Air-to-Water Heat Pump Systems

PAW-VP1000LDHW

PAW-VP750LDHW

PAW-VP380L

Domestic Hot Water System for R410A and R32 Use

Installation Manual

Commercial System Air Conditioner

20200506-1

Air-to-Water Heat Pump Systems

PAW-VP1000LDHW

PAW-VP750LDHW

PAW-VP380L

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Installation Manual

Origin Quick Installation Manual (English)

State of the documentation: 05/2020

Software version: 0.0.0

Contents

Introduction

Important Notice!

Please read before starting

Preparation for operation

Before operating the Air-to-Water Heat Pump System, it is absolutely mandatory to carefully read and to strictly execute the instructions and settings in Chapter 8.

Failure to follow instructions

The manufacturer shall in no way be responsible for improper installation, problems in operation, malfunction of the unit or safety hazards resulting from failure to follow the instructions in this manual.

Target groups

This manual is intended for specialist planners and installers, as well as service companies.

Installation, commissioning and maintenance of the products may only be carried out by qualified specialist personnel. The operation of the products can also be carried out by private persons.

Treated products

This manual covers the following products:

R32 and R410A products

- Indoor Units, and connectable outdoor units combinations

	DHW preparation		Heating or Cooling
DHW Tank	PAW-VP1000LDHW	PAW-VP750LDHW	x
Buffer Heating Tank	x	x	PAW-VP380L
Outdoor unit R410A	U-16MF3E8	U-16MF3E8	x
Outdoor unit R410A	U-250PE2E8A	U-250PE2E8A	x
Outdoor unit R32	x	x	U-200PZH2E8

Used symbols

The text in this manual uses various notices, symbols and textual representations, which are briefly explained below.

Safety-related cautions

Safety-related information alerts users to hazards and provides instructions for the safe, designated use of the product. This guide uses the following warnings and signs:

DANGER

This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.

► Follow the warnings provided to avoid this.

CAUTION

This symbol refers to a hazard or unsafe practice which can result in personal injury or product or property damage.

► Follow the warnings provided to avoid this.

WARNING

This signal word warns of a situation that can result in property damage.

► Follow the warnings provided to avoid this.

Further used symbols

Warning against Electrical Shock

Further notes

Important

Important notes that must be followed to ensure that the units work as intended.

Note

Hints for more useful information.

Text displays

►	indicates instructions in a warning.
1., 2., 3. ... or a, b, c ...	indicate steps to be performed in the specified order.
⇨	indicates the result of a work step.
✓	indicates the result of a sequence of work steps.
●	indicates an enumeration.
[Key]	indicates the name of a key.
Option	indicates an option of the panel.
Menu » Option	indicates a sequence of several options that must be selected one after the other.
Accent	indicates important terms or passages.
(**1**)	indicates references to legends in the text.
→ *cross-reference*	indicates a cross-reference.
www.example.com	indicates web addresses (without Hyperlink function).

Safety Instructions

This Air to water system - Air conditioning system meets strict safety and operating standards. As the installer or service person, it is an important part of your job to install or service the system so it operates safely and efficiently.

For safe installation and trouble-free operation, you must:

- Carefully read this instruction booklet before beginning.
- Follow each installation or repair step exactly as shown.
- Observe all local, state, and national electrical codes.
- Pay close attention to all warning and caution notices given in this manual.

DANGER

This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.

► Follow the warnings provided to avoid this.

CAUTION

This symbol refers to a hazard or unsafe practice which can result in personal injury or product or property damage.

► Follow the warnings provided to avoid this.

If Necessary, Get Help

These instructions are all you need for most installation sites and maintenance conditions. If you require help for a special problem, contact our sales/service outlet or your certified dealer for additional instructions.

In Case of Improper Installation

The manufacturer shall in no way be responsible for improper installation or maintenance service, including failure to follow the instructions in this document.

Special Precautions

DANGER

When Wiring

Electrical shock can cause severe personal injury or death.
Only a qualified, experienced electrician should attempt to wire this system.

- Do not supply power to the unit until all wiring and tubing are completed or reconnected and checked.
- Highly dangerous electrical voltages are used in this system. Carefully refer to the wiring diagram and these instructions when wiring. Improper connections and inadequate grounding can cause accidental injury or death.
- Ground the unit following local electrical codes.
- Connect all wiring tightly. Loose wiring may cause overheating at connection points and a possible fire hazard.
- A power supply should be provided exclusively for each unit, complete with circuit breaker and over current protection.
- Provide a power outlet exclusively for each unit, and full disconnection means, with contact separation in all poles, must be incorporated in the fixed wiring, in accordance with the wiring rules.
- To prevent possible hazards from insulation failure, the unit must be grounded.
- This equipment is strongly recommended to be installed with Earth Leakage Circuit Breaker (ELCB) or Residual Current Device (RCD). Otherwise, it may cause electrical shock and fire in case of equipment break down or insulation breakdown.

When Transporting

Be careful when picking up and moving the indoor and outdoor units. Get a partner to help, and bend your knees when lifting to reduce strain on your back. Sharp edges or thin aluminum fins on the air conditioner or Air-to-Water can cut your fingers.

When Installing

Select an installation location which is rigid and strong enough to support or hold the unit, and select a location for easy maintenance.

In a Room

Properly insulate any tubing run inside a room to prevent “sweating” that can cause dripping and water damage to walls and floors.

DANGER

► Keep the fire alarm and the air outlet at least 1.5 m away from the unit.

In moist or uneven locations

Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the outdoor unit. This prevents water damage and abnormal vibration.

In an area with high winds

Securely anchor the outdoor unit down with bolts and a metal frame. Provide a suitable air baffle.

In a snowy area (for heat pump type systems)

Install the outdoor unit on a raised platform that is higher than drifting snow. Provide snow vents.

In laundry rooms

Do not install in laundry rooms. Indoor unit is not drip proof.

When Connecting Refrigerant Tubing

DANGER

- When performing piping work, do not mix air except for specified refrigerant (R410A or R32, depending on the outdoor unit model) in refrigeration cycle. It causes capacity down, and risk of explosion and injury due to high pressure inside the refrigerant cycle.
- If the refrigerant comes in contact with a flame, it produces a toxic gas.
- Do not add or replace refrigerant other than specified type. It may cause product damage, burst and injury, etc.
- Ventilate the room immediately, in the event that is refrigerant gas leaks during the installation. Be careful not to allow contact of the refrigerant gas with a flame as this will cause the generation of toxic gas.
- Keep all tubing runs as short as possible.
- Apply refrigerant lubricant to the matching surfaces of the flare and union tubes before connecting them, then tighten the nut with a torque wrench for a leak-free connection.
- Check carefully for leaks before starting the test run.
- Do not leak refrigerant while piping work for an installation or re-installation, and while repairing refrigeration parts. Handle liquid refrigerant carefully as it may cause frostbite.
- Under no circumstances shall potential sources of ignition be used in the searching or detection of refrigerant leaks.
- A halide torch (or any other detector using a naked flame) shall not be used.
- Electronic leak detectors may be used to detect refrigerant leaks but, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.)
- Isolate the electrical supply to the unit (power OFF), before opening the unit to check or repair electrical parts and wiring.
- Keep your fingers and clothing away from any moving parts.
- Clean up the site after you finish, remembering to check that no metal scraps or bits of wiring have been left inside the unit being serviced.
- Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used.
- Leak detection equipment shall be set at a percentage of the lower flammable limit (LFL) of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (25 % maximum) is confirmed.
- Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.
- If a leak is suspected, all naked flames shall be removed/extinguished.
- If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

When Servicing

- Contact the sales dealer or service dealer for a repair.
- Isolate the electrical supply to the unit (power OFF), before opening the unit to check or repair electrical parts and wiring.
- Keep your fingers and clothing away from any moving parts.
- Clean up the site after you finish, remembering to check that no metal chips or bits of wiring have been left inside the unit.

DANGER

- This product must not be modified or disassembled under any circumstances. Modified or disassembled unit may cause fire, electric shock or injury.
- Cleaning must not be carried out by end users. Engage authorized dealer or specialist for cleaning.
- In case of malfunction of this appliance, do not repair by yourself. Contact the sales dealer or service dealer for repair.

CAUTION

- Do not touch the air inlet or the sharp aluminum fins of the outdoor unit. You may get injured.
- Ventilate any enclosed areas when installing or testing the refrigeration system. Escaped refrigerant gas, on contact with fire or heat, can produce dangerously toxic gas.
- Confirm after installation that no refrigerant gas is leaking. If the gas comes in contact with a burning stove,gas water heater, electric room heater or other heat source, it can cause the generation of poisonous gas.

Others

- Do not touch the air inlet or the sharp aluminum fins of the outdoor unit. You may get injured.
- Do not sit or step on the unit, you may fall resulting in injury.
- Do not stick any object into the FAN CASE. You may be injured and the unit may be damaged.

Note

The English text is the original instructions. Other languages are translations of the original instructions.

Important Information regarding the Refrigerant Used

Used refrigerant

This product contains fluorinated greenhouse gases covered by the Kyoto Protocol. Do not vent gases into the atmosphere.

Refrigerant type: R410A
GWP*: value: 2088

* GWP = global warming potential

Refrigerant type: R32
GWP*: value: 675

* GWP = global warming potential

Periodical inspections for refrigerant leaks may be required depending on European or local legislation.

Please contact your local dealer for more information.

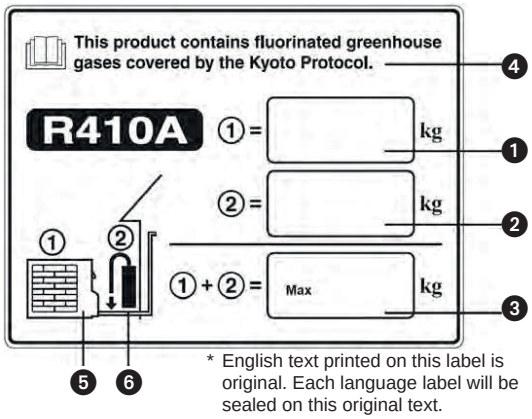
Sample label: R410A and R32 type outdoor unit

Please fill in with indelible ink,

- ① the factory refrigerant charge of the product
- ② the additional refrigerant amount charged in the field and
- ① + ② the total refrigerant charge on the refrigerant charge label supplied with the product.
- (① + ②) × ③ / 1000 CO2 equivalent in tons; multiply the total refrigerant charge by GWP value, then divided by 1000

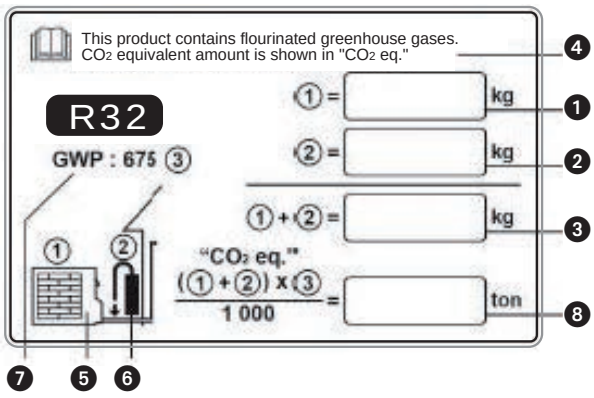
The filled out label must be adhered in the proximity of the product charging port (e.g. onto the inside of the service cover).

Label for R410A



* English text printed on this label is original. Each language label will be sealed on this original text.

Label for R32



Legend:

❶ Factory refrigerant charge of the product: see unit name plate
❷ Additional refrigerant amount charged in the field
❸ Total refrigerant charge
❹ Contains fluorinated greenhouse gases covered by the Kyoto Protocol
❺ Outdoor unit
❻ Refrigerant cylinder and manifold for charging
❼ Global Warming Potential of the refrigerant used in this product
❽ CO_2 equivalent of fluorinated greenhouse gases contained in this product

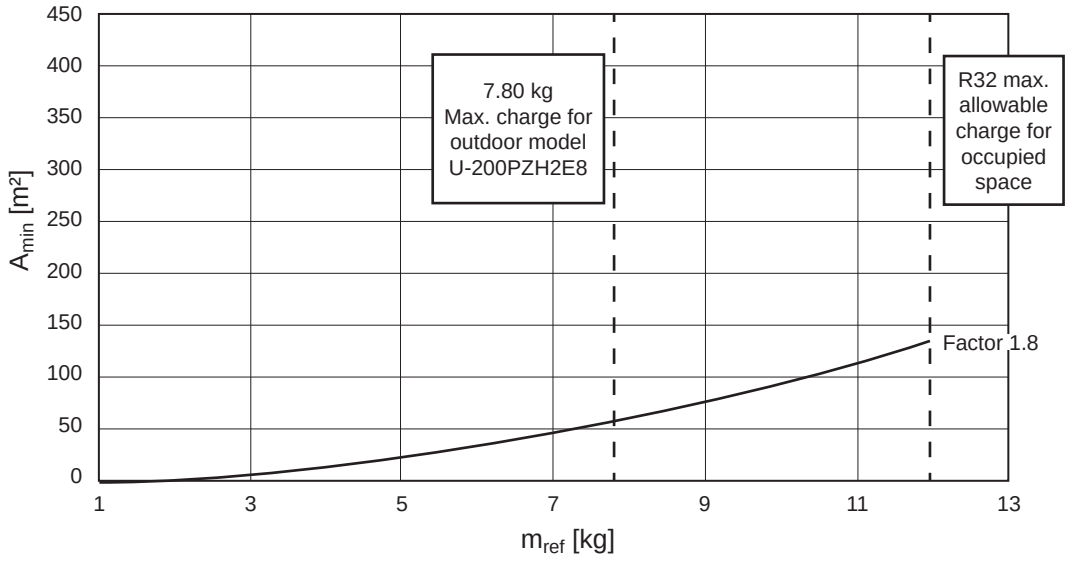
Check of Density Limit R32

■ U-200PZH2E8

The refrigerant (R32), which is used in the air conditioner, is a flammable refrigerant. So the requirements for installation space of appliance are determined according to the refrigerant charge amount [mc] used in the appliance.

The minimum indoor floor space compared with the amount of refrigerant is roughly as follows, in case it is installed in a living area with height factor 1.8:

PAW-VP380L must be calculated as wall mounted.



For R410A please refer to installation manual for outdoor unit.

Check of Density Limit R410A

Check the amount of refrigerant in the system and floor space of the room according to the legislation on refrigerant drainage. If there is no applicable legislation, follow the standards described below.

The room in which the air conditioner is to be installed requires a design that in the event of refrigerant gas leaking out, its density will not exceed a set limit.

The refrigerant (R410A), which is used in the air conditioner, is safe, without the toxicity or combustibility of ammonia, and is not restricted by laws imposed to protect the ozone layer.

However, since it contains more than air, it poses the risk of suffocation if its density should rise excessively. Suffocation from leakage of refrigerant is almost non-existent. With the recent increase in the number of high density buildings, however, the installation of multi air conditioner systems is on the increase because of the need for effective use of floor space, individual control, energy conservation by curtailing heat and carrying power, etc.

Most importantly, the multi air conditioner system is able to replenish a large amount of refrigerant compared to conventional individual air conditioners. If a single unit of the multi air conditioner system is to be installed in a small room, select a suitable model and installation procedure so that if the refrigerant accidentally leaks out, its density does not reach the limit (and in the event of an emergency, measures can be made before injury can occur).

In a room where the density may exceed the limit, create an opening with adjacent rooms, or install mechanical ventilation combined with a gas leak detection device. The density is as given below.

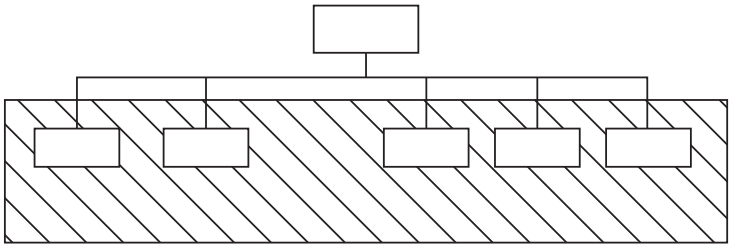
$$\frac{\text{Total amount of refrigerant (kg)}}{\text{Min. volume of the indoor unit installed room (m}^3\text{)}} \leq \text{Density limit (kg/m}^3\text{)}$$

The density limit of refrigerant which is used in multi air conditioners is 0.44 kg/m³ (ISO 5149).

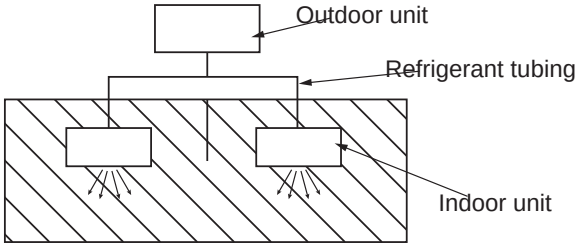
Note

1. The standards for minimum room values are as follows:

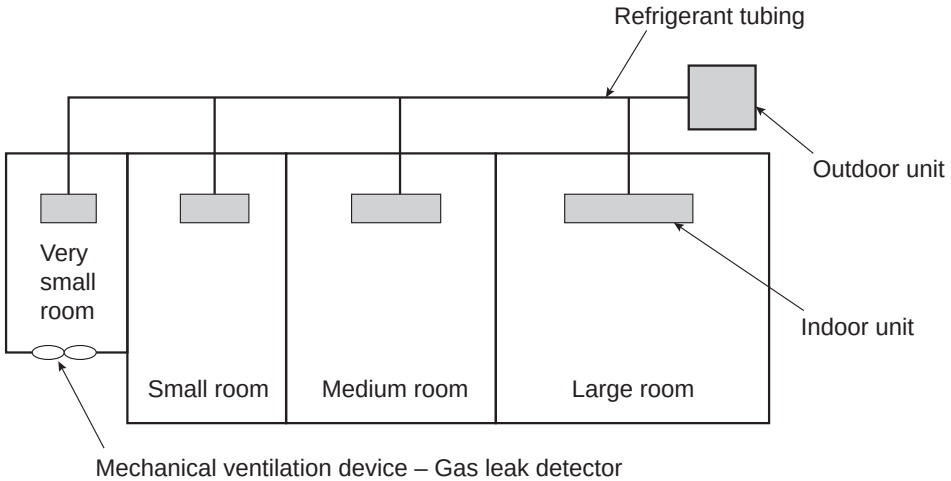
   (1) No partition (shaded portion)



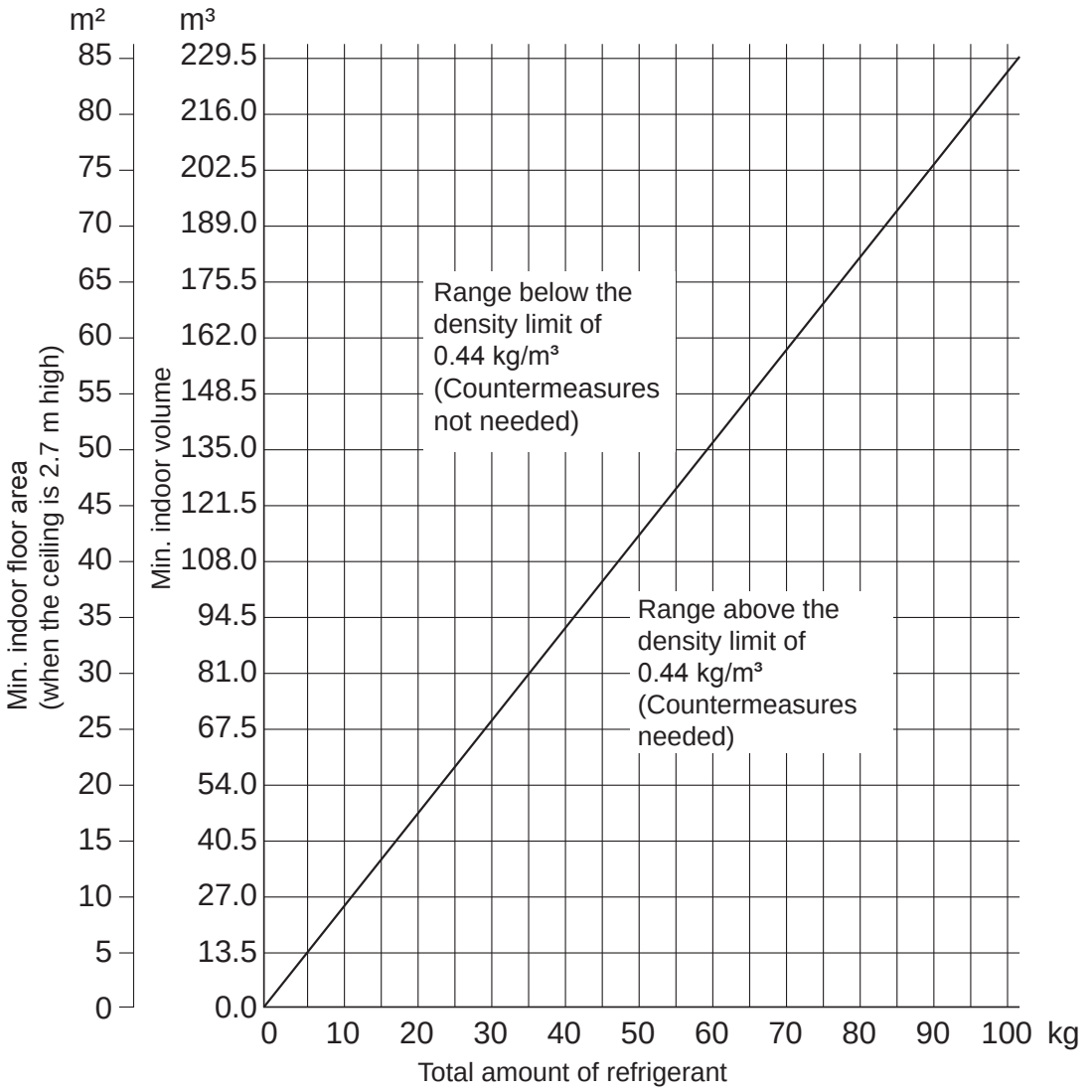
   (2) When there is an effective opening with the adjacent room for ventilation of leaking refrigerant gas (opening without a door, or an opening 0.15% or larger than the respective floor spaces at the top or bottom of the door).



   (3) If an indoor unit is installed in each partitioned room and the refrigerant tubing is interconnected, the smallest room of course becomes the object. But when mechanical ventilation is installed interlocked with a gas leakage detector in the smallest room where the density limit is exceeded, the volume of the next smallest room becomes the object.

