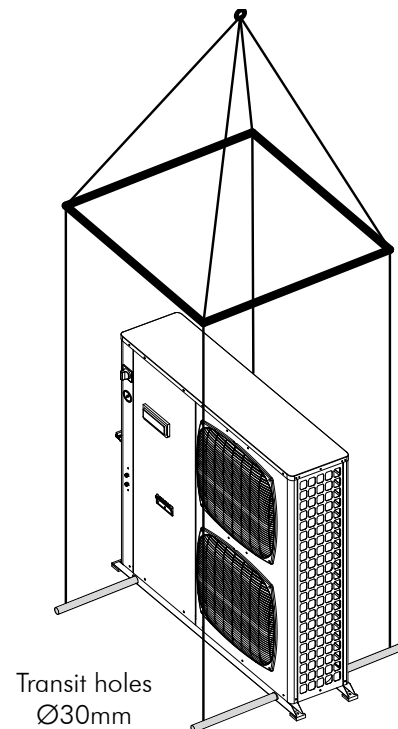
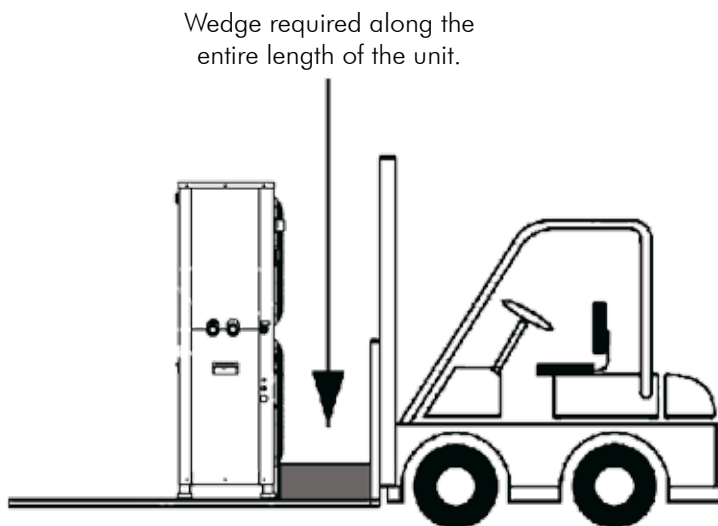
## DIMENSIONS

**SEE APPENDIX**

## HANDLING

Take care to avoid any rough handling or impacts when unloading and moving the appliance. Only push or pull the appliance by its base. Place a safety wedge between the unit base and the fork lift truck to avoid damaging the unit's structure and casing.

The handles present on the appliance's panels are intended for the removal/refitting of the latter and must not be used for handling the complete appliance (too heavy to be supported by the panels).



## NET WEIGHT

12-6	14-7	18-9
172	197	200





## TECHNICAL SPECIFICATIONS

### PHYSICAL CHARACTERISTICS

		12-6	14-7	18-9
<b>REFRIGERANT</b>				
Type		R407C		
Factory charge	g	SEE NAME PLATE		
<b>HYDRAULIC LINKS</b>				
Inlet water	gas	1" Female		
Outlet water	gas	1" Female		
<b>WATER FLOW</b>				
Nominal	l/h	1032	1230	1480
Minimum	l/h	877	1050	1258
Maximum	l/h	1166	1390	1672
<b>FANS</b>				
Fans (x2)		206W - 700tr/mn - 6000m <sup>3</sup> /h		
<b>ACOUSTIC PRESSURE</b>				
Acoustic pressure	dB(A)	67	67	67

This equipment contains fluorinated gas with greenhouse gas effects covered by the Kyoto agreement.

### ELECTRICAL CHARACTERISTICS

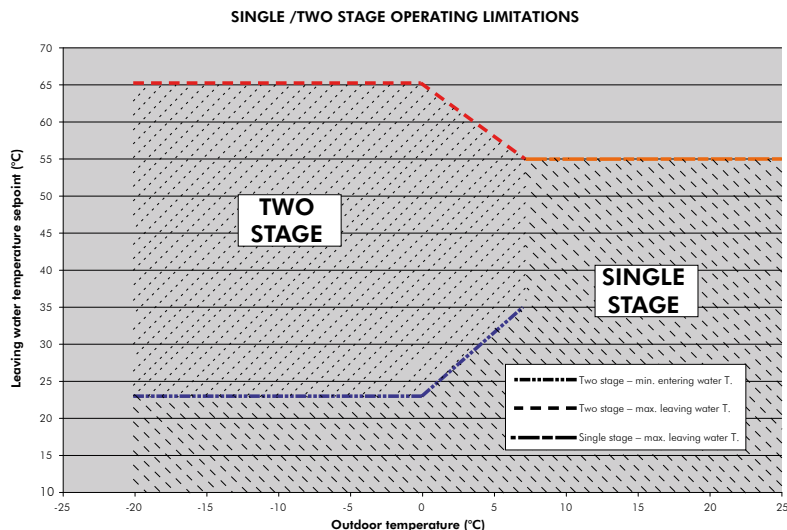
		12-6	14-7	18-9
<b>SUPPLY VOLTAGE</b>		400V / 3 Ph / 50Hz		
Start-up current draw with limiter	A	< 60		
Maximum current	A	15	16	18
<b>SUPPLY VOLTAGE</b>		230V / 1 Ph / 50Hz		
Start-up current draw with limiter	A	< 45		
Maximum current	A	28	32	/

### OPERATING LIMITS

**PAC HT** appliances are equipped with a 2-stage output system with a ratio of 1:2.

When heating needs are low and when the required outlet water temperature is below 55° C, only the first stage is used at reduced capacity until the temperature balance point is reached. In other cases, the **PAC HT** operates at full capacity to supply heating needs until the chosen balance point is reached.

The outlet water temperature is automatically adjusted to the water rule (heating curve) up to a maximum temperature of 65° C.



## THERMODYNAMIC DOMESTIC HOT WATER PRODUCTION PERFORMANCE

		12-6			
Configuration		C2 Compressor		C1+C2 Compressor	
Outdoor temp.	°C	40	7	0	-10
PAC max. outlet temp.	°C	60	60	65	65
Average capacity	kW	9	5.5	10.6	9.3
DHW temperature	°C	56	58	58	58
Time [min]					
Initial temperature: 15°C	min	97	163	85	98
Time [min]					
Initial temperature: 35°C	min	49	87	45	53

		14-7			
Configuration		C2 Compressor		C1+C2 Compressor	
Outdoor temp.	°C	40	7	0	-10
PAC max. outlet temp.	°C	60	60	65	65
Average capacity	kW	11	7.1	13.6	12
DHW temperature	°C	54	57	56	57
Time [min]					
Initial temperature: 15°C	min	72	124	63	73
Time [min]					
Initial temperature: 35°C	min	35	65	32	38

		18-9			
Configuration		C2 Compressor		C1+C2 Compressor	
Outdoor temp.	°C	40	7	0	-10
PAC max. outlet temp.	°C	60	60	65	65
Average capacity	kW	13.3	8.3	16	14.1
DHW temperature	°C	53	56	55	56
Time [min]					
Initial temperature: 15°C	min	60	103	52	61
Time [min]					
Initial temperature: 35°C	min	28	53	26	31

Tank capacity: 300l

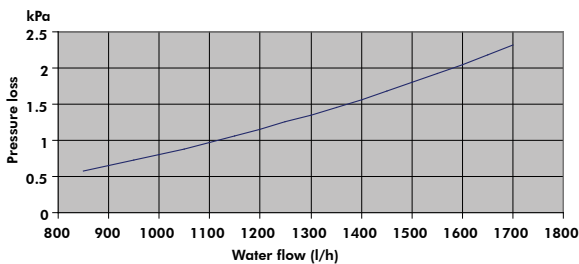


**The above performance figures are stated for a system with the Domestic Hot Water tank accessory.**

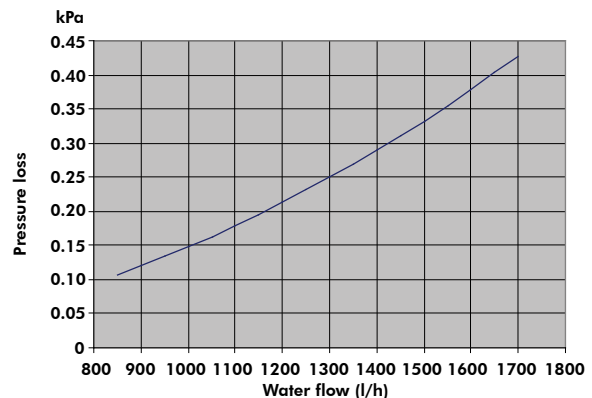
The tank is equipped with a 2.5kW back-up heating element for single or three phase connection. The performances obtained and stated in the above table are without back-up heating. For higher domestic hot water temperatures or for Legionnaires disease protection treatment, the use of the back-up electric heating resistances is required.

### PRESSURE LOSS

**DHW TANK  
300l**



**3-WAY-VALVE  
HEATING/DHW**



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## REFRIGERATION AND HYDRAULIC DIAGRAM

# SEE APPENDIX

### INSTALLATION



The unit is not designed to withstand weights or stresses from adjacent equipment, pipe work or constructions. Any foreign weight or stress on the unit structure could lead to a malfunction or a collapse with dangerous consequences for personnel and property. In such an event, the warranty shall be null and void.

#### SITING THE INSTALLATION

The outdoor unit must be installed outdoors with sufficient surrounding clearance to enable unobstructed air circulation through the appliance and access for maintenance work.

#### PREVAILING WIND

In the case of the unit being sited in areas exposed to high winds, you must avoid the wind hitting the fan blowing surface areas directly to avoid any risk of recycling cooled air. Strong wind can disrupt exchanger ventilation and create de-frosting problems.



Unit operation depends on air temperature. Any recycling of air extracted by the fan lowers the air intake temperature across the exchanger fins and alters the standard operating conditions.

The arrows show the direction of air circulation through the appliance. (Refer to Fig. § Floor location).

#### CONDENSATE WATER MANAGEMENT

Depending on temperature and outdoor air humidity conditions, water vapour contained in the air can condense on the finned heat exchanger and even form ice under low outdoor temperature conditions (around  $< 5^{\circ}\text{C}$ ). This condensate water and defrosted water runs off via outlets provided under the exchanger. To assist drainage and to prevent frozen water remaining in the appliance in winter, we recommend that the unit is installed at a height of around 10cm off the ground and placed on plastic blocks or other suitable supports. In this way, condensate and defrosted water can run off freely and be absorbed into the ground or channelled to a basin built under the appliance in order to protect the environment.

In areas where outdoor temperatures fall below  $1^{\circ}\text{C}$ , the system can be equipped with a condensate anti-freeze protection system (e.g. a heated pipe sheath).

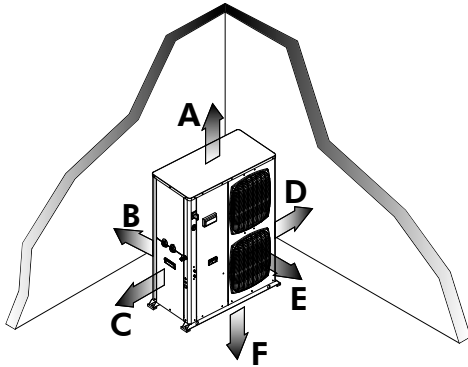
#### HOW TO REDUCE NOISE POLLUTION

In order to contain noise levels, we equip our appliances with quiet fans and encase the technical compartment in sound-proofed panels. However, noise levels can be reduced even further by following a few installation precautions:

- Do not install the appliance near a bedroom window. Avoid locating the appliance in a corner (increased reverberated noise).
- Install the rubber pads supplied or anti-vibration pads (available as an option) under the appliance.
- Use flexible hoses (available as options) for connections between the appliance and the mains water network.
- Do not join the concrete slab supporting the appliance to the structure of the dwelling (structure-borne noise transmission)

## CLEARANCE

When choosing the location for the appliance, take care to leave sufficient free clearance on all sides to ensure easy access for maintenance work. The minimum free clearance dimensions indicated must be observed to ensure both proper system operation and allow access for maintenance and cleaning.



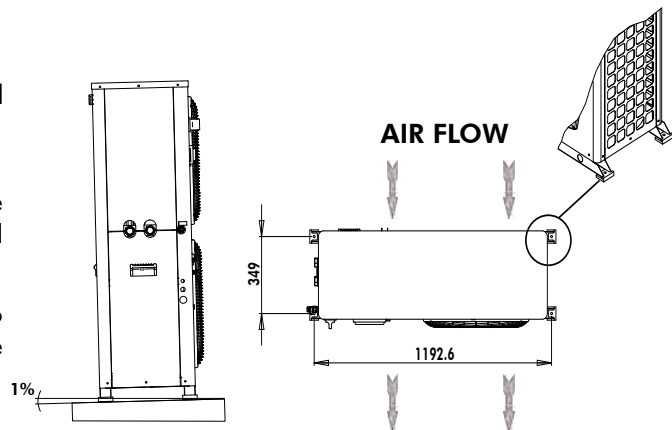
REF.	DIMENSION
A	800mm
B	500mm
C	500mm
D	400mm
E	800mm
F	100mm

## ATTACHMENT TO THE GROUND

**The appliance must be sited on a level and solid floor and preferably on a masonry surface.**

The unit location dimensions are indicated on the figure below. A slope of 1 cm/m should be created to assist rainwater drainage.

Vibration dampers must be fitted during installation to overcome any risks of vibration being transmitted due to direct contact with a rigid support surface.



**THE UNIT MUST NEVER BE INSTALLED ON A WALL BRACKET.**

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## HYDRAULIC LINKS

When choosing and installing water pipes, you must consult and observe all current local standards, regulations and instructions.

### GENERAL RECOMMENDATIONS

- You must design the pipe network with the minimum number of bends and keep the number of changes in height to the strict minimum. This will reduce installation costs and ensure optimum system performance. The pipe network must include:
- A vibration elimination system (e.g.: link hoses available as an accessory) on all pipes connected to the appliance in order to reduce vibrations and noise transmitted to the building fabric.
- Stop cocks to isolate the hydraulic circuit during maintenance.
- Manual or automatic bleed valves at the highest point on the water circuit.
- A suitable system for maintaining water pressure in the circuit (expansion tank).
- The installation of thermometers and pressure gauges on the heat exchanger inlet and outlet to facilitate day-to-day controls and system maintenance.

### ANTI-CLOGGING PROTECTION

**WE STRONGLY RECOMMEND THAT YOU INSTALL THE WATER FILTER ACCESSORY on the appliance inlet pipe to prevent the entry of foreign bodies and to maintain optimum system performance.**

When installing **PAC HT** appliances in existing water circuits, a sludge trap and a removable mesh filter should be installed upstream of the appliance.

### MINIMUM HEATED WATER VOLUME REQUIREMENTS – BUFFER TANK.

To ensure that the system operates correctly you must use suitably sized and properly routed pipes for the hydraulic links between the Heat pump and the mains network.

The volume of water flowing through the installation must be sufficient to avoid compressor "short-cycling" and ensure adequate running times to guarantee its long service life. To ensure the **PAC HT** functions efficiently, available installation water volume must be:



**200l < available water volume < 250l**

When water circulation through heat emitters can be interrupted (thermostatic radiator valves closed) or the heating supply halted, you must ensure that:

- The heat pump maintains its nominal water flow.
- The heat pump operates in a loop with a minimum available volume of 200 litres.

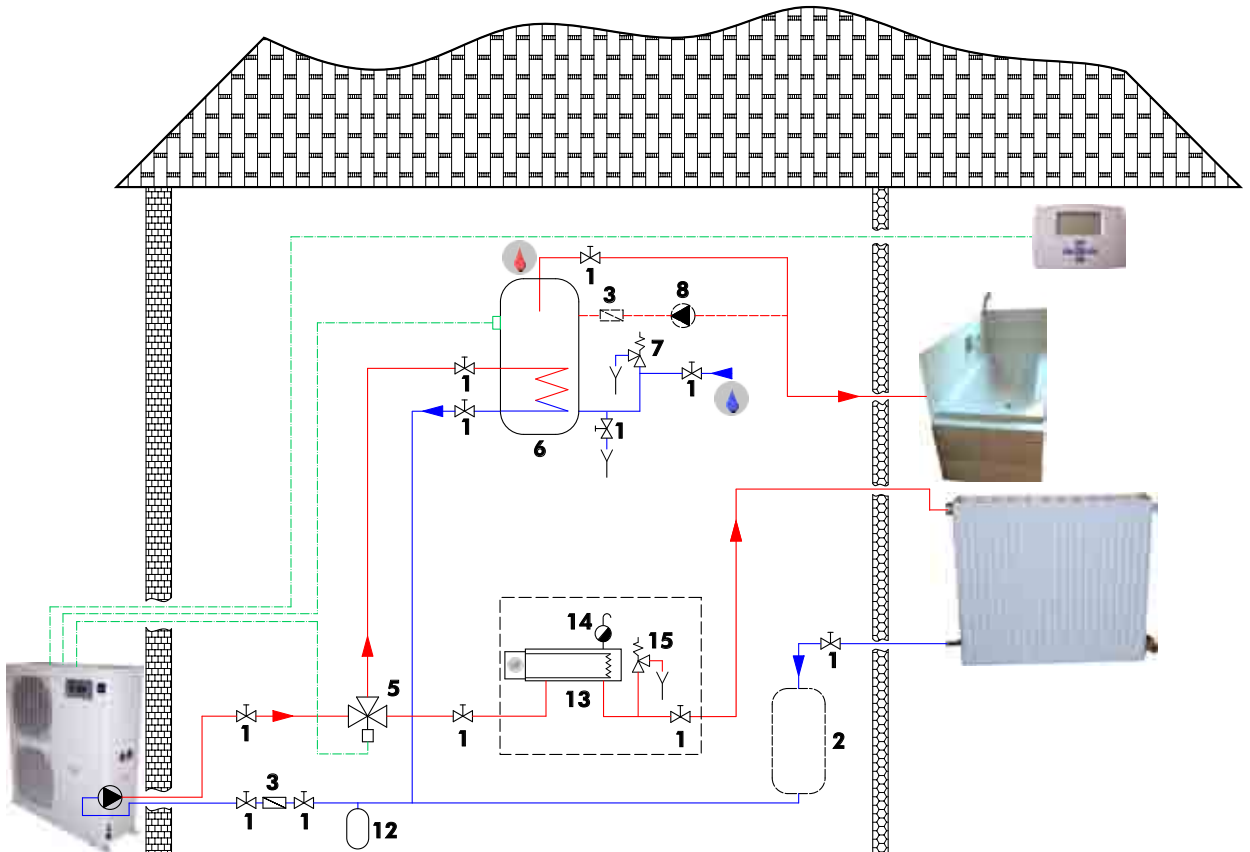
The use of a 3-speed circulation pump enables water flow through the appliance to be adapted to pressure losses in the system. (Pump supplied set on Max position). Refer to water flow graph.

## STANDARD CIRCUITS

### Layout 1:

This layout is recommended when the **PAC HT** water flow is continuous and close to the nominal value (**no thermostatic valves**).

The buffer tank (2) provides extra circulating water volume to maintain the minimum volume.

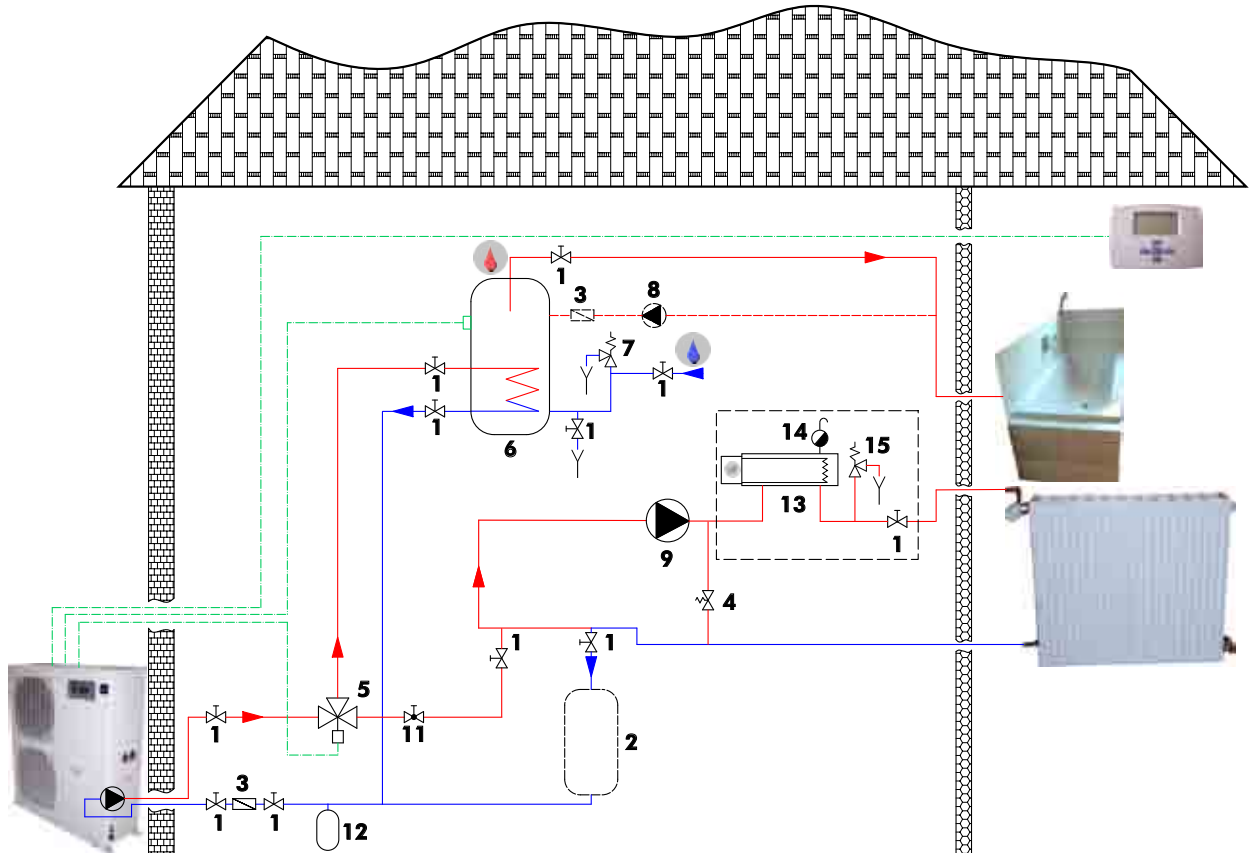


1. Stop cocks
2. Buffer tank (optional)
3. Filter or sludge trap
4. Relief valve
5. 3-way valve – Domestic Hot Water
6. Domestic Hot Water tank
7. Safety devices
8. Recycling circulation pump (optional)
9. Circulation pump
10. Mixing tank
11. Flow regulating valve
12. Expansion tank
13. In-line heater
14. Bleed
15. Safety valve

## Layout 2:

This layout is recommended for heating installations with wide operating water flow variations (radiator thermostatic valves present in the system). We strongly recommend including the buffer tank (2) as it guarantees that the heating loop capacity is higher than the minimum volume when the maximum number of thermostatic valves are closed.

The flow regulating valve (11) is used to balance the flow in heating mode and domestic hot water production mode to always ensure optimum **PAC HT** operation.

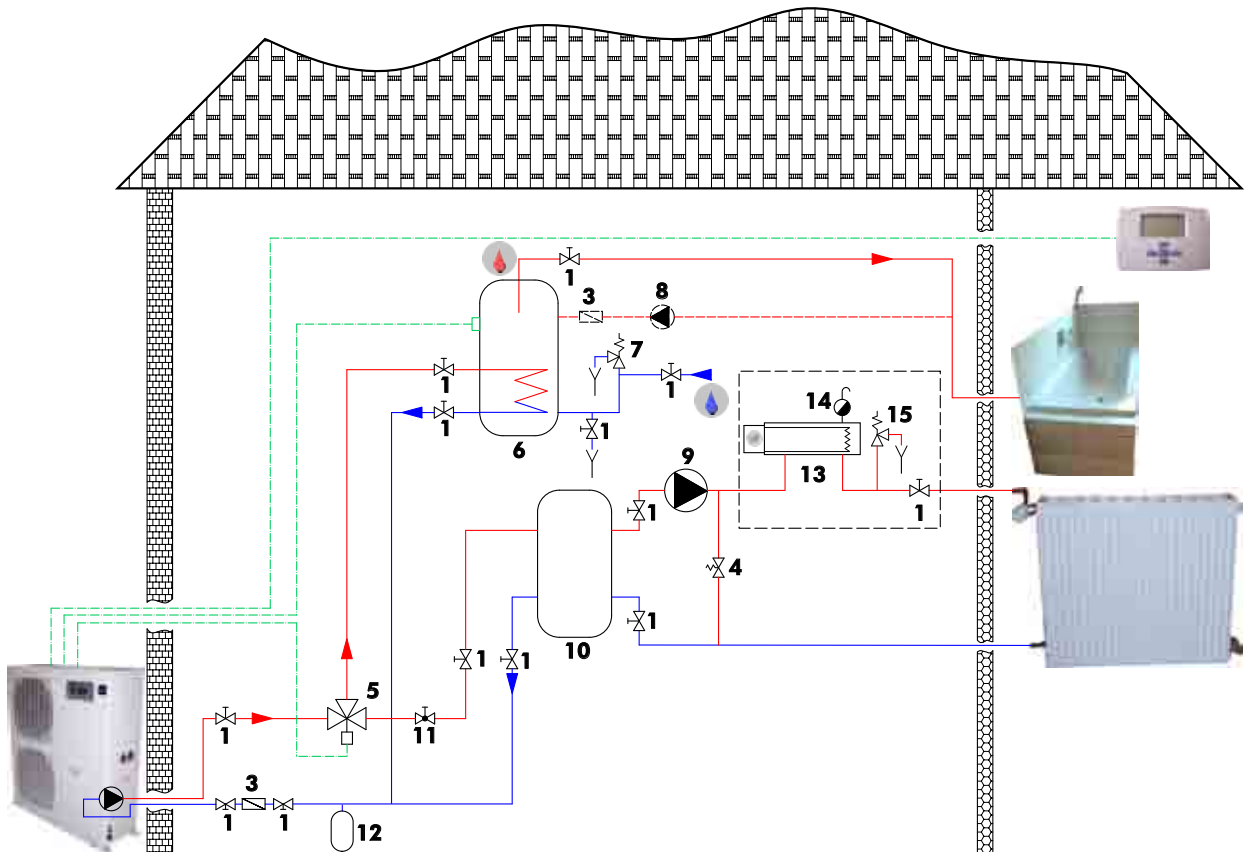


### Layout 3:

This layout is also recommended for heating installations with wide operating water flow variations (radiator thermostatic valves present in the system). Minimum system volume is guaranteed by a mixing tank (10). Take care when calculating the volume of water in the installation and only take account of 50% of the mixing tank's volume.

Example: For a useful volume of 100 litres the actual mixing tank volume will be 200 litres.

The flow regulating valve (11) is used to balance the flow in heating mode and domestic hot water production mode to always ensure optimum **PAC HT** operation.



### ANTI-FREEZE PROTECTION

We recommend that the installation is protected against freezing by adding anti-freeze.

The chart below indicates the concentration of anti-freeze to be used relative to the minimum outdoor temperature reached.

The mixture considerably alters the installation's performances, particularly in terms of pressure losses:

- Observe the calculation method detailed in the Technical Manual ref: 97 TAQ 06.

Minimum outdoor temperature	°C	0	-5	-10	-15	-25	-30
Concentration	%	10	20	30	40	50	60

### WATER TREATMENT WARNING

Using untreated or inadequately treated water in this appliance can lead to a build-up of limescale, algae or sludge deposits and cause corrosion and erosion. As the manufacturer is not aware of the components used in the hydraulic network, or of the quality of water used, the installer or the owner should contact a specialised water treatment company. This issue is particularly important and every care should be taken to ensure that circuit water is properly treated in order to avoid problems associated with incorrect water distribution. A clogged water network will systematically lead to premature wear of the appliance's components.



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## CONNECTION TO THE CENTRAL HEATING LOOP

You must check water tightness and the cleanliness of the installation before connecting the **PAC HT**.

For the **PAC HT**'s WATER INLET and OUTLET connections, you must install manual stop cocks with the same diameter as the main pipe work. This will enable maintenance work to be carried out on the **PAC HT** without having to bleed the entire system.

**A link valve with pressure tap kit is available.**

The **PAC HT** must be protected by a water filter. When connecting this device to the **PAC HT**, take care to keep the water filter sieve pointing downwards. A sludge trap should be fitted in the event of high sludge build-ups.



**AN EXPANSION TANK ADAPTED TO THE VOLUME OF WATER IN THE INSTALLATION MUST BE INSTALLED.**

It is important to ensure that the mains water supply pressure is sufficient to fill the installation.



**THE MANUFACTURER'S WARRANTY IS VOID IF THE FILTER SUPPLIED WITH THE PAC HT IS NOT INSTALLED TO PROTECT THE APPLIANCE**

### WARNING!

Take care not to damage the hydraulic pipe links by applying too much tightening pressure. Use a second wrench to compensate for the tightening torque.

You should always use a counter-wrench for tightening valves.



### HEAT INSULATION

To guarantee proper energy efficiency and compliance with current standards, water pipes passing through uninhabited zones should be properly lagged to retain heat.

To achieve correct insulation with conductivity of 0.04 W/m<sup>2</sup>K, lag the pipes with insulating material with a radial thickness between 25mm and 30 mm.

### FILLING THE SYSTEM WITH WATER

All installation works must be completed and the system cleaned and drained, before filling the water circuit in accordance with current best practices. The system should be filled to obtain a service pressure not exceeding 2.5 bars.

The water supply should come either from the mains network or from the Heat Pump or from any other point on the installation.

Check that the automatic bleed valve operates correctly.

You must completely bleed the circuit of all air to ensure efficient operation.

Close the inlet water valve once the hydraulic circuit is filled correctly.

### WATER FLOW CONTROLLER

A paddle type water flow controller is fitted to the water circuit connected to the condenser. This safety device ensures that the water flow has been established before appliance start-up.

The appliance is equipped with a set of safety devices including a safety valve set at 3 bars and a manual pressure relief valve.

## DETERMINING WATER FLOW

To ensure that the **PAC HT** operates properly and to attain the required outlet water temperatures, the water flow through the appliance has to be within specifications. The water flow through the **PAC HT** can be controlled and regulated by measuring the difference between:

- Both the outlet water and inlet water pressures,
- Or the outlet water and inlet water temperatures.

### METHOD BASED ON WATER PRESSURES

$$\text{AVAILABLE PRESSURE} = P1 - P2$$

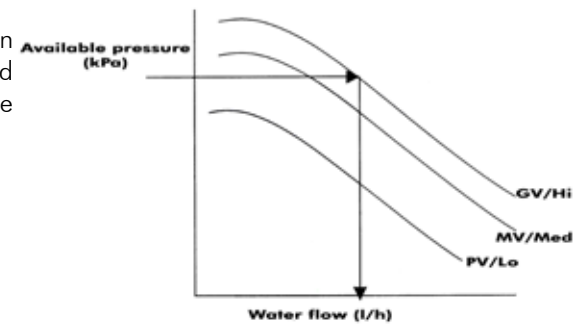
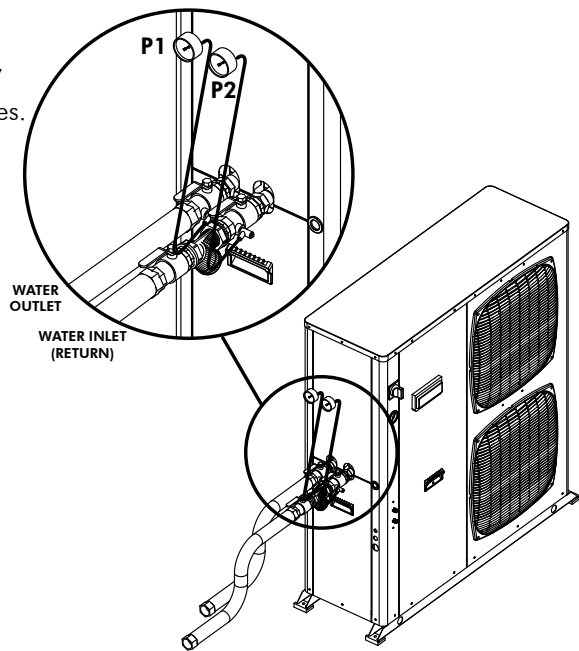
- P1 = **PAC HT** outlet water pressure.
- P2 = **PAC HT** inlet water pressure.

Reminder:

1 bar = 100kPa = 10m water column

### WATER FLOW CALCULATION GRAPH

When you have measured the available pressure, expressed in kPa, refer to the graph corresponding to the appliance installed and read the flow value at the point where the pressure value crosses the speed curve for the pump.



## SEE APPENDIX

### METHOD BASED ON WATER TEMPERATURE

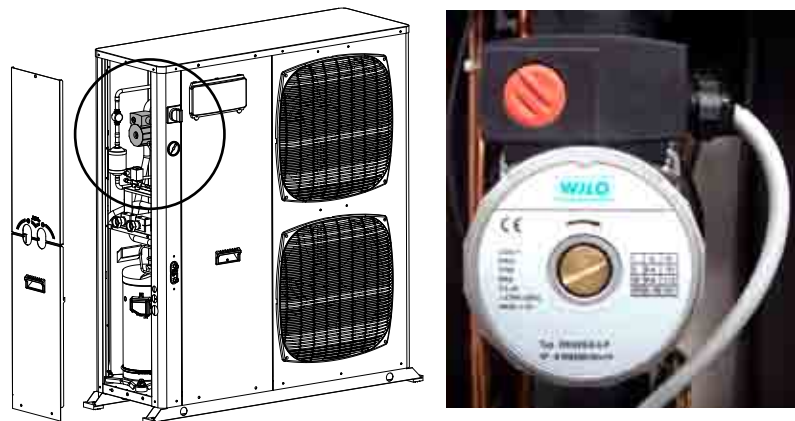
The circulation pump speed selector is used to match the water temperature to the proposed temperature range.

Increasing the speed results in a reduction in temperature.

Outdoor temperature range		°C	-9 < Tex < -2	-2 < Tex < 2	2 < Tex < 6	7 < Tex < 10	10 < Tex < 15	15 < Tex < 20
SINGLE STAGE	COMPRESSOR C1	°C			9.5 < ΔT < 10.5	10.5 < ΔT < 11	11 < ΔT < 12	12 < ΔT < 12.5
	COMPRESSOR C2	°C				4.5 < ΔT < 5.5	5.5 < ΔT < 6	6 < ΔT < 6.5
TWO-STAGE	COMPRESSORS C1 + C2	°C	8.5 < ΔT < 9.5	9.5 < ΔT < 11	10.5 < ΔT < 11.5			

### WATER FLOW REGULATION

Pump output (flow) is adjustable in relation to the system's pressure losses, by means of the internal pump speed selector.



## DOMESTIC HOT WATER

### CONNECTION TO THE CENTRAL HEATING LOOP

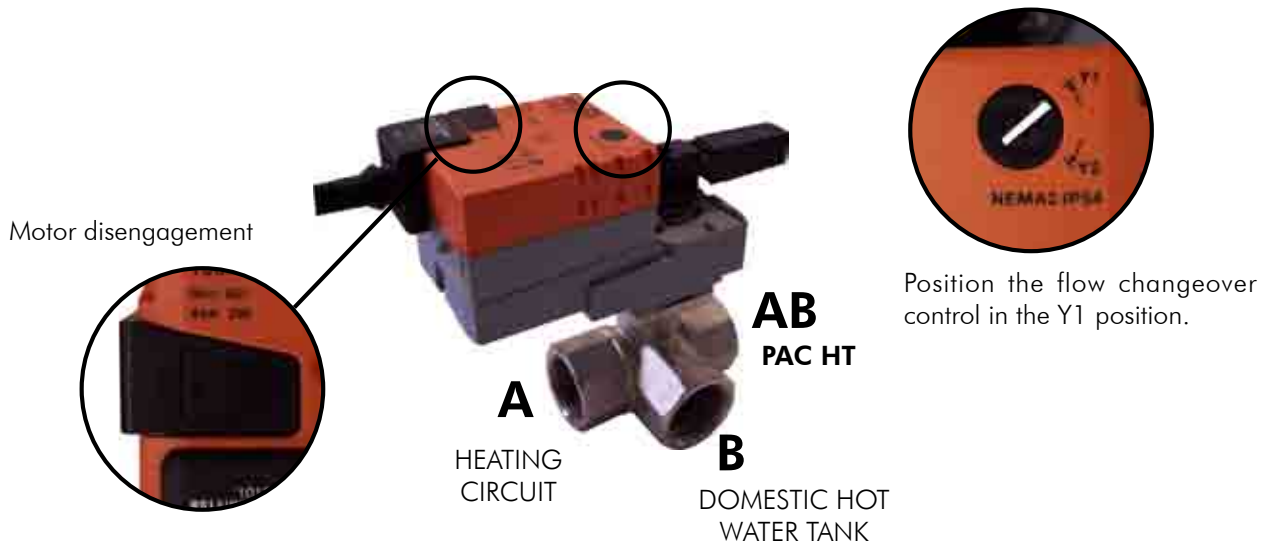
An On-Off 3-way valve directs hot water produced by the **PAC HT** to either the heating circuit or the domestic hot water tank. Hydraulic connections must be made in accordance with the circuit layout diagrams provided.

**Warning:** You must ensure that the 3-way valve orifices (marked A, B and AB) are connected correctly to the circuit in order for the valve to operate in accordance with the electrical diagram provided.

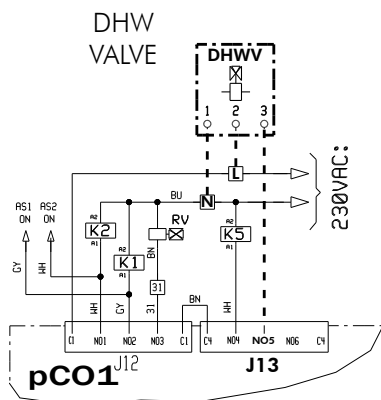
### 3-WAY HEATING / DOMESTIC HOT WATER VALVE

Fit the valve in accordance with the flow direction marks etched on the valve.

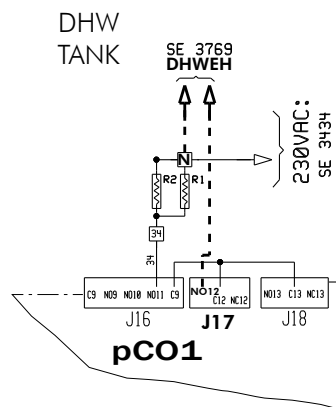
**THE CONNECTIONS MUST CORRESPOND EXACTLY WITH THE FLOW DIRECTIONS INDICATED ON THE LAYOUT DIAGRAM FOR THE TYPE OF INSTALLATION.**



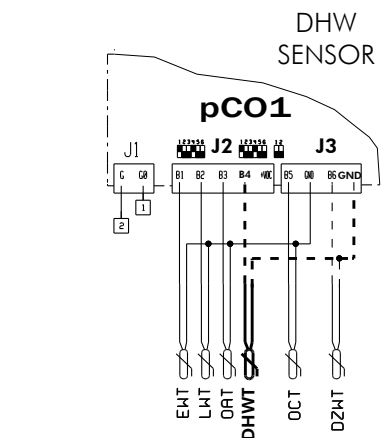
### ELECTRICAL CONNECTIONS



DHW VALVE



DHW TANK



DHW SENSOR



## DOMESTIC HOT WATER PRODUCTION MODES

The **PAC HT** controller manages domestic hot water production in accordance with the following operating modes:

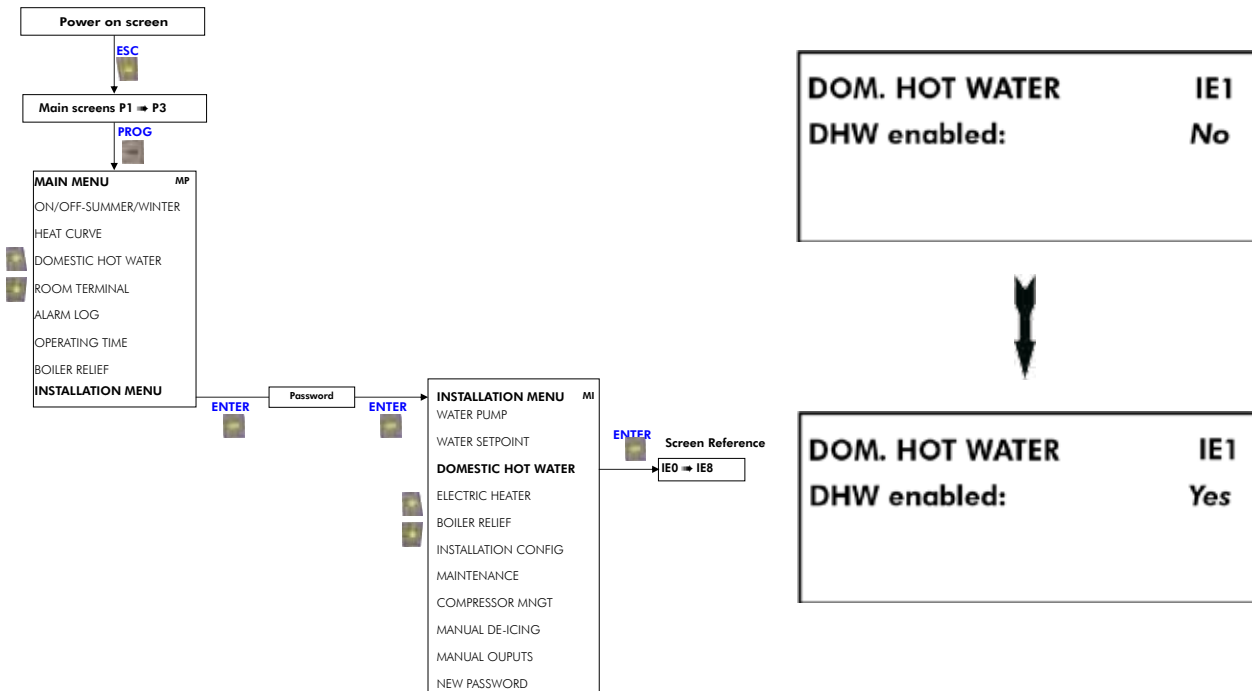
- **COMFORT MODE**  
Domestic hot water production has priority over heating except when the ambience temperature / set temperature difference is greater than 2° C (Maximum one hour).
- **ECONOMY MODE**  
Domestic hot water is produced during off-peak hours (dry contact) or in accordance with times programmed in the controller.  
Option: Possibility to restart domestic hot water production outside off-peak hours if the water temperature has reached a programmable minimum temperature.
- **IMMEDIATE DOMESTIC HOT WATER PRODUCTION**  
The **PAC HT**'s regulator enables domestic hot water production to be forced as required. At the end of the cycle, the system returns to its usual operating mode.

The Legionnaires' Disease protection treatment managed by the **PAC HT**'s controller is fully programmable (frequency, temperature threshold, treatment length).



**This function requires the installation of the ambience terminal.**

## DOMESTIC HOT WATER HEATING FUNCTION ACTIVATION



**IN-LINE ELECTRIC HEATER  
ELECTRICAL CONNECTIONS**

**SEE APPENDIX**

**OPERATING MODE**

Operating parameters for these modes can be set via the display on the **PAC HT**.

**BOOST MODE**

The heater provides additional heating when the demand for heating exceeds the capacity of the **PAC HT**. The aim is to maintain occupier comfort while favouring operation of the **PAC HT** for optimal performance.