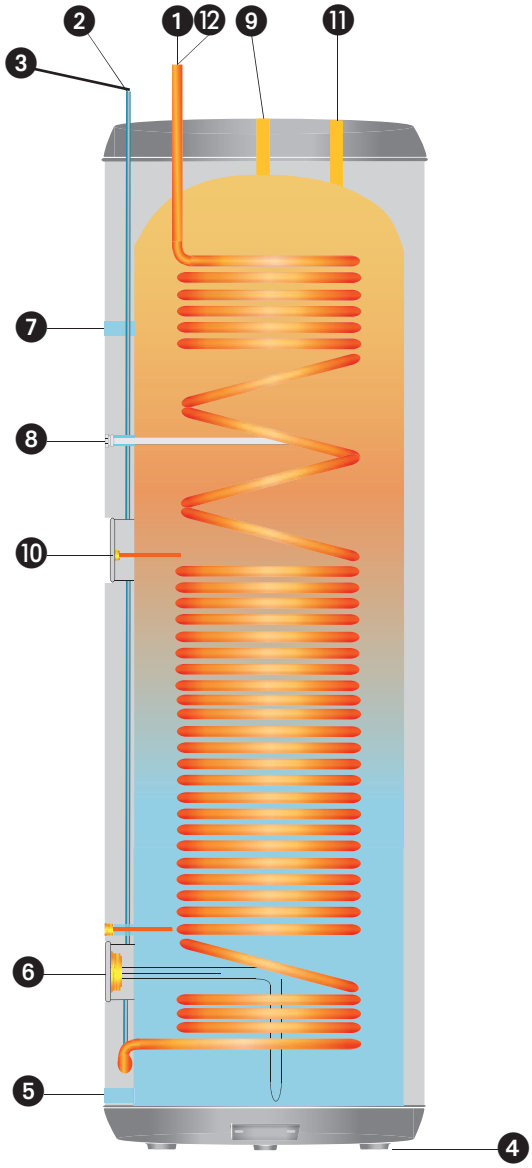


2. The minimum indoor floor space compared with the amount of refrigerant is roughly as follows: (When the ceiling is 2.7 m high)



1 Main components

1.1 Main components PAW-VP1000L / 750L

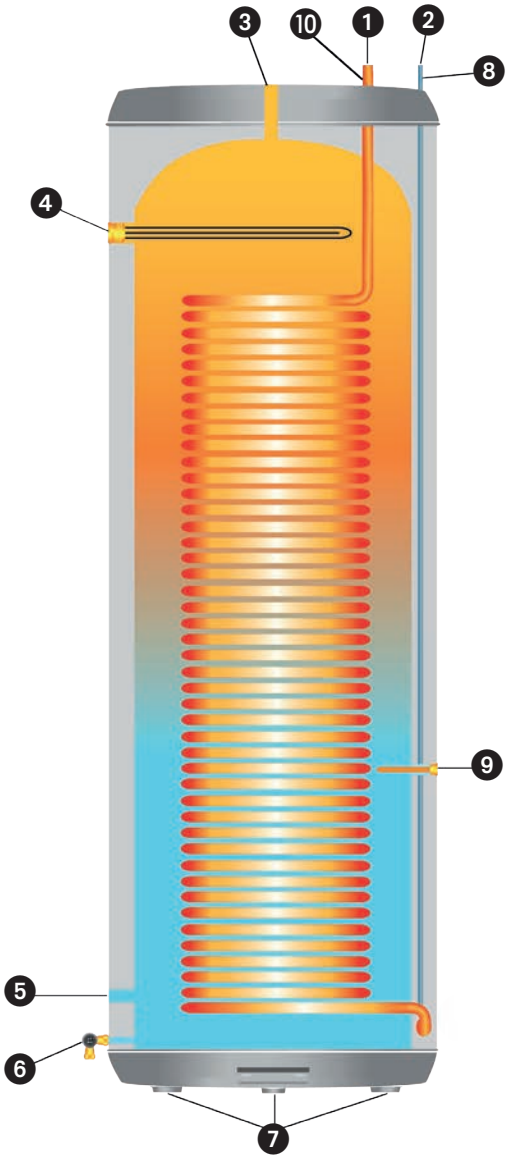


1. Turn pressure pipe 3/4"
2. Return liquid pipe 1/2"
3. E1 and E2* sensor
4. Adjustable levelling feet
5. Inlet city water 1 1/4"
6. Booster heater 6 kW
7. Return pump circulation 1/2"
8. Magnesium anode
9. Outlet DHW 1 1/4"
10. Sensor pocket TA
11. Safety valve 1"
12. Hot gas sensor E3**

* For connection with VRF systems, this is an optional part for monitoring only
** For connection with PACi systems, this is an optional part for monitoring only

1

1.2 Main components PAW-VP380L

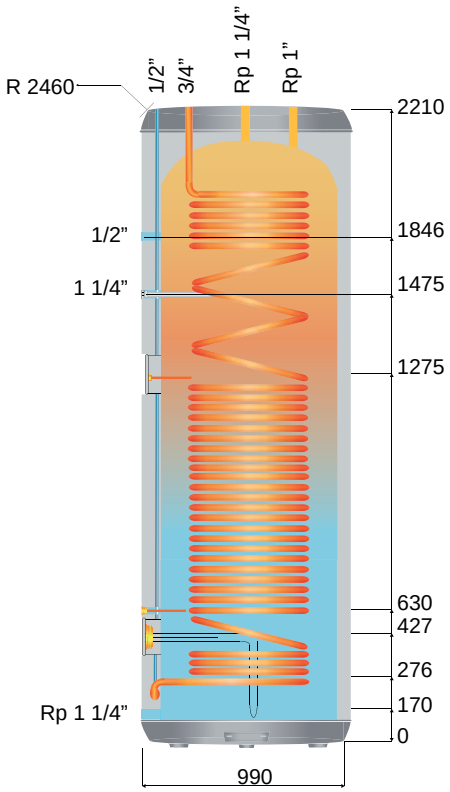


1. Turn pressure pipe 3/4"
2. Return liquid pipe 1/2"
3. Turn waterborne heating 1 1/4"
4. Booster heater 6 kW
5. Return waterborne heating
6. Safety valve 3 bar
7. Adjustable levelling feet
8. Liquid sensor E1 and E2*
9. Sensor pocket TA
10. Hot gas sensor E3**

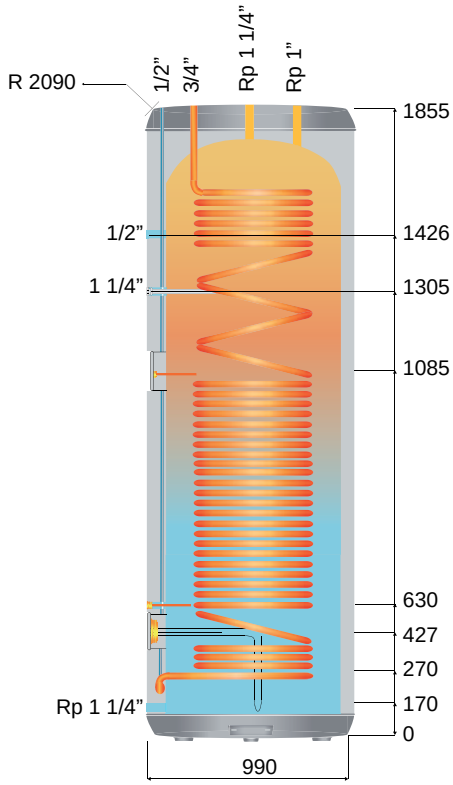
* For connection with VRF systems, this is an optional part for monitoring only
** For connection with PACi systems, this is an optional part for monitoring only

1.3 Dimensions

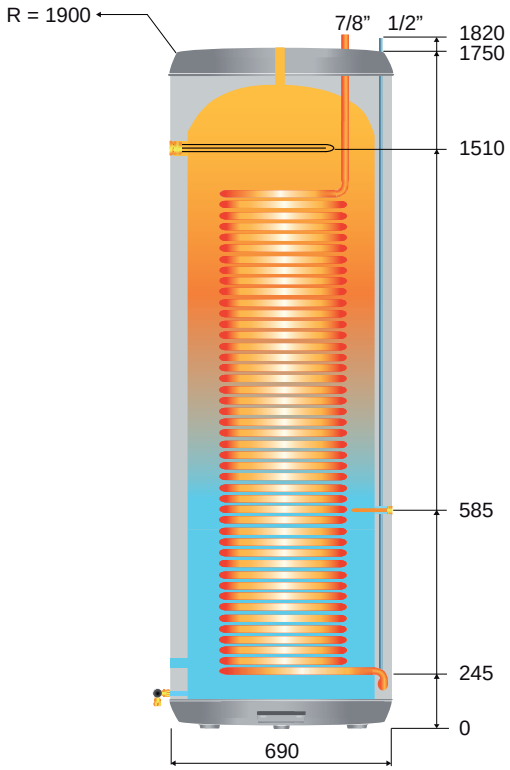
Tank model PAW-VP1000LDHW



Tank model PAW-VP750LDHW



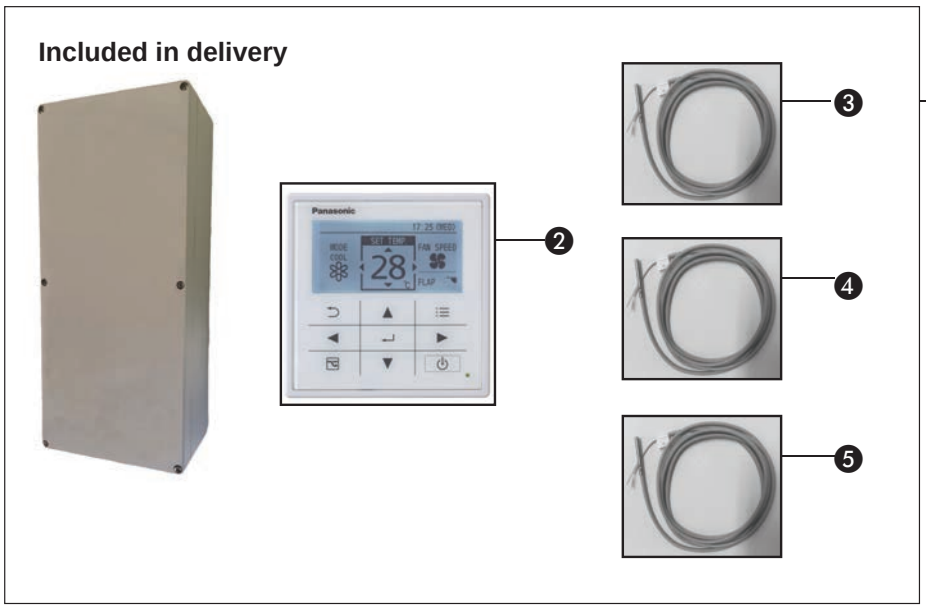
Tank model PAW-VP380L



Note:
R value indicates maximum overturning height.

All dimensions in mm.

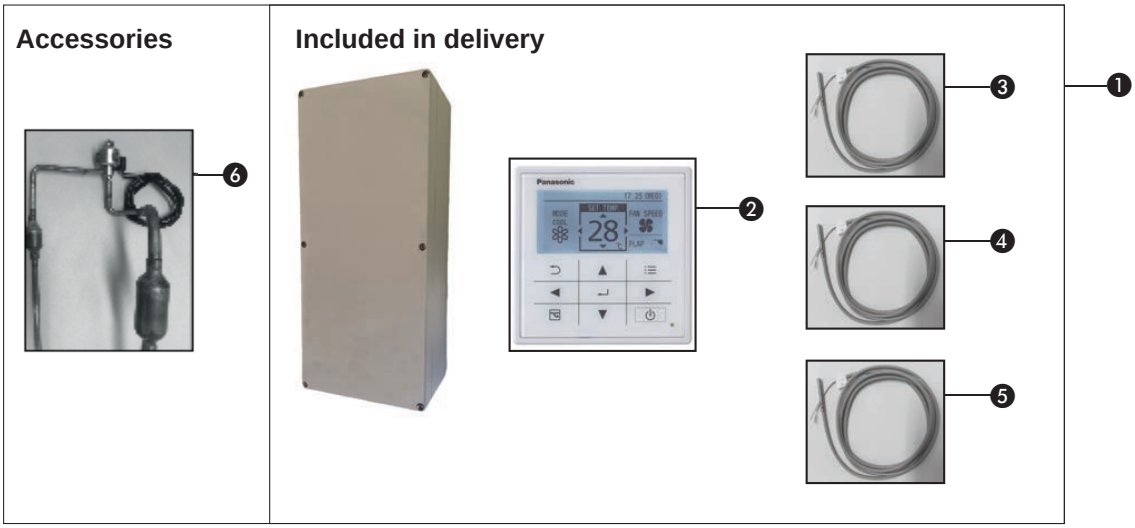
1.4 Main components PAW-VP-RTC5B-PAC



❶ PAW-VP-RTC5B-PAC*
❷ CZ-RTC5B*
❸ Temperature sensor TA*
❹ Temperature sensor E1*
❺ Temperature sensor E2*

* included in delivery

1.5 Main components PAW-VP-RTC5B-VRF



❶ PAW-VP-RTC5B-VRF*
❷ CZ-RTC5B*
❸ Temperature sensor TA*
❹ Temperature sensor E1*
❺ Temperature sensor E3*
❻ Expansion valve

* included in delivery

PAW-VP-VALV-280 (Optional part)

2 DHW Temperature layering

The water temperature distribution in the tank is not homogeneous! Due to the thermodynamic properties of the refrigerant, the water is at different temperatures across the tank volume.

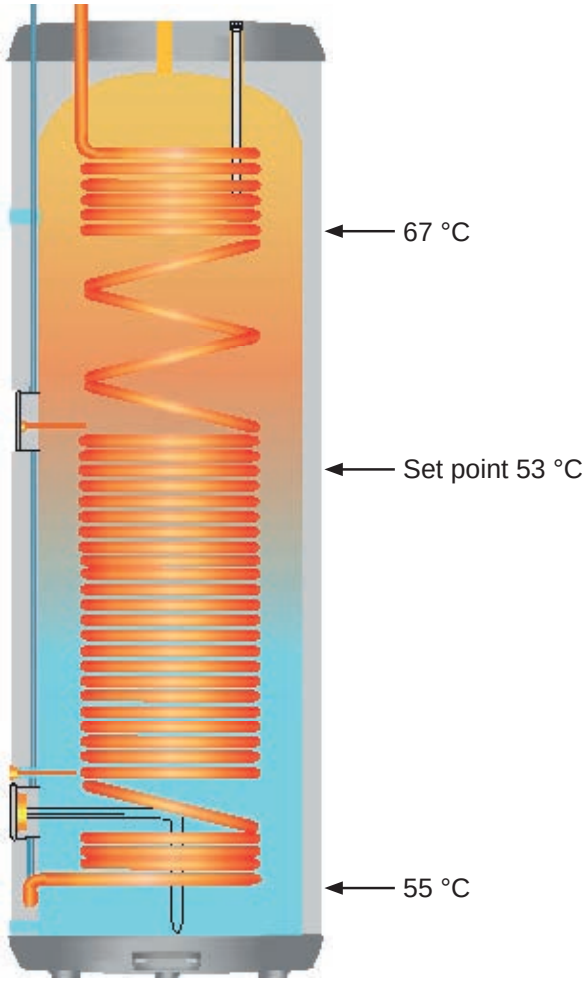
(Top: discharge gas cooling area
Middle: condensing area
Bottom subcooling area)

This is expected to result in a layering of temperatures.

See example 1000ltr DHW tank

Set point position of TA temperature sensor (ON /OFF)

Set point	Low part tank	Middle part tank	Upper part tank	Mixing temperature
46 °C	48 °C	50 °C	57 °C	52 °C
50 °C	52 °C	54 °C	60 °C	56 °C
53 °C	55 °C	57 °C	67 °C	61 °C



Set temperature X

Compressor OFF = X + 3.5 K
Compressor ON = Y (or less)

* Mixing temperature is the temperature that is reached when the water in the tank is evenly mixed. Compressor OFF without water flow.

3 Water Piping Installation

General Notes

- Please request a licensed technician to install this water circuit.
- This water circuit must comply with all relevant European and national regulations, i.e. IEC/EN 61770 European Council Directive 98/83 EC.
- Be careful not to deform the piping with excessive force when doing piping connection job.
- When connecting pipes to tank, always use brass between pipe and tank sleeve to prevent corrosion between base material.
- Choose proper sealer which can withstand the pressures and temperatures of the system. When tank is to be connected ensure the pipings are clean before water piping installation is carried out.
- Water operating pressures DHW tank (Minimum ~ Maximum): 0.05 MPa – 0.95 MPa

3.1 Tank Unit Refrigerant Piping Installation

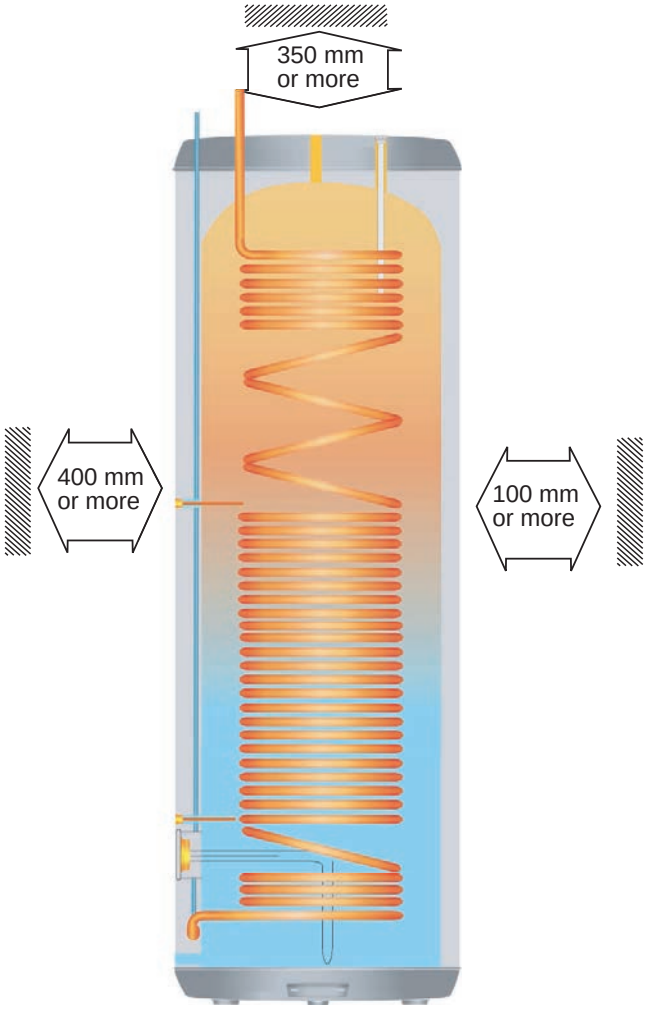
1. Please make flare after inserting flare nut (located at joint portion of tube assembly) onto the copper pipe. (In case of using long piping)
2. Do not use pipe wrench to open refrigerant piping. Flare nut may be broken and cause leakage. Use proper spanner or ring wrench.
3. Connect the piping:
   - Align the centre of piping and sufficiently tighten the flare nut with fingers.
   - Further tighten the flare nut with torque wrench in specified torque as stated in the table.

Model	Piping size (Braising tank)	
	Gas	Liquid
PAW-VP1000LDHW	3/4" [19.05 mm]	1/2" [12.7 mm]
PAW-VP750LDHW	3/4" [19.05 mm]	1/2" [12.7 mm]
PAW-VP380L	3/4" [19.05 mm]	1/2" [12.7 mm]

Nominal diameters of the junction pipes (refrigerant pipe diameter of the connecting pipe may vary). Please refer to chapter 4 for Refrigerant connecting pipes.

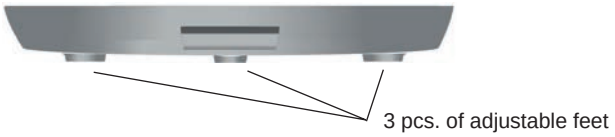
3.2 DHW Tank Unit Installation Space

The DHW tank must be within the following maintenance space.



CAUTION

► The tank level must be adjusted before the piping installation can start. Use the three adjustable feet that are located under the floor tank.



3.3 Filling Procedure

- DO NOT turn on any heat source connected to the storage tank until it is filled, it can result in catastrophic damage.
- Ensure that all installation requirements, electrical and safety, have been met.
- Check all plumbing and electrical connections are properly connected.
- Make sure that unused connections are closed with sealing plugs.
- Open the bleed valve on the set which is connected to the tank and start filling slowly.
- Let the unit fill, checking the bleeding air from the open tap; let out of the water to allow the flushing of the pipes.
- Close the bleed valve.
- Open the any water sources (e.g. taps), to eliminate residual air in the system.
- Close all the water outlets and check for water leaks in the system.
- Fill any circuits connected to the tank.
- Test manually the pressure regulating valve and the safety valves on each hydraulic circuit.

3.4 Emptying Procedure

- Isolate any electrical supplies to the heat source.
- Disconnect the water supply to the tank.
- Open a bleed valve on the set connected to the tank to allow the entry of air into the system.
- Open the discharge of the system. Please pay close attention and care with the water discharged from the system, as it could cause damage to property or persons.

3.5 Maintenance Procedure

- Check periodically (at least once a year) the smooth operation of the safety valve.
- In accumulations of DHW always install a passive cathodic protection (magnesium anode) or active (impressed current anode) and check periodically, at least twice a year, observe wear of a sacrificial magnesium anode or the presence of power supply on the anode impressed current; an anode of magnesium consumed more than 60% should be replaced.
- Inspect all water connections for leakage every year.
- Dismantle the flange with the DHW heater and clean the bottom tank internally every other year if the water quality is poor.
- Test safety thermostat and check electrical connections for DHW heater every year.
- Leak search refrigerant connections at the top of the tank for heat pump every year.
- Leak search refrigerant hose from double coil every year.
- Inspect the coil and clean it if necessary every other year.
- Test run the heat pump and check sensor info parameters.
- Check outdoor unit procedures referenced to the service manual for outdoor unit.

3.6 Warranty Conditions

The manufacturer grants a warranty only for defects in material and workmanship on the cylinders of its production under normal installation, use and maintenance of the product claimed.

The warranty is void if failure to respect the installation specifications listed above under

“RULES OF INSTALLATION AND MAINTENANCE”.

If the user or installer detects technical problems or functional product purchased, you must immediately contact the Local Retailer; it is recommended not to perform actions without the permission of the manufacturer or its dealer direct as possible tampering or repair could void the warranty.

The warranty period begins from the date shown on the delivery paperwork and evidence by a serial number printed on the label of the tank. This term shall not be extended by means of intervention, replacement under warranty.

The warranty period is shown on the label of each product. For accessories and items for the general, for which not expressly specified (hydraulic units, removable exchangers, etc.), The warranty period is of two years except for electrical and electronic devices for which the duration is one year. It is not covered by warranty accessory parts subject to natural wear such as screws, gaskets, wells, probes, anodes, thermometers, etc.

The manufacturer shall not cover any costs for any direct and/or indirect damages resulting from defects found related to removal of defective products and installation of replacement products. The persons who receive the goods are always required to verify the integrity of the product and compliance to order, any disputes must be noted on the transport document in the presence of the carrier and notified no later than eight days from receipt of goods.

4 Tubing Data and Refrigerant

4.1 Tubing data for DHW and outdoor unit combination

4.1.1 PAW-VP1000LDHW

Indoor Unit			Outdoor Unit
PAW-VP1000LDHW			U-250PE2E8A
Tubing data			
Tubing size outer diameter Refrigerant connection pipe	Liquid tube	[mm (inch.)]	Ø 9.52 (3/8)
	Gas tube	[mm (inch.)]	Ø 19.05 (3/4)
Indoor unit pipe junction	Liquid tube	[mm (inch.)]	Ø brazing 12.7 (1/2)
	Gas tube	[mm (inch.)]	Ø brazing 19.05 (3/4)
Outdoor unit pipe junction	Liquid tube	[mm (inch.)]	Ø flared connection 12.7 (1/2)
	Gas tube	[mm (inch.)]	Ø flared connection (ø19.05) (1/2)
Wall thickness of the insulation	Liquid tube	[mm]	>10
	Gas tube	[mm]	>19
Limit of tubing length (L)		[m]	30
Height differential of Indoor/ Outdoor units (H1)	Outdoor unit is placed higher	[m]	30
	Outdoor unit is placed lower	[m]	30
Attention: follow instruction			Remove 1400 g for pipe length 7.5 m
Required additional refrigerant over 7,5 meters		[g/m]	45 (>7.5m = -1400 g + 45 g/m)
Refrigerant charged at shipment R410A		[kg]	6.4

Indoor Unit			Outdoor Unit
PAW-VP1000LDHW			U-16MF3E8
Tubing data			
Tubing size outer diameter Refrigerant connection pipe between SVK and Tank	Liquid tube	[mm (inch.)]	Ø 9.52 (3/8)
	Gas tube	[mm (inch.)]	Ø19.08 (3/4)
Indoor unit pipe junction	Liquid tube	[mm (inch.)]	Ø brazing 12.7 (1/2)
	Gas tube	[mm (inch.)]	Ø brazing 19.05 (3/4)
Wall thickness of the insulation	Liquid tube	[mm]	>10
	Gas tube [mm]		>19
Limit of tubing length (L)		[m]	50
Height differential of Indoor/ Outdoor units (H1)	Outdoor unit is placed higher	[m]	30
	Outdoor unit is placed lower	[m]	30
Attention: follow instruction			*
Indoor Outdoor ratio	Indoor unit capacity not more than [%] of Outdoor capacity		130
Refrigerant charged at shipment R410A		[kg]	8.3

*The system must have extra refrigerant filling, please see installation manual for U-16MF3E8.
** Between SVK Box and Tank other charge calculation must be done according to MF3 installation manual.
Pipe connection between distribution joint and SVK box refer to installation manual.