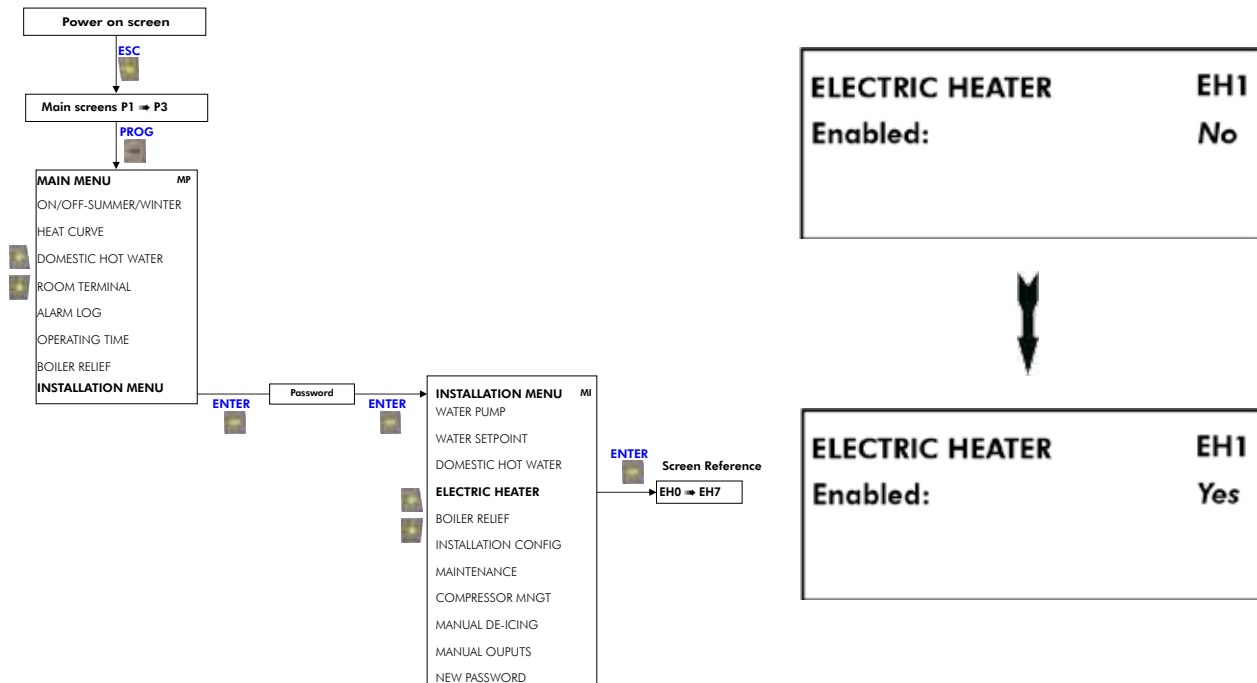
The resistances are only activated below a certain outdoor temperature (values can be set for Stage 1, AEH1 and Stage 1 +2, AEH1 +AEH2) and only if the **PAC HT** regulation system detects a lack of capacity in compressor only mode (check on water temperature and ambient temperature).

Activation of the ICS Back-up switch on the heater switches the **PAC HT** into Back-up mode.

**BACK-UP MODE**

As opposed to Booster mode, this mode operates only when the user activates the ICS Back-up switch (this supposes an alarm on the **PAC HT**). Outdoor temperature conditions are overridden and priority is no longer given to the thermodynamic mode but to the heating resistances that are nevertheless still controlled by the **PAC HT**.

**ELECTRIC HEATER FUNCTION ACTIVATION**



## BOILER RELIEF

### ELECTRICAL CONNECTIONS

The boiler relief function uses the digital outputs of the in-line electric heater function to control the hot water boiler ON/OFF switch (Boiler dry contact switch) as well as a 3-way valve output (230V BRV). A switch should be wired to the ICS input to ensure operation in Back-up mode.

### OPERATING MODES

Operating parameters for these modes can be set via the display on the **PAC HT**.

#### BOOST MODE

Hot water boiler operation is only authorised below a certain set outdoor temperature value and the appliance can also be placed in forced shutdown mode below a different outdoor temperature value. Just as the electric heater, the **PAC HT** continuously checks the water temperature and the ambient temperature to optimise compressor operation and to only start the hot water boiler when absolutely necessary.

The **PAC HT** can also be set to manage a heat curve on the hot water boiler higher than the temperature set for the appliance (65° C maximum).

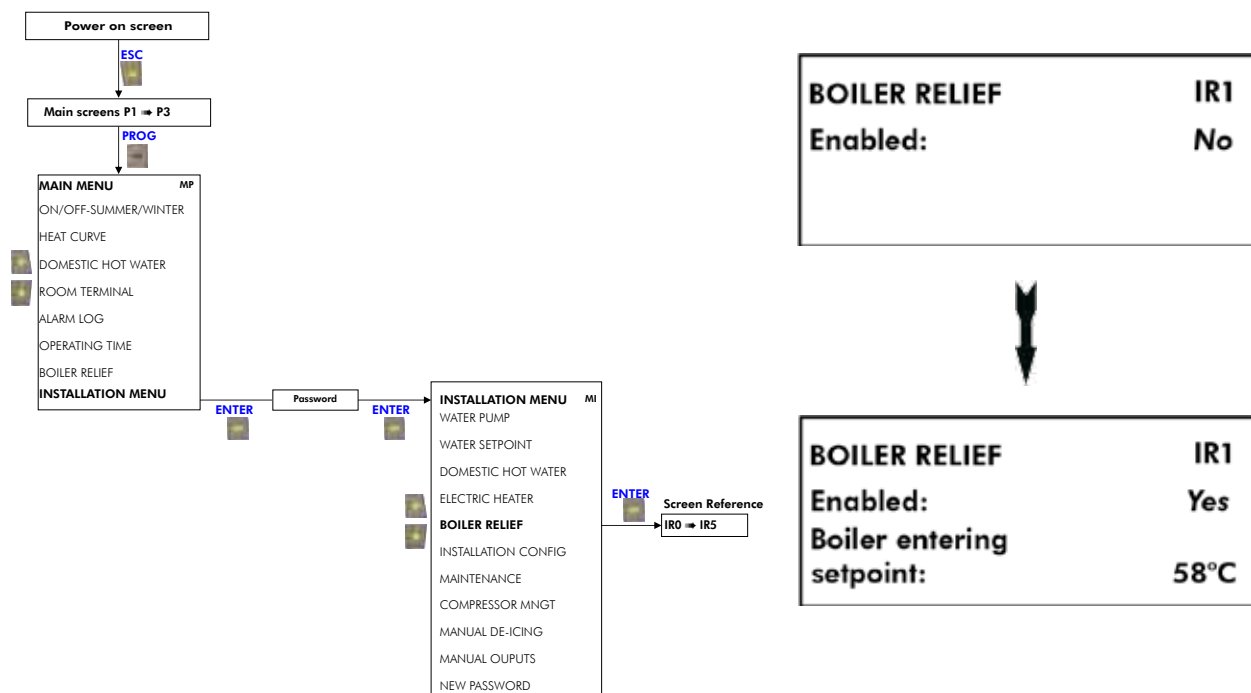
#### BACK-UP MODE

Activation of the ICS switch (to be wired by the installer) or the Back-up parameter, via the "Boiler Relief" tab on the main menu of the **PAC HT** display, switches the system into Back-up mode and both outdoor temperature and ambient temperature conditions are overridden.



**We strongly recommend the installation of the ambience terminal for effective operation of the Boiler Relief function. In the absence of an ambience terminal the PAC HT will be unable to optimise hot water boiler operation and this will lead to unnecessary energy consumption.**

### BOILER RELIEF FUNCTION ACTIVATION



## WIRING DIAGRAM AND LEGEND

### WIRING DIAGRAM

# SEE APPENDIX

### LEGEND


#### N 773

SE 3743	<b>PAC HT</b> 12-6	Control	1-Phase	230V +/-10% 50Hz
SE 3742	<b>PAC HT</b> 12-6	Power	1-Phase	230V +/-10% 50Hz
SE 3529	<b>PAC HT</b> 14-7	Control	1-Phase	230V +/-10% 50Hz
SE 3527	<b>PAC HT</b> 14-7	Power	1-Phase	230V +/-10% 50Hz
SE 3745	<b>PAC HT</b> 12-6/14-7	Control	3-Phases	3N~400V +/-10% 50Hz
SE 3744	<b>PAC HT</b> 12-6/14-7	Power	3-Phases	3N~400V +/-10% 50Hz
SE 3435	<b>PAC HT</b> 18-9	Control	3-Phases	3N~400V +/-10% 50Hz
SE 3434	<b>PAC HT</b> 18-9	Power	3-Phases	3N~400V +/-10% 50Hz


### POWER SUPPLY

Connection to the QG main disconnect switch

#### 230V +/-10% 50Hz

- L : phase
- N : neutral
-  : ground

#### 3N~400V +/-10% 50Hz

- L1 (L1) : phase
- L2 (L2) : phase
- L3 (L3) : phase
- N (N) : neutral
-  : ground

This supply comes from a CIRCUIT BREAKER or a FUSE HOLDER equipped with aM type fuses supplied by the installer. Fuse sizes are indicated on the chart on the following page.

The appliance's electrical installation and wiring must comply with the country's current standards.

### WIRING DIAGRAM KEY DESCRIPTIONS

#### POWER

**QG** : Main cut-out switch

**K1/2** : M1/2 compressors power contactor or relay

**FT1/2** : M1/2 compressors thermo-magnetic relay (three phase models)

**FF1/2** : M1/2 compressors protection fuse carrier (single phase models)

**R1/2** : Sump resistance

**M1/2** : Compressors

**CF1/2** : M1/2 compressors capacitors (single phase models)

**AS1/2** : "Soft START" starter

**RV** : 4-way cycle changeover valves

**KA1** : Phase sequence and cut-out control module (three phase models)

**RAG** : Anti-freezing protection electric resistance

#### COMMAND AND REGULATION

**FF8** : Control circuit protection fuse

**FF9** : T1 transformer protection fuse (230V primary circuit)

**FF10** : T1 transformer protection fuse (24V secondary circuit)

**T1** : Pco1 230/24V power supply transformer

**Pco1** : Controller

**FT1/2** : Thermo-magnetic relays ancillary contacts for M1/2 compressors

**EWI** : Inlet water probe

**LWT** : Outlet water probe

**OCT** : Condensation control probe

**OAT** : Outdoor air temperature probe  
**FB11** : Automatic reset low pressure switch  
**FH11** : Automatic reset high pressure switch  
**CDT1/2** : High discharge temperature (circuit 1/2)  
**IHP** : Intermediate high pressure switch

**DHP** : De-icing high pressure switch  
**ISV** : Injection valve  
**DRV** : De-icing valve  
**TAG** : Anti-freezing protection thermostat  
**ESV** : Oil equalization valve

#### VENTILATION - FAN

**M21** : Lower air exchanger fan motor  
**M22** : Upper air exchanger fan motor  
**FM21** : M21 motor internal safety  
**FM22** : M22 motor internal safety

**C21** : M21 motor capacitor  
**C22** : M22 motor capacitor  
**K3** : M21 fan motor relay  
**K4** : M22 fan motor relay

#### WATER CIRCUIT

**FS** : Water flow detector (flow switch)  
**MP** : Water pump

**K5** : MP water pump relay

#### OPTIONS

**DHWT** : Domestic hot water temperature probe  
**DZWT** : Dual zone water temperature probe  
**DZV** : Dual zone modulating valve  
**DHWV** : Domestic hot water valve  
**DHWEH** : Domestic hot water electric heater  
**DZWP1/2** : Dual zone – Zones 1 and 2 water pumps

**ON/OFF** : On / Off switch  
**LS** : DHW Off-peak hour  
**AEH** : Additional electric heater  
**BOILER** : Hot water boiler  
**BRV** : Boiler relief valve  
**ICS** : Back-up heating switch

#### FUSE RATINGS, NOMINAL CONTACTOR AMPERAGE (IN CLASS AC3/AC1)

Supply voltages	3N~400V +/-10% 50Hz		
<b>PAC HT</b>	12-6	14-7	18-9
General protection fuse rating (not supplied)	16A	16A	20A
Fuse ratings			
FF8 aM type	6A	6A	6A
FF9/10 T type	1.6A	1.6A	1.6A
Thermo-magnetic cut-out switch			
FT1 Range	9 - 14A	9 - 14A	9 - 14A
FT1 Setting	10A	11A	13A
FT2 Range	4 - 6.3A	4 - 6.3A	4 - 6.3A
FT2 Setting	4.2A	5.1A	6.3A
Contactors			
K1	12A	12A	/
K2	9A	9A	9A

Supply voltages	230V +/-10% 50Hz	
<b>PAC HT</b>	12-6	14-7
General protection fuse rating (not supplied)	32A	32A
Fuse ratings		
FF1 aM type	25A	25A
FF2 aM type	12A	16A
FF8 aM type	6A	6A
FF9/10 T type	1.6A	1.6A
Contactors		
K2	12A	/

\* These values are provided for information purposes only and must be checked and adjusted in relation to currently applicable standards. They vary depending on the type of installation and the choice of conductors.



## ELECTRICAL CONNECTIONS

### WARNING



**Before carrying out any work on the equipment, make sure that the electrical power supply is disconnected and that there is no possibility of the unit being started inadvertently. Non-compliance with the above instructions can lead to injury or death by electrocution.**

The electrical installation must be performed by a fully qualified electrician, and in accordance with local electrical standards and the wiring diagram corresponding to the unit model.

Any modification performed without our prior authorisation may result in the unit's warranty being declared null and void.

The power supply cable section must be sufficient to provide the appropriate voltage to the unit's power supply terminals, both at start-up and under full load operating conditions.

The power supply cable shall be selected in accordance with the following criteria:

1. Power supply cable length.
2. Maximum unit starting current draw – the cables shall supply the appropriate voltage to the unit terminals for starting.
3. Power supply cables' installation mode.
4. Cables' capacity to transport the total system current draw.

Short circuit protection shall be provided. This protection shall comprise fuses or circuit breakers with high breaking capacity, mounted on the distribution board.

If the local control includes a remote ambient terminal, it shall be connected with shielded cable and shall not pass through the same conduits as the power supply cables as the voltages induced may create reliability faults in the unit's operation.

### WARNING!

**On-site wiring must be performed in accordance with the wiring diagram present in the appliance's electrical connection box.**

**Mains power supply cables to the appliance must have copper conducting cores and be sized in compliance with currently applicable IEC standards.**

**The appliance must be grounded via a terminal block located inside the electrical connection box.**

**The power supply must not fluctuate by more than 10 %. Imbalance between phases must not exceed 3%.**

## PHASE SEQUENCE AND CUT-OUT CONTROLLER

3N~400V-50HZ

### VERY IMPORTANT:

The **PAC HT** is equipped as standard with a phase sequence and cut-out controller located in the electrical box.

### THE LED's INDICATE THE FOLLOWING CONDITIONS:

**Green LED = 1**

**Yellow LED = 1**

Power ON

The compressor rotation direction is correct.

**Green LED = 1**

**Yellow LED = 0**

Phase inversion or phase absent (L1)

The compressor and the fans do not start.

**Green LED = 0**

**Yellow LED = 0**

Phase absent (L2 or L3)

The compressor and the fans do not start.

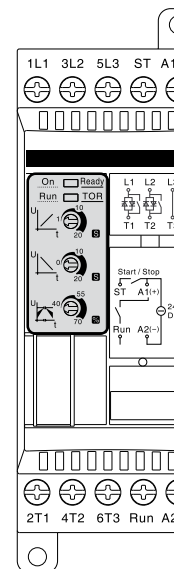
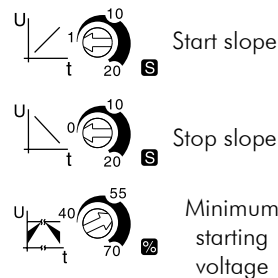
### PROGRESSIVE START-UP

3N~400V-50HZ

The **PAC HT 18-9** is equipped with a progressive starter (soft start) for the C1 compressor. The starter is situated in the electrical box and marked "**AS**".

It is important to check the following settings:

- Start slope 1 s
- Stop slope 0 s
- Minimum starting voltage 60%



230V +/-10% 50Hz

### IMPORTANT :

The compressors are equipped with a soft starter. The starter is situated in the electrical box and marked "**AS**".

### THE LED's INDICATE THE FOLLOWING CONDITIONS:

**Green diode = On**

Supply voltage: OK

**Green diode = Off**

No supply voltage

**Green diode = Flashing**

Internal power supply fault or voltage < 90V

**Red diode = Off**

No alarm

**Red diode = Flashing  
5 times / 2 sec.**

Supply voltage < 190V

**Red diode = Flashing  
Once / 4 sec.**

Starting current too high

In the event of an excess current or low voltage alarm, the controller will wait for 5 minutes before attempting a second starting sequence. If the second starting sequence is unsuccessful, power to the appliance must be switched off in order to reset the starter. The high current draw alarm indicates a compressor problem.

The starter includes an anti short-cycling timer: 1 minute minimum between stop and start.

These appliances are equipped with a disconnect switch, fitted and wired at the factory.



The switch can be padlocked.

Press to unclip and withdraw the disconnect switch.

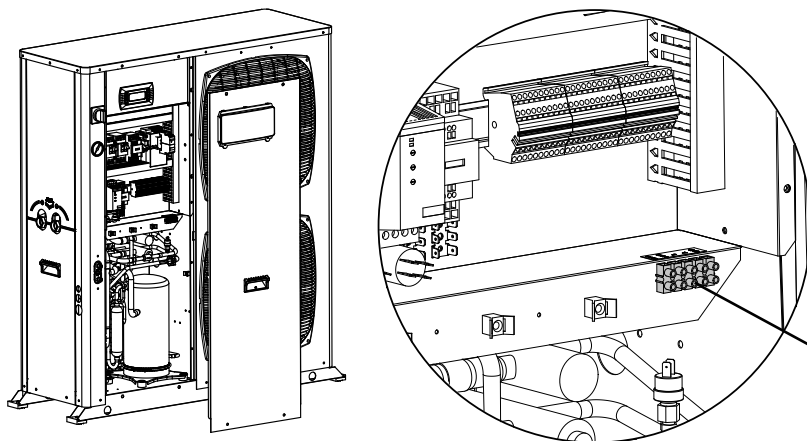
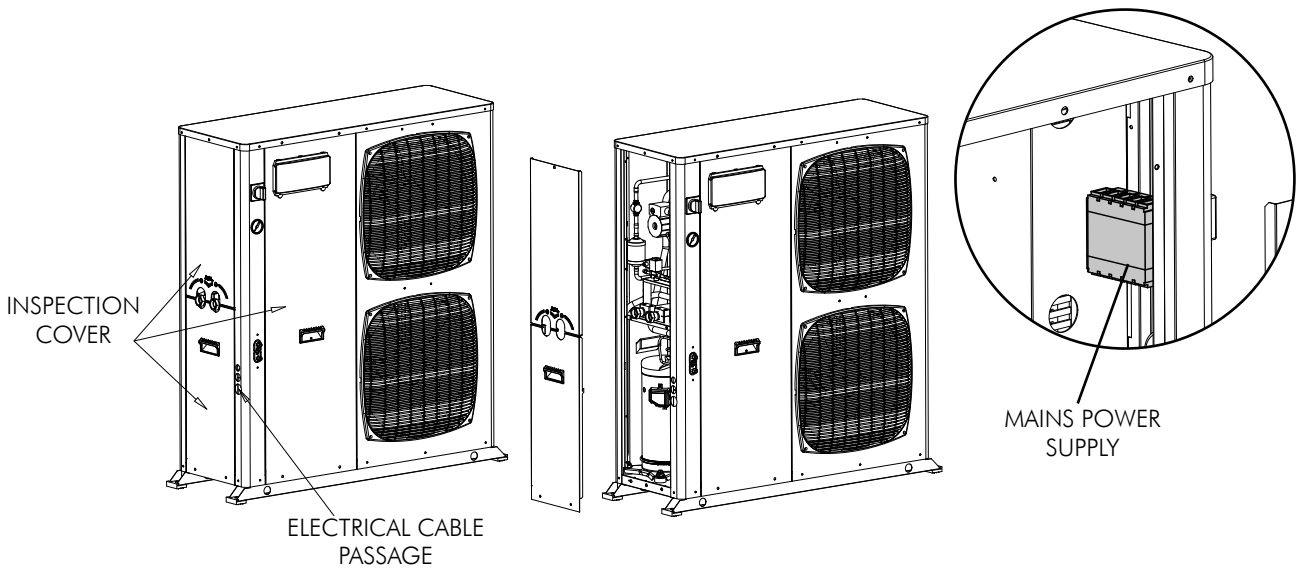


A circuit breaker or fuse holder ( not supplied ) must be installed on the main power supply of the unit in accordance with the circuit diagram; for the ratings, refer to the electrical specifications. Remove the inspection cover to gain access to the electrical connection box.

Pass the power supply cable through the cable passage provided on the appliance.

Install end fittings suitable for the cable section to ensure a good contact. Make the connections as shown.

### CONNECTIONS



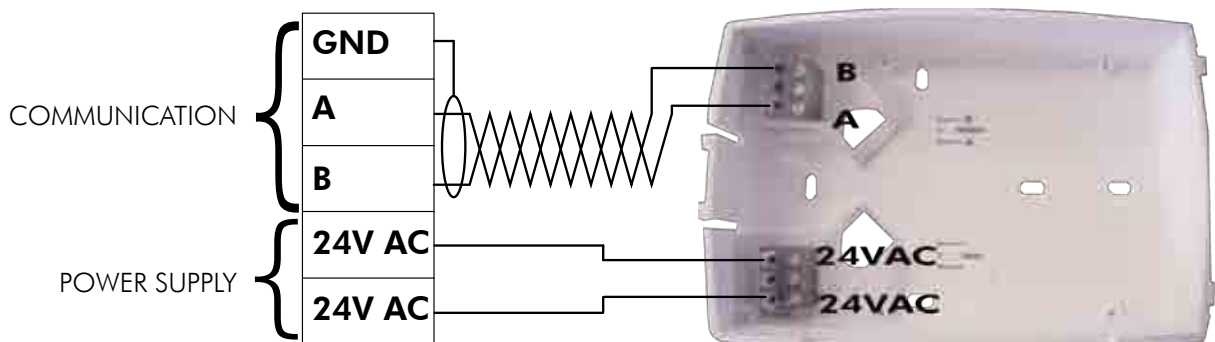
2 separate cables for power supply (24V) and communication (A-B-GND).