4.1.2 PAW-VP750LDHW

Indoor Unit			Outdoor Unit
PAW-VP1000LDHW			U-250PE2E8A
Tubing data			
Tubing size outer diameter Refrigerant connection pipe	Liquid tube	[mm (inch.)]	Ø 9.52 (3/8)
	Gas tube	[mm (inch.)]	Ø 19.05 (3/4)
Indoor unit pipe junction	Liquid tube	[mm (inch.)]	Ø brazing 12.7 (1/2)
	Gas tube	[mm (inch.)]	Ø brazing 19.05 (3/4)
Outdoor unit pipe junction	Liquid tube	[mm (inch.)]	Ø flared connection 12.7 (1/2)
	Gas tube	[mm (inch.)]	Ø flared connection 19.05 (3/4)
Wall thickness of the insulation	Liquid tube	[mm]	>10
	Gas tube	[mm]	>19
Limit of tubing length (L)		[m]	30
Height differential of Indoor/ Outdoor units (H1)	Outdoor unit is placed higher	[m]	30
	Outdoor unit is placed lower	[m]	30
Attention: follow instruction			Remove 1200 g for pipe length 7.5 m
Required additional refrigerant over 7,5 meters		[g/m]	45 (>7.5m = -1200 g + 45 g/m)
Refrigerant charged at shipment R410A		[kg]	6.4

Indoor Unit			Outdoor Unit
PAW-VP750LDHW			U-16MF3E8
Tubing data			
Tubing size outer diameter Refrigerant connection pipe between SVK and Tank	Liquid tube	[mm (inch.)]	Ø 9.52 (3/8)
	Gas tube	[mm (inch.)]	Ø19.08 (3/4)
Indoor unit pipe junction	Liquid tube	[mm (inch.)]	Ø brazing 12.7 (1/2)
	Gas tube	[mm (inch.)]	Ø brazing 19.05 (3/4)
Wall thickness of the insulation	Liquid tube	[mm]	>10
	Gas tube [mm]		>19
Limit of tubing length (L)		[m]	50
Height differential of Indoor/ Outdoor units (H1)	Outdoor unit is placed higher	[m]	30
	Outdoor unit is placed lower	[m]	30
Attention: follow instruction			*
Indoor Outdoor ratio	Indoor unit capacity not more than [%] of Outdoor capacity		130
Required additional refrigerant over 7,5 meters		[g/m]	56
Refrigerant charged at shipment R410A		[kg]	8.3

*The system must have extra refrigerant filling, please see installation manual for U-16MF3E8.
** Between SVK Box and Tank other charge calculation must be done according to MF3 installation manual.

4.2 Tubing data for cooling and heating tank

4.2.1 PAW-VP380L

Indoor Unit			Outdoor Unit
PAW-VP380L			U-200PE2E8A
Tubing data			
Tubing size outer diameter Refrigerant connection pipe	Liquid tube	[mm (inch.)]	Ø 9.52 (3/8)
	Gas tube	[mm (inch.)]	Ø 22.22 (7/8)
Indoor unit pipe junction	Liquid tube	[mm (inch.)]	Ø brazing 12.7 (1/2)
	Gas tube	[mm (inch.)]	Ø brazing 19.05 (3/4)
Outdoor unit pipe junction	Liquid tube	[mm (inch.)]	Ø flared connection 12.7 (1/2)
	Gas tube	[mm (inch.)]	Ø flared connection 19.05 (3/4)
Wall thickness of the insulation	Liquid tube	[mm]	>10
	Gas tube	[mm]	>19
Limit of tubing length (L)		[m]	30
Height differential of Indoor/ Outdoor units (H1)	Outdoor unit is placed higher	[m]	30
	Outdoor unit is placed lower	[m]	30
Systems must be pre-charged with refrigerant		[kg]	1
Required additional refrigerant over 7,5 meters		[g/m]	45
Refrigerant charged at shipment R410A		[kg]	4.2

4.3 Calculation of the refrigerant charge

How to calculate refrigerant charge

Example 1:

Indoor Unit:		PAW-VP1000LDHW
Outdoor unit:		U-250PE2E8A
Pre charge	[kg]	6.4
Total pipe length (one way):	[m]	20
Attention: follow instruction	[g]	Remove 1400 g for pipe length 7.5 m
Required additional refrigerant over 7,5 meters	[g]	45

How to calculate:

1. Total pipe length 20 m; remove length 7.5 m
2. Calculation of correction pipe length: 20 m – 7.5 m = 12.5 m
3. Refrigerant amount:
   a. Pipe length refrigerant amount: 12.5 m * 45 g/m = 562.5 g
   b. Remove for pipe length up to 7.5 m: = 1400 g
   c. Refrigerant amount to remove: 1400 g – 562.5 g = 837.5 g

The refrigerant amount to remove is **837 g**.

Example 2:

Indoor Unit:		PAW-VP1000LDHW
Outdoor unit:		U-250PE2E8A
Pre charge	[kg]	6.4
Total pipe length (one way):	[m]	5
Attention: follow instruction	[g]	Remove 1400 g for pipe length 7.5 m
Required additional refrigerant over 7,5 meters	[g]	45

How to calculate:

1. Total pipe length 5 m; remove length 7.5 m
2. Remove for pipe length up to 7.5 m: = **-1400 g**

If total pipe length less than 7.5 m the refrigerant charge is good after correction, no need to make calculation. Minimum pipe length is 5 m.

4.4 Temperature loss by refrigerant pipe length

Use suitable insulation: For outdoor use, make sure it is weatherproof, UV-resistant and protected against damage. The thicker the insulation, the lower the heat loss.

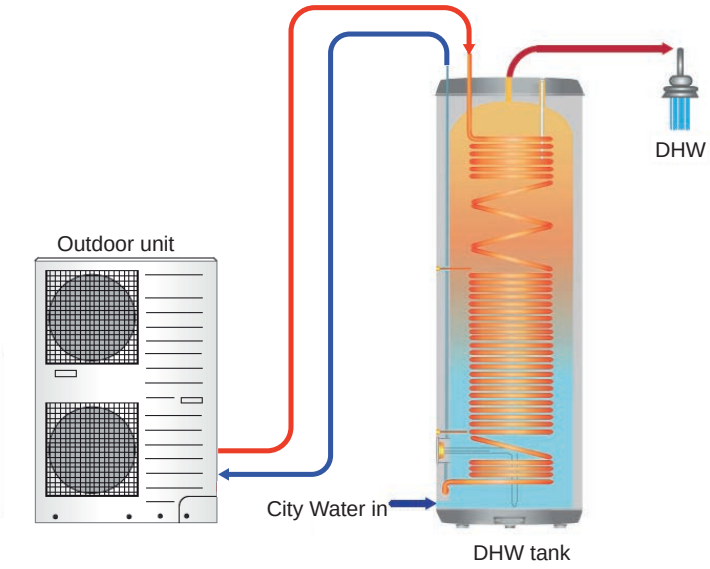
Wall thickness of the insulation Liquid tube > 10 mm; Gas tube > 19 mm

If the discharge pipe is well insulated between the heat pump and the tank, the heat loss is approximately 0.2 ˚C per meter (one way).

5 System drawings

5.1 System PACi DHW

Standard system 1:1
without water circulation



Standard system 1:1
with water circulation pipe*

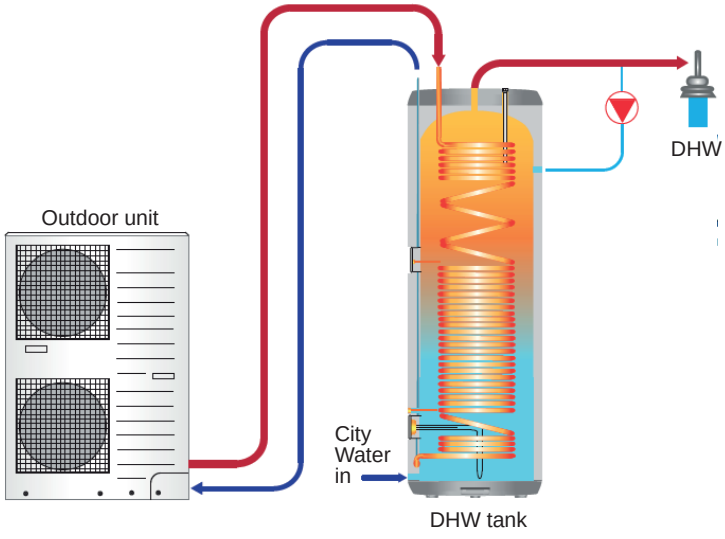
External Pump control example:

Water flow:
Qmin = 1 ltr./minute

Water pump operation schedule:

At night: ON 15 min
OFF 80 min

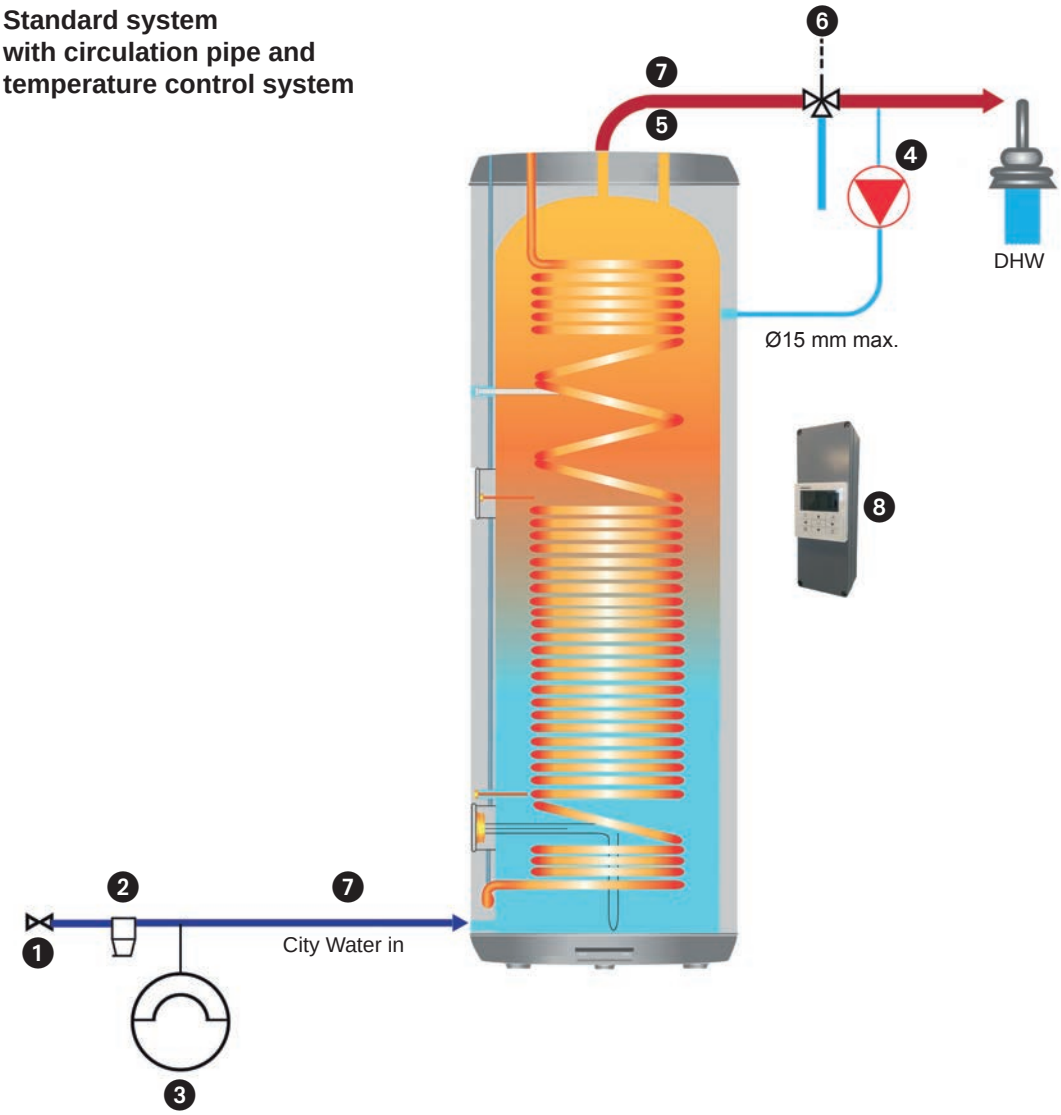
Through the day:
ON 15 min
OFF 40 min



For a hotel or apartment complex where the last room is more than 30 meters away from the DHW tank, a water pump (for example type Grundfos comfort UP 15-14 BA PM) should be installed in order to obtain hot water quickly.
Remember to install a return pipe pump circulation of maximum Ø15 mm and make sure that supply and return pipes are well insulated for minimal heat loss.

5.2 System PACi/ECOi DHW

■ **Standard system with circulation pipe and temperature control system**



(Field supplied) accessories

❶ Pressure control valve if inlet city water is more than 6 bar (field supplied)*

❷ Strainer (field supplied)*

❸ Expansion tank if check valve or pressure control valve is mounted (field supplied)

❹ Circulation water pump (e.g. Grundfos comfort UP 15–14 BA PM, field supplied)

❺ Safety valve 6 or 9.5 bar (field supplied)**

❻ Temperature control valve (field supplied)

❼ Water pipe inlet/outlet VP1000L/750 (35 mm) VP500L/200 (22 mm)

❽ PAW-VP-RTC5B-PAC/VRF controller

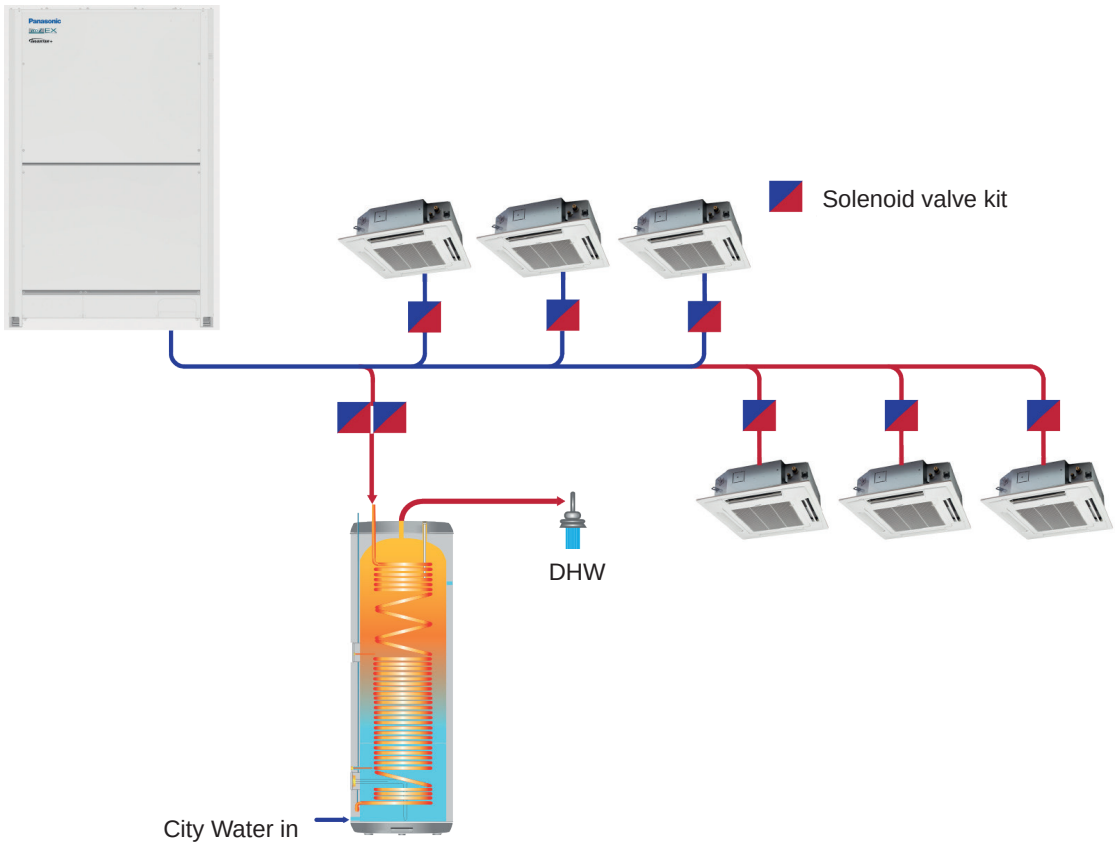
For a hotel or apartment complex where the last room is more than 30 meters away from the DHW tank, a water pump (for example type Grundfos comfort UP 15-14 BA PM) should be installed in order to obtain hot water quickly.

Remember to install a return pipe for pump circulation of maximum Ø15 mm and make sure that supply and return pipes are well insulated for minimal heat loss.

* This is supplied in UK as part of optional accessory (PAW-G3KITL).

** For models PAW-750LDHW-1 and PAW-1000LDHW-1. The pressure temperature relief valve is factory fitted as standard.

5.3 3 Way-Mixed-System with DHW tank and indoor units



Solenoid valve kit 1 Port: 2 x CZ-P160HR3

Two kits are required for:
PAW-VP1000LDHW or PAW-VP750LDHW
Accessories must be ordered separately!

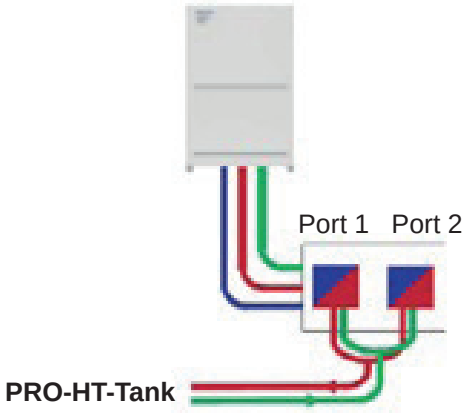
Solenoid valve kit 4 Port: CZ-P4160HR3

Two ports are required for:
PAW-VP1000LDHW or PAW-VP750LDHW
Accessories must be ordered separately!

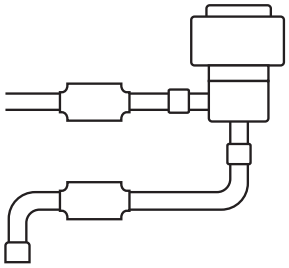
Continued on the next page

The solenoid valve kit must be connected to the joints provided for this purpose. (Accessories)
The main line must be dimensioned as detailed in section 4; Tubing Data and Refrigerant.

ATTENTION:
Always position the solenoid valve kit as close as possible to the outdoor unit and use the first two branches.



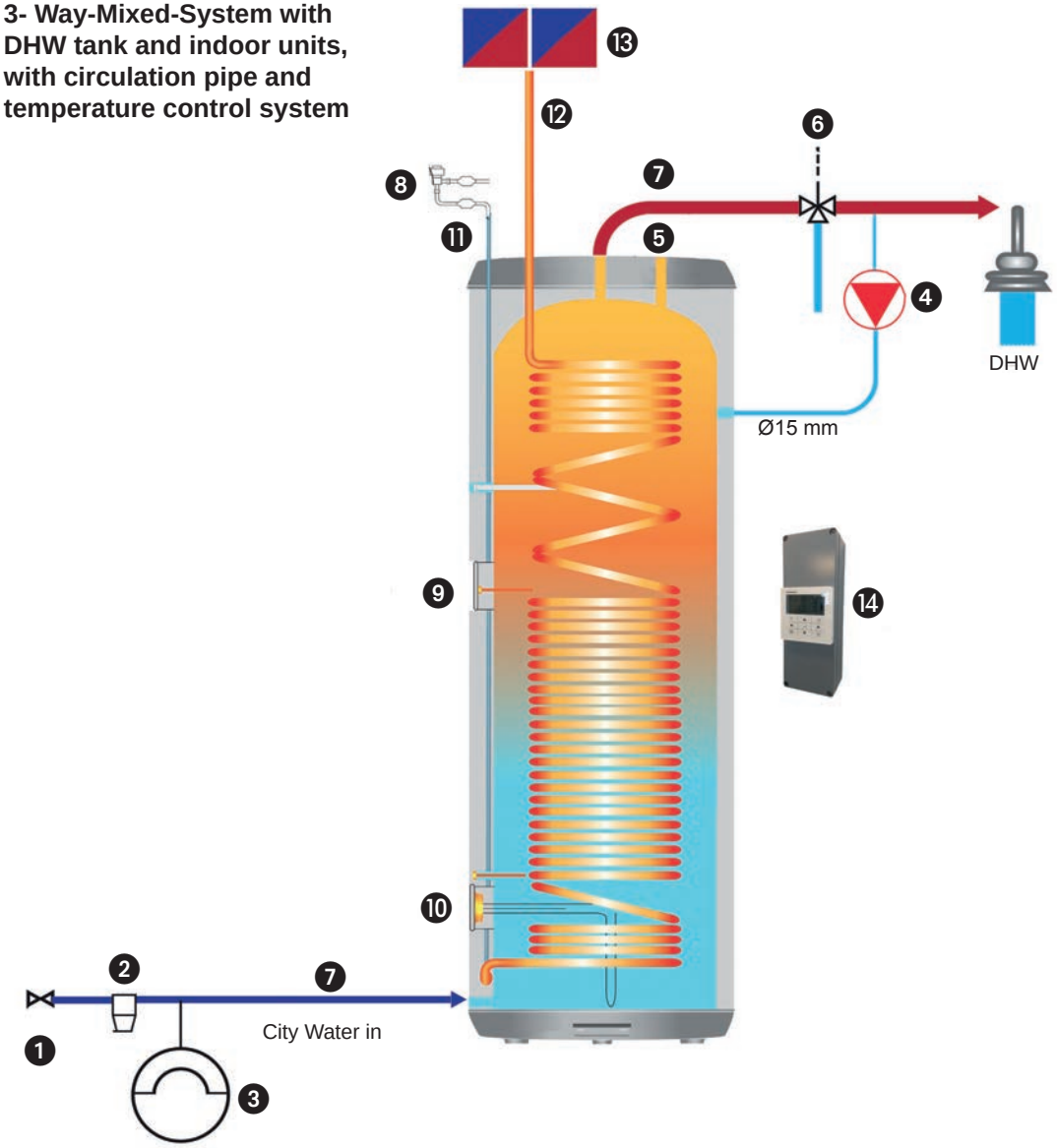
External expansion valve
PAW-VP-VALV-280
Required for:
PAW-VP1000LDHW or PAW-VP750LDHW
Accessories must be ordered separately!



The discharge pipe must be kept as short as possible, max 50 m to the DHW tank and connected at the first branch of the outdoor unit.
The pressure pipe from the MF3 to the DHW tank must be insulated with the correct insulation.
Use only insulation that fulfils installation condition.
Recommended insulation: Glass wool pipe insulation with aluminum foil with a minimum thickness of 20 mm.