Power supply:

Single pair cable: 1 mm<sup>2</sup>

Communication:

Shielded twisted single pair cable with screen 0.33 mm<sup>2</sup> to 0.5mm<sup>2</sup> (AWG 20/22)



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## COMMISSIONING

### PRE-START CHECK LIST

Before commissioning the system, you must carry out a certain number of installation checks to ensure that the appliance will operate in the best possible conditions. The following list of checks is not exhaustive and only serves as a minimum reference guide.

#### APPLIANCE POSITIONING

- Check free clearances around the unit, including the exchanger air intake and outlet, and access for maintenance work.
- Comply with the free clearance dimensions around the domestic hot water tank.
- Check unit assembly in accordance with specifications.
- Check presence and tightness of all screws and bolts.
- Check that the rubber anti-vibration pads are in place.
- Check that the unit is level and that condensates drain freely away from the unit.
- Check that there is no possibility of blown air being recycled through the fans due to wind exposure.
- In arduous climates (sub-zero temperature, snow, high humidity), check that the appliance is raised 10 cm off ground.
- Check that the ambience terminal is located correctly (frequently occupied area, 1.5 m above ground level, etc.).

#### ELECTRICAL CHECK

- Electrical installation has been carried out according to unit wiring diagram and the Supply Authority Regulations.
- Check the circuit breaker setting or the fuse rating on the mains power supply.
- Supply voltages as specified on unit wiring diagram.
- Check the tightness of wire to component connections.
- The cables and wires are clear of or protected from pipework and sharp edges.
- Check the electrical grounding of the appliance.

#### HYDRAULIC CHECKS

- Check the presence, direction and position of the **water filter** upstream of the appliance. Rinse the filter after the first 2 hours of operation.
- Check that the external water circuit components are installed correctly in accordance with manufacturer's recommendations and that the water inlet and outlet connections have been made correctly.
- Check that the water quality complies with stated standards.
- Check that the hydraulic circuit is filled properly and that the fluid flows freely without any signs of leakage or air bubbles.
- Adjust water flow in accordance with the specifications.
- Check the presence and position of the stop cocks to isolate the appliance for maintenance.
- Check the presence of the air bleed valve.
- Check the protection of the installation against freezing conditions (thermal insulation, percentage of ethylene glycol in the water circuit if required...).
- Check that the bleed valve in the appliance has been opened.

## STARTING THE APPLIANCE


After checking all the electrical connections and making any rectifications as required, proceed with starting up the installation.


### USER INTERFACE


The terminal is a 6-button, 4-line x 20-character LCD model, which can display text in various sizes and icons.

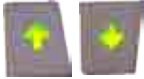



### KEYPAD

**ALARM**  : When you press the Alarm key (the red bell is apparent if an alarm is active), the first active alarm is displayed on the screen. Use the UP/DOWN keys to view all the active alarms. Press the Alarm key a second time to cancel all alarms that can be cancelled in this manner. Alarms that remain active are still displayed. If no alarm is active, pressing the key returns the system to the "NO ALARM ACTIVE" screen.

**ESC**  : Moves to previous level in the menu arborescence. Press this to change an analogue or integer variable, such as 34.5 for example (as opposed to a digital variable such as Yes/No), to cancel the current change and return to the previous menu. This function is very important if a parameter is changed by mistake.

**PROG**  : From any screen, this key returns to the main menu. Just as the ESCAPE key, this key cancels the current change.

**UP/DOWN**  : These keys have several functions:  
In a menu, they enable you to scroll through the list of available selections. When the cursor is placed in the top left hand corner of the screen it is possible to scroll through the screens available in this arborescence. Finally, these keys enable you to change the value of a parameter when the cursor is placed on the parameter in question.

**ENTER**  : On those screens where it is possible to change one or several parameters, the first press on the key moves the cursor to the first parameter on the screen. A second press validates the current parameter and the cursor scrolls to the following parameter until it returns to the upper left hand corner.

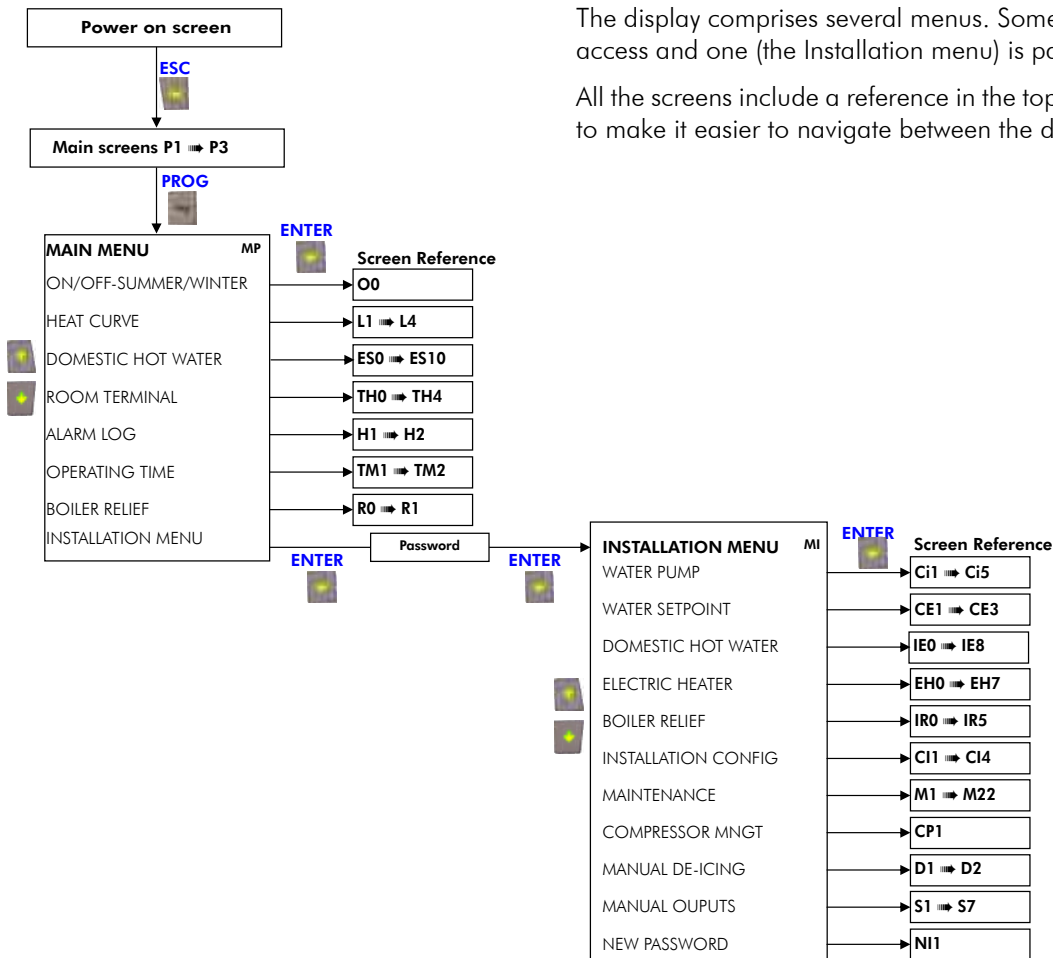
### BACKLIGHTING

All the screen keys are backlit.

The ALARM key diode lights up when at least one alarm is active. The PROG key is lit when you are in the main menu or in one of its sub-menus. The ESCAPE, UP, DOWN and ENTER keys light up along with the display backlighting.

If no key is pressed during a 5 minute period, the display automatically reverts to the first main screen (P1) and all backlighting is switched off.

## MENUS



The display comprises several menus. Some have unrestricted access and one (the Installation menu) is password protected.

All the screens include a reference in the top right hand corner to make it easier to navigate between the different menus.

## ICONS

P1		Outlet water set temperature, calculated from the heat curve parameters, the outdoor temperature, the ambience set temperature and the variance between the set and the ambience temperature.
		Compressor 1 (large) in operation
		Compressor 2 (small) in operation
		Fan 1 (upper) in operation
		Fan 2 (lower) in operation
		Outlet water temperature
		Inlet (return) water temperature
		<b>PAC HT</b> in Summer mode
		Flashing: Countdown for de-icing Fixed on: De-icing in progress
P2		Instantaneous outdoor temperature
		Reference outdoor temperature used by the <b>PAC HT</b> (upper fan special management)
		Outdoor exchanger temperature (used for the de-icing countdown)
		Domestic hot water temperature (when the option is installed)
		<b>PAC HT</b> in domestic hot water production mode (flashing)
		Electric heater Stage 1 in operation (flashing)
		Electric heater Stage 2 in operation (flashing)
	Hot water boiler in operation (flashing)	

## SIMPLIFIED START-UP PROCEDURE

### MAIN SCREENS

On the **PAC HT** display, after having checked the coherence of the temperature probes on the main screens **P1** and **P2**, as well as effective communication with the ambience terminal, it is advisable to set the heat curve parameters before starting the **PAC HT**. The main screen **P1** is accessible by pressing the **ESC** key several times. The main screen **P1** also appears after 5 minutes of display inactivity.



### HEAT CURVE PARAMETERS

On the main menu (**Prg** key), use the **UP/DOWN** arrows to highlight the "**HEAT CURVE**" menu. Validate this selection with the **ENTER** key. This moves the display to the **L1** screen. Use the **ENTER** and **UP/DOWN** keys to set the following parameters:

Screen L1

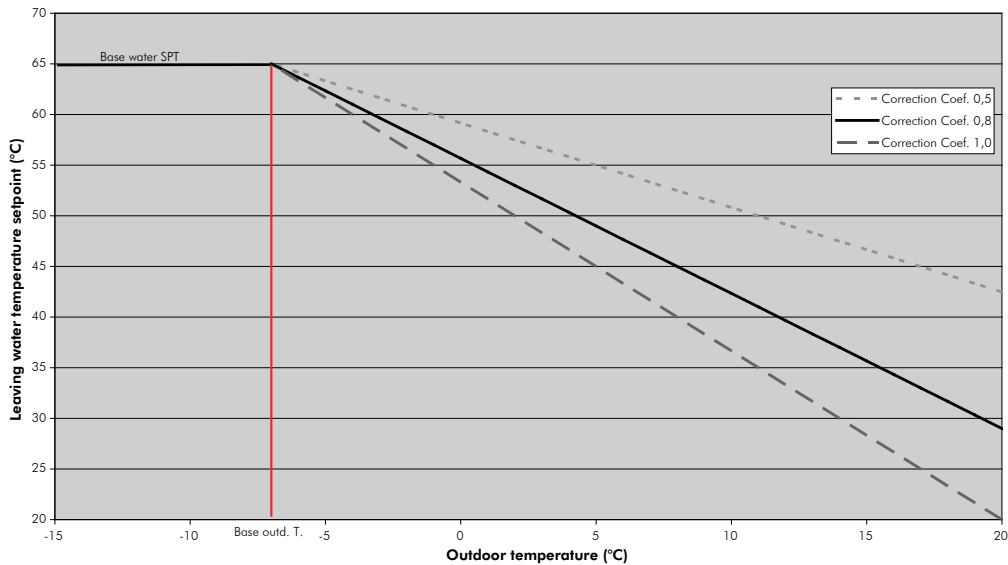
<b>HEAT CURVE</b>	<b>L1</b>
<b>Altitude :</b>	<b>0.0 km</b>
<b>Base outd. T. :</b>	<b>-07°C</b>
<b>Correction coef. :</b>	<b>0.8</b>

**Altitude:** Installation site altitude, in km (e.g. 0.5km equals 500m. Default setting: 0).

**Base outd. T.:** Typical outdoor temperature for the installation region (Default setting: -7°C).

**Corr. Coef.:** Correction Coefficient for the base of the slope. This is a simple way of changing the water set temperature (Default setting: 0.8).

### RADIATOR HEAT CURVE PARAMETERS



Screen L2

<b>HEAT CURVE</b>	<b>L2</b>
<b>Heat loss at Base outd. temp.:</b>	<b>9.9 kW</b>
<b>Base water SPT:</b>	<b>65°C</b>

**Losses at Base Temp.:** Estimated heat loss for the dwelling for an ambient temperature of 20°C and a base outdoor temperature (e.g. -7°C). This parameter is used to calculate the outdoor temperature that triggers the change from small compressor mode to two-stage compressor mode. This value is capped at the maximum capacity of the **PAC HT** model in question for this same outdoor temperature (Default value = Maximum value).

**Base Outd. T.:** Outlet water temperature required at the base outdoor temperature to have an ambient temperature of 20°C (Default setting: 65°C).

Screen L3

<b>Default balance point outd. temp.</b>	<b>L3</b>
<b>Comp.2 (small) :</b>	<b>06.0°C</b>

Information screen for the outdoor temperature calculated automatically by the **PAC HT**. With the preceding default parameters, the value of 5.4° C means that below an outdoor temperature of 5.4° C the **PAC HT** will start the large compressor or the two-stage compressor. Above 5.4° C the **PAC HT** will start the small compressor.

Screen L4

<b>Automatic balance point outd. temp.</b>	<b>L4</b>
<b>Comp.2 (small) :</b>	<b>06.0°C</b>
<b>Reset :</b>	<b>No</b>

The value of the outdoor balance temperature displayed on **L4** is the one updated by the **PAC HT** after running for some time, in the event that the **PAC HT** detects a lack of capacity with the small compressor.

**Zero reset:** This is required in the event of changes to the heat curve parameters in order for the **PAC HT** to register these changes. The parameter on screen **L3** is then recopied into screen **L4**.

**VERIFICATION OF COMMUNICATION WITH THE COMMUNICATING AMBIENCE TERMINAL**

Screen P3

<b>TIME/DATE</b>	<b>P3</b>
<b>Time:</b>	<b>14 : 30 : 28</b>
<b>Day:</b>	<b>Monday</b>

The ambience terminal supplied with each **PAC HT** is declared in the regulator by default. This means that an alarm will be visible on the **PAC HT** screen a few seconds after the power is switched on if the terminal is disconnected. Its proper operation can be checked on the screen **P3** where the time and date and the day of the week data keyed into the terminal is available.

Screen TH1

<b>TERMINAL PARAM.</b>	<b>TH1</b>
<b>Current room setpoint:</b>	<b>20.0°C</b>
<b>Mode:</b>	<b>Comfort</b>

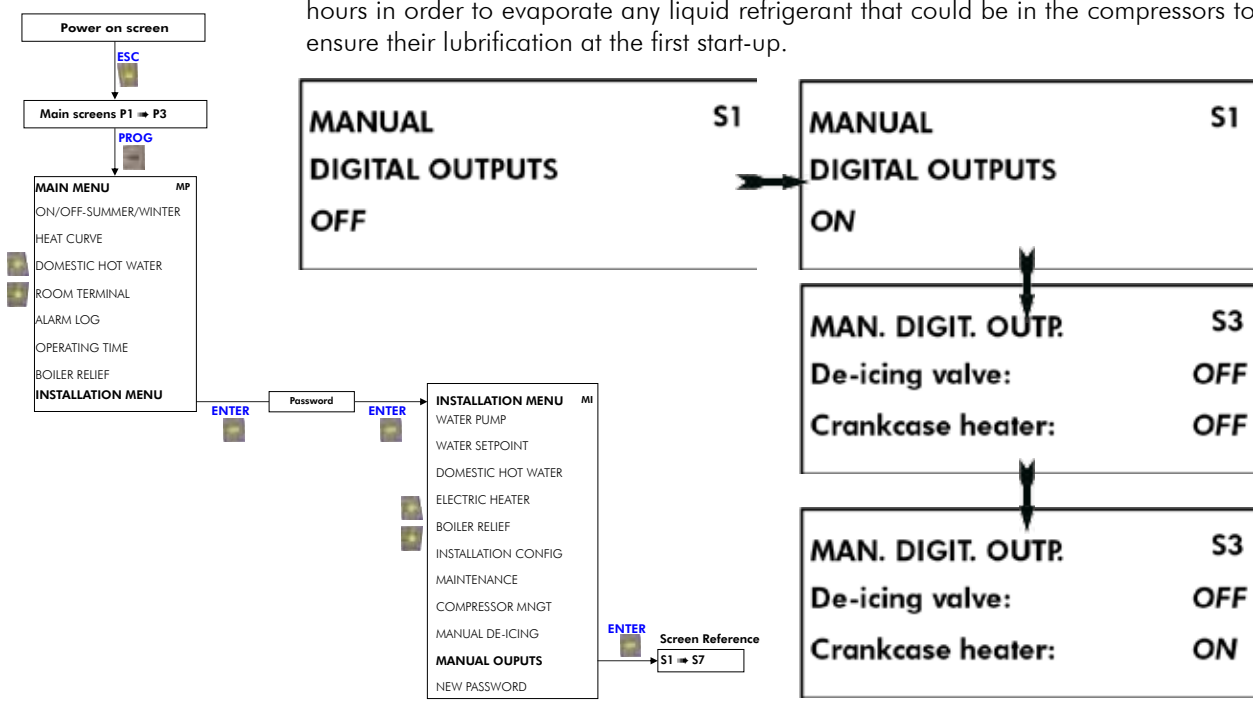
All the terminal parameters are accessible via the "**Ambience Terminal**" menu in the main menu (**Prg** key).

Screens: TH0 to TH4.

**COMPRESSOR SUMP HEATER FUNCTION ACTIVATION**


After the first power ON (compressors OFF), **and for any outdoor air temperature**, manually switch ON the compressor sump heaters.

Before starting the compressors, the sump heaters must be powered On for at least 2 hours in order to evaporate any liquid refrigerant that could be in the compressors to ensure their lubrication at the first start-up.

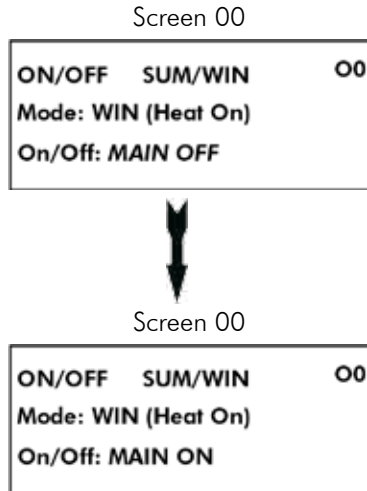




## PAC HT ON/OFF SETTINGS

In order to start, the **PAC HT** must always be **ON** at the level of the appliance's display. In addition, the ambience terminal must be in demand mode (when it is connected). To force the terminal to enter demand mode, change it to Comfort mode  with an ambience temperature set at 30° C.

The appliance **OFF** function will always have priority and therefore you will never be able to start the **PAC HT** in this mode.





From the main menu, use the **UP/DOWN** arrows to highlight the "**ON/OFF-SUMMER/WINTER**" menu. Validate this selection by pressing the **ENTER** key. The display moves to the **00** screen.

Press the **ENTER** key twice to move the cursor to the **GENERAL OFF** parameter.

Use the **UP/DOWN** arrows to change this parameter to **ON**.

Press **ENTER** to validate.

If the ambience terminal is in demand mode, and if no alarm is active and the water temperature condition permits (inlet water  at least 7° C below set temperature ) , the **PAC HT** will start operating.

Normal **PAC HT** operation is guaranteed with an appliance inlet (system return) water temperature above 20° C.

## OPERATING CHECK LIST

### GENERAL

Check for any unusual noises or vibration in the running components, particularly the indoor fan drive system.

### OPERATING VOLTAGE:

1. Recheck voltage at unit supply terminals.

### CONTROL

1. Verify all sensor inputs, using the controller display.

### FAN & DRIVE

1. Check that the fans rotate freely without rubbing.

### COMPRESSOR AND REFRIGERATION SYSTEM

1. Checking operation: Start the **PAC HT**. Check for any abnormal noises or vibrations.
2. Suction superheat should be 6°K ±2°K.(\*)

\* These checks can be performed at the time of commissioning with the help of qualified technical personnel.

### FINAL CHECK

1. All panels and fan guards are in place and secured.
2. Unit clean and free of remainder installation material.

---

## **FINAL TASKS**

If needed, fix the cables and the pipes on the wall with clamping collars.

Operate the heat pump in the presence of the user and explain all functions.

## **IN CASE OF WARRANTY - MATERIAL RETURN PROCEDURE**

Material must not be returned without permission of our After Sales Department.

To return the material, contact your nearest sales office and ask for a "return voucher". The return voucher shall be sent with the returned material and shall contain all necessary information concerning the problem encountered.

The return of the part is not an order for replacement. Therefore, a purchase order must be entered through your nearest distributor or regional sales office. The order should include part name, part number, model number and serial number of the unit involved.

Following our personal inspection of the returned part, and if it is determined that the failure is due to faulty material or workmanship, and in warranty, credit will be issued on customer's purchase order. All parts shall be returned to our factory, transportation charges prepaid.

## **ORDERING SERVICE AND SPARE PARTS ORDER**

The part number, the order confirmation and the unit serial number indicated on the name plate must be provided whenever service works or spare parts are ordered.

For any spare part order, indicate the date of unit installation and date of failure. Use the part number provided by our service spare parts, if it not available, provide full description of the part required.

## MAINTENANCE

The user is responsible for ensuring that the appliance is in a proper working condition and that technical installation as well as the regular maintenance operations are performed by properly trained technicians and in accordance with the instructions contained in this manual.