5.4 System U-16MF3E8 with DHW

■ **3- Way-Mixed-System with DHW tank and indoor units, with circulation pipe and temperature control system**



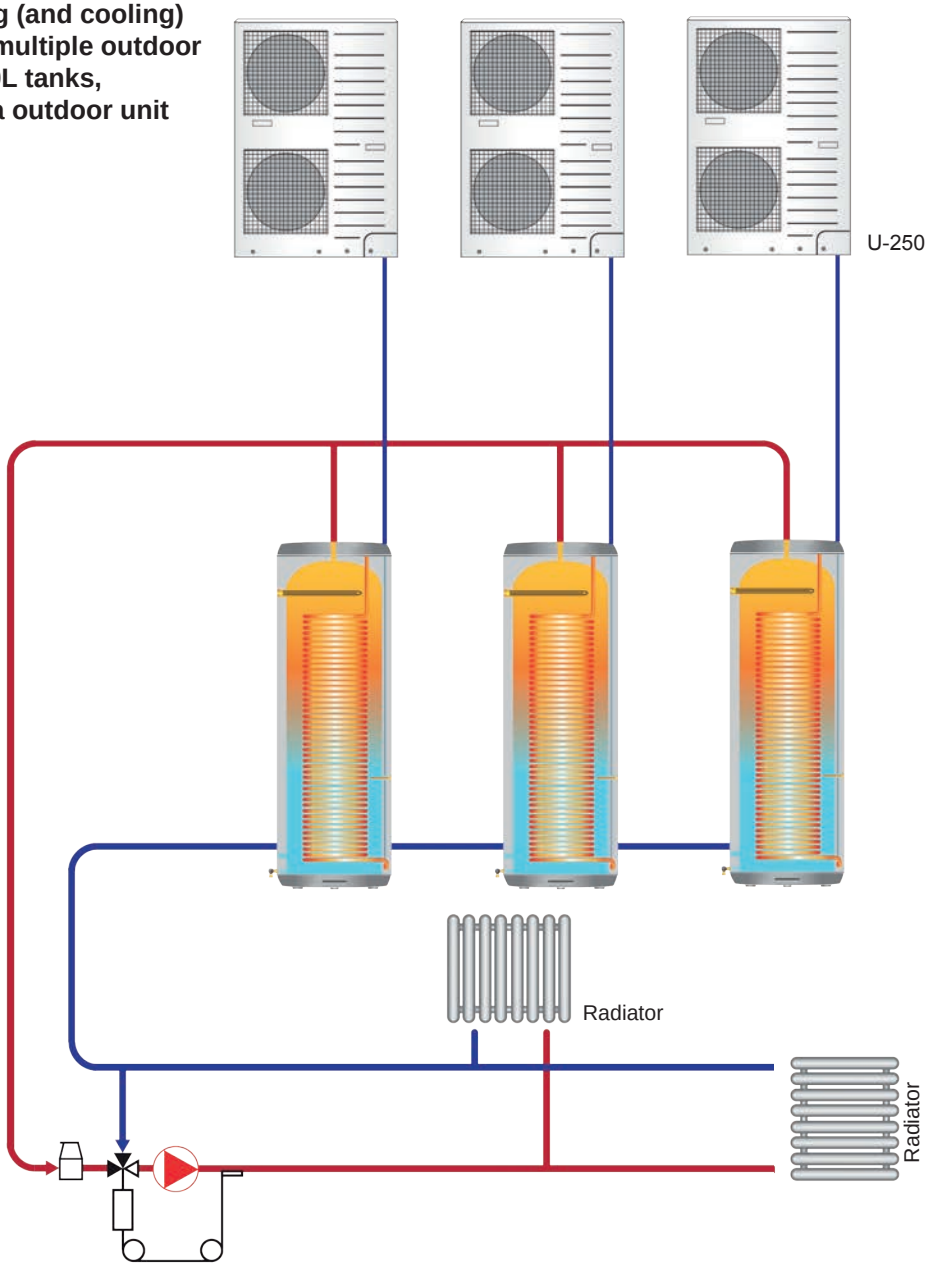
(Field supplied) accessories

❶ Pressure control valve if inlet city water is more then 6 bar (field supplied)
❷ Strainer (field supplied)*
❸ Expansion tank if check valve or pressure control valve is mounted (field supplied)*
❹ Circulation water pump (e.g. Grundfos comfort UP 15–14 BA PM, field supplied), if needed
❺ Safety valve 6 or 9.5 bar (field supplied)**
❻ Temperature control valve (field supplied)
❼ Water pipe inlet/outlet VP1000L/750 (35 mm)
❽ Expansion valve PAW-VP-VALV-280 (optional accessory)
❾ TA sensor
❿ E2 sensor
⓫ E1 sensor
⓬ E3 sensor
⓭ Solenoid valve kit (optional accessory)
⓮ PAW-VP-RTC5B-VRF controller, CZ-CAPE2 for solenoid valve kit

* This is supplied in UK as part of optional accessory (PAW-G3KITL)
** For models PAW-750LDHW-1 and PAW-1000LDHW-1. The pressure temperature relief valve is factory fitted as standard

5.5 System PACi and PAW-VP380L

■ **Room heating (and cooling) system with multiple outdoor units and 380L tanks, controlled via outdoor unit**



This system solution has no limitations on capacity or functionality. To increase capacity, increase the number of PAW-VP380L tanks.

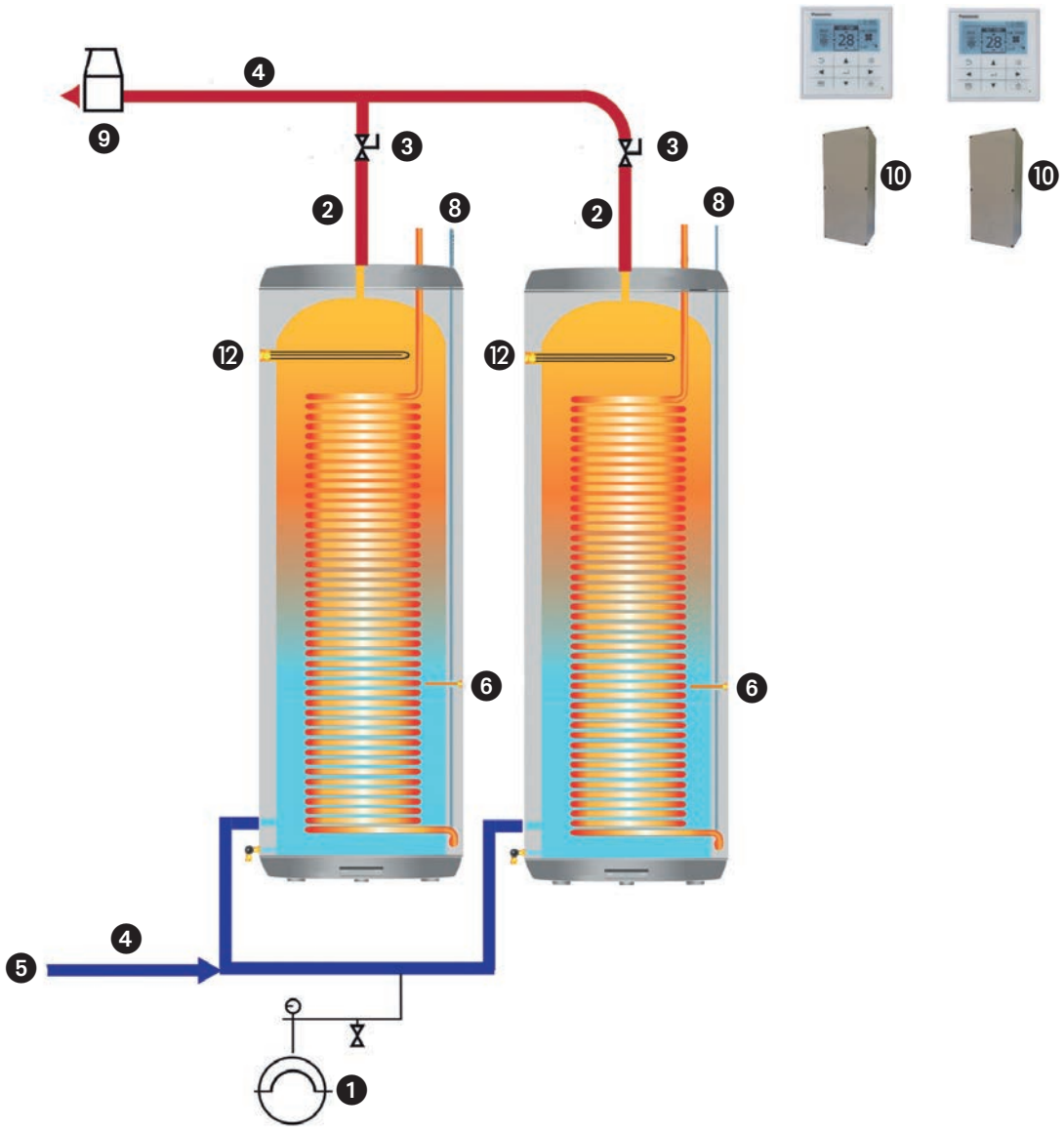
The system solution can be used for heating and cooling.

Remember to always install pressure balancing valve for outlet water for equal water flow. Water circulation can be increased or decreased for the desired temperature difference between turn and return water flow.

One controller PAW-VP-RTC5B-PAC for each tank is needed when using PACi.

5.6 System PACi and PAW-VP380L Cooling/Heating

■ **Room heating (and cooling) system with multiple outdoor units and 380L tanks**



(Field supplied) accessories

❶ Expansion tank (field supplied)
❷ Water pipe return/turn tank 35 mm (field supplied)
❸ TA valve control valve water flow DN35 (field supplied)
❹ Water pipe main return/turn 52 mm (field supplied)
❺ Max water flow 8000 L/h
❻ TA sensor
❽ E1 sensor
❽ E2 sensor
❾ Air separator (field supplied)
❿ PAW-VP-RTC5B-PAC controller
⓫ (Fig not shown) Immersion heater kit 6 kW 230/400 V single or 3 phase version (accessory sold separately)
⓬ Magnesium anode

6 Electrical Wiring

6.1 General Precautions on Wiring

1. Before wiring, confirm the rated voltage of the unit as shown on its nameplate, then carry out the wiring closely following the wiring diagram.
2. A power supply should be provided exclusively for each unit, complete with circuit breaker and over current protection.
3. To prevent possible hazards from insulation failure, the unit must be grounded.
4. Each wiring connection must be done in accordance with the wiring system diagram. Incorrect wiring may cause the unit to misoperate or become damaged.
5. Do not allow wiring to touch the refrigerant tubing, compressor, or any moving parts of the fan.
6. Unauthorized changes in the internal wiring can be very dangerous. The manufacturer will accept no responsibility for any damage or misoperation that occurs as a result of such unauthorized changes.
7. Regulations on wire diameters differ from locality to locality. For field wiring rules, please refer to your LOCAL ELECTRICAL CODES before commencing wiring. You must ensure that installation complies with all relevant rules and regulations.
8. To prevent malfunction of the Air-to-Water caused by electrical noise, care must be taken when wiring as follows:
   - The remote control wiring and the inter-unit control wiring should be wired apart from the inter-unit power wiring.
   - Use shielded wires for inter-unit control wiring between units and ground the shield at both ends.
   - Use shielded wires for remote control wiring between units and ground the shield on indoor unit side.
9. If the power supply cable of this appliance is damaged it must be replaced by a service agent appointed by the manufacturer (special-purpose tools are required).

Important

For all electrical connection data for the outdoor unit, so as power consumption and selection of fuse, please refer to the corresponding Outdoor Unit Installation Manual.

6.2 Recommended Wire Diameter

Power supply wiring

(B) Power supply cable control box			
Model name	Power supply	Minimum power supply cables L1/N/PE	Circuit breaker (minimum capacity)
CZ-RTC5B	Single phase 220/230/240 V	0.75 mm^2	2 A

Power supply cable backup heater			
Model name	Power supply	Minimum power supply cables L1/N/PE	Circuit breaker (minimum capacity)
PAW-VP750LDHW	3-phases 380/400/420 V	2.5 mm^2	16 A
PAW-VP1000LDHW	3-phases 380/400/420 V	2.5 mm^2	16 A
PAW-VP380L	3-phases 380/400/420 V	2.5 mm^2	16 A

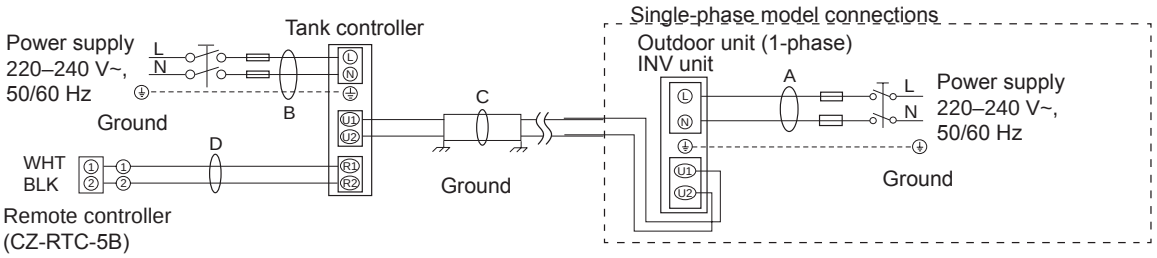
Control wiring

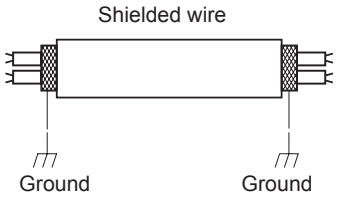
(B) Inter-unit (between outdoor and indoor units) control wiring	
Control wiring U1 U2	Length (m)
0.75 mm^2 (AWG #18) Use shielded wiring*2	Max. 100

Note

Please observe the legal regulations.

Wiring system diagram





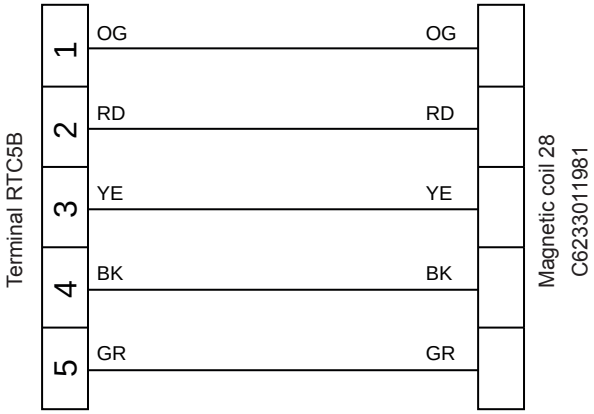
This equipment must be properly earthed.

1. Use shielded wires for inter-unit control wiring (C) and ground the shield on both ends, otherwise misoperation from noise may occur. Connect wiring as shown in figure before.
2. Connecting cable between indoor unit and outdoor unit shall be approved poly-chloroprene sheathed 5 or 1.5 mm² flexible cord. Type designation 60245 IEC57 (H05RN-F, GP85PCP etc.) or heavier cord.
3. Use the standard power supply cables for Europe (such as H05RN-F or H07RN-F which conform to CENELEC (HAR) rating specifications) or use the cables based on IEC standard. (60245 IEC57, 60245 IEC66)

6.3 Indoor unit Electric Wiring Diagrams

6.3.1 Wiring system diagram for EX valve magnetic coil

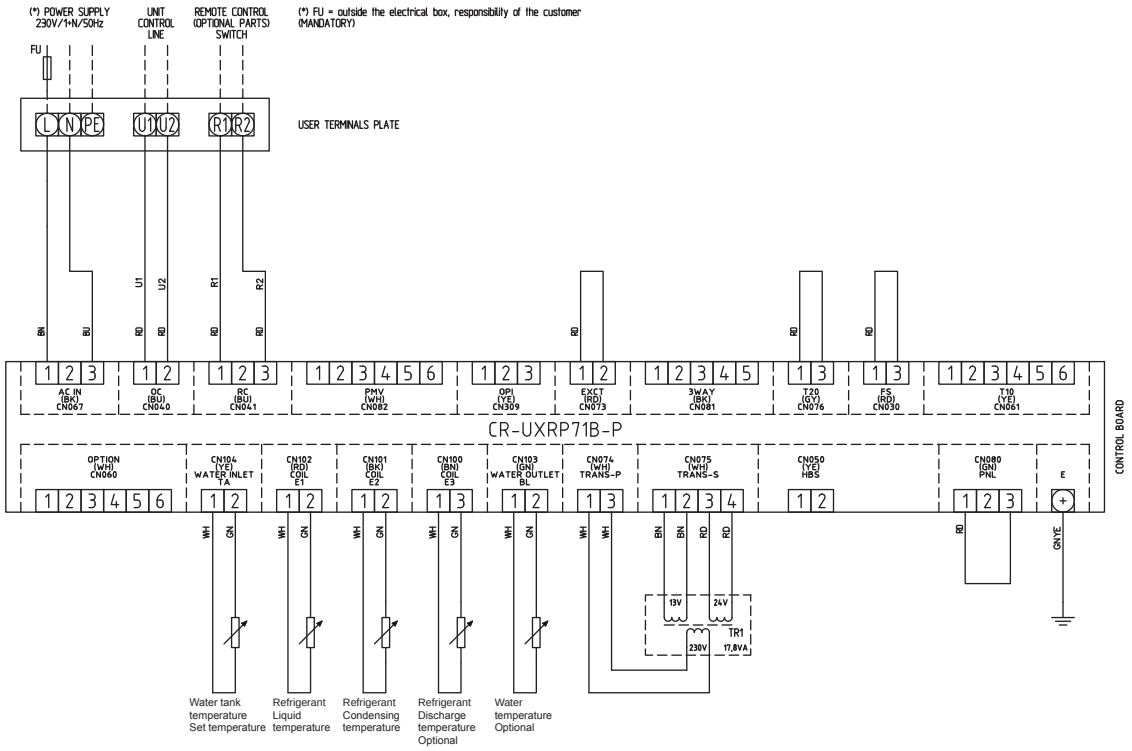
PAW-VP-VALV-280



6

6.3.2 Wiring system diagram PACi

PACi PZ2 /PZH2 **PACi R32**

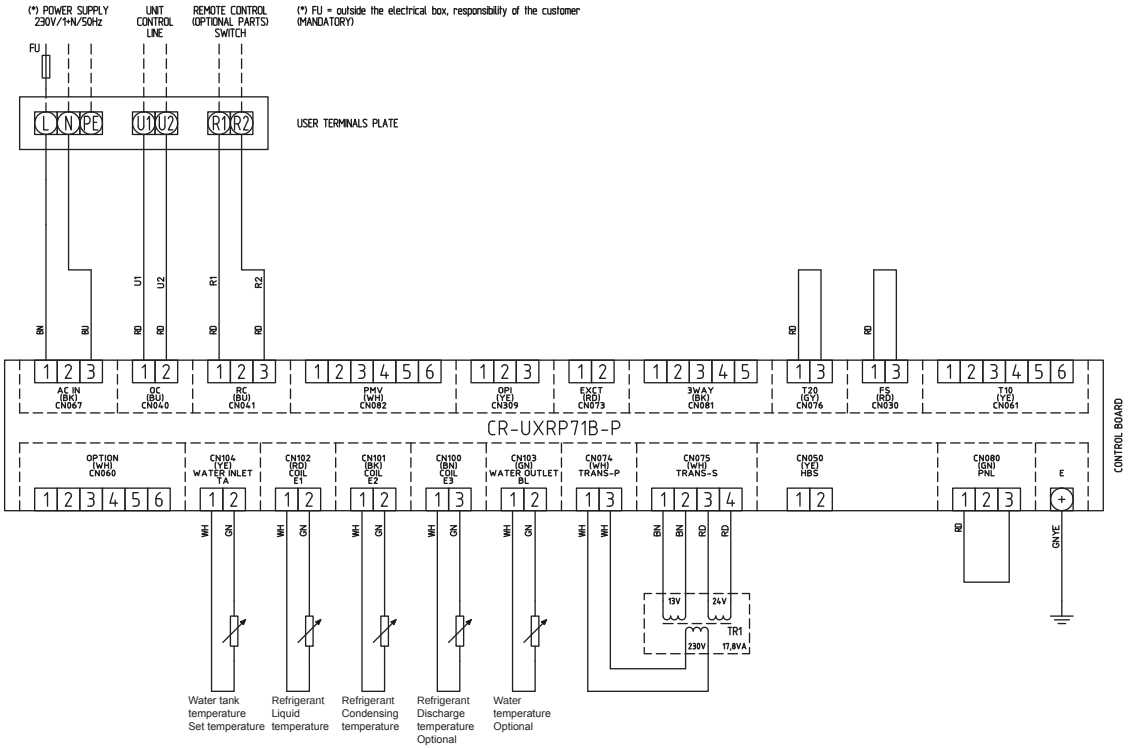


Item	Description	Position
TA	Set temperature thermistor	Middle Tank
E1	Liquid temperature thermistor	Heat exchanger outlet (heating mode)
E2	Condensing temperature thermistor	Heat exchanger outlet (heating mode)
E3*	Discharge temperature thermistor	Heat exchanger inlet (heating mode)
BL*	Water temperature	Water outlet or water inlet

* Optional to be purchased separately (for monitoring only)

Wiring system diagram PACi (cont.)

PACi PE2 /PE1 /PEY PACi R410A

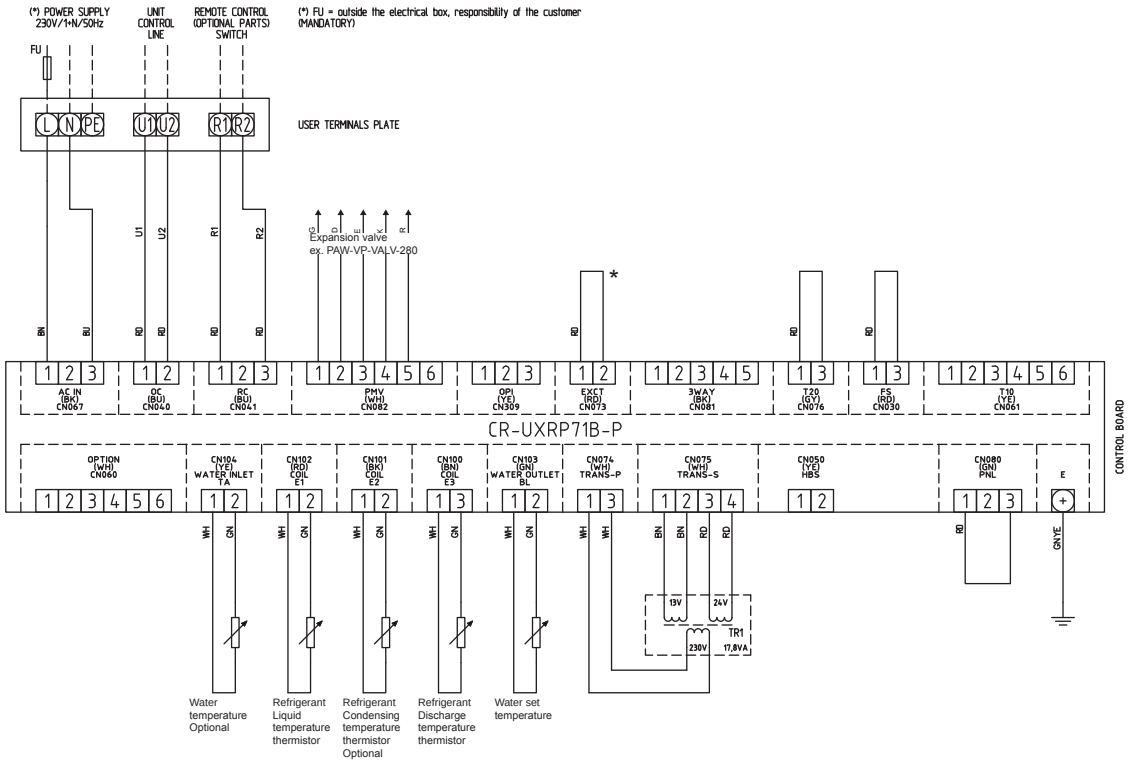


Item	Description	Position
TA	Set temperature thermistor	Middle Tank
E1	Liquid temperature thermistor	Heat exchanger outlet (heating mode)
E2	Condensing temperature thermistor	Heat exchanger outlet (heating mode)
E3*	Discharge temperature thermistor	Heat exchanger inlet (heating mode)
BL*	Water temperature	Water outlet or water inlet

* Optional to be purchased separately (for monitoring only)

6.3.3 Wiring system diagram ECOi

MF3



* Please check, if the EXCT jumper is plugged in correctly.

Item	Description	Position
TA*	Water temperature	Water inlet
E1	Liquid temperature thermistor	Heat exchanger outlet (heating mode)
E2*	Condensing temperature thermistor	Heat exchanger outlet (heating mode)
E3	Discharge temperature thermistor	Heat exchanger inlet (heating mode)
BL	Set temperature thermistor	Middle Tank

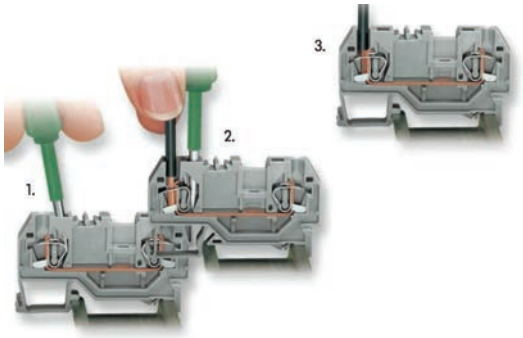
* Optional to be purchased separately (for monitoring only)

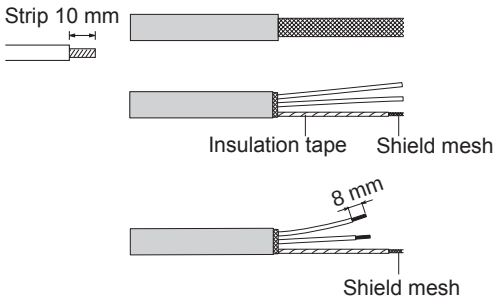
Note (MF3 only):

The SVK box (for 3 way system) need to be added.

6.4 How to connect electrical wires and sensors

6.4.1 How to connect wiring to the terminal





Proceed as follows:

1. A screwdriver is inserted with a rocking motion to the stop.
2. The screwdriver is captivated, holding the CAGE CLAMP open, while the wire is inserted.
3. The screwdriver is withdrawn and the wire is automatically secured.