Some alarms can only be cancelled by switching the **PAC HT** to **OFF**.

Generally, an alarm means that there is an anomaly present on the appliance. We **strongly** recommend that you refrain from repeatedly resetting an alarm without rectifying its cause in order to avoid the risk of **causing irrevocable damage** to one or several components.

### REGULAR MAINTENANCE

These units have been designed for minimum maintenance through the use of permanently lubricated components. However, there are operational maintenance requirements that require regular attention to ensure optimum performance.

Maintenance must be performed by appropriately experienced personnel only.

**WARNING** : Isolate unit from power supply before working on unit.

### GENERAL INSPECTION

Carry out a visual inspection of the complete installation in service.

Check the general cleanness of the installation, and check if the condensate evacuation is not blocked.

Check the condition of the condensate tray by pulling it out of the casing.

### REFRIGERATION CIRCUIT

Clean the heat exchanger using a special product for aluminium-copper heat exchangers, and rinse with water. Do not use hot water or steam, as this could cause the pressure of the refrigerant to rise.

Check that the surface of the aluminium fins of the heat exchanger is not damaged by impacts or scratches, and clean with an appropriate tool if necessary.

The refrigeration system is hermetically sealed and should require no regular maintenance. However, it is recommended to leak test the refrigerant system and check the general operating conditions and control devices on a regular basis. The operating pressures should be checked particularly as they are an excellent guide for maintenance.

### ELECTRICAL SECTION

Check that the main power supply cable is not damaged or altered in such a way as to affect the insulation.

The contact surfaces of relays and contactors should be inspected regularly by an electrician and replaced as judged necessary. On these occasions the control box should be blown out with compressed air to remove any accumulation of dust or other contaminants.

Check the earth grounding connection.



### CAUTION

**BEFORE CARRYING OUT ANY OPERATION ON THE EQUIPMENT, CHECK THAT THE ELECTRICAL POWER SUPPLY IS SWITCHED OFF AND THAT IT CANNOT BE SWITCHED ON INADVERTENTLY.**

**IT IS RECOMMENDED THAT THE DISCONNECT SWITCH BE PADLOCKED**

---

## SERVICING CHECKLIST

### CASING

1. Clean the outer panels.
2. Remove the panels.
3. Check that the insulation is not damaged. Repair as required.

### CONDENSATE DRAIN PAN

1. Check that the drainage orifices and conduits are not blocked.
2. Eliminate all accumulated dirt.
3. Check that no traces of rust are present.

### REFRIGERATION CIRCUIT

1. Check the absence of gas leaks.  
This equipment must be subjected to regular tightness checks conducted by qualified personnel. Please refer to national requirements to determine the frequency of these checks.
2. Check that the copper tubes or the capillary tubes do not rub against any metal or vibrate.
3. Check that the compressors do not generate any abnormal noises or vibrations.
4. Check the compressor discharge temperature.

### COILS

1. Clean the fin surfaces as required.
2. Check the condition of the fans and the fan motors.

### ELECTRICAL EQUIPMENT

1. Check nominal current draw and the condition of the fuses.
2. Check the tightness of the screw terminals.
3. Perform a visual check of the condition of the contacts.
4. Check the general tightness of all cable connections.

**Replace the panels and add any missing screws.**

### HYDRAULIC CIRCUIT

1. Check that the hydraulic circuit is filled properly and that the fluid flows freely without any signs of leakage or air bubbles.
2. Check the cleanness of the filter.

## ALARM LIST AVAILABLE ON THE PAC HT DISPLAY

Software version: 4.0

Some terms may differ depending on the software version.


Ref.	Alarm description	PAC HT action	Alarm cancellation	Time delay	Possible cause(s)	Recommended action(s)
AL01	Inlet (return) water probe disconnected or damaged	Complete shutdown	Manual	10 s	Disconnected or faulty probe	Replace the probe
AL02	Outlet water probe disconnected or damaged	Complete shutdown	Manual	10 s		
AL03	Outdoor temperature probe disconnected or damaged	Complete shutdown	Manual	10 s		
AL04	Domestic hot water probe disconnected or damaged	DHW shutdown	Manual	10 s		
AL05	Outdoor coil probe disconnected or damaged	Complete shutdown	Manual	10 s		
AL06	Lack of water flow, risk of freezing	Complete shutdown and forced pump shut down	Manual	30s after start of circulation pump	Sticking circulation pump	Check circulation pump operation (stop it from sticking)
AL07	Not allocated				Water flow too low or air in the system	Check the PAC's temperature difference in operation. Increase the flow (change the circulation pump speed)
AL08	Fan fault	Complete shutdown	Manual	None	Internal overheating protection tripping out on one of the fans	Reset the alarm after the fan motors have cooled down. Check which fan is overheating and replace it
AL09	C1 – Large compressor overcurrent	Automatic changeover to C2 compressor <b>WARNING: De-icing impossible.</b>	Manual ( <b>PAC HT OFF</b> via keypad)	None	Fuse(s) blown (single phase)	Test the fuses. Replace as required
AL10	C2 – Small compressor overcurrent	Automatic changeover to C1 compressor	Manual ( <b>PAC HT OFF</b> via keypad)	None	Thermo-magnetic circuit breaker tripped (three phase)	Reset the circuit breaker. Check that the setting corresponds to specifications
AL11	High Pressure safety tripped	Complete shutdown (no automatic reset)	Manual ( <b>PAC HT OFF</b> via keypad) after at least 2 minutes stoppage	None	Fuse(s) blown (single phase) Thermo-magnetic circuit breaker tripped (three phase)	Test the fuses. Replace as required Reset the circuit breaker. Check that the setting corresponds to specifications
					Refer to the fault diagnosis guide in the Installation and Maintenance Manual	Refer to the fault diagnosis guide in the Installation and Maintenance Manual
					Water flow too low or air in the system	Re-establish nominal water flow or bleed the system

Ref.	Alarm description	PAC HT action	Alarm cancellation	Time delay	Possible cause(s)	Recommended action(s)
AL12	Low Pressure safety trips	Complete shutdown (no automatic reset)	Manual <b>PAC HT</b> OFF via keypad) after at least 2 minutes stoppage	60 s after compressor start-up	Refer to the fault diagnosis guide in the Installation and Maintenance Manual	Refer to the fault diagnosis guide in the Installation and Maintenance Manual
AL13	Not allocated				Coil blocked	Clean the finned coil
AL14	Safety protection trips on both compressors, appliance shut down	Complete shutdown	Manual <b>PAC HT</b> OFF via keypad)	None	Incomplete de-icing (lack of refrigerant charge)	Check the amount of refrigerant charge
AL15	B PAC/Terminal cable breakage, Forced heating	Switchover to forced heating mode via a pre-set ambient temperature (20° C by default)	Manual	20s	Both compressors in Alarm mode	Find the cause of the alarm for each compressor
AL16	PAC/Terminal communication failure, forced Heating	Switchover to forced Heating mode by changing the adjustable ambient temperature (Default setting: 20° C)	Manual	Variable depending on the cause of the problem (clean trip or trip due to electrical interference)	Only the wire on terminal B is disconnected or faulty. Any other communication fault will be flagged up by Alarm 16.	Check the connections on the <b>PAC HT</b> and the terminal. Check the continuity of the B polarity wire.
AL17	Phase inversion or phase missing	Complete shutdown	Manual	None	Ambiance terminal is not connected	Deactivate it via the <b>PAC HT</b> keypad
AL18	Need to de-ice, C1 (large) compressor unavailable	Complete shutdown	Auto. If outdoor conditions permit natural de-icing	None	One of the communication cables is disconnected	Check the connections on the <b>PAC HT</b> and the terminal as well as the polarities (A and B)
AL19 to 21	Not allocated				Too much interference on the communication bus	Use shielded cable as recommended
					Power supply fault detection by the phase controller (three phase)	Two phases have been inverted or one phase is missing. Refer to the Installation and Maintenance Manual
					There is a fault on the large C1 compressor at a time when it is required by the <b>PAC HT</b> for de-icing	Rectify the fault on the C1 compressor

Ref.	Alarm description	PAC HT action	Alarm cancellation	Time delay	Possible cause(s)	Recommended action(s)
AL22	De-icing ended abnormally by maximum time limit.	De-icing stopped	Auto. Alarm displayed for 2 minutes for information purposes	None	De-icing has lasted over 10 minutes. This is abnormal as de-icing usually takes between 3 and 4 minutes	Monitor the appliance to see if this fault is a one-off occurrence. If not, check all possible causes of poor de-icing (lack of refrigerant charge)
AL23	De-icing ended abnormally by low outlet water temperature	De-icing stopped	Auto. Alarm displayed for 2 minutes for information purposes	None	Outlet water temperature during de-icing has fallen below 10° C	Check that there is sufficient water volume in the system, as recommended in the Installation and Maintenance Manual
AL24	C1 Large compressor discharge temperature thermostat	Complete shutdown	Manual	None	Tripped out by the C1 compressor discharge temperature thermostat	Monitor the appliance to see if this fault is a one-off occurrence, if not check the level of the charge in the expansion tank or for compressor overheating (perhaps too hot due to an output blockage)
AL25	C2 Small compressor discharge temperature thermostat	Complete shutdown	Manual	None	Tripped out by the C2 compressor discharge temperature thermostat	
AL26	Not allocated					
AL27	De-icing valve failure	Complete shutdown	Manual (PAC HT OFF via keypad)	90 s	De-icing valve fault detected automatically by the control system. Valve disconnected, inverted or blocked	Check valve wiring. Activate the Manual controller outputs and check that the valve operates. Replace the valve if the slide is blocked or the coil is burnt out
AL28	C1 Large compressor switched to safety mode by system	Automatic changeover to C2 compressor <u>WARNING: De-icing impossible.</u>	Manual (PAC HT OFF via keypad)	90 s	Fault detected automatically by the system management (e.g. when the Temp. difference is too low, indicating that the compressor has not started)	Refer to fault diagnosis guide in the Installation and Maintenance Manual Probable cause: single phase soft starter defective or supply voltage too low
AL29	C2 Small compressor switched to safety mode by system	Automatic changeover to C1 compressor	Manual (PAC HT OFF via keypad)	90 s		
AL30	De-icing problem – C1 compressor or comp. valve	Automatic changeover to C2 compressor	Manual (PAC HT OFF via keypad)	90 s	Zero temperature difference during de-icing due to C1 compressor not starting or non activation of the compressor changeover valve. Impossible to determine the cause of the blockage in compressor C1 with certainty	Check that C1 is operating correctly. Check the compressor changeover valve wiring. Activate the Manual controller outputs and check that the valve operates. Replace the valve if the slide is blocked or the coil is burnt out

Ref.	Alarm description	PAC HT action	Alarm cancellation	Time delay	Possible cause(s)	Recommended action(s)
AL31	Defective compressor changeover valve	Automatic changeover to C2 compressor	Manual (PAC HT OFF via keypad)	10 s	Alarm generated by the intermediate pressostat. Compressor changeover valve disconnected, blocked or coil burnt out	Check the compressor changeover valve wiring. Activate the Manual controller outputs and check that the valve operates. Replace the valve if the slide is blocked or the coil is burnt out
AL32	Inlet /outlet water probes inverted	Complete shutdown	Manual (PAC HT OFF via keypad)	90 s	Automatic detection by management system if the water temperature probes are inverted	Invert the probes at the level of the controller. Check the probe values during operation of both compressors
AL33	Temperature difference > 20°C, flow too low, clean filter	Complete shutdown	Manual (PAC HT OFF via keypad)	90 s	Insufficient water flow in the circuit, flow too low for proper PAC HT operation	Check that the water flow in the system is always adequate (presence of thermostatic radiator valves) Clean the inlet water filter on the PAC HT
AL34	N°1/Large compressor in safety mode via auto restart control	Complete shutdown during 7 minutes. 2 cut-outs → AL28	Automatic	90 s	Fault detected automatically by the system management (e.g. when the Temp. difference is too low, indicating that the compressor has not started)	Refer to fault diagnosis guide in the Installation and Maintenance Manual Probable cause: single phase soft starter defective or supply voltage too low
AL35	N°2/Small compressor in safety mode via auto restart control	Complete shutdown during 7 minutes. 2 cut-outs → AL29	Automatic	90 s		
AL36	--Information-- Boiler/Electric heat. backup activated	Information	Stop backup mode	None	Activation of the ICS digital input of the controller or backup mode through the display for boiler relief	

#### General comments:

- If you have a doubt about a **PAC HT** component, use the Manual activation function for the outputs (all the all or nothing outputs excluding the compressors) via the "INSTALLATION" menu on the appliances display. Use a voltmeter to check that the regulator output is activated (230V) and that the component is question is also activated.
- The **PAC HT** retains a very comprehensive log of alarms, i.e. the 150 last alarms, as well as temperature probe values (water inlet and outlet, outdoor and outdoor battery) when the alarm appears. You can access this log from the main menu (sub-menu "Alarm log"). Press the ENTER (  ) key to switch back and forth between the log screen and the probes screen.



Generally, an alarm means that there is an anomaly with the appliance. We strongly **advise against** repeatedly resetting an alarm at the risk of causing **irreparable damage** to one or several components.



## FAULTY DIAGNOSIS GUIDE

Simple diagnosis advice. In the event of a breakdown, you should contact your local after sales department for confirmation and assistance.

<b>Compressor does not start</b>		
<b>Problem symptoms</b>	<b>Probable cause</b>	<b>Recommended action</b>
Power is present at the compressor terminal but the motor does not rotate	Motor burnt out	Replace the compressor
Motor contactor inoperable	Coil burnt out or contacts broken	Repair or replace the contactor
No current upstream of the motor contactor	Circuit breaker tripped	Check the fuses / thermo-magnetic circuit breakers and electrical connections
Current upstream of the fuse, but not on the contactor side	Fuse blown or thermo-magnetic circuit breaker tripped	Replace the fuse. Reset the thermo-magnetic circuit breaker Check current values
Low voltage measured on voltmeter	Voltage too low	Contact your electricity supplier
No power supply to contactor coil	Regulation open circuit	Use the appliance display to check that the system is actually calling for compressor operation
Compressor operates but current draw is abnormally high	Compressor damaged	Replace the compressor
"Growling" compressor motor	Excessive output pressure Abnormally low voltage on start-up in single phase	Check the supply voltage. Refer to the single phase soft start faults chart Check the controller control relays and their wiring (refer to wiring diagrams)

<b>Compressor stops.</b>		
<b>Problem symptoms</b>	<b>Probable cause</b>	<b>Recommended action</b>
HP pressostat triggered	Excessively high outlet pressure	Refer to instructions provided for "high outlet pressure"
Discharge thermostat triggered	Lack of refrigerant fluid	Repair the leak. Add refrigerant fluid or completely replace the charge
	Abnormal Compressor superheat	Set the superheat on the expansion valve
	Defective de-icing	Check proper de-icing operation
Inlet pressure too low	Dryer filter blocked	Replace dryer filter
	Lack of refrigerant fluid	Repair the leak. Add refrigerant fluid or completely replace the charge
	Faulty expansion valve	Replace the expansion valve
	Abnormal icing up of finned exchanger	Check proper operation of de-icing function
Dryer filter iced up	Blocked dryer filter	Replace the dryer filter

<b>Compressor lubrication problem</b>		
<b>Problem symptoms</b>	<b>Probable cause</b>	<b>Recommended action</b>
Noisy compressor	Fault in oil equalisation system	Check operation of the oil equalisation valve. Contact your After Sales Service

<b>Excessively high discharge pressure</b>		
<b>Problem symptoms</b>	<b>Probable cause</b>	<b>Recommended action</b>
Major difference between condensing and water outlet temperatures	Presence of incondensable matter in the system or excessive refrigerant fluid charge Presence of air in water circuit	Bleed the incondensable matter and drain off the excess refrigerant fluid Bleed the air from the circuit
High output pressure and very high water $\Delta T$	Insufficient water flow	Check the flow controller Ensure that there is an adequate water flow through the entire system

<b>Excessively high inlet pressure</b>		
<b>Problem symptoms</b>	<b>Probable cause</b>	<b>Recommended action</b>
Presence of liquid in the intake line	Expansion valve open too far	Check the superheat and check the attachment and the position of the thermostatic expansion bulb
Refrigerant fluid flow back towards the compressor, irrespective of the expansion valve setting	Expansion valve blocked in open position	Replace the expansion valve

<b>Excessively low inlet pressure</b>		
<b>Problems - symptoms</b>	<b>Probable cause</b>	<b>Recommended action</b>
Excessive pressure loss across the dryer filter	Clogged dryer filter	Replace the dryer filter
Refrigerant fluid does not flow through the thermostatic expansion valve, irrespective of the expansion valve setting	The expansion valve bulb has lost its refrigerant charge. The expansion valve remains closedS	Replace the expansion valve
Loss of power	Expansion valve blocked	Replace the expansion valve
	Lack of refrigerant fluid	Repair the leak. Add refrigerant fluid or completely replace the charge
	Evaporator blocked	Clean the finned evaporator
	Insufficient air flow	Check proper operation of the fan/motor units
	Defective de-icing	Check proper operation of de-icing function

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<b>ESQUEMA ELECTRICO</b> .....	<b>VII</b>
<b>PAC HT 12-6 230V +/-10% 50HZ</b> .....	VIII
<b>PAC HT 14-7 230V +/-10% 50HZ</b> .....	X
<b>PAC HT 12-6 / 14-7 3N~400V +/-10% 50HZ</b> .....	XII
<b>PAC HT 18-9 3N~400V +/-10% 50HZ</b> .....	XIV
<b>ACUMULADOR DE AGUA CALIENTE SANITARIA</b> .....	XVI
<b>CALEFACCION ELECTRTICA ADICIONAL</b> .....	XVI

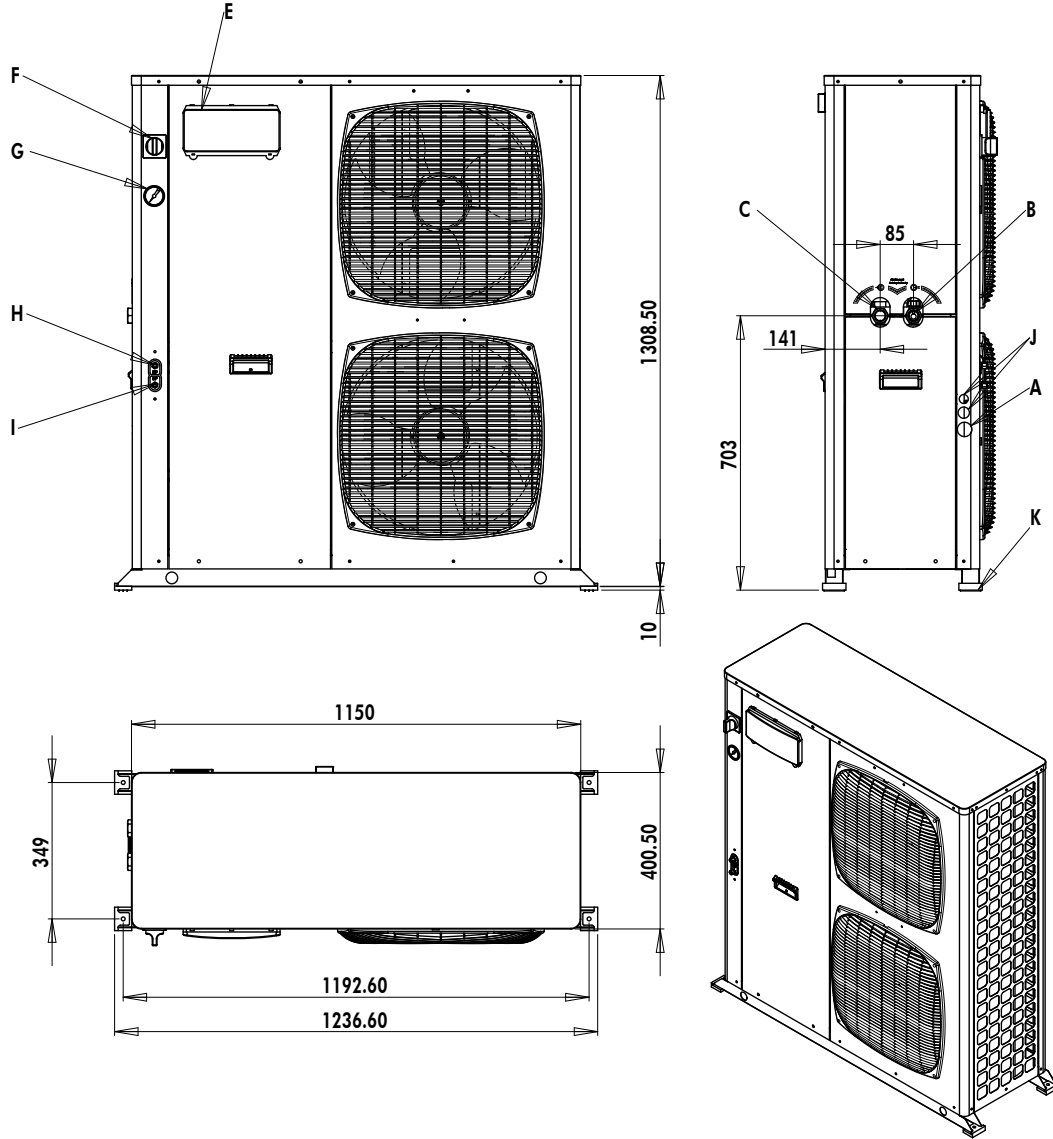
DIMENSIONS

DIMENSIONS

ABMESSUNGEN

DIMENSIONI

DIMENSIONES



	<b>GB</b>	<b>F</b>	<b>D</b>	<b>I</b>	<b>E</b>
<b>A</b>	Main power supply	Alimentation électrique	Stromversorgung	Alimentazione elettrica	Alimentación eléctrica
<b>B</b>	Water inlet 1" female gas	Entrée eau 1" gaz femelle	Wassereintritt 1" Innengewinde Gas	Ingresso acqua 1" gas femmina	Entrada agua 1" gas hembra
<b>C</b>	Water outlet 1" female gas	Sortie eau 1" gaz femelle	Wasseraustritt 1" Innengewinde Gas	Uscita acqua 1" gas femmina	Salida agua 1" gas hembra
<b>E</b>	Display	Afficheur	Display	Display	Display
<b>F</b>	Circuit breaker	Sectionneur	Trennschalter	Sezionatore	Seccionador
<b>G</b>	Water pressure gauge	Manomètre pression d'eau	Manometer Wasserdruck	Manometro pressione dell'acqua	Manómetro presión de agua
<b>H</b>	High pressure takeoff	Prise haute pression	Hochdruckanschluss	Presa alta pressione	Toma de alta presión
<b>I</b>	Low pressure takeoff	Prise basse pression	Niederdruckanschluss	Presa bassa pressione	Toma de baja presión
<b>J</b>	Remote control	Commande à distance	Fernbetätigung	Comando a distanza	Mando a distancia
<b>K</b>	Anti-vibration device	Dispositif anti vibrations	Schwingungsdämpfende Vorrichtungen	Dispositivo antivibrations	Dispositivo antivibraciones