6.4.2 How to connect temp sensors TA, E1, E2, E3 to the tank system

■ Terminal PAW-VP-RTC5B-PAC

Note

Remember that the E2 sensor is required.

Important

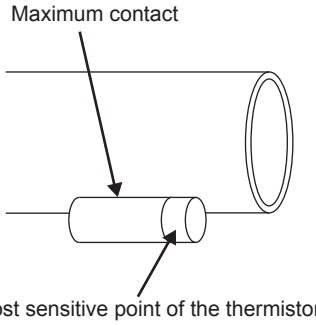
When using PAW-VP-RTC5B-PAC together with DHW tank remove jumper for E2-E2 and connect the sensor E2.

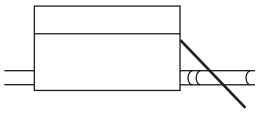
■ Terminal PAW-VP-RTC5B-VRF

Important

When using PAW-VP-RTC5B-VRF together with ECOi MF3 DHW tank and air to air indoor unit remember to install adapter CZ-CAPE2 for solenoid valve kit.

6.4.3 How to mount the E1, E2 and E3 sensors on the pipes

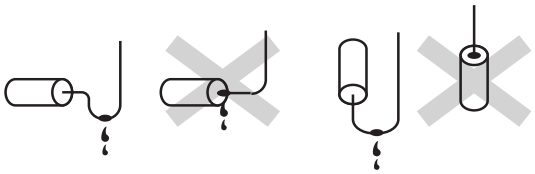




Cover the thermistor and the pipe with aluminum tape, then the aluminum tape with thermal insulation.

Installation of temperature sensors

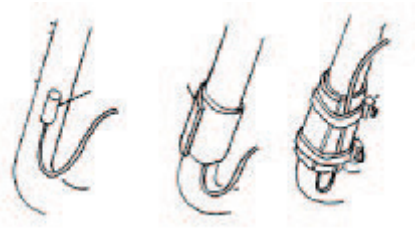
To prevent condensation entering the terminals on the electrical lines, the following must be observed. Install them with a downwards running U-shaped loop.



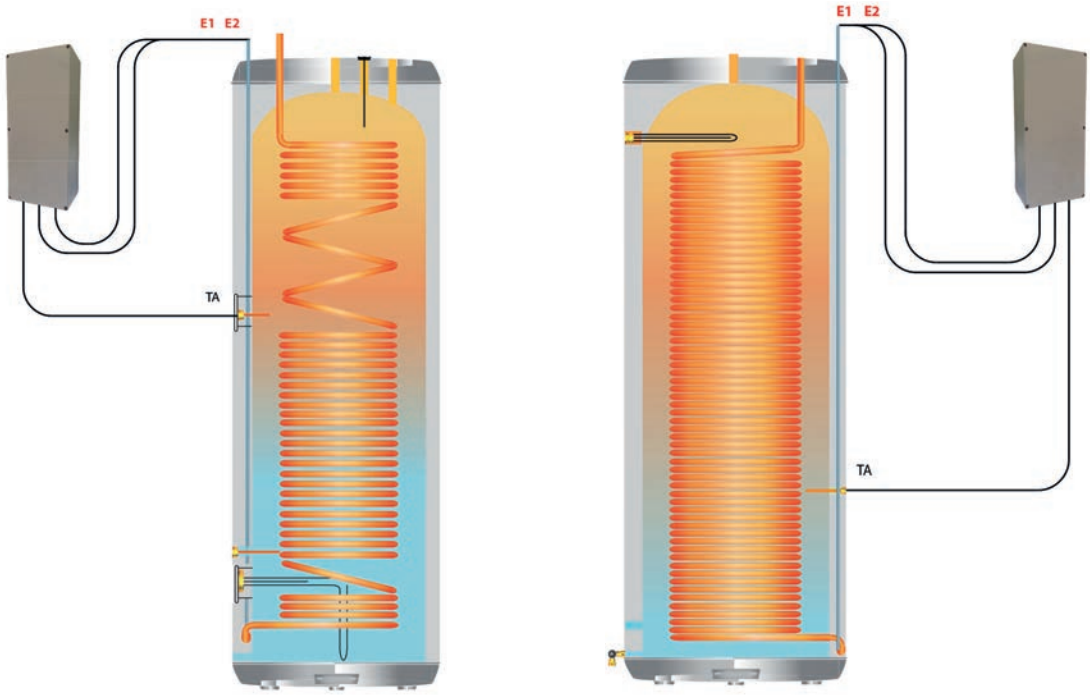
Hold the temperature sensor so that the measuring tip points upwards. Let the control cable of the temperature sensor hang loosely, insert the tip of the temperature sensor to the pipeline.

To ensure heat transfer please use heat conducting paste (not included in delivery)

Wrap aluminum tape (field supplied) around the probe tip and pipe to attach the temperature sensor.

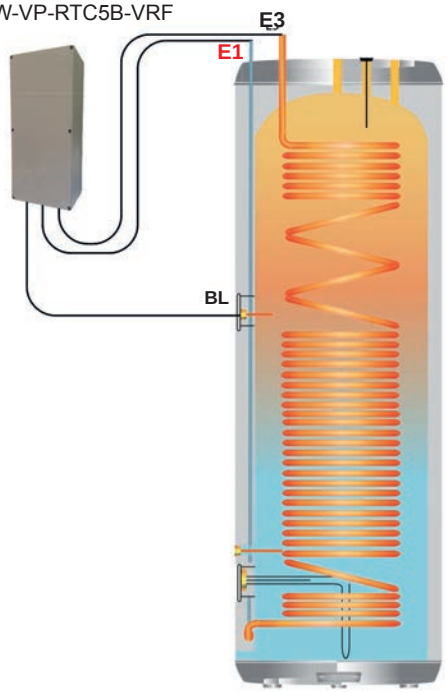


6.4.4 How to use with Terminal PAW-VP-RTC5B-PAC



6.4.5 How to use with Terminal PAW-VP-RTC5B-VRF

PAW-VP-RTC5B-VRF

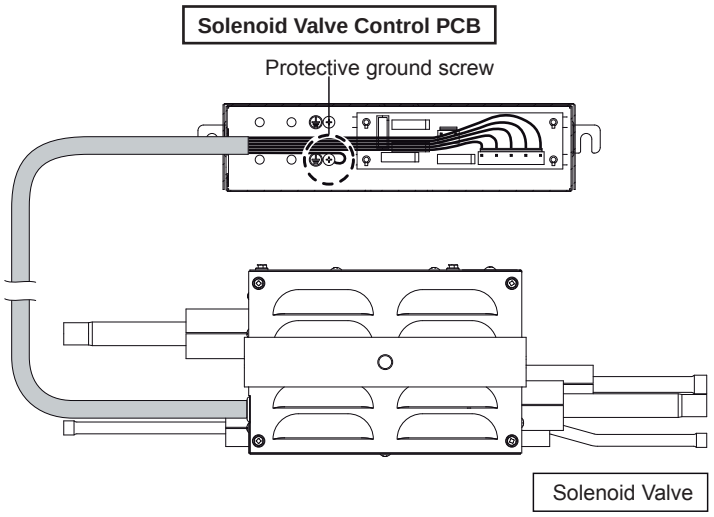


PAW-VP1000LDHW
PAW-VP750LDHW

6.5 Solenoid Valve Kit – For 3-Way ECO-i System

6.5.1 Wiring

- Connect the 9P connector coming from the solenoid valve kit through the power inlet of the PAW-VP-RTC5B-VRF to the 9P connector (red) of the Solenoid Valve Control PCB (sold separately) (Fig. 6-1).
- Accessory wire length is 5 m.
- In case the wire is not long enough, cut the wire halfway and connect additional wire (field supply) as an extension using a terminal box (field supply).
- Additional wire must be "H05VVF 0.5 mm2" or "60227 IEC53".
- Anchor the cabtyre cable using the binding bands inside the unit.
- Do not route the cabtyre cable through the same wiring conduit as the remote controller wiring or inter-unit control wiring.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard



.

Fig. 6-1 Connection

6.5.2 CZ-P4160HR3

Note

The wire should be fixed with the clamp inside the indoor unit.

Do not route the wire through a tube together with the remote-control line and inter-unit operation line.

Recommended wire size

6-core cable, 0.5 mm^2 or more (300 V or more)

Grounding should be done between the indoor unit and solenoid valve kit.

6.5.3 General Precautions on Wiring

1. Before wiring, confirm the rated voltage of the unit as shown on its nameplate, then carry out the wiring closely following the wiring diagram.
2. Each wiring connection must be done in accordance with the wiring system diagram. Wrong wiring may cause the unit to mis-operate or become damaged.
3. Do not allow wiring to touch the refrigerant tubing.
4. Unauthorized changes in the internal wiring can be very dangerous. The manufacturer will accept no responsibility for any damage or misoperation that occurs as a result of such unauthorized changes.
5. Regulations on wire diameters differ from locality to locality. For field wiring rules, please refer to your LOCAL ELECTRICAL CODES before beginning. You must ensure that installation complies with all relevant rules and regulations.
6. If the power supply cord of this appliance is damaged, it must be replaced by a repair shop designated by the manufacturer, because special-purpose tools are required.

DANGER

- ► This equipment is strongly recommended to be installed with Earth Leakage Circuit Breaker (ELCB) or Residual Current Device (RCD). Otherwise, it may cause electrical shock and fire in case of equipment breakdown or insulation breakdown.
- ► Earth Leakage Circuit Breaker (ELCB) must be incorporated in the fixed wiring in accordance with the wiring regulations. The Earth Leakage Circuit Breaker (ELCB) must be an approved 10–16 A, having a contact separation in all poles.
- ► To prevent possible hazards from insulation failure, the unit must be grounded.

6.5.4 Recommended Wire Length and Wire Diameter

Tab. 6-1: Solenoid valve kit

Type	Power supply	Time delay fuse or circuit capacity
4160	2.5 mm², Max. 130 m	10–16 A

Tab. 6-2: Control wiring

Type	Inter-unit (between relay kit and solenoid valve kit) control wiring
4160	0.75 mm² (AWG #18), Max. 30m

CAUTION

Use the standard power supply cables for Europe (such as H05RN-F or H07RN-F which conform to CENELEC (HAR) rating specifications) or use the cables based on IEC standard. (60245 IEC57, 60245 IEC66)

6.5.5 Wiring system diagram

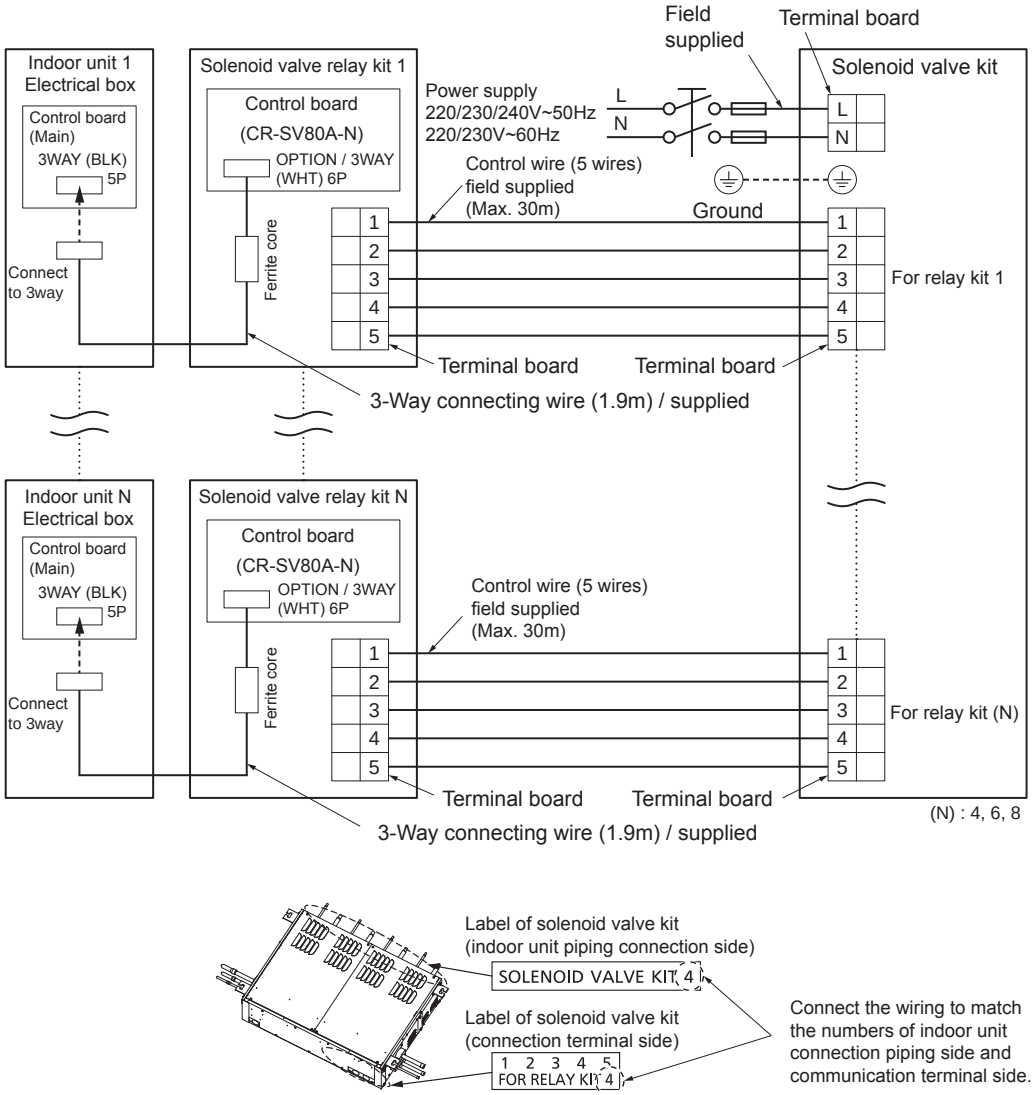


Fig. 6-2 Wiring system diagram

Procedure

1. Connect the power supply wire to the solenoid valve kit, using the wire shown in Tab. 6-1 (Fig. 6-4).
2. Connect the solenoid valve kit to the solenoid valve relay kit, using the wire shown in Tab. 6-2 (Fig. 6-3, Fig. 6-4).
3. Connect the solenoid valve relay kit to the indoor unit, using the supplied connecting wire (Fig. 6-3, Fig. 6-4).
4. The leftover wires connected to the solenoid valve relay kit should be tied up in a bundle of wires by the supplied wire holder not to leave the wires loose as shown in the diagram at right. (Fig. 6-3)

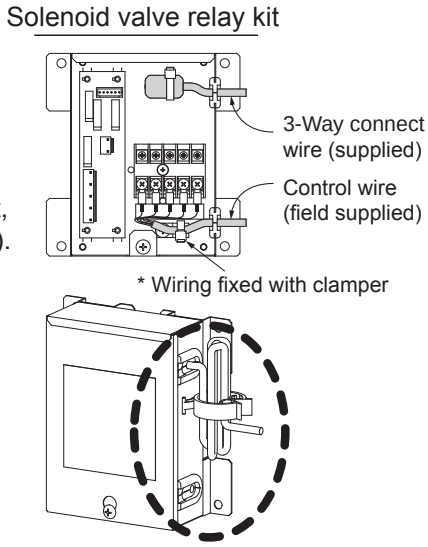


Fig. 6-3

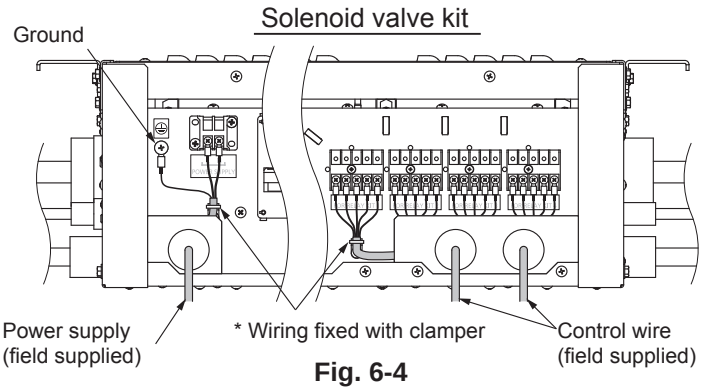
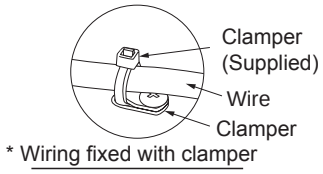


Fig. 6-4



How to connect wiring to the terminal

■ For stranded wiring

1. Cut the wire end with cutting pliers, then strip the insulation to expose the stranded wiring about 10 mm and tightly twist the wire ends (Fig. 6-5).
2. Using a Phillips head screwdriver, remove the terminal screw(s) on the terminal board.
3. Using a ring connector fastener or pliers, securely clamp each stripped wire end with a ring pressure terminal.
4. Place the ring pressure terminal, and replace and tighten the removed terminal screw using a screwdriver (Fig. 6-6).

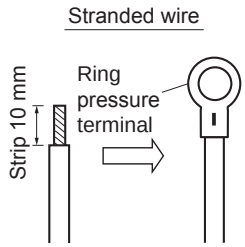


Fig. 6-5

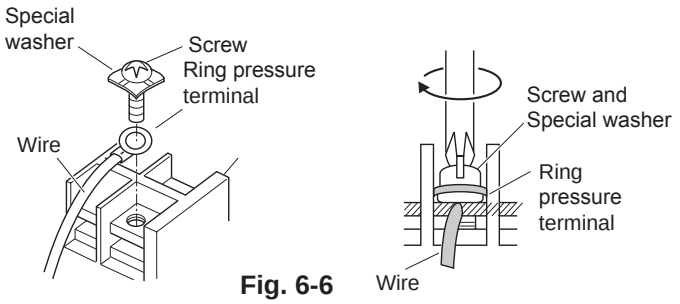


Fig. 6-6

CAUTION

Loose wiring may cause the terminal to overheat or result in unit malfunction.

► A fire hazard may also occur.

► Therefore, ensure that all wiring is tightly connected.

6.5.6 Installation to the Solenoid Valve Relay Kit

Install the solenoid valve relay kit into the indoor unit and fix it using a Philips-head screwdriver.

DANGER

- ► Do not install outside the building and the area where the water is splashed. Failure to do so could result in product or property damage.
- ► Do not handle or touch the unit with wet hands. Failure to do so could result in electric shock.

7 Connecting the Refrigerant Tubing

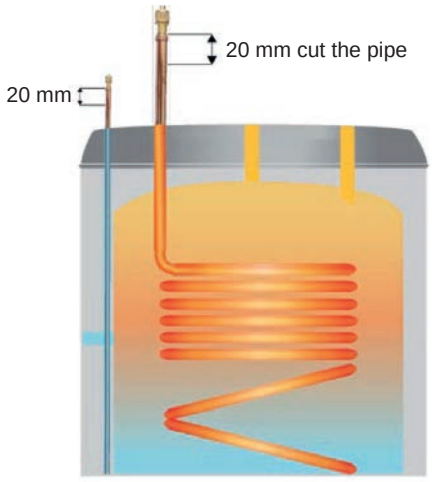
7.1 Use soldering method

Many of conventional split system air conditioners employ the flaring method to connect refrigerant tubes which run between indoor and outdoor units. In this method, the copper tubes are soldering at tank end.

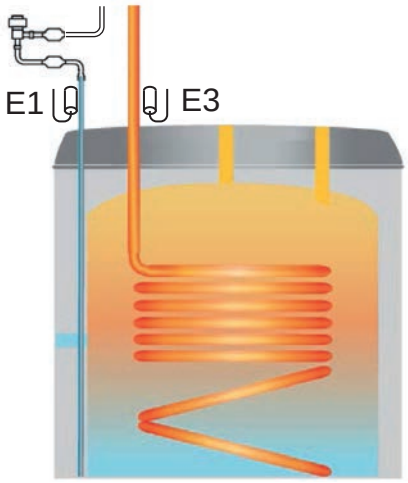
WARNING

Remember to cool down pipes with wet paper during soldering.

7.2 Preparation of cooling pipe for tank



7.3 How to install the expansion valve when using ECOi

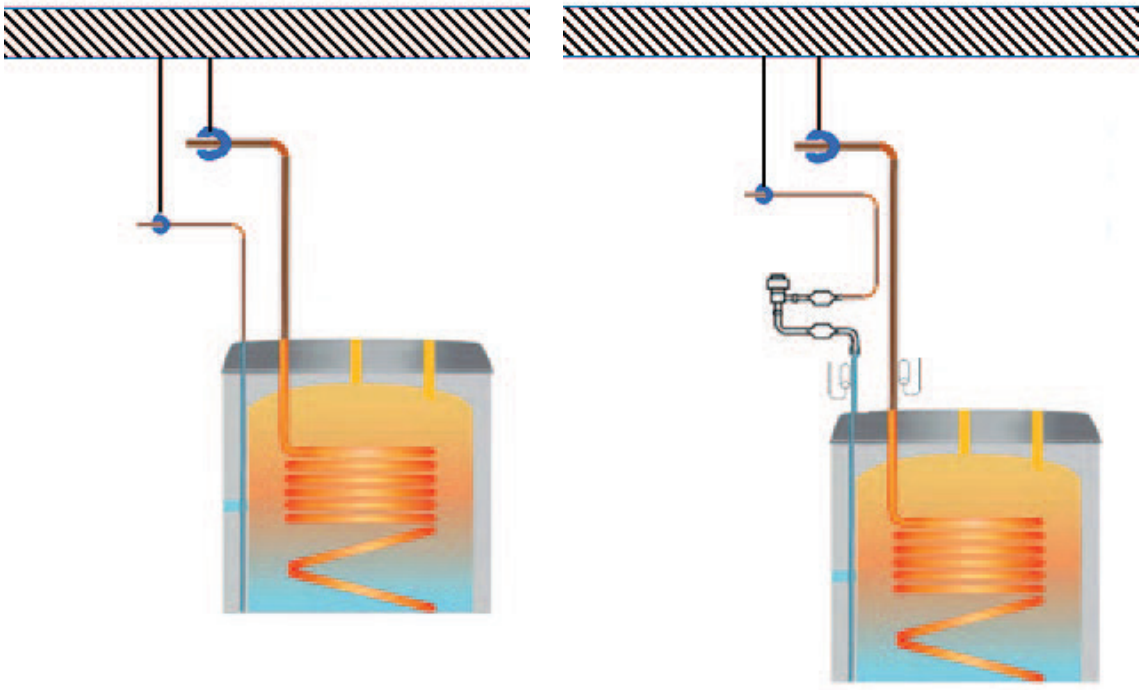


7.4 Installation of Refrigerant pipe

Follow the basics of installation technology!

The refrigerant lines must be installed vertically and without tension.

Use only approved pipe clamps to fix the refrigerant pipes. Use rubber buffered pipe clamps for decoupling. Vertical position ±15°



Note

Vertical inclination of expansion valve must be less than ±15°

CAUTION

Remember to cool down pipes with wet paper during soldering

When installing the expansion valve, the following limitations and restrictions need to be observed:

- ► The distance from tank heat exchanger and expansion valve must not exceed 2 meters.
- ► Pipe reducers or pipes expanders must be used in the field when needed.

Important

If there are multiple tanks in one ECOi system, an individual expansion valve and controller must be installed for each tank system.

7.5 Expansion valve

Expansion valve shall be installed, when:

- ECOi setup for 3 ways system
- Expansion valve ECOi setup when cooling and heating demand is needed

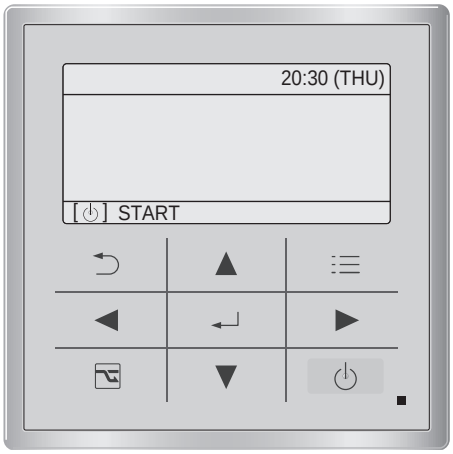
PAW-VP-VALV-280
PAW-VP1000LDHW
PAW-VP750LDHW
PAW-VP380L

8 How to make Settings

8.1 Detailed Settings for Indoor Unit

The settings must be made after switching on the power supply but before regular operation!