# APPENDIX / ANNEXE / ANLAGE / ALLEGATO / ANEXO

## REFRIGERATION AND HYDRAULIC LINKS DIAGRAM

## SCHÉMA FRIGORIFIQUE ET HYDRAULIQUE

## KÜHL- UND HYDRAULIKDIAGRAMM

## SCHEMA FRIGORIFERO ED IDRAULICO

## ESQUEMA FRIGORÍFICO E HIDRÁULICO

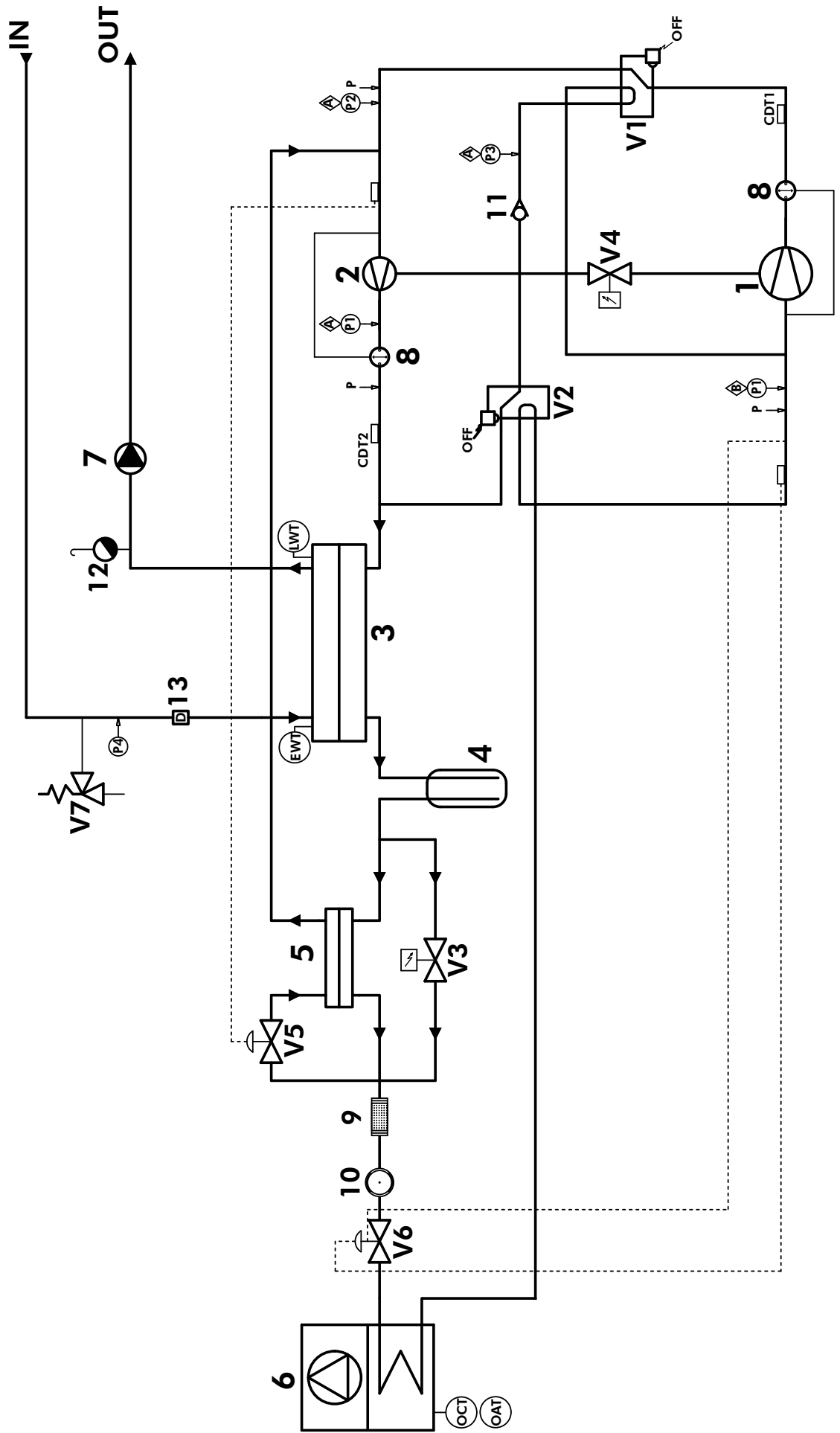
<b>1</b>	Large compressor
<b>2</b>	Small compressor
<b>3</b>	Plate heat exchangers. Counter-current heating
<b>4</b>	Liquid tank
<b>5</b>	Plate heat exchangers. economiser
<b>6</b>	Finned heat exchanger and fans
<b>7</b>	Circulation pump
<b>8</b>	Oil separator
<b>9</b>	Dehydrator filter
<b>10</b>	Liquid warning light
<b>11</b>	Non-return valve
<b>12</b>	Automatic bleed
<b>13</b>	Flow detector
<b>V1</b>	Four-way valve
<b>V2</b>	Four-way valve
<b>V3</b>	Injection electrovalve
<b>V4</b>	Electrovalve
<b>V5</b>	Injection expansion valve
<b>V6</b>	Thermostatic expansion valve
<b>V7</b>	Safety valve (3.5 bar)
<b>P1-A</b>	High Pressure safety pressostat
<b>P2-A</b>	High Pressure pressostat
<b>P3-A</b>	Defrost system high pressure control pressostat
<b>P1-B</b>	Low Pressure safety pressostat
<b>P4</b>	Water pressure gauge
<b>CDT1/2</b>	Discharge Thermostat
<b>LWT</b>	Water temperature probe (outlet)
<b>EWT</b>	Water temperature probe (inlet)
<b>OCT</b>	Outdoor coil temperature probe
<b>OAT</b>	Air temperature probe

<b>1</b>	Gros compresseur
<b>2</b>	Petit compresseur
<b>3</b>	Echangeur à plaques Contre courant chauffage
<b>4</b>	Réservoir liquide
<b>5</b>	Echangeur à plaques. économiseur
<b>6</b>	Echangeur à ailettes et ventilateurs
<b>7</b>	Circulateur
<b>8</b>	Séparateur d'huile
<b>9</b>	Filtre déshydrateur
<b>10</b>	Voyant liquide
<b>11</b>	Clapet anti-retour
<b>12</b>	Purgeur automatique
<b>13</b>	Détecteur de débit
<b>V1</b>	Vanne 4 voies
<b>V2</b>	Vanne 4 voies
<b>V3</b>	Electrovanne d'injection
<b>V4</b>	Electrovanne
<b>V5</b>	Détendeur d'injection
<b>V6</b>	Détendeur thermostatique
<b>V7</b>	Soupape sécurité (3.5 bar)
<b>P1-A</b>	Pressostat sécurité haute pression
<b>P2-A</b>	Pressostat haute pression
<b>P3-A</b>	Pressostat contrôle haute pression dégivrage
<b>P1-B</b>	Pressostat sécurité basse pression
<b>P4</b>	Manomètre pression d'eau
<b>CDT1/2</b>	Thermostat de reflux
<b>LWT</b>	Sonde de température d'eau (sortie)
<b>EWT</b>	Sonde de température d'eau (entrée)
<b>OCT</b>	Sonde contrôle de condensation
<b>OAT</b>	Sonde de température d'air

<b>1</b>	Kompressor Niederdruck
<b>2</b>	Kompressor Hochdruck
<b>3</b>	Plattenwärmeaustauscher. Gegenstrom Heizung
<b>4</b>	Flüssigkeitsbehälter
<b>5</b>	Plattenwärmeaustauscher. economiser
<b>6</b>	Lamellenwärmetauscher und Ventilatoren
<b>7</b>	Umlaufpumpe
<b>8</b>	Olabscheider
<b>9</b>	Filtertrockner
<b>10</b>	Anzeigelampe Flüssigkeit
<b>11</b>	Rückschlagklappe
<b>12</b>	Automatischer Ablasshahn
<b>13</b>	Wassermelder
<b>V1</b>	Vierwegventil
<b>V2</b>	Vierwegventil
<b>V3</b>	Injektionelektroventil
<b>V4</b>	Elektroventil
<b>V5</b>	Expansionsventil Injektion
<b>V6</b>	Thermostat-Expansionsventil
<b>V7</b>	Sicherheitsventil (3.5 Bar)
<b>P1-A</b>	Hochdruck-Sicherheitspressostat
<b>P2-A</b>	Hochdruck-Pressostat
<b>P3-A</b>	Hochdruckkontrollpressostat Abtauen
<b>P1-B</b>	Niederdruck - Sicherheitspressostat
<b>P4</b>	Wasserdruckmesser
<b>CDT1/2</b>	Druckseitiger Thermostat
<b>LWT</b>	Wassertemperaturfühler (Austritt)
<b>EWT</b>	Wassertemperaturfühler (Eintritt)
<b>OCT</b>	Messfühler Verflüssigungskontrolle
<b>OAT</b>	Lufttemperaturfühler

<b>1</b>	Compresor baja presión
<b>2</b>	Compresor alta presión
<b>3</b>	Scambiatori di calore a piastre Contracorriente calefacción
<b>4</b>	Depósito líquido
<b>5</b>	Scambiatori di calore a piastre economizzatore
<b>6</b>	Intercambiador de aletas y ventiladores
<b>7</b>	Circulador
<b>8</b>	Separatore d'olio
<b>9</b>	Filtro deshidratador
<b>10</b>	Spia liquido
<b>11</b>	Valvola antiritorno
<b>12</b>	Purgador automático
<b>13</b>	Rilevatore del flusso
<b>V1</b>	Valvola a quattro vie
<b>V2</b>	Valvola a quattro vie
<b>V3</b>	Elettrovalvola di iniezioni
<b>V4</b>	Elettrovalvola
<b>V5</b>	Valvola de expansión di iniezioni
<b>V6</b>	Valvola de expansión termostática
<b>V7</b>	Valvola de seguridad (3.5 bares)
<b>P1-A</b>	Presostato de seguridad alta presión
<b>P2-A</b>	Presostato alta presión
<b>P3-A</b>	Presostato de control alta presión descongelación
<b>P1-B</b>	Presostato de seguridad baja presión
<b>P4</b>	Manómetro de presión de agua
<b>CDT1/2</b>	Termostato de descarga
<b>LWT</b>	Sonda de temperatura de agua (salida)
<b>EWT</b>	Sonda de temperatura de agua (entrada)
<b>OCT</b>	Sonda controllo di condensazione
<b>OAT</b>	Sonda de temperatura de aire

<b>1</b>	Compressore bassa pressione
<b>2</b>	Compressore alta pressione
<b>3</b>	Intercambiador térmico de placas Controcorriente riscaldamento
<b>4</b>	Serbatoio liquido
<b>5</b>	Intercambiador térmico de placas economizador
<b>6</b>	Scambiatore ad alette e ventilatori
<b>7</b>	Circolatore
<b>8</b>	Separador de aceite
<b>9</b>	Filtro desidratante
<b>10</b>	Indicador luminoso líquido
<b>11</b>	Valvula antirretorno
<b>12</b>	Valvula di scarico automatica
<b>13</b>	Detector del flujo
<b>V1</b>	Valvula de cuatro vias
<b>V2</b>	Valvula de cuatro vias
<b>V3</b>	Electrovalvula de inyección
<b>V4</b>	Electrovalvula
<b>V5</b>	Valvula d'espansione de inyección
<b>V6</b>	Valvula d'espansione termostatica
<b>V7</b>	Valvula di sicurezza (3.5 bar)
<b>P1-A</b>	Pressostato sicurezza alta pressione
<b>P2-A</b>	Pressostato alta pressione
<b>P3-A</b>	Pressostato controllo alta pressione sbrinamento
<b>P1-B</b>	Pressostato sicurezza bassa pressione
<b>P4</b>	Manometro pressione acqua
<b>CDT1/2</b>	Termostato di mandata
<b>LWT</b>	Sonda di temperatura acqua (uscita)
<b>EWT</b>	Sonda di temperatura acqua (ingresso)
<b>OCT</b>	Sonda de control de condensación
<b>OAT</b>	Sonda di temperatura aria



# APPENDIX / ANNEXE / ANLAGE / ALLEGATO / ANEXO

## WATER FLOW CALCULATION GRAPH

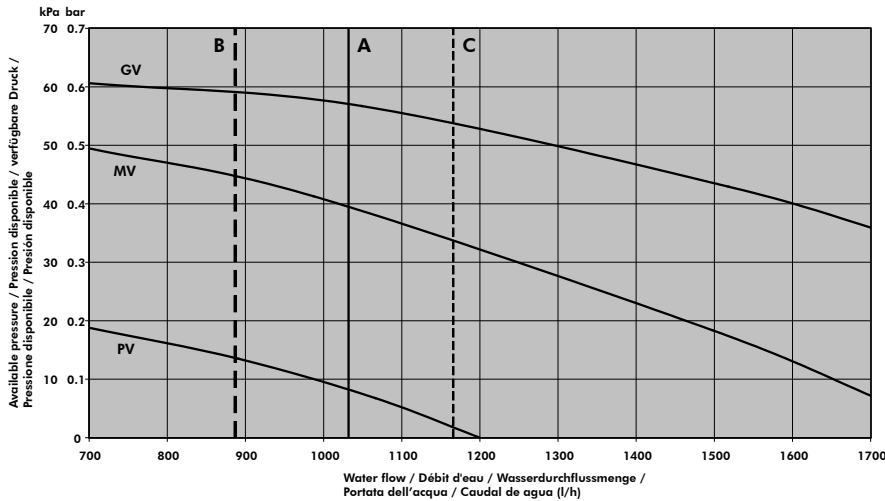
## ABAQUE DE CALCUL DE DÉBIT D'EAU

## BERECHNUNGSKURVE DER WASSERDURCHFLUSSMENGE

## ABACO DI CALCOLO DELLA PORTATA DELL'ACQUA

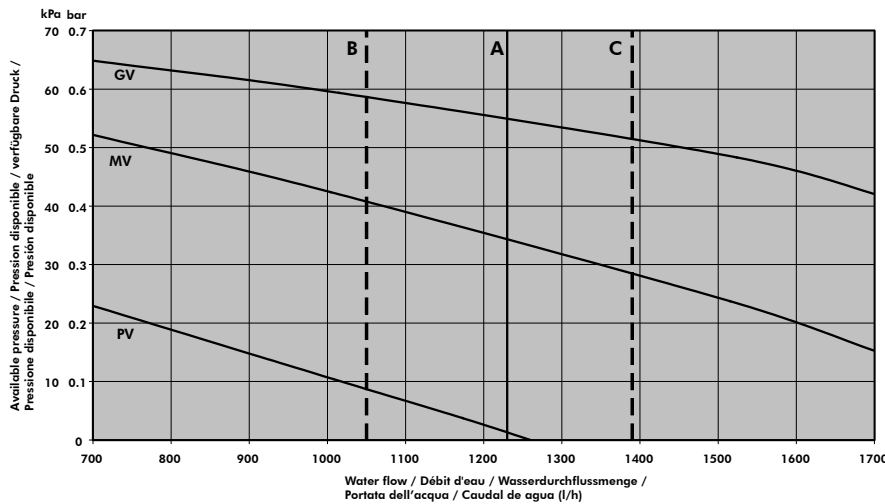
## ÁBACO DE CÁLCULO DE CAUDAL DE AGUA

### PAC HT 12-6



- A** Nominal flow
- B** Minimal flow
- C** Maximal flow

### PAC HT 14-7

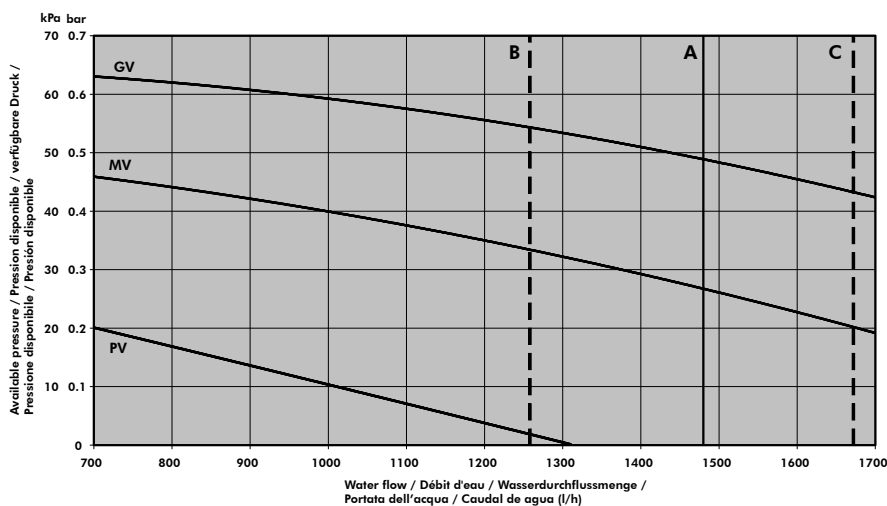


- A** Débit nominal
- B** débit minimal
- C** Débit maximal

- A** Nenndurchflussmenge
- B** Minimaler Absatz
- C** Maximaler Absatz

- A** Portata nominale
- B** Portata Minimo
- C** Portata massimo

### PAC HT 18-9



- A** Caudal nominal
- B** Caudal mínimo
- C** Caudal máximo



**WIRING DIAGRAM**

**SCHEMAS ELECTRIQUES**

**STROMLAUFPLANS**

**SCHEMA ELETRICO**

**ESQUEMA ELECTRICO**

**TAKE CARE!**

These wiring diagrams are correct at the time of publication. Manufacturing changes can lead to modifications. Always refer to the diagram supplied with the product.

**ATTENTION**

Ces schémas sont corrects au moment de la publication. Les variantes en fabrication peuvent entraîner des modifications. Reportez-vous toujours au schéma livré avec le produit.

**ACHTUNG!**

Diese Stromlaufplans sind zum Zeitpunkt der Veröffentlichung gültig. In Herstellung befindliche Varianten können Änderungen mit sich bringen. In jedem Fall den mit dem Produkt gelieferten Stromlaufplan hinzuziehen.

**ATTENZIONE !**

Questi schemi sono corretti al momento della pubblicazione. Le varianti apportate nel corso della fabbricazione possono comportare modifiche. Far sempre riferimento allo schema fornito con il prodotto.

**ATENCIÓN !**

Esto esquemas son correctos en el momento de la publicación. Pero las variantes en la fabricación pueden ser motivo de modificaciones. Remítase siempre al esquema entregado con el producto.