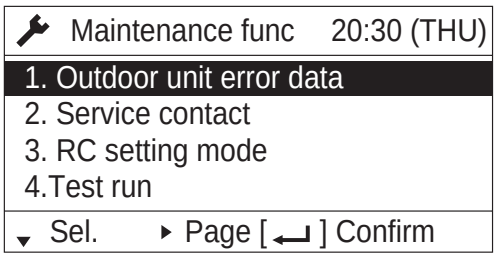
8.1.1 Setting Procedure for Remote Controller Model CZ-RTC5B



CZ-RTC5B

Operating procedure

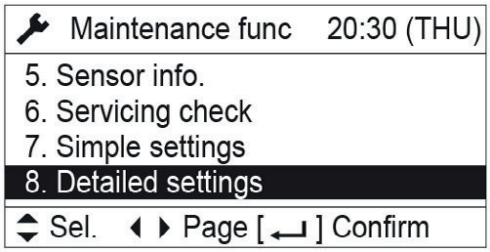
1. Keep pressing the ⮌ , ↵ and ▶ buttons simultaneously for 4 or more seconds. The “Maintenance func” screen appears on the LCD display.



2. Press the ▼ or ▲ button to see each menu.

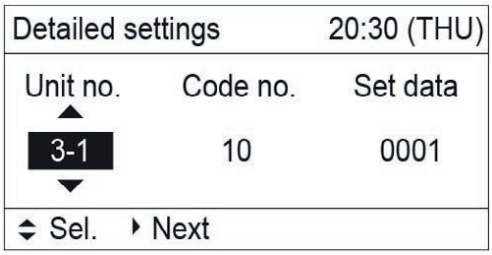
   If you wish to see the next screen instantly, press the ▲ or ▶ button.

   Select “8. Detailed settings” on the LCD display and press the ↵ button.

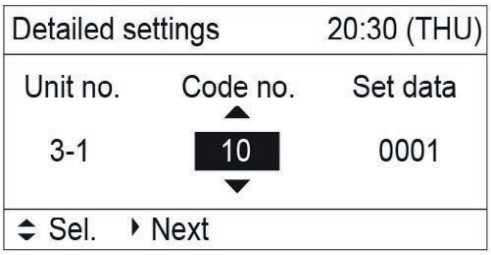


   The “Detailed settings“ screen appears on the LCD display.

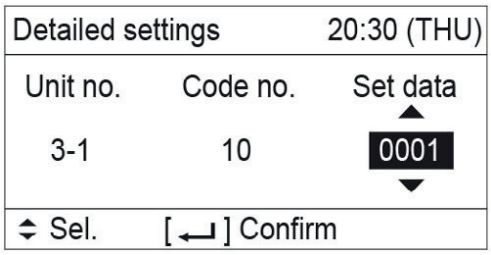
   Select the “Unit no.” by pressing the ▼ or ▲ button for changes.



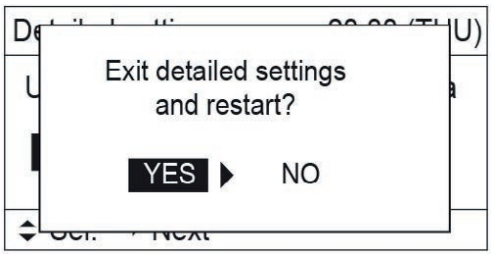
3. Select the “Code no.” by pressing the ▲ or ► button.
   Change the “Code no.” by pressing the ▼ or ▲ button (or keeping it pressed).



4. Select the “Set data” by pressing the ▲ or ► button.
   Select one of the “Set data” by pressing the ▼ or ▲ button.
   Then press the ↵ button.



5. Select the “Unit no.” by pressing the ▲ or ► button and press the ⮌ button.
   The “Exit detailed settings and restart?“ (Detailed setting-end) screen appears on the LCD display. Select “YES” and press the ↵ button



8

8.1.2 Detailed Setting Procedure for Remote Controller Model CZ-RTC4

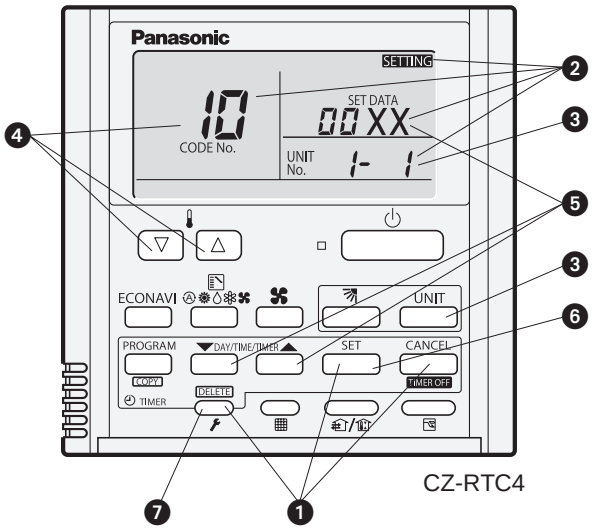
This allows the system address, indoor unit address, and other settings to be made for the individual or group-control indoor unit to which the remote controller used for detailed settings is connected.

When detailed settings mode is engaged, operation stops at the individual or group-control indoor unit where the remote controller used for detailed settings is connected. Simple settings items can also be set at this time.

Proceed as follows:

1. Press and hold the [🔧], [SET] and [CANCEL] button simultaneously for 4 seconds or longer.
2. "SETTING", unit No. "1- 1" (or "ALL" in the case of group control), item code "10", and settings data "00XX" are displayed blinking on the remote controller LCD display (see figure below). At this time, the indoor unit fan (or all indoor unit fans in the case of group control) begins operating.
3. If group control is in effect, press the [UNIT] button and select the address (unit No.) of the indoor unit to set. At this time, the fan only at the selected indoor unit begins operating.
4. Press the temperature setting [△] / [▽] buttons to select the item code to change.
5. Press the timer time [DAY/] / [/TIMER] buttons to select the desired setting data.
   * For item codes and setting data, refer to sec. *8.1.6 "DN" code setting list on page 62*.
6. Press the [SET] button. (The display stops blinking and remains lit, and setting is completed.)
7. Press the [🔧] button to return to normal remote controller display.

Key and displays



CZ-RTC4

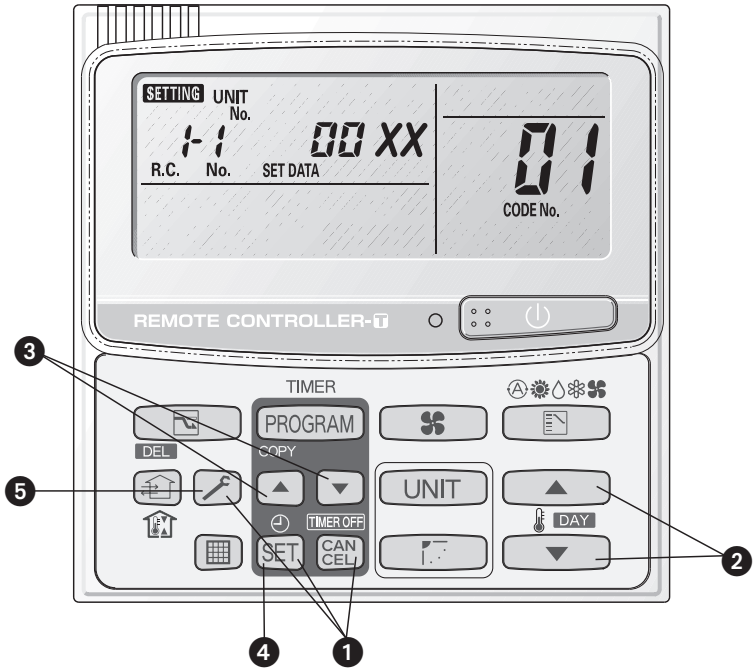
❶–❼:
Keys and displays for the steps shown above.

8.1.3 Detailed Setting Procedure for Remote Controller Model CZ-RTC2

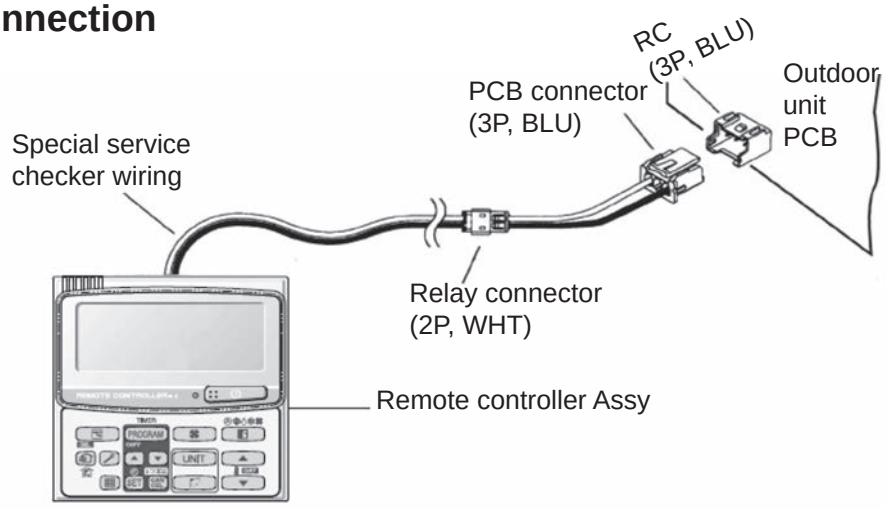
Proceed as follows:

1. Press and hold the [🔧], [SET] and [CANCEL] buttons simultaneously for 4 seconds or longer.
2. Press the temperature setting [▲] / [▼] buttons to select the item code to change.
3. Press the timer time [▲] / [▼] buttons to select the desired setting data.
   * For item codes and setting data, refer to sec. *8.1.6 "DN" code setting list on page 62*.
4. Press the [SET] button. (The display stops blinking and remains lit, and setting is completed.)
5. Press the [🔧] button to return to normal remote controller display.

Key and displays



Connection



8.1.4 Detailed settings for indoor/outdoor unit CZ-RTC5B/RTC4/2

The new value must be set during the commissioning.

8.1.5 Setting Flow Chart

The system is in a fault-free state so that a safe commissioning can take place. All valid rules have been followed.

Important

To follow exactly the described steps at the following flow chart is mandatory.

No.	Action	Note
1	Check Indoor Unit	Check if all temperature sensors are correctly connected. All jumpers/bridged plugs (if any) according to the wiring diagram, power supply and communication wires are connected as shown in the electrical wiring diagram.
2	Turn Power “ON”	
3	Initialization	Wait until initialization is finished.
4	Start Indoor Unit Detail Setting	Described at pages before: Setting Procedure for Remote Controller Model CZ-RTC5B
5	Set Indoor Unit "DN" code 10 & 11	Attention: After the setting "DN" 10 & 11 go out of detailed setting: Follow described at pages before: Setting Procedure for Remote Controller Mode CZ-RTC5B See corresponding "DN" code list described on the following pages, (combination for combination) for Indoor Unit.
6	Restart Detail Setting and set other Indoor Unit "DN" codes	
7	Finish Indoor Unit "DN" code setting	Described at pages before: Setting Procedure for Remote Controller Model CZ-RTC5B
8	Initialization	Wait until initialization is finished.
9	Start Outdoor Unit Detail Setting	Described at pages before: Detailed Setting Procedure for Remote Controller Model CZ-RTC2 / CZ-RTC4
10	Set Outdoor Unit "DN" codes	See corresponding "DN" code list described on the following pages (combination for combination) for Outdoor unit.
11	Finish Outdoor unit "DN" code setting	Described at pages before: Detailed Setting Procedure for Remote Controller Model CZ-RTC2 / CZ-RTC4
12	Reset Power supply	After restart Power supply and Initialisation is finished, proceed commissioning.

8.1.6 "DN" code setting list

Important

All settings are necessary, otherwise faultless operation is not possible. Please follow the sequence described above!

■ PAW-VP1000LDHW; PAW-VP750LDHW – U-16MF3E8 (VRF)

Indoor Unit Tank detailed settings; Remote controller CZ-RTC5B

Parameter "DN" code	Default value	New value to set	Explanation	Check and adjust
10	0006	0031	Unit Type	
11	0015	0023	Capacity code	
06	0000	0000	Inlet temperature shift in heating mode. non-active	
0b	0002	0001	EXCT setting	
0C	0000	0001	Heating preparation display	
0d	0000	0001	Cool/ Heat auto non-active	
15	0022	0013		
16	0000	0000	Fan speed not displayed	
21	0030	0055	Heating upper limit 55°C	
22	0018	0035	Heating lower limit 35°C	
28	0001	0001	Automatic restart after power failure activated	
2C	0000	0000	Expansion valve setting	
2d	0008	0008	Operation mode DHW	

Note

"DN" codes 10 & 11 must be set first.

Outdoor unit detailed settings by CZ-RTC2/4

Parameter "DN" code	Default value	New value to set	Explanation	Check and adjust
15	000	005	Specific Tank setting	
35	000	-05	Specific Tank setting	
36	000	-05	Specific Tank setting	
4b	001	003	Tank setting	
50	000	001	Evaporation temperature shift by indoor unit type	
7b	001	003	Air to Water indoor unit connection permission	

* to be purchased separately

Important

All settings are necessary, otherwise faultless operation is not possible. Please follow the sequence described above!

■ PAW-VP1000LDHW; PAW-VP750LDHW – U-250PE2E8A (PACi R410A)

Indoor Unit Tank detailed settings; Remote controller CZ-RTC5B

Parameter "DN" code	Default value	New value to set	Explanation	Check and adjust
10	0006	0033	Unit Type	
11	0015	0023	Capacity code	
06	0004	0000	Inlet temperature shift in heating mode. non-active	
0b	0002	0000	EXCT setting	
0C	0000	0001	Heating preparation display	
0d	0000	0001	Cool/ Heat auto non-active	
15	0022	0022		
16	0000	0000	Fan speed not displayed	
21	0030	0055	Heating upper limit 55°C	
22	0018	0035	Heating lower limit 35°C	
28	0001	0001	Automatic restart after power failure activated	
2C	0000	0006	Expansion valve setting	
2d	0008	0008	Operation mode DHW	

Note

"DN" codes 10 & 11 must be set first.

Outdoor unit detailed settings by CZ-RTC2/4*

Parameter "DN" code	Default value	New value to set	Explanation	Check and adjust
7	000	001	Specific tank setting	
1d	-001	070	Demand Level	
20	-015	-035	Th. Off differential change from 1.5 k to 3.5 k	
21	000	600	Thermostat off judgement time (600 sec.)	
4b	000	001	Specific tank setting	
A5	000	-004	Frost adherence temperature	

* to be purchased separately

Important

All settings are necessary, otherwise faultless operation is not possible. Please follow the sequence described above!

■ PAW-VP380L – U-200PZH2E8 (PACi R32)

Indoor Unit Tank detailed settings; Remote controller CZ-RTC5B

Parameter "DN" code	Default value	New value to set	Explanation	Check and adjust
10	0006	0031	Unit Type	
11	0015	0021	Capacity code	
06	0004	0000	Inlet temperature shift in heating mode.	
0b	0002	0001	EXCT setting	
0C	0000	0001	Heating preparation display	
0d	0000	0001	Cool/ Heat auto	
15	0022	0022	Temperature sensors	
16	0000	0000	Fan speed adjustment	
1F	0000	0015	Cooling upper limit 15°C	
20	0000	0005	Cooling lower limit 5°C	
21	0030	0055	Heating upper limit 55°C	
22	0018	0035	Heating lower limit 35°C	
28	0001	0001	Automatic restart after power failure activated	
2C	0000	0006	Expansion valve setting	
2d	0008	0010	Operation mode Cooling and Heating	

Note

"DN" codes 10 & 11 must be set first.

"DN" 15 display temperature sensor TA, E1, E2, E3*, BL* change 0022 -> 0031

* to be purchased separately

Outdoor unit detailed settings by CZ-RTC2/4

Parameter "DN" code	Default value	New value to set	Explanation	Check and adjust
7	000	001	Specific tank setting	
42	002	000	Tank offset	
4b	001	001	Specific tank setting	
4E	000	005	Condensation temperature minimum shift in heating	
4F	000	005	Condensation temperature maximum shift in heating	
A5	000	-04	Frost adherence temperature	

8.2 Monitoring operations (Sensor info)

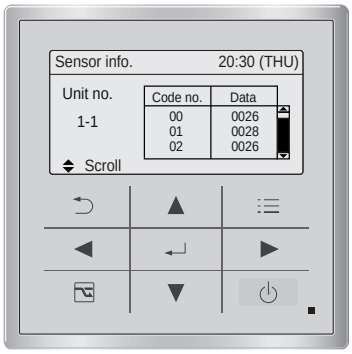
8.2.1 How to open the sensor menu

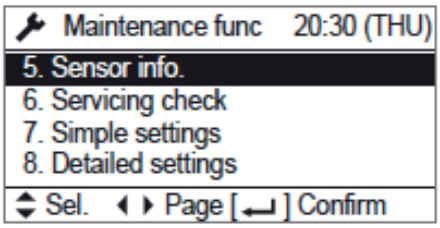
Proceed as follows:

Press the ▼ or ▲ button to scroll thrugh see each menu.

If you wish to see the next screen instantly, press the ◄ or ► button.

Select “5. Sensor info.” on the LCD display and press the ↵ button.





8.2.2 Monitoring operations (Sensor info) PACi

	Item code	Meaning of Code
Indoor unit data	02	Indoor unit intake temp.
	03	Indoor unit heat exchanger temp. (E1)
	04	Indoor unit heat exchanger temp. (E2)
	05	Indoor unit heat exchanger temp. (E3)
	06	—
Outdoor unit data	07	—
	08	—
	09	
	0A	Discharge temp. (TD)
	0b	—
	0C	—
	0d	Intake temp. (TS)
	0E	Outdoor unit heat exchanger temp. (C1)
	0F	Outdoor unit heat exchanger temp. (C2)
	10	—
	11	Outdoor air temp. (TO)
	12	—
	13	Inverter primary current
	14	—
	15	Outdoor MV value
	16	—
	19	Frequency

Note

Depending on the model, some items may not be displayed.

8.2.3 Monitoring operations (Sensor info) ECOi

"DN"	Description	Remarks	
02	Indoor unit intake temp. (TA)	°C	Indoor unit
03	Indoor unit heat exchanger temp. E1 (E1)	°C	
04	—		
05	Indoor unit heat exchanger temp. E3	°C	
06	Discharge air temp. (BL)	°C	
07	Discharge air temp. setting	°C	
08	Indoor unit MOV pulse (MOV)	STEP	
0A	Discharge temp. (DISCH)	°C	Outdoor unit
0C	High-pressure sensor temp.	°C	
0d	Heat exchanger gas (EXG)	°C	
0E	Heat exchanger liquid (EXL)	°C	
11	Outdoor air temp. (TO)	°C	
12	Inverter secondary current	A	
13	Inverter primary current (L2 phase) (Three phase only)	A	
15	MOV pulse 1 (MOV1)	STEP	
16	—		
17	—		
19	Inverter actual operating frequency	Hz	
1A	Sub cooler (MOV4)	STEP	
1b	Inverter primary current (L1 phase)	A	
1d	Low-pressure sensor temp.	°C	
1E	Suction temp. (SCT)	°C	
21	Inverter primary current (L3 phase) (Three phase only)	A	
24	Temp. sensor at refrigerant gas outlet of dual-tube temp. (SCG)	°C	
26	High-pressure	MPa	
27	Low-pressure	MPa	

Note

It takes about 10 seconds until outdoor unit data appears or changes on the display.

9 Error Codes PACi & ECOi

9.1 Alarm codes for indoor/outdoor units PACi R32

Error group	Symptoms	Possible causes / Remedy	Wired remote controller display
Serial communication errors Missetting	Failure in receiving serial signal from remote controller's indoor unit	Faulty remote controller Disconnection/Contact failure of remote controller wiring CHK(check) pins on the indoor unit control PCB are short circuited	E01
	Settings of system address, indoor unit address and group control are not made	In the case of non-group control: ● Power supply OFF of outdoor unit ● Disconnection / Contact failure of inter-unit wiring In the case of group control: Automatic address operation was not carried out.	
	Setting failure of nonvolatile memory IC	Faulty setting of EEPROM on indoor unit	
	Failure in indoor unit serial signal from remote controller	Faulty remote controller	E02
		Wrong wiring of remote controller	
	Error in indoor unit receiving signal from remote controller (central)		E03
	Failure in indoor unit receiving serial signal from outdoor unit	Disconnection / Contact failure of inter-unit wiring	E04
		● Faulty indoor unit control PCB ● Faulty outdoor unit control PCB ● Communication circuit fuse on indoor unit control PCB opened	
		● Fuse on outdoor unit control PCB opened Since failure of an outdoor fan motor is considered as a cause, both outdoor unit control PCB and outdoor unit fan motor are exchanged simultaneously.	
	Failure in outdoor unit receiving serial signal from indoor unit	● Disconnection / Contact failure of inter-unit wiring	E06
		● Disconnection of inter-unit wiring ● Communication circuit fuse on indoor unit control PCB opened	
		Indoor unit control PCB address setting error	
	Duplication of indoor unit address	Duplication of indoor unit address setting	E08
	Duplication of main remote controller setting	Error because of more than one remote controller setting to main	E09
	Improper setting	Automatic address setting start is prohibited	E12
		Duplication of main unit in group control	E14
	Communication error between main and sub indoor units	● Disconnection of wiring between main unit and additional units ● Contact failure of wiring ● Faulty indoor unit control PCB (Main or Addition)	E18
	Automatic address settings failure	Automatic Address Alarm The total capacity of indoor units is too low	E15
		Automatic Address Alarm The total capacity of indoor units is too high	E16
		Automatic Address Alarm No indoor unit connected	E20
	Outdoor unit Communication error		E24
	Outdoor unit Communication error		E29
	Indoor & outdoor unit type miss-matched	Setting error, indoor/outdoor unit type/model miss-matched	L02
	Duplication of group control's main indoor unit	Duplication of main indoor unit address in group control	L03
	Group control wiring is connected to individual control indoor unit	Group control wiring is connected to individual control indoor unit	L07
	Indoor unit address is not set		L08
Serial communication errors Missetting	Indoor unit capacity is not set		L09
	Duplication of outdoor unit address		L04
	Outdoor unit capacity is not set or setting error		L10
	Indoor unit type setting error Type of indoor/outdoor units is different		L13
	4-way valve locked trouble / operation failure		L18

Continued on the next page

Alarm codes for indoor/outdoor units PACi R32 (continued)

Error group	Symptoms	Possible causes / Remedy	Wired remote controller display
Activation of protective device	Faulty wiring connections of (ceiling) indoor unit panel		P09
	Activation of float switch wiring	Faulty drain pump	P10
		Drainage failure	
		Contact failure of float switch wiring	
	WHE water freezing alarm	WHE water freezing error	P11
	Valve error	Valve error Refrigerant circuit error Wrong installation for refrigerant piping and wiring	P13
	O_2 sensor error	O_2 sensor detected	P14
	Discharge temperature protective alarm	Compressor discharge temperature trouble	P03
	Activation of high pressure switch	Compressor discharge pressure trouble	P04
	Power supply failure	Open phase detected AC power supply trouble	P05
	Insufficient gas	Insufficient gas level detected	P15
	Compressor overcurrent trouble		P16
	Fan motor locked/reversed airflow detected	Outdoor unit fan motor trouble Outdoor unit fan trouble	P22
	WHE water pump interlock OFF alarm	WHE pump interlock error (EXCT Error)	P23
	Inverter compressor trouble		P29
	Group control trouble	Indoor unit in group control trouble	P31
	Activation of current control compressor's protective device	Primary (input) overcurrent detected	H01
	PAM trouble (overcurrent/overvoltage), Activation of compressor's protective device	PAM trouble	H02
	Primary current control, Activation of compressor's protective device	Primary current CT sensor failure	H03
	HIC trouble	HIC trouble DC voltage not detected	H31
Thermistor fault	Indoor unit thermistor open/short	Indoor heat exchanger temperature sensor (E1) trouble	F01
		Indoor heat exchanger temperature sensor (E2) trouble	F02
		Indoor air temperature sensor (TA) trouble	F10
	Outdoor unit thermistor open/short	Compressor discharge temperature sensor (TD) trouble	F04
		Outdoor heat exchanger temperature sensor (C1) trouble	F06
		Outdoor heat exchanger temperature sensor (C2) trouble	F07
		Outdoor air temperature sensor (TO) trouble	F08
		Compressor suction temperature sensor (TS) trouble	F12
Monvolatile memory failure		Indoor unit EEPROM trouble	F29
		Outdoor unit EEPROM trouble	F31

Note

For full Trouble Diagnosis details please refer to the outdoor unit Technical Data & Service Manual.