**POWER SUPPLY MUST BE SWITCHED OFF BEFORE STARTING TO  
WORK IN THE ELECTRIC CONTROL BOX!**



**MISE HORS TENSION OBLIGATOIRE AVANT TOUTE INTERVENTION  
DANS LES BOITIERS ELECTRIQUES.**

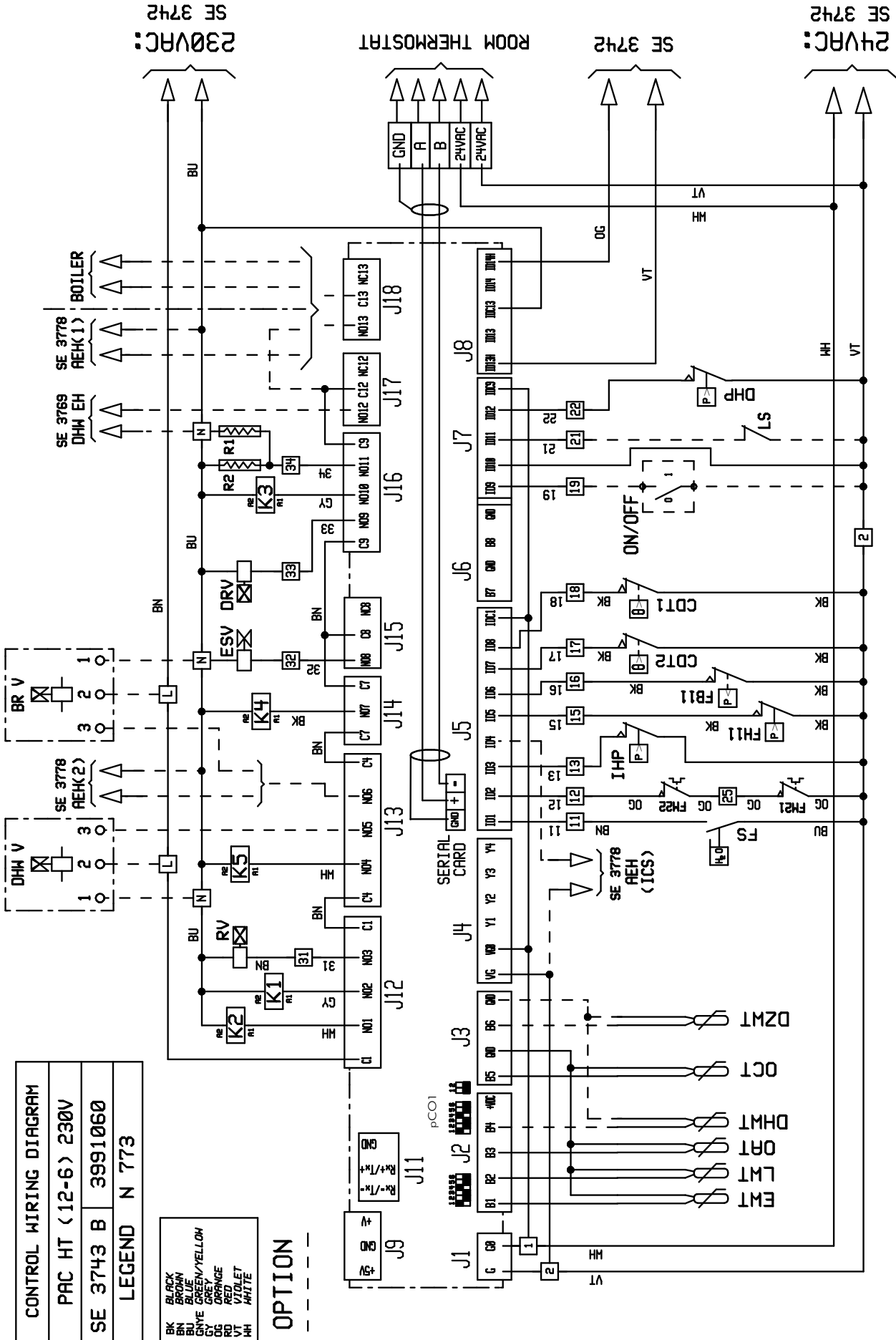
**VOR JEDEM EINGRIFF AN DEN ANSCHLUßKÄSTEN UNBEDINGT  
DAS GERÄT STROMLOS SCHALTEN!**

**PRIMA DI OGNI INTERVENTO SULLE CASSETTE ELETTRICHE  
ESCLUDERE TASSATIVAMENTE L'ALIMENTAZIONE !**

**PUESTA FUERA DE TNESIÓN OBLIGATORIA ANTES DE CUALQUIER  
INTERVENCIÓN EN LAS CAJAS ELÉCTRICAS!**

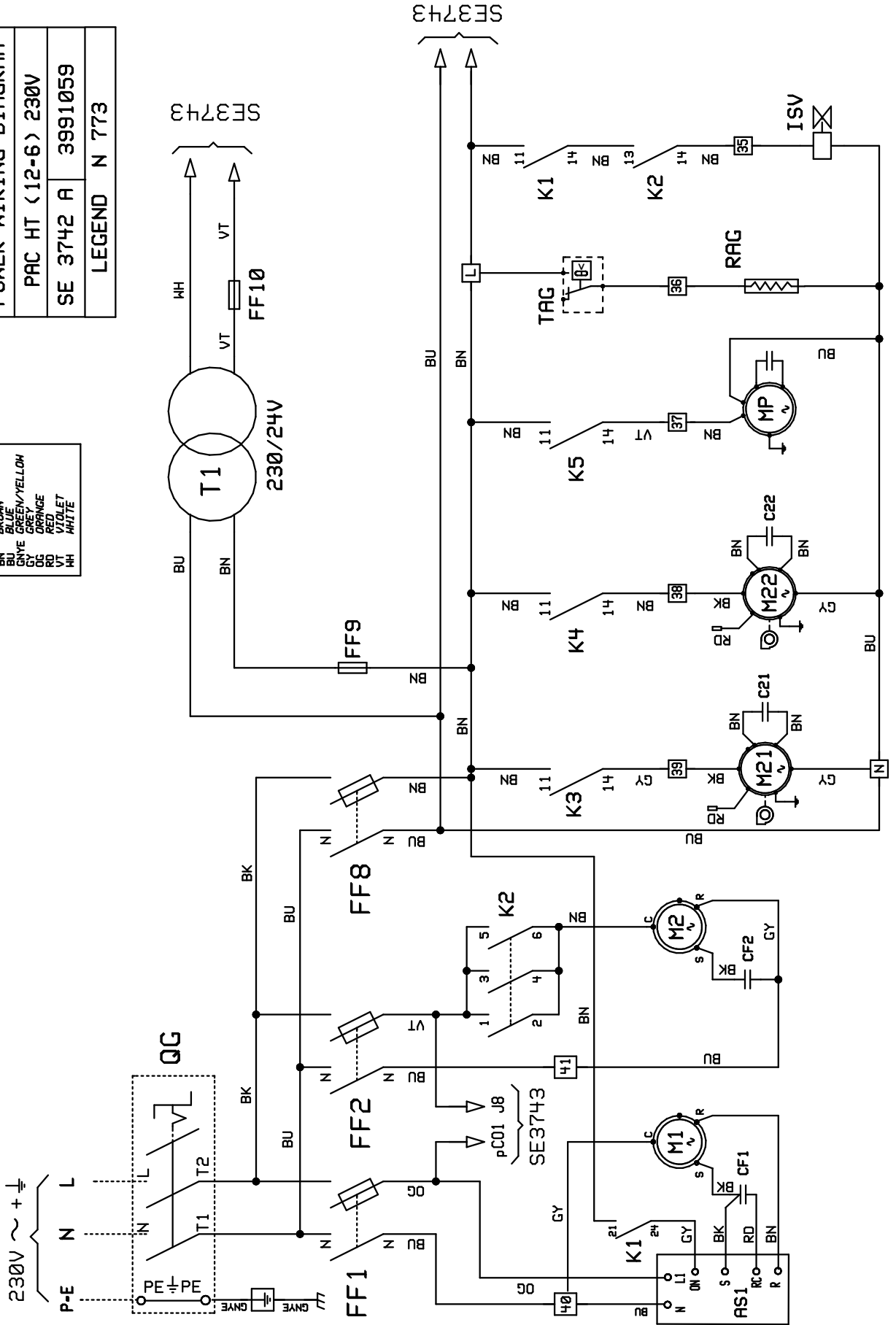
# APPENDIX / ANNEXE / ANLAGE / ALLEGATO / ANEXO

PAC HT 12-6 230V +/-10% 50HZ



POWER WIRING DIAGRAM	
PAC HT (12-6) 230V	
SE 3742 A	3991059
LEGEND N 773	

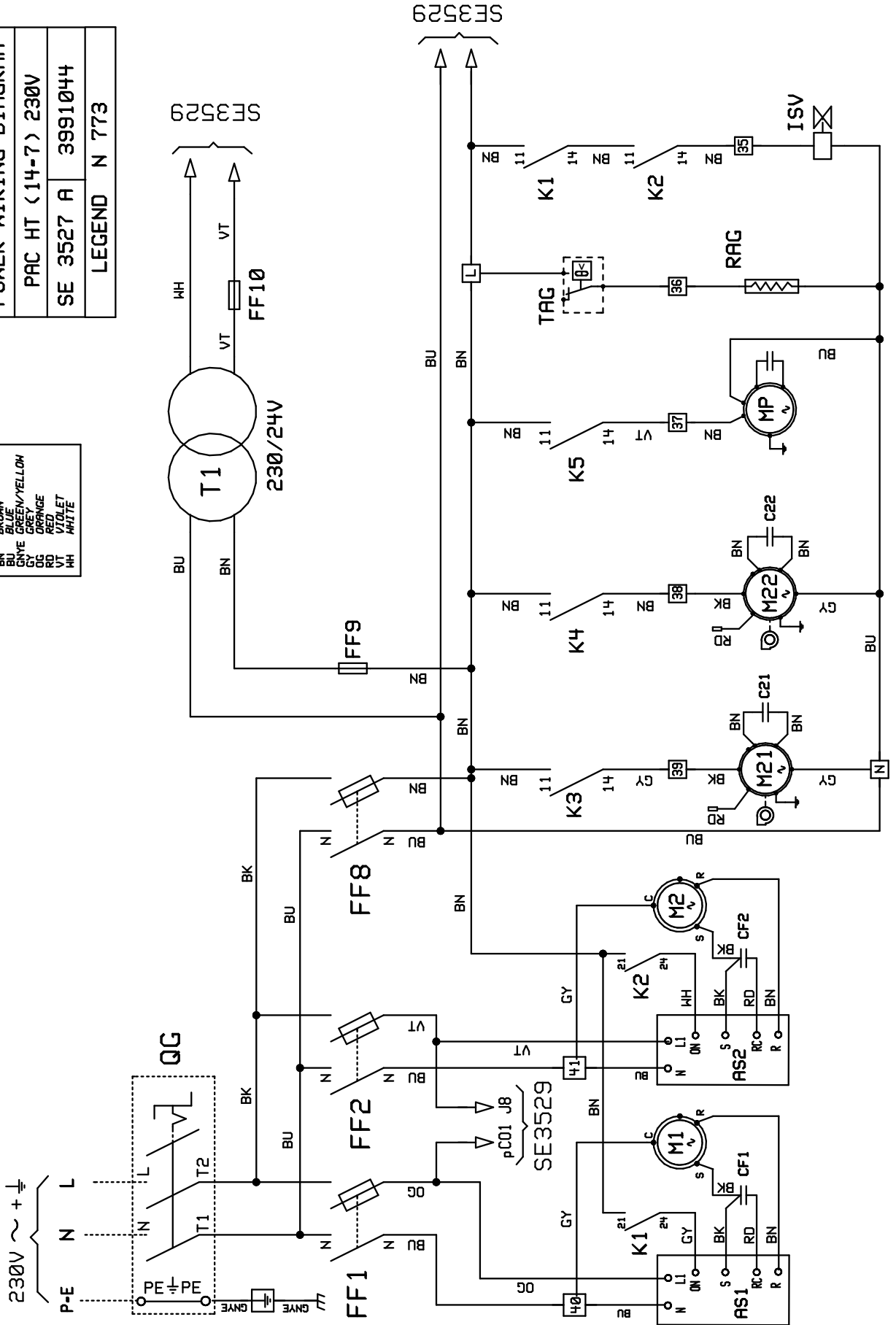
BK	BLACK
BRN	BROWN
BU	BLUE
GNVE	GREEN/YELLOW
GY	GREY
OR	ORANGE
RD	RED
VT	VIOLET
WH	WHITE





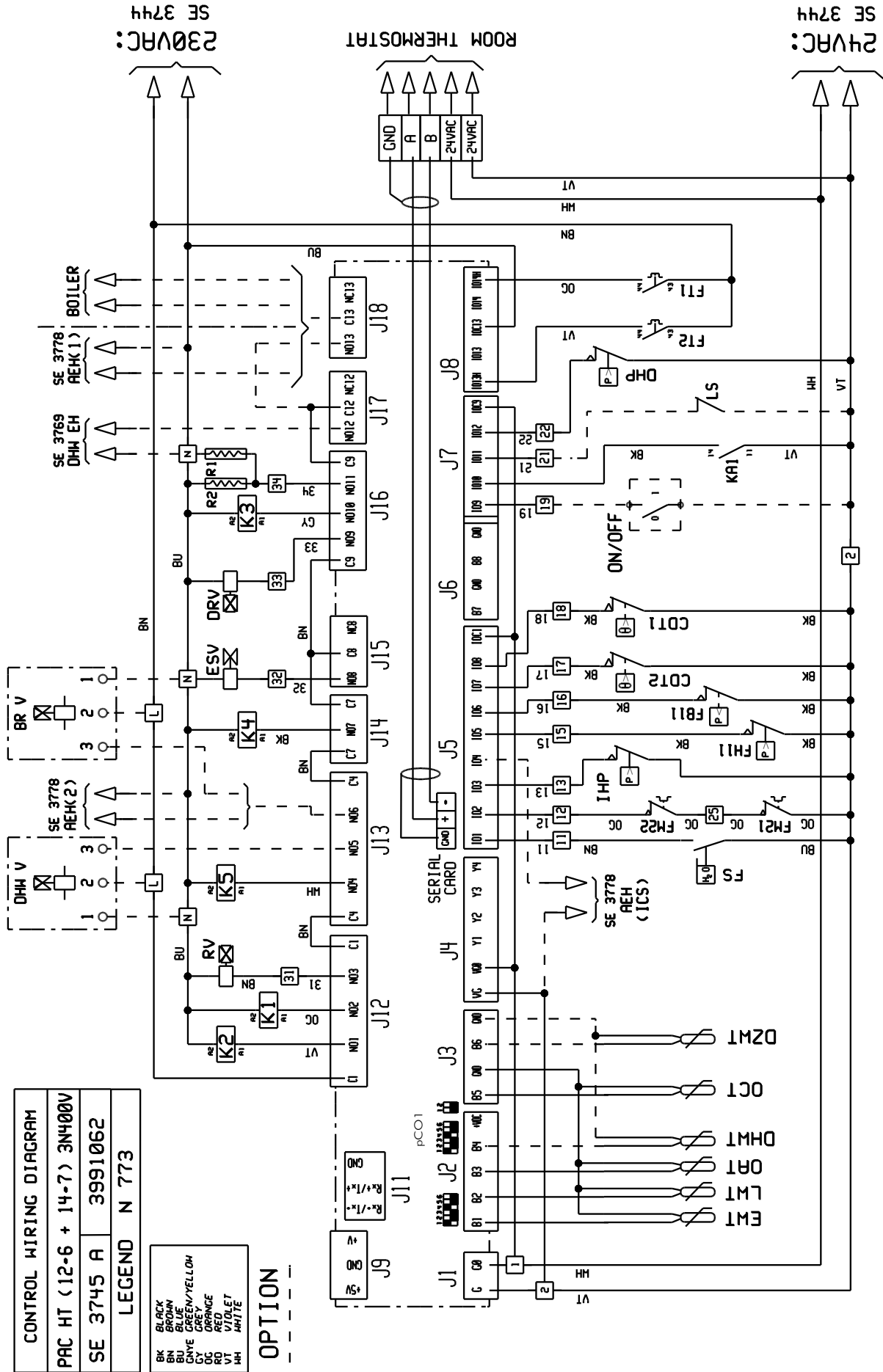
POWER WIRING DIAGRAM	
PAC HT (14-7) 230V	
SE 3527 A	3991044
LEGEND N 773	

BK	BLACK
BRN	BROWN
BU	BLUE
GRN	GREEN
GY	GREY
OR	ORANGE
RD	RED
VT	VIOLET
WH	WHITE



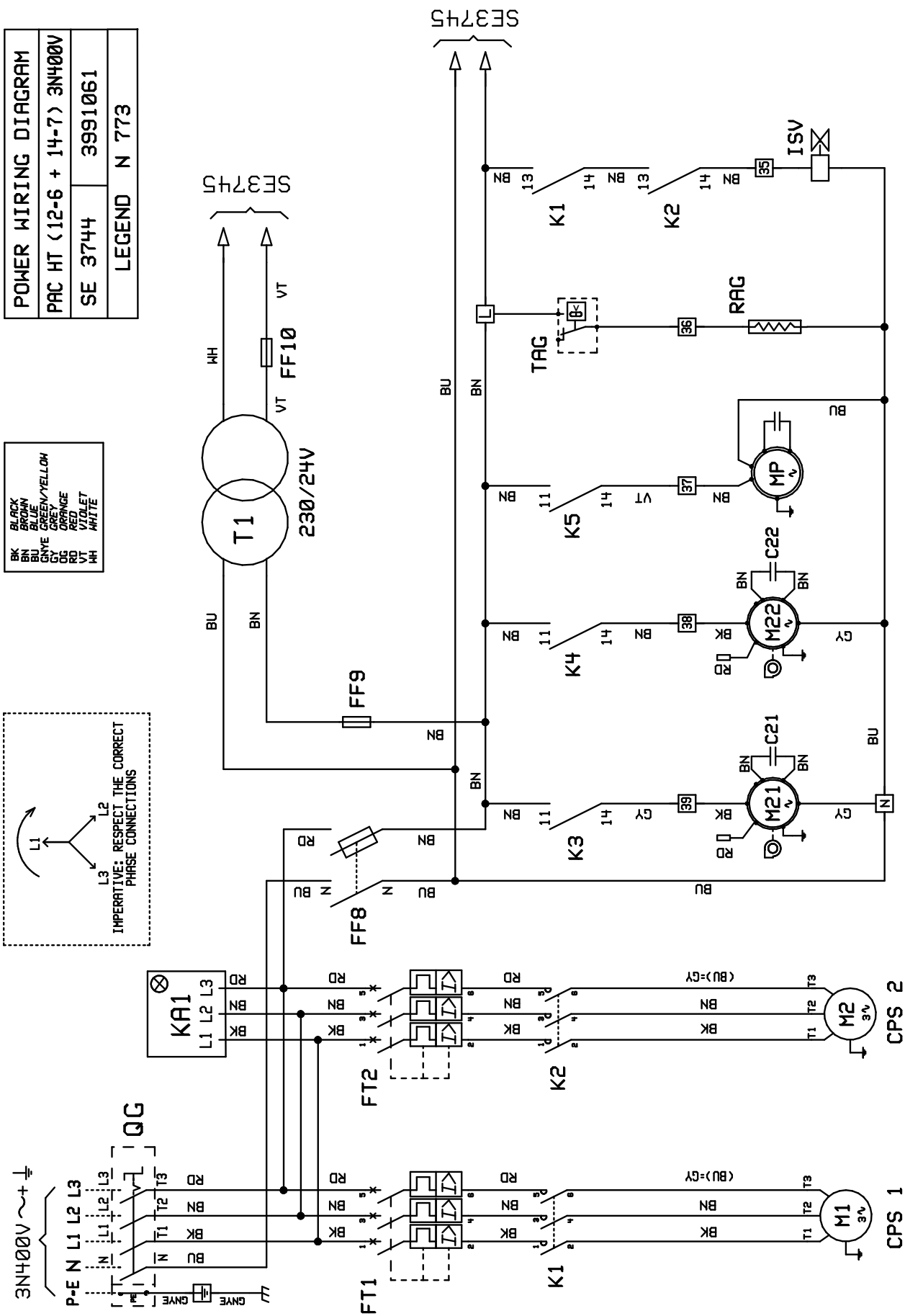
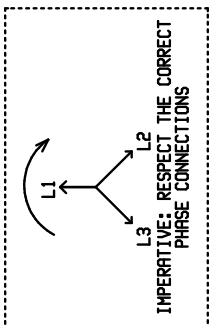
# APPENDIX / ANNEXE / ANLAGE / ALLEGATO / ANEXO

PAC HT 12-6 / 14-7 3N~400V +/-10% 50HZ



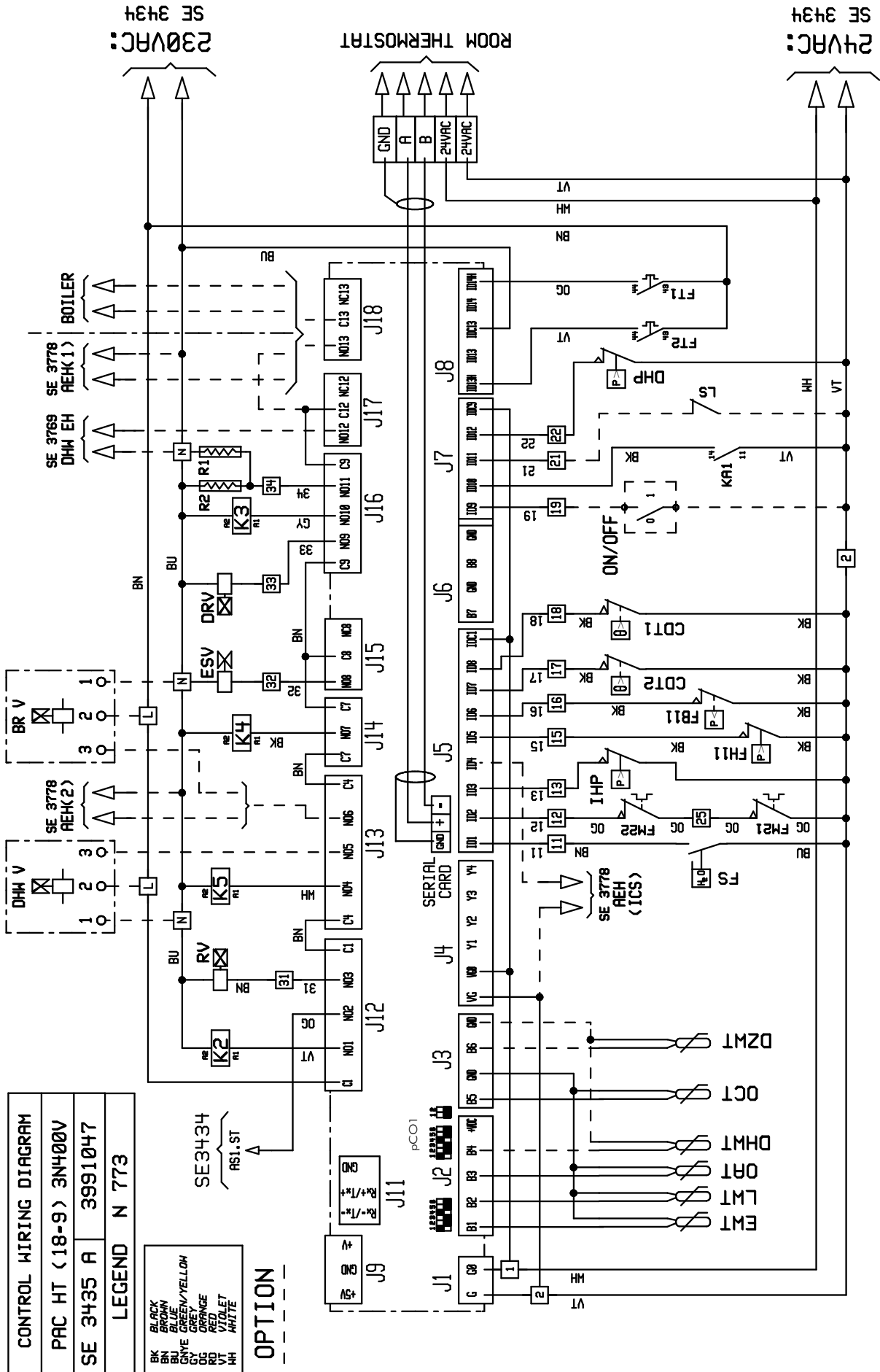
<b>POWER WIRING DIAGRAM</b>	
PAC HT (12-6 + 14-7) 3N400V	
SE 3744	3991061
LEGEND N 773	