9.2 Alarm codes for indoor/outdoor units PACi R410A

Error group	Symptoms	Possible causes / Remedy	Wired remote controller display
Serial communication errors Missetting	Failure in receiving serial signal from remote controller's indoor unit	Faulty remote controller Disconnection/Contact failure of remote controller wiring CHK(check) pins on the indoor unit control PCB are short circuited	E01
	Settings of system address, indoor unit address and group control are not made	In the case of non-group control: ● Power supply OFF of outdoor unit ● Disconnection / Contact failure of inter-unit wiring In the case of group control: Automatic address operation was not carried out.	
	Setting failure of nonvolatile memory IC	Faulty setting of EEPROM on indoor unit	
	Failure in indoor unit serial signal from remote controller	Faulty remote controller	E02
		Wrong wiring of remote controller	
	Error in indoor unit receiving signal from remote controller (central)		E03
	Failure in indoor unit receiving serial signal from outdoor unit	Disconnection / Contact failure of inter-unit wiring	E04
		● Faulty indoor unit control PCB ● Faulty outdoor unit control PCB ● Communication circuit fuse on indoor unit control PCB opened	
		● Fuse on outdoor unit control PCB opened Since failure of an outdoor fan motor is considered as a cause, both outdoor unit control PCB and outdoor unit fan motor are exchanged simultaneously.	
	Failure in outdoor unit receiving serial signal from indoor unit	● Disconnection / Contact failure of inter-unit wiring	E06
		● Disconnection of inter-unit wiring ● Communication circuit fuse on indoor unit control PCB opened	
		Indoor unit control PCB address setting error	
	Duplication of indoor unit address	Duplication of indoor unit address setting	E08
	Duplication of main remote controller setting	Error because of more than one remote controller setting to main	E09
	Improper setting	Automatic address setting start is prohibited	E12
		Duplication of main unit in group control	E14
	Communication error between main and sub indoor units	● Disconnection of wiring between main unit and additional units ● Contact failure of wiring ● Faulty indoor unit control PCB (Main or Addition)	E18
	Automatic address settings failure	Automatic Address Alarm The total capacity of indoor units is too low	E15
		Automatic Address Alarm The total capacity of indoor units is too high	E16
		Automatic Address Alarm No indoor unit connected	E20
	Outdoor unit Communication error		E24
	Outdoor unit Communication error		E29
	Indoor & outdoor unit type miss-matched	Setting error, indoor/outdoor unit type/model miss-matched	L02
	Duplication of group control's main indoor unit	Duplication of main indoor unit address in group control	L03
	Group control wiring is connected to individual control indoor unit	Group control wiring is connected to individual control indoor unit	L07
	Indoor unit address is not set		L08
Serial communication errors Missetting	Indoor unit capacity is not set		L09
	Duplication of outdoor unit address		L04
	Outdoor unit capacity is not set or setting error		L10
	Indoor unit type setting error Type of indoor/outdoor units is different		L13
	4-way valve locked trouble / operation failure		L18

Continued on the next page

Alarm codes for indoor/outdoor units PACi R410A (continued)

Error group	Symptoms	Possible causes / Remedy	Wired remote controller display
Activation of protective device	Faulty wiring connections of (ceiling) indoor unit panel		P09
	Indoor unit fan motor trouble	Indoor unit fan motor locked	P01
		Indoor unit fan motor layer short	
		Contact failure in thermostat protector circuit	
	Activation of float switch wiring	Faulty drain pump	P10
		Drainage failure	
		Contact failure of float switch wiring	
	Faulty drain pump	Faulty drain pump	P11
		Drain pump locked	
	Indoor unit fan motor trouble	Indoor unit fan motor locked Faulty wiring connections of indoor unit fan motor	P12
	Valve error	Valve error Refrigerant circuit error Wrong installation for refrigerant piping and wiring	P13
	O_2 sensor error	O_2 sensor detected	P14
	Discharge temperature protective alarm	Compressor discharge temperature trouble	P03
	Activation of high pressure switch	Compressor discharge pressure trouble	P04
	Power supply failure	Open phase detected AC power supply trouble	P05
	Insufficient gas	Insufficient gas level detected	P15
	Compressor overcurrent trouble		P16
	Fan motor locked/reversed airflow detected	Outdoor unit fan motor trouble Outdoor unit fan trouble	P22
	Inverter compressor trouble		P29
	Group control trouble	Indoor unit in group control trouble	P31
	Activation of current control compressor's protective device	Primary (input) overcurrent detected	H01
	PAM trouble (overcurrent/overvoltage), Activation of compressor's protective device	PAM trouble	H02
	Primary current control, Activation of compressor's protective device	Primary current CT sensor failure	H03
	HIC trouble	HIC trouble DC voltage not detected	H31
Thermistor fault	Indoor unit thermistor open/short	Indoor heat exchanger temperature sensor (E1) trouble	F01
		Indoor heat exchanger temperature sensor (E2) trouble	F02
		Indoor air temperature sensor (TA) trouble	F10
	Outdoor unit thermistor open/short	Compressor discharge temperature sensor (TD) trouble	F04
		Outdoor heat exchanger temperature sensor (C1) trouble	F06
		Outdoor heat exchanger temperature sensor (C2) trouble	F07
		Outdoor air temperature sensor (TO) trouble	F08
		Compressor suction temperature sensor (TS) trouble	F12
Nonvolatile memory failure		Indoor unit EEPROM trouble	F29
		Outdoor unit EEPROM trouble	F31

Note

For full Trouble Diagnosis details please refer to the outdoor unit Technical Data & Service Manual.

9.3 Alarm codes for indoor/outdoor units ECOi MF3

Error group	Symptoms	Possible causes / Remedy	Wired remote controller display
Serial communication errors Mis-setting	Remote controller is detecting error signal from indoor unit.	Indoor unit does not respond to remote controller.	<E01>
		The remote controller is having error in sending serial communication signal.	<E02>
	Remote Controller does not respond to indoor unit.		<<E03>>
	Outdoor unit is detecting error signal from indoor unit.	Outdoor unit does not respond to indoor unit.	E04
	Indoor unit is detecting error signal from outdoor unit.	Some indoor units does not respond to outdoor unit.	E06
	Improper setting of indoor unit or remote controller	Indoor unit address is dupulicating.	E08
		Two or more remote controllers are set as main on R1-R2 link.	<<E09>>
	Improper setting	Auto Address failed to start.	E12
	Indoor unit communication error of group control wiring	No response from sub indoor to the main indoor unit in group control wiring.	E18
	During auto address setting, number of connected units does not correspond to number set.	Fewer indoor units are found in Auto Addressing than the setting on outdoor PCB.	E15
		More indoor units are found in Auto Addressing than the setting on outdoor PCB.	E16
		No indoor unit responded in Auto Addressing.	E20
		No response from sub outdoor unit.	E24
		The outdoor unit address is duplicating.	E25
		The number of responding outdoor units does not match with the setting on the main outdoor unit.	E26
		No response from main outdoor unit.	E29
		The outdoor unit is having error in sending serial communication signal on main-sub communication line.	E30
		Error in communication inside outdoor unit control box.	E31
	Improper setting	Indoor unit address setting has error. (No main indoor unit in group control.)	L01
		Indoor unit model does not match with the outdoor unit model. (Multi-split/mini-split)	<<L02>>
		Two or more indoor units are set as main in group control.	<L03>
		Two or more indoor units are set as priority indoor unit (priority indoor unit).	L05
		Two or more indoor units are set as priority indoor unit (nonpriority indoor unit).	L06
		Group control wiring is detected for indoor unit set as individual control.	L07
		Indoor unit address is not set.	L08
		Capacity setting of indoor unit is not correct.	<<L09>>
		Duplicate system address setting on outdoor units.	L04
		Capacity setting of outdoor unit is not correct.	L10
		Incorrect wiring of remote group control wiring (in case of shared solenoid valve kit)	L11
		Indoor unit model does not match with outdoor unit.	L13
		Model mismatch between outdoor units.	L17
Thermistor fault	Indoor thermistor is either open or damaged	Indoor unit heat exchanger liquid temperature sensor has failure. (E1)	<<F01>>
		Indoor unit heat exchanger temperature sensor has failure. (E2)	<<F02>>
		Indoor unit heat exchanger gas temperature sensor has failure. (E3)	<<F03>>
		Indoor suction air (room) temperature sensor has failure. (TA)	<<F10>>
		Indoor discharge air temperature sensor has failure. (BL)	<<F11>>

Continued on the next page

Alarm codes for indoor/outdoor units ECOi MF3 (continued)

Error group	Symptoms	Possible causes / Remedy	Wired remote controller display
Thermistor fault	Outdoor thermistor is either open or damaged	Compressor 1 discharge temperature sensor has failure. (DISCH1)	F04
		Compressor 2 discharge temperature sensor has failure. (DISCH2)	F05
		Outdoor unit heat exchanger 1 gas temperature sensor has failure. (EXG1)	F06
		Outdoor unit heat exchanger 1 liquid temperature sensor has failure. (EXL1)	F07
		Outdoor temperature sensor has failure. (TO)	F08
	Outdoor thermistor is either open or damaged.	Compressor inlet temperature sensor has failure. (SCT)	F12
		Subcooling heat exchanger temperature sensor has failure. (SCG)	F14
		High pressure sensor has failure. (HPS)	F16
		Low pressure sensor has failure. (LPS)	F17
		Outdoor unit heat exchanger 2 gas temperature sensor has failure. (EXG2)	F23
		Outdoor unit heat exchanger 2 liquid temperature sensor has failure. (EXL2)	F24
Activation of protective device	Protective device in indoor unit is activated.	Thermal protector for Indoor unit fan motor is activated.	<<P01>>
		Connection to the panel of indoor unit is not good.	<<P09>>
		Float switch of drain pan safety is activated.	<<P10>>
		Cooling water freeze (Air-to-Water)	<<P11>>
		Indoor unit fan inverter protection control is activated.	<<P12>>
		O_2 sensor has activated.	P14
	Protective device in outdoor unit is activated.	Compressor 1 discharge temperature is too high.	P03
		High pressure switch is activated.	P04
		Compressor 1 AC power supply has abnormal.	P05
		Compressor 2 AC power supply has abnormal.	P15
		Compressor 1 secondary current is overcurrent.	P16
		Compressor 2 discharge temperature is too high.	P17
		Compressor 2 start failure. Compressor 2 is missing phase.	P19
		Outdoor unit fan motor has failure.	P22
		WHE water pump interlock OFF alarm WHE pump interlock error (EXCT error)	P23
		Compressor 2 secondary current is overcurrent.	P26
		Compressor 1 start failure. Compressor 1 is missing phase.	P29
	Indoor unit communication error of group control wiring.	Other indoor unit in group control has an alarm.	<P31>
EEPROM on indoor unit PCB failure.			F29
EEPROM on outdoor unit PCB has failure.			F31
Protective device for compressor is activated	Protective device for compressor No. 1 is activated.	Compressor 1 primary current is overcurrent.	H01
		Compressor 1 current sensor is disconnected or shorted.	H03
		Compressor 1 discharge temperature sensor is disconnected, shorted or misplaced. (DISCH1)	H05
	Protective device for compressor No. 2 is activated.	Compressor 2 primary current is overcurrent.	H11
		Compressor 2 current sensor is disconnected or shorted.	H13
		Compressor 2 discharge temperature sensor is disconnected, shorted or misplaced. (DISCH2)	H15
		Low pressure sensor value is too low.	H06
	Oil sensor fault. (Disconnection, etc.)	Compressor 1 oil temperature sensor has failure. (OIL1)	H08
		Compressor 2 oil temperature sensor has failure. (OIL2)	H27
	Abnormal device function	Compressor 2 HIC has failure. HIC is overcurrent or overheat. VDC is undervoltage or overvoltage.	H21
		Compressor 1 HIC has failure. HIC is overcurrent or overheat. VDC is undervoltage or overvoltage.	H31

<< >> Alarm indication: Does not affect the operation of other indoor units.
< > Alarm indication: In some cases may affect the operation of other indoor units.

10 Electrical Heater

10.1 Models PAW-VP1000LDHW, PAW-VP750LDHW

The three above mentioned models are delivered with an additional electric heater as standard. The heating is available according to the requirements of the customer.

For example as:

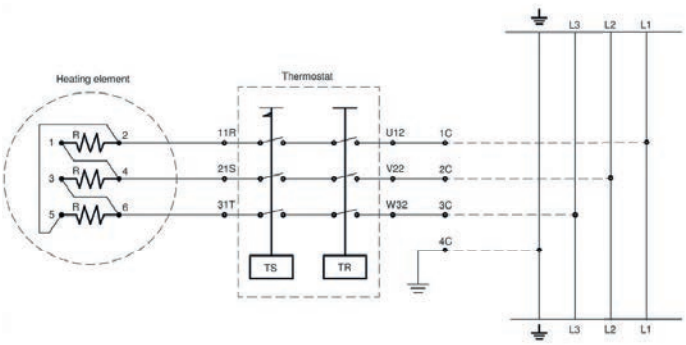
Anti-legionella heating, Additional heating, or both.

Important

The control of the electric heating must be carried out by the customer with electrical timer controller or similar.

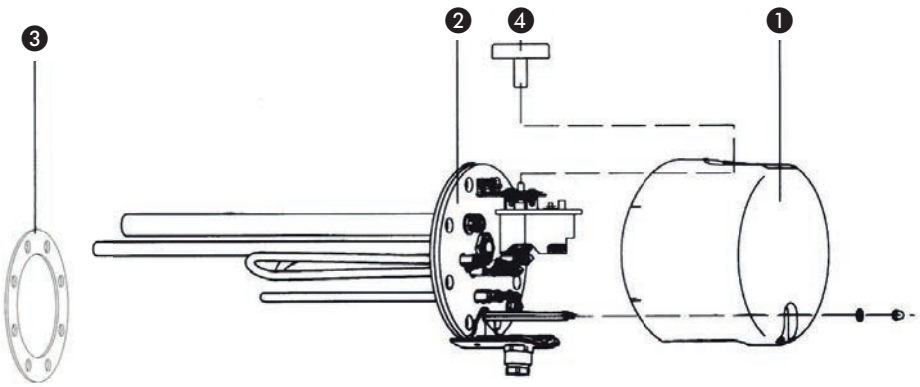
Heater for	Voltage	Capacity
PAW-VP1000LDHW	400 V (L1 / L2 / L3 / N /PE / 50Hz)	6 kW
PAW-VP750LDHW	400 V (L1 / L2 / L3 / N /PE / 50Hz)	6 kW

10.1.1 Electrical connection three phase 400 V



Symbol	Description
R	Electric heating element
1, 2, 3, 4, 5, 6	Heating elements contacts
11R, 21S, 31T	Thermostat-out contacts
TS	Thermostat safety device
TR	Contact operated
U12, V22, W32	Thermostat-in contacts
1C, 2C, 3C, 4C	Supply contacts
L1, L2	Electric line connection terminals
⏚	Ground

10.1.2 Parts and functions



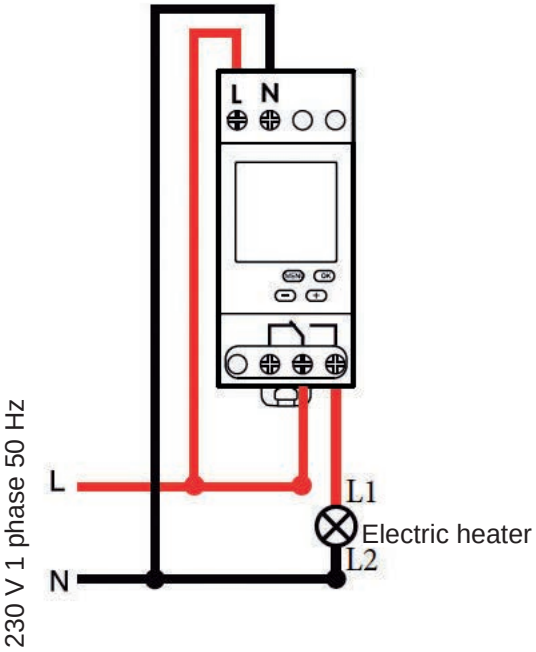
❶ Flange cover
❷ Flange heater, thermostat, TR and anode
❸ Gasket FD180
❹ Thermostat adjustment 35 to 85 degrees

10.1.3 Legionella protection cycle

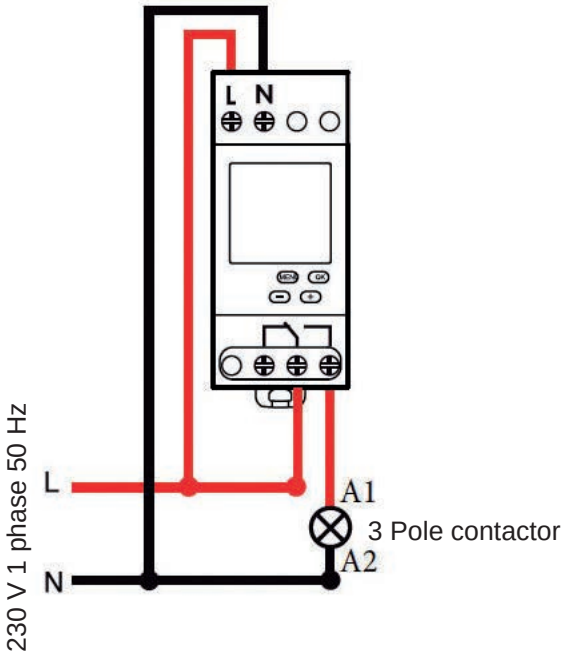
Please observe all local and national regulations and requirements regarding legionella, valid in your application and installation area.

- It is recommended that no less than once per week, the heating element must be activated until the minimum temperature in the tank is reached at 63 degrees.
- Minimum ON time 3 hrs.
- 10 amps for VP750 and VP1000LDHW and connected to poles for contactor A1-A2

DIN rail time switch*



DIN rail time switch*



Digital weekly DIN rail mounting time switch
1 program consists of 1 ON and 1 OFF time and the allocation of any day of the week or a combination of days and the selected channel.

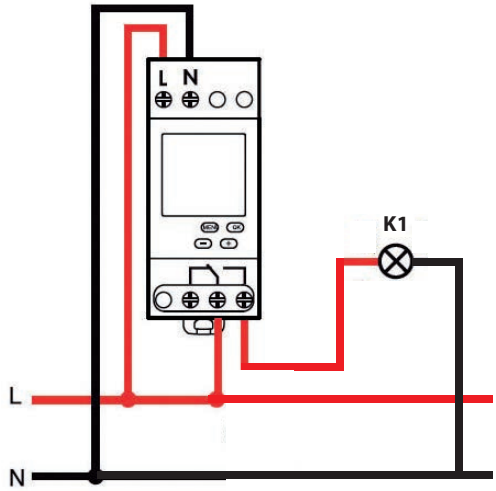
Example:
1. Prog.: ON 03:00h OFF 06:00h MO
2. Prog.: ON 03:00h OFF 06:00h FR

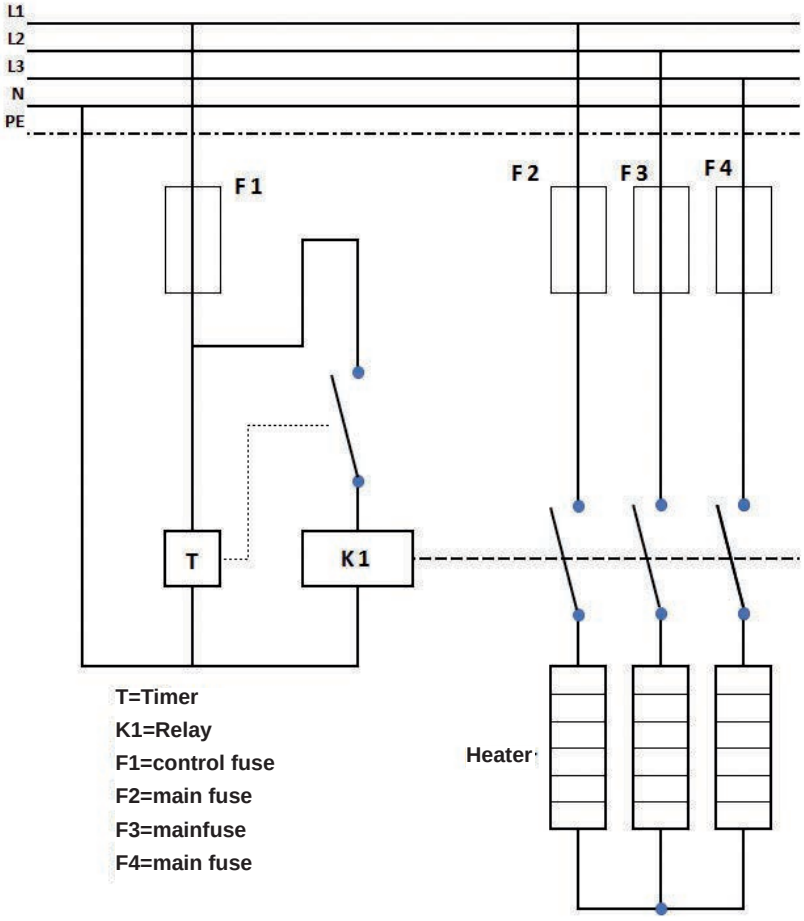
Important

Adjust the thermostat for the immersion heater to the desired setpoint. Minimum setpoint must always apply.

* The DIN rail time switch is for illustrative purposes only. It is the installers responsibility to select a suitable timer controller matching with the electrical ratings indicated above.

Example with 3 Phase heater – Timer controlled





- **All electrical components must be housed within an electrical enclosure (field supplied).**
- The synchronization of the timers (remote control and external clock) is absolutely necessary.
- The heat pump must be switched off during the operating hours of the electric heating. (Timers must be synchronized).

10.2 Model PAW-VP380L

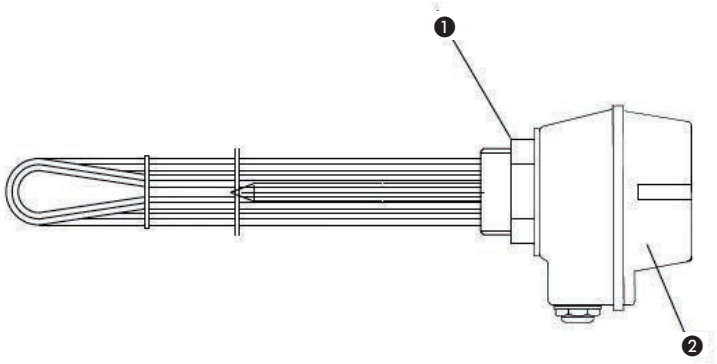
For the above mentioned heating or cooling tank, the electrical auxiliary heater is an optional component and must be ordered separately on request.

It can be useful, for example, when particularly low outside temperatures are expected or to compensate for maintenance interruptions.

Heater for	Voltage	Capacity
PAW-VP380L	400 V (L1 / L2 / L3 / N /PE / 50Hz)	6 kW

10.2.1 Installation of the Heating Unit

How to Mount the Heating Unit



Proceed as follows:

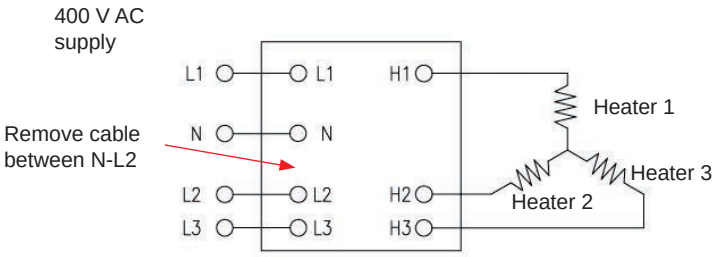
1. Screw the heating unit (❶) into the unit seat (ensure the appropriate tightness of the connection)
2. Unscrew the upper part of the box (❷)
3. Connect the supplying cables to appropriate power connections situated in the upper part of the box (❷) in accordance with the diagram for connecting three or one phase heaters (see item *10.2.2 „Electrical Connection“ on page 77*).
4. Assemble the upper part of the box with the rest of the heating unit

10.2.2 Electrical Connection

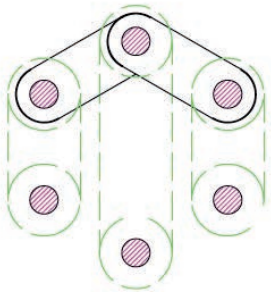
Connection for 3 Phase (Star)

400 V AC power supply

Controller connections



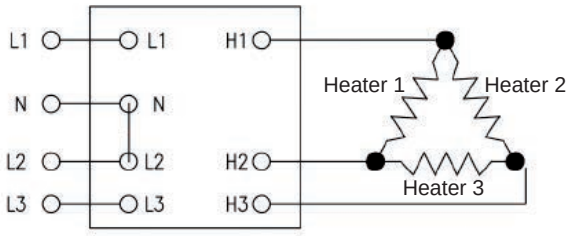
Bridge connection

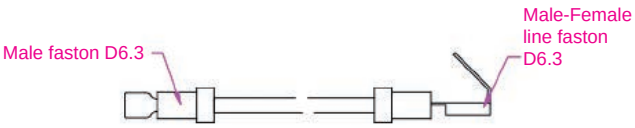


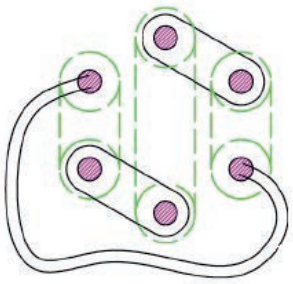
Connection for 3 Phase (Triangle)

230 V 3 phase AC power supply

Bridge connection







10

10.3 Start-up and Service

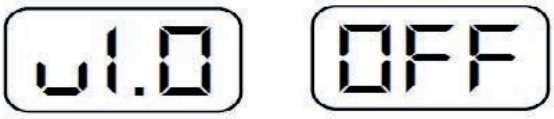
10.3.1 Operation Keys and Displays

The heater and protecting box equipped with the temperature controller is a simple unit serving to control the heating process. The unit controls the heater or set of the electric heaters which are supplied from the power supply 230 V AC (1or 3 phase) or 400 V AC (3 phase).

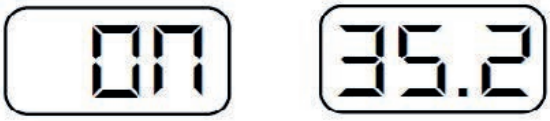
The appearance and description of control push-buttons and information LEDs are shown below.

Number	Name	Description
❶	Alarm-LED diode	LED diode flashes, when alarm status is detected.
❷	Heating-LED diode	LED diode lights during heating. For 3-phase unit diode flashes 1°C before the preset temperature.
❸	„–“ push button	Reduces the setting value or, if pressed for approximately 3 seconds – changes the status of controller (ON/OFF) (see diagram page 13 for more information).
❹	„+“ push button	Increases the setting value or, if pressed for approximately 3 seconds – moves to the menu for hysteresis change (ON/OFF) (see diagram page 13 for more information).
❺	LED display	Displays the information on the current temperature, settings, alarms and the status of the controller.

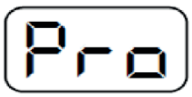
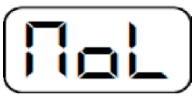
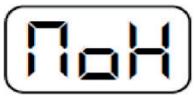
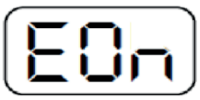
Connecting the TR-01 controller to supply voltage 230V/400V AC (depending on version) causes switching on the informative screen with the current software version and then switching off mode of the controller (OFF).



In this mode controlling of the heating process is switched off – all heaters are disconnected from the power supply. Pressing the push-button – by approximately 3 seconds causes a change of the controller mode into switched on (ON) and displaying the current temperature. From this moment the process of controlling heater/ heaters is switched on.

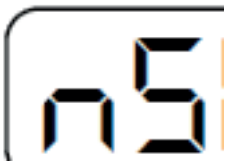
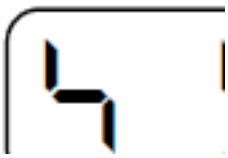


Also, the other information can be seen on the display. All reminders and their description are specified in the following table:

Information displayed	Acoustic alarm	Alarm diode	Description
	Variable	Flashing	Lack or failure of the sensor. Alarm switches off automatically after repair of the failure.
	Variable	Flashing	Exceeding of the maximum temperature (75 °C, 95 °C, 110 °C) (Protect). Alarm is switched off after manual deleting (entering the off switching mode).
	Interrupted	Flashing	Detection of lack of water (No Liquid). Alarm is switched off after manual deleting (entering the off switching mode).
	Interrupted	Flashing	Detection of lack of heating (No Heating). Alarm is switched off after manual deleting (entering the off switching mode).
	—	—	Input of the external control EXT opened. Controller stops the function of heating.

The menu is divided into two sections: the operational menu (the unit in the ON mode) and the service menu (unit in the OFF mode).

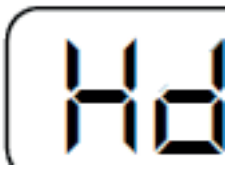
Operational Menu (Controller in ON Mode, see also sec.10.3.3 auf Seite 81)

Function name	Parameter	Setting ranges	Factory setting
Setting of heating temperature		15–160 °C*	50 °C**
Setting of temperature hysteresis		1–10 °C*	°C**

* Depending on the maximum heating temperature programmed in the controller.

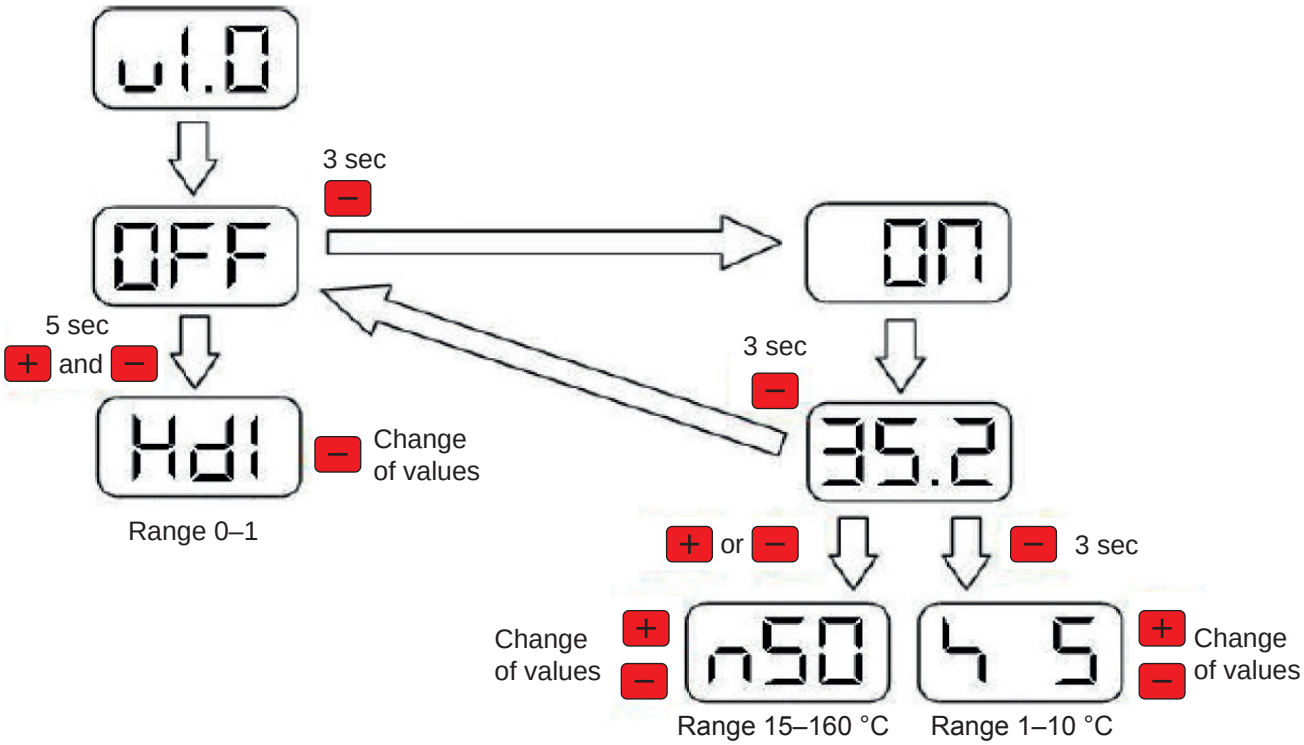
** Factory settings are only the proposals for a setting. All the values depend on the size of heaters, the capacity of the tank, user requirements etc.

Service Menu (Controller in OFF Mode, see also sec. 10.3.4 auf Seite 81)

Function name	Parameter	Setting ranges	Factory setting
Setting of heating detection		0 and 1	1

10.3.2 Menu diagram

The way of moving through the menu is shown in the following diagram.



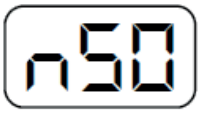
Important

Return from the setting mode is executed automatically after approximately 5 seconds from the last pressing of the push-button.

10.3.3 Operational Menu

The operational menu is available when the controller operates in the switched on mode (ON). One pressing of or push-button + during displaying the temperature causes entering the SETTINGS OF TEMPERATURE mode. Keeping the push-button − pressed for 3 seconds while the temperature displaying causes entering the SETTINGS OF HYSTERESIS. Return from the settings to the temperature displaying is automatic after 5 seconds counted from pressing of the push-button. The description of parameters is presented below.

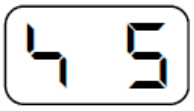
1. Setting of temperature



In this menu, the user sets the temperature to which the tank is to be heated. If 3 heaters are installed in the 3 phase system, one of three heaters will be switched off 0.5 °C before the preset temperature. The LED diode which shows heating starts flashing.

Depending on the application, such way of the heating enables setting the temperature of heating within the range from 15 to 160 °C.

2. Setting of hysteresis



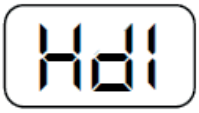
In this menu, the user sets the temperature hysteresis (the value by which the tank temperature has to decrease to switch heating again). Setting of hysteresis is possible within the range from 1 to 10 °C.

10.3.4 Service Menu

The service menu is available when the controller operates in the switched off mode (OFF). The push-button + shall be pressed while switching on the unit until the inscription OFF appears. Then, within 2 seconds, the push-buttons + and − shall be pressed one after another. Making these steps causes entering the advanced service mode and appearing the first of parameters – SETTINGS OF HEATING DETECTION. Pressing the push-button + causes change of the value whilst pressing − causes moving to the next parameter. Return from settings to the OFF display is automatic after 5 seconds counted from the last pressing of the button.

The description of the described parameters is shown below:

1. Setting of heating detection



In this menu, the maker sets the status of the function of heating detection (Heating detect). Hd1 – the detection of heating switched on, Hd0 – the detection of heating switched off. Switching off this function causes switching off detection of lack of heating (NoH) and detection of lack of water (NoL). Switching off this function causes also switching off alarms initiated by these events. In case of problems during heating (too frequent switching on alarms from NoH or NoL) this function shall be set to Hd0.

10.4 Checks Before Contacting Service

10.4.1 Factory pre-installed Back-up Heater

Trouble shooting

Before you contact your dealer, check following points:

Symptom	Cause	Remedy
Air-to-Water unit does not run at all although power is turned on.	Power failure or after power failure Operation button is turned off. Fuse blown. Improper temperature settings.	Press ON/OFF operation button on remote controller again.
		Switch on breaker if power is turned off. If breaker has been tripped, consult your dealer without turning it on.
		If fuse is blown, consult your dealer.

If your Air-to-Water unit still does not work properly although you checked the points as described above, first stop the operation and isolate the electrical supply. Then contact your dealer and report the serial number and symptom.

Never repair your Air-to-Water unit by yourself, to do so may result in serious injury. The unit must only be repaired by an authorised service agent.

You also report if the inspection mark ⚠ and the letters E, F, H, L, P in combination with the numbers appear on the LCD of the remote control unit.

Should the power fail while the unit is running. If the power supply for this unit is temporarily cut off, the unit will automatically resume operation once power is restored using the same settings before the power was interrupted.

A Appendix

A.1 U.K. Accessories: PAW-G3KITL

Please check and follow local regulations!

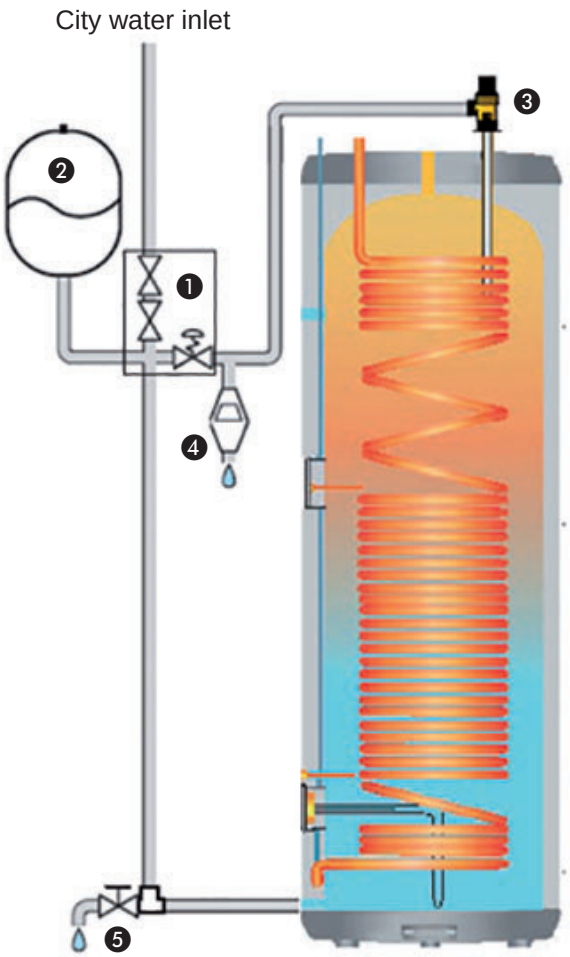
For the United Kingdom, please follow the Water Supply Water Fitting Regulation, WRAS requirements. For use with PAW-VP1000LDHW-1 or PAW-VP750LDHW-1 the optional PAW-G3KITL may be utilised to fulfil the local regulation.

Components supplied with the unit in a separate accessory kit* (PAW-G3KITL) for site fitting:

- Multiblock valve, includes pressure reducing valve, line strainer, balanced cold water take off, (for shower or bidet only) check and expansion valve.
- Tundish - 1 1/4" × 1 1/2"
- 22mm x 1" Elbow / Drain Cock
- Motorised valve
- Expansion vessel.

* Only valid for UK can be ordered separately if required

Installation example



1. Pressure reducing valve Multiblock (2.1 bar) includes Expansion valve (8 bar)
2. Expansion vessel
3. Temperature and pressure relief valve
4. Tundish
5. Elbow / Drain cock

3	"Temperature and pressure relief valve" is factory fitted for tank versions PAW-VP1000LDHW-1 or PAW-VP750LDHW-1

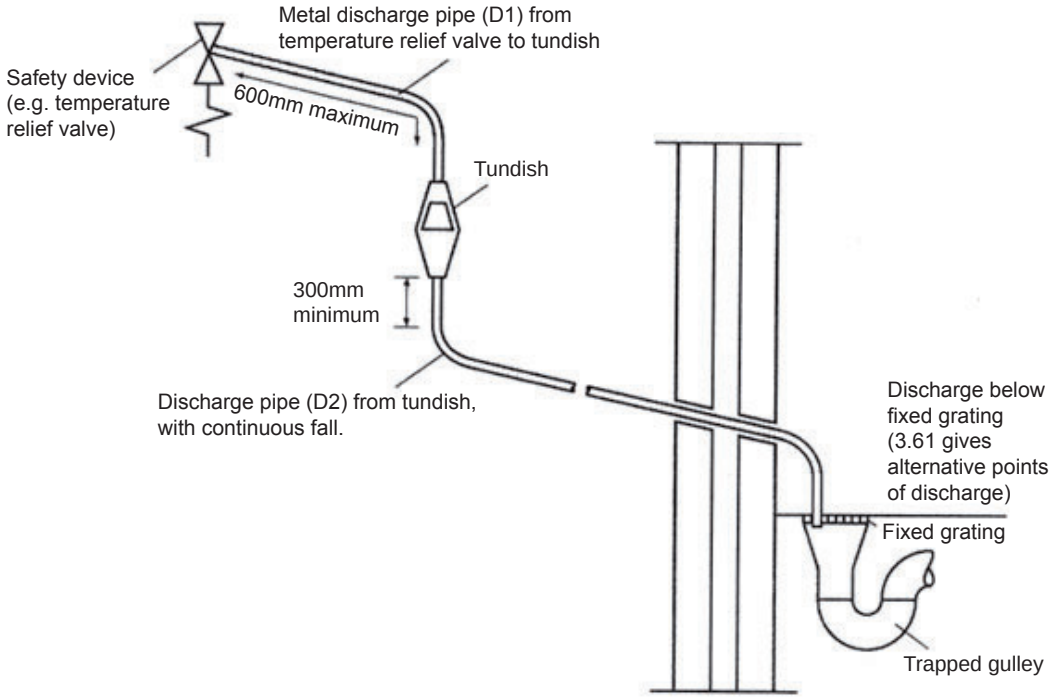
A

A.2 Alternative Discharge

Discharge pipes should be in metal and dedicated to the unvented cylinder. The pipe should have a continuous fall and should terminate in a safe and visible place. Downward discharges at low level, i.e. up to 100 mm above external surfaces such as car parks, hard standings, grassed areas etc. are acceptable providing that where children may play or otherwise come into contact with discharges, a wire cage or similar guard is positioned to prevent contact, whilst maintaining visibility.

Discharge at high level, i.e. into a metal hopper and metal down pipe with the end of the discharge pipe clearly visible (tundish visible or not) or onto a roof capable of withstanding high temperature discharges of water and 3 m from any plastics guttering system that would collect such discharges (tundish visible).

Where a single pipe serves a number of discharges, such as in blocks of flats, the number served should be limited to not more than 6 systems so that any installation discharging can be traced reasonably easily. The single common discharge pipe should be at least one pipe size larger than the largest individual discharge pipe to be connected. For further information contact your Building Control Office.



Valve outlet size	Minimum size of discharge pipe D1*	Minimum size of discharge pipe D2* from tundish	Maximum resistance allowed, expressed as a length of straight pipe (i.e. no elbows or bends)	Resistance created by each elbow or bend
		22 mm	up to 9 m	0.8 m
G1/2	15 mm	28 mm	up to 18 m	1.0 m
		35 mm	up to 27 m	1.4 m
		28 mm	up to 9 m	1.0 m
G3/4	22 mm	35 mm	up to 18 m	1.4 m
		42 mm	up to 27 m	1.7 m
		35 mm	up to 9 m	1.4 m
G1	28 mm	42 mm	up to 18 m	1.7 m
		54 mm	up to 27 m	2.3 m

A.3 Installation, Commissioning and Service record sheets

The code of practice for the installation, commissioning & servicing of mains pressure hot water storage

Installation, Commissioning and Service Record Log Book

Customer details	
Name	
Address	
	TEL No.

Important

1. Please, keep the Log Book in a safe place for future reference.
2. This Log Book is to be completed in full by the competent person(s) who commissioned the equipment and then handed to the customer. When this is done, the Log Book is a commissioning certificate that can be accepted as evidence of compliance with the appropriate Building Regulations.
3. Failure to install and commission this appliance to the manufacturer's instructions may invalidate the warranty.

The above does not affect your statutory rights.

INSTALLER & COMMISSIONING ENGINEER DETAILS

Installer details	
Company name	Date
Address	
Installer name	TEL No.
REGISTRATION DETAILS REGISTERED OPERATIVE ID CARD No. (IF APPLICABLE)	

COMMISSIONING ENGINEER (IF DIFFERENT)	
Name	Date
Address	
TEL No.	
REGISTRATION DETAILS REGISTERED OPERATIVE ID CARD No. (IF APPLICABLE)	

IT IS THE RESPONSIBILITY OF THE INSTALLER TO COMPLETE THIS LOGBOOK AND PASS IT ON TO THE CUSTOMER. FAILURE TO DO SO MAY INVALIDATE THE CYLINDER WARRANTY.

A

APPLIANCE & TIME CONTROL DETAILS

Manufacturer		Model
Capacity	litres	Serial no.
Type	Unvented	
Time control	Programmer ☐ or	Time switch ☐

COMMISSIONING PROCEDURE INFORMATION

Primary settings (indirect heating only)

IS THE PRIMARY A SEALED OR OPEN VENTED SYSTEM?	SEALED ☐ OPEN ☐
WHAT IS THE MAXIMUM INDIRECT HEAT SOURCE FLOW TEMPERATURE?	☐ °C

ALL MAINS PRESSURISED SYSTEMS

WHAT IS INCOMING STATIC COLD WATER PRESSURE AT THE INLET TO THE PRESSURE REDUCING VALVE?	☐ bar
HAS STRAINER (IF FITTED) BEEN CLEANED OF INSTALLATION DEBRIS?	YES ☐ NO ☐
HAS A WATER SCALE REDUCER BEEN FITTED?	YES ☐ NO ☐
WHAT TYPE OF SCALE REDUCER HAS BEEN FITTED?	

UNVENTED SYSTEMS

ARE COMBINED TEMPERATURE AND PRESSURE RELIEF VALVE AND EXPANSION VALVE FITTED AND DISCHARGE TESTED?	YES ☐ NO ☐
IS PRIMARY ENERGY SOURCE CUT OUT FITTED?	YES ☐ NO ☐
WHAT IS THE PRESSURE REDUCING VALVE SETTING (IF FITTED)?	☐ bar
WHERE IS OPERATING PRESSURE REDUCING VALVE SITUATED?	
HAS THE EXPANSION VESSEL BEEN CHECKED?	YES ☐ NO ☐
WHAT IS THE HOT WATER TEMPERATURE AT THE NEAREST OUTLET?	☐ °C

ALL PRODUCTS

DOES THE HOT WATER SYSTEM COMPLY WITH THE APPROPRIATE BUILDING REGULATIONS?	YES ☐
HAS THE SYSTEM BEEN INSTALLED AND COMMISSIONED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS?	YES ☐
HAVE YOU DEMONSTRATED THE OPERATION OF THE SYSTEM CONTROLS TO THE CUSTOMER?	YES ☐
HAVE YOU LEFT ALL THE MANUFACTURER'S LITERATURE WITH THE CUSTOMER?	YES ☐

COMPETENT PERSON'S SIGNATURE	CUSTOMER'S SIGNATURE (To confirm demonstrations of equipment and receipt of appliance instructions)

PLEASE FOLLOW THE INSTALLATION AND COMMISSIONING INSTRUCTIONS IN THE INSTALLATION MANUAL SUPPLIED WITH THE EQUIPMENT

A

SERVICE INTERVAL RECORD

It is recommended that your hot water system is serviced regularly and that your service engineer completes the appropriate Service Interval Record below.

SERVICE PROVIDER

Before completing the appropriate Service Interval Record below, please ensure you have carried out the service as described in the manufacturer's instructions and in compliance with all relevant codes of practice.

SERVICE 1	Date:
Engineer name	
Company name	
TEL no.	
Comments	
Signature	

SERVICE 2	Date:
Engineer name	
Company name	
TEL no.	
Comments	
Signature	

SERVICE 3	Date:
Engineer name	
Company name	
TEL no.	
Comments	
Signature	

SERVICE 4	Date:
Engineer name	
Company name	
TEL no.	
Comments	
Signature	

SERVICE 5	Date:
Engineer name	
Company name	
TEL no.	
Comments	
Signature	

SERVICE 6	Date:
Engineer name	
Company name	
TEL no.	
Comments	
Signature	

SERVICE 7	Date:
Engineer name	
Company name	
TEL no.	
Comments	
Signature	

SERVICE 8	Date:
Engineer name	
Company name	
TEL no.	
Comments	
Signature	

SERVICE 9	Date:
Engineer name	
Company name	
TEL no.	
Comments	
Signature	

SERVICE 10	Date:
Engineer name	
Company name	
TEL no.	
Comments	
Signature	

When all the above services have been completed, please contact your Service Engineer for an additional service interval record sheet.

POLAR ENERGI AS
POSTBOKS 117
9450 HAMNVIK
NORWAY
www.polarenergi.com