BK	BLACK
BR	BROWN
BU	BLUE
BY	GREEN/YELLOW
GY	GREY
OR	ORANGE
OG	GREEN
WT	WHITE
VT	VIOLET
MH	MAGENTA



# APPENDIX / ANNEXE / ANLAGE / ALLEGATO / ANEXO

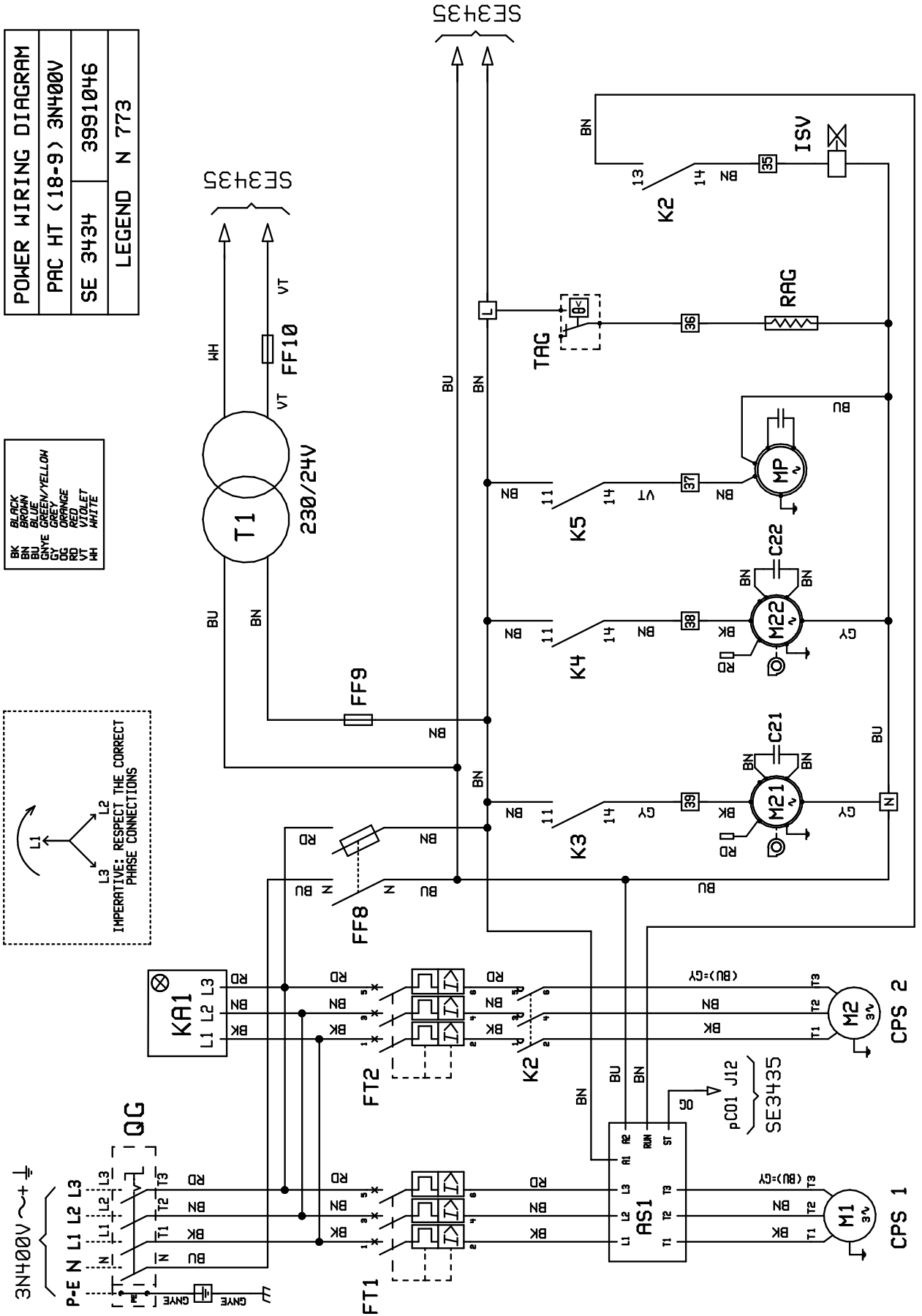
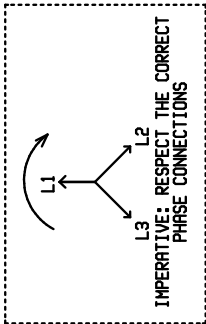
PAC HT 18-9 3N~400V +/-10% 50HZ





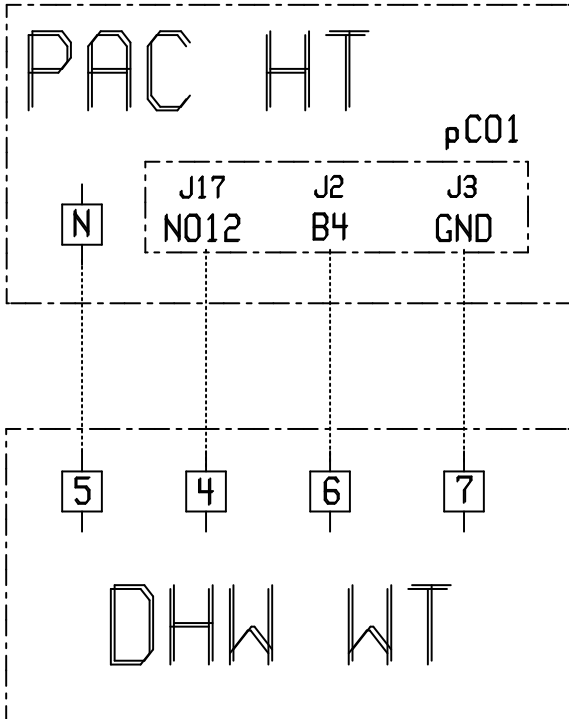
POWER WIRING DIAGRAM	
PAC HT <18-9> 3N400V	
SE 3434	3991046
LEGEND N 773	

BK	BLACK
BRN	BROWN
BU	BLUE
GRN	GREEN/YELLOW
GY	GREY
OR	ORANGE
RD	RED
VT	VIOLET
WH	WHITE



# APPENDIX / ANNEXE / ANLAGE / ALLEGATO / ANEXO

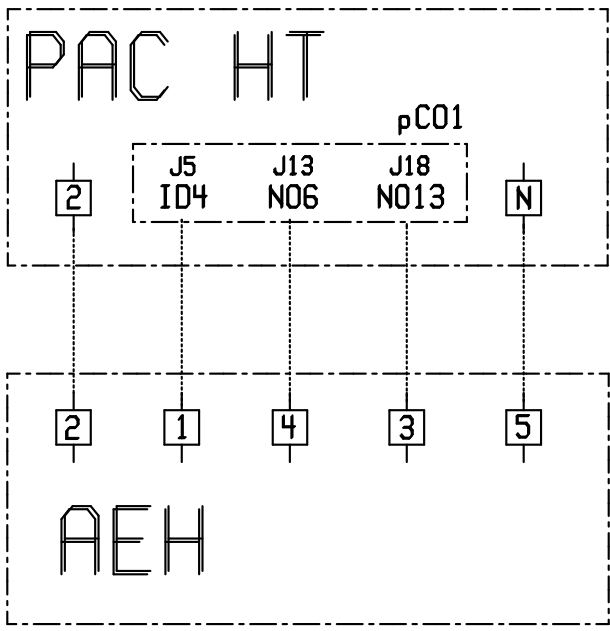
DOMESTIC HOT WATER TANK  
 BALLON D'EAU CHAUDE SANITAIRE  
 BRAUCHWASSERVERSORGUNG  
 PALLA DI ACQUA CALDA SANITARIA  
 ACUMULADOR DE AGUA CALIENTE SANITARIA



CONNECTION DIAGRAM  
 SE 3769

- PC01 DHW WT REGULATEUR DE LA PAC HT  
BALLON D'EAU CHAUDE SANITAIRE
- PC01 DHW WT PAC HT CONTROLLER  
DOMESTIC HOT WATER TANK
- PC01 DHW WT KONTROLLEUR DES PAC HT  
BRAUCHWASSERVERSORGUNG
- PC01 DHW WT CONTROLLO ELETTRONICO DEL PAC HT  
PALLA DI ACQUA CALDA SANITARIA
- PC01 DHW WT CONTROL DE LA PAC HT  
ACUMULADOR DE AGUA CALIENTE SANITARIA

ADDITIONAL ELECTRIC HEATER  
 CHAUFFAGE ELECTRIQUE ADDITIONNEL  
 ZUSATZLICHE ELEKTROHEIZUNG  
 RESISTENZE ELETTRICHE ADDIZIONALE  
 CALEFACCION ELECTRTICA ADICIONAL



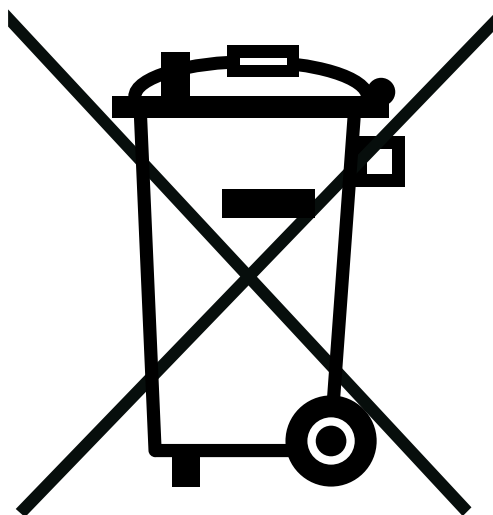
CONNECTION DIAGRAM  
 SE 3814 A 3991074

- SE 3814 A ANNULE ET REMPLACE SE 3814  
 SE 3814 A SUPERSEDES SE 3814  
 SE 3814 A ANNULLIERT UND ERSETZT SE 3814  
 SE 3814 A ANNULLA E SOSTITUISCE SE 3814  
 SE 3814 A ANULA Y SUSTITUYE SE 3814
- PC01 AEH REGULATEUR DE LA PAC HT  
CHAUFFAGE ELECTRIQUE ADDITIONNEL
  - PC01 AEH PAC HT CONTROLLER  
ADDITIONAL ELECTRIC HEATER
  - PC01 AEH KONTROLLEUR DES PAC HT  
ZUSATZLICHE ELEKTROHEIZUNG
  - PC01 AEH CONTROLLO ELETTRONICO DEL PAC HT  
RESISTENZE ELETTRICHE ADDIZIONALE
  - PC01 AEH CONTROL DE LA PAC HT  
CALEFACCION ELECTRTICA ADICIONAL









## English

The meaning of the above logo representing a crossed-out wheeled bin is that this unit must not be disposed of as unsorted municipal waste but should be collected separately as WEEE (Waste Electrical and Electronic Equipment).

The presence of hazardous substances in electrical and electronic equipment or an improper use of such equipments or of parts thereof as well as the hazards of not separating WEEE from unsorted domestic waste, may affect the environment and human health.

As an End User, you are required to place WEEE in a collection separate from that for unsorted domestic waste. Please contact a point of sale or installer to find out the collection system available at your local community. You may return your old air conditioning unit for free to the point of sale or the installer when purchasing a new one.

As an End User, it is your role to contribute to the reuse, recycling and other forms of recovery of such wastes so as to reduce the disposal of waste. This will help preserve your environment.

## Français

Le logo ci-dessus représentant une "poubelle barrée" signifie qu'il ne faut pas se débarrasser de cet appareil comme d'un déchet classique mais que celui-ci doit être collecté séparément en tant que DEEE (Déchet d'Équipement Électrique et Electronique).

La présence de substances dangereuses dans les équipements électriques et électroniques, l'utilisation inappropriée de tels équipements ou partie de tels équipements ainsi que le danger représentant la collecte non centralisée de matériels DEEE peuvent être préjudiciables à l'environnement et à la santé publique.

En tant qu'utilisateur final, il vous est demandé de collecter les DEEE séparément des déchets ordinaires. Vous êtes priés de prendre contact avec votre revendeur ou votre installateur pour qu'il vous indique le mode de collecte de votre commune. Lors du renouvellement de votre appareil, vous avez la possibilité de rendre votre ancien appareil gratuitement à votre installateur ou votre revendeur qui se chargera d'en assurer la collecte. En tant qu'utilisateur final, il est de votre devoir de participer à la réutilisation, au recyclage, et à toute autre forme de récupération de tels déchets afin d'en diminuer la quantité. Cela contribuera à la préservation de l'environnement.

## Deutsch

Die Bedeutung des Logos mit der durchgestrichenen Mülltonne besteht darin, dass es sich bei diesem Gerät nicht um Hausmüll (Wertstoffmüll oder Restmüll) handelt.

Dieses Gerät ist nach der Elektro- und Elektronikgerätengesetz ElektroG (WEEE) zu sammeln und zu entsorgen.

Durch das Vorhandensein von gefährlichen Substanzen in elektrischen oder elektronischen Bauteilen kann die missbräuchliche Verwendung solcher Teile oder das Entsorgen solcher Geräte über den Hausmüll zu nicht unerhebliche Umwelt- und/ oder Gesundheitsschäden führen.

Sie als Endkunde sind angehalten, Geräte, welche unter die ElektroG (WEEE) fallen, separat vom Hausmüll zu entsorgen. Bitte informieren Sie den Händler, Installateur oder Ihre Stadt- oder Gemeindeverwaltung, um einen Entsorgungsbetrieb in Ihrer Nähe ausfindig zu machen. Eine Möglichkeit besteht darin, das Gerät kostenlos bei Ihrem Händler oder Installateur abzugeben, wenn Sie sich ein neues Gerät kaufen.

Als Endkunde beteiligen Sie sich so an der Wiederverwendung, R ü c k g e w i n n u n g o d e r Wiederverwertung von derartigen Rohstoffen. Sie helfen, Müll zu vermeiden und leisten so Ihren Beitrag zu einer sauberen Umwelt.

## Italiano

Il significato del logo qui sopra rappresentato indica che il apparecchio non deve essere rottamato come rifiuto nella spazzatura indifferenziata, ma deve essere smaltito separatamente in base alle direttive WEEE (Waste Electrical and Electronic Equipment - rifiuti elettrici ed elettronici), in accordo con il decreto legislativo n.151/2005.

A causa della presenza di sostanze tossiche nella componentistica elettrica o elettronica, uno smaltimento di queste o di parti di esse nei rifiuti non riciclabili, può avere effetti nocivi sull'ambiente e sulla salute umana.

Il Cliente è tenuto a separare i prodotti o parte di essi etichettati in base alle normative WEEE dai rifiuti domestici solidi. Per ulteriori informazioni si contatti un punto vendita o un installatore per conoscere il punto di raccolta più vicino alla propria città. Il Cliente può smaltire gratuitamente il vecchio apparecchio presso il punto vendita o l'installatore contestualmente all'acquisto di un nuovo apparecchio.

Qualora il punto vendita o l'installatore non si prendano carico delle incombenze necessarie allo smaltimento del vecchio apparecchio secondo la normativa prevista, potranno essere soggetti ad un'ammenda compresa tra i 150 ed i 400 euro per ogni unità. E' compito del Cliente provvedere al riutilizzo, al riciclo e ad altre forme di riduzione degli sprechi in modo tale da ridurre la quantità di rifiuti da smaltire. Questa normativa viene introdotta a sostegno di politiche ambientali.

Il mancato rispetto della legislazione vigente prevede quattro sanzioni pecuniarie comprese tra 25,82 euro e 619.74 euro.

## Español

El significado de este logo que representa un cubo de basura con ruedas tachado, es que esta unidad no debe ser desechada como residuo doméstico sin clasificar, sino que deberá ser recogida de forma separada como RAEE (residuos aparatos eléctricos y electrónicos). La presencia de sustancias peligrosas en los aparatos eléctricos y electrónicos o un uso impropio de tales aparatos o de partes de los mismos, así como los peligros de no separar RAEE de los residuos domésticos sin clasificar, puede afectar al medio ambiente y a la salud.

Como usuario final, se le requiere para que ponga los RAEE en una recogida distinta de los residuos domésticos sin clasificar. Por favor, contacte con un punto de venta o instalador para averiguar el sistema de recogida disponible en su comunidad. Puede devolver gratis su antigua unidad al punto de venta o instalador cuando compre una unidad.

Como usuario final, su papel es contribuir a la reutilización, reciclado y otras formas de recuperación de dichos residuos para reducir la eliminación de basura. Esto ayudará a mantener el medio ambiente.

# EC Compliance declaration

Under our own responsibility, we declare that the product designated in this manual comply with the provisions of the EEC directives listed hereafter and with the national legislation into which these directives have been transposed.

## Déclaration CE de conformité

Nous déclarons sous notre responsabilité que les produits désignés dans la présente notice sont conformes aux dispositions des directives CEE énoncées ci- après et aux législations nationales les transposant.

## EG-Konformitätserklärung

Wir erklären in eigener Verantwortung, das die in der vorliegenden Beschreibung angegebenen Produkte den Bestimmungen der nachstehend erwähnten EG-Richtlinien und den nationalen Gesetzesvorschriften entsprechen, in denen diese Richtlinien umgesetzt sind.

## Dichiarazione CE di conformità

Dichiariamo, assumendone la responsabilità, che i prodotti descritti nel presente manuale sono conformi alle disposizioni delle direttive CEE di cui sott e alle lagislazionni nazionali che li recepiscono

## Declaración CE de conformidad

Declaramos, bajo nuestra responsabilidad, que los productos designados en este manual son conformes a las disposiciones de las directivas CEE enunuciadas a continuacion, asi como a las legislaciones nacionales que las contemplan.

PAC HT 12-6 / PAC HT 14-7 / PAC HT 18-9

MACHINERY DIRECTIVE 2006 / 42 / EEC  
LOW VOLTAGE DIRECTIVE (DBT) 2006 / 95 / EEC  
ELECTROMAGNETIC COMPATIBILITY DIRECTIVE 2004 / 108 / EEC  
PRESSURISE EQUIPMENT DIRECTIVE (DESP) 97 / 23 / EEC  
SUB-MODULE A CATEGORY I

DIRECTIVE MACHINES 2006 / 42 / C.E.E.  
DIRECTIVE BASSE TENSION (DBT) 2006 / 95 / C.E.E.  
DIRECTIVE COMPATIBILITE ELECTROMAGNETIQUE 2004 / 108 / C.E.E  
DIRECTIVE DES EQUIPEMENTS SOUS PRESSION (DESP) 97 / 23 /C.E.E.  
SOUS-MODULE A CATEGORIE I

RICHTLINIE MASCHINEN 2006 / 42 / EG  
RICHTLINIE NIERDERSPANNUNG (DBT) 2006 / 95 / EG  
RICHTLINIE ELEKTROMAGNETISCHE VERTRÄGLICHKEIT 2004 / 108 / EG  
RICHTLINIE FÜR AUSRÜSTUNGEN UNTER DRUCK (DESP) 97 / 23 / EG  
UNTER MODUL A, KATEGORIE I

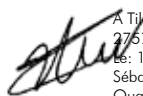
DIRETTIVA MACHINE 2006 / 42 / CEE  
DIRETTIVA BASSA TENSIONE (DBT) 2006 / 95 / CEE  
DIRETTIVA COMPATIBILITA ELETTROMAGNATICA 2004 / 108 / CEE  
DIRETTIVA DEGLI IMPIANTI SOTTO PRESSIONE (DESP) 97 / 23 / CEE  
SOTTOMODULO A, CATEGORIA I

DIRECTIVA MAQUIAS 2006 / 42 / CEE  
DIRECTIVA BAJA TENSION (DBT) 2006 / 95 / CEE  
DIRECTIVA COMPATIBILIDAD ELECTROMAGNETICA 2004 / 108 / CEE  
DIRECTIVA DE LOS EQUIPOS A PRESION (DESP) 97 / 23 / CEE  
BAJA MODULO A, CATEGORIA I

And that the following paragraphs of the harmonised standards have been applied.  
Et que les paragraphes suivants les normes harmonisées ont été appliqués.  
Und dass die folgenden Paragraphen der vereinheitlichten Normen Angewandt wurden.  
E che sono stati applicati i seguenti paragrafi delle norme armonizzate.  
Y que se han aplicado los siguientes apartados de las normas armonizadas.

EN 378-2:2002  
EN 61000-6-1:2007  
EN 61000-3-3:1995 + A1 2001 + A2 2005  
EN 60 335-1: 2003+ A1 2005 + A2 2006+ A11 2004 + A12 2006

EN 61000-6-3:2007  
EN 61000-3-2:2006  
EN 60 335-2-21  
EN 60 335-2-40:2005 + A11 2005 + A12 2005 + A1 2006

  
A Tillières sur Avre  
27570 - FRANCE  
Le: 13/07/2010  
Sébastien Blard  
Quality Manager  
AIRWELL Industrie France

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

*Dans un souci d'amélioration constante, nos produits peuvent être modifiés sans préavis. Photos non contractuelles.*

*In dem Bemühen um ständige Verbesserung können unsere Erzeugnisse ohne vorherige Ankündigung geändert werden. Fotos nicht vertraglich bindend.*

*A causa della politica di continua miglioria posta in atto dal costruttore, questi prodotti sono soggetti a modifiche senza alcun obbligo di preavviso. Le foto pubblicate non danno luogo ad alcun vincolo contrattuale.*

*Con objeto de mejorar constantemente, nuestros productos pueden ser modificados sin previo aviso. Fotos no contractuales.*

