

# INSTALLATION AND MAINTENANCE MANUAL

“Original Language”

## PAW-FC Fan Coils

Cassette



**Read through the Installation Instructions before you proceed with the installation. In particular, you will need to read under the “ IMPORTANT ! ” section at the top of the page.**

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# IMPORTANT!

## Please Read Before Starting

This equipment must be installed by the sales dealer or installer. This information is provided for use only by authorized persons.

### 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.
- This unit shall be installed in accordance with National Wiring Regulations.
- This unit complies with the requirements of the following EU legislation: 2014/30/EU (EMC), 2006/42/EC (Machinery), 2011/65/EU (RoHS), 2014/35/UE (Low Voltage Directive) and all applicable Standards (see EC Declaration for details).
- Pay close attention to all warning and caution notices given in this manual.



#### WARNING

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



#### CAUTION

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

### 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.

### Notice

The English text is the 'Original language'. The content of this document is intended for use by the manufacturer professional personnel only.

## SPECIAL PRECAUTIONS



#### WARNING

#### 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 see the wiring diagram provided with the IMM Manual when wiring. Improper connections and inadequate grounding can cause accidental injury or death.
- Connect all wiring tightly. Loose wiring may cause overheating at connection points and a possible fire hazard.
- ELCB must be incorporated in the fixed wiring.
- Circuit breaker must be incorporated in the fixed wiring in accordance with the wiring regulations.

### When Transporting

- It may need two or more people to carry out the installation work.
- Care should be taken when lifting or moving the unit to reduce the chance of serious injury. Do not attempt to move the equipment without the correct means of lifting.

### 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.

### When Servicing

- Turn the power OFF at the main power box (mains), wait at least 10 minutes until it is discharged, then open 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.



#### WARNING





- This product must not be modified or disassembled under any circumstances. Modified or disassembled unit may cause fire, electric shock or injury.
- Users must not clean inside the unit. Engage authorized dealer or specialist for cleaning.
- In case of malfunction of this unit, please contact to the sales dealer or service dealer for a repair and disposal.
- Any operation carried out by unauthorized personnel is prohibited and can cause serious damage to people and things.

### Others

When disposing of the product, comply with national Regulations.



## CAUTION

- Do not touch the air inlet or the sharp aluminium fins of the coil of the unit. You may get injured. 
- Do not sit or step on the unit, you may fall down accidentally. 
- Do not stick any object into the FAN CASE. You may be injured and the unit may be damaged.   


**It is the installer's responsibility to contact their pipe supplier and take into account the general instructions for the use of plastic pipes.**

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

If you meet a problem, please call the Technical Department for your area. If possible, assemble the compulsory or optional accessories before placing the appliance on its final location (see instructions provided with each accessory). In order to become fully familiar with the appliance, we suggest to read also our Technical Data Manual (TDM). The information contained in this manual are subject to modification without prior notice.



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

### **1. General recommendations**

The purpose of this Manual is to provide users with instructions for installing, commissioning, using the units. It contains the description of all the maintenance operations guaranteeing the unit's long life and reliability. Only the services of a qualified technician can guarantee the unit's safe operation over a long service life. Please read the following safety precautions very carefully before working on the unit.

#### **1.1 Safety directions**

Follow the safety rules in force when you are working on your fan coil. This appliance has not been designed for use by persons (including children) with reduced physical, sensorial or mental faculties or by persons without any experience or knowledge of cooling and heating systems, unless they act under the safety and supervision of a responsible person or have received prior training concerning the use of the appliance.

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

Make sure that the power supply and its frequency are adapted to the required electric current of operation, taking into account specific conditions of the location and the current required for any other appliance connected to the same circuit. The unit must be EARTHED to avoid any risks caused by insulation defects.

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

#### **1.2 Warning**

Cut-off power supply before starting to work on the unit.

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

**The fan-coil units may contain a small amount of oil incompatible with plastic polyethylene piping (PER/HTA/PVC). The coil should be rinsed out before use to avoid any problem.**

## 2. Inspection and storage

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

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

Never store or transport the unit upside down. It must be stored indoors, completely protected from rain, snow etc. The unit must not be damaged by changes in the weather (high

and low temperatures). Excessively high temperatures (above 60°C) can harm certain plastic materials and cause permanent damage. Moreover, the performance of certain electrical or electronic components can be impaired.

Environmental conditions must be within the following limits:

- Minimum ambient temperature : -20°C
- Maximum ambient temperature : +55°C
- Maximum R.H. : 95% not condensing

The equipment must be stored in environments with a temperature within the limits indicated above. High humidity atmosphere may damage electrical components.

### 2.1 Disposal information

Units must be disposed of in accordance with local regulations.

#### Information for Users on Collection and Disposal of Old Equipment and Used Batteries



These symbols on the products, packaging, and/or accompanying documents mean that used electrical and electronic products and batteries should not be mixed with general household waste. For proper treatment, recovery and recycling of old products and used batteries, please take them to applicable collection points, in accordance with your national legislation and the Directives 2012/19/EU of 4 July 2012 on waste electrical and electronic equipment (WEEE).

By disposing of these products and batteries correctly, you will help to save valuable resources and prevent any potential negative effects on human health and the environment which could otherwise arise from inappropriate waste handling. For more information about collection and recycling of old products and batteries, please contact your local municipality, your waste disposal service or the point of sale where you purchased the items. Penalties may be applicable for incorrect disposal of this waste, in accordance with national legislation.

#### For business users in the European Union

If you wish to discard electrical and electronic equipment, please contact your dealer or supplier for further information.

#### [Information on Disposal in other Countries outside the European Union]

These symbols are only valid in the European Union. If you wish to discard these items, please contact your local authorities or dealer and ask for the correct method of disposal.



#### Note for the battery symbol (bottom two symbol examples):

This symbol might be used in combination with a chemical symbol. In this case it complies with the requirement set by the Directive for the chemical involved.

## 3. Warranty

The appliances are delivered fully assembled, factory tested and ready to operate.

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

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

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






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

## 4. Presentation

The range of **PAW-FC** Fan Coil includes the **Cassette** (AC / EC) configuration which is available in different sizes. The cooling capacity is from 1,4 to 9,4 kW and the heating capacity is from 1,1 to 14,0 kW. The version available is reversible 2-pipes, 4-pipes, with AC fan or EC fan.

### Main features and accessories:

- 2 and 4-pipe configurations
- Very low acoustic levels
- Quick access, by simply removing the front grille
- All connections: located at the same side
- Galvanized steel sheet with thermal and acoustical insulation, avoiding condensation on the casing and providing good sound attenuation
- Cleanable synthetic-type air filter

Optional controller for <b>AC fan</b>	Optional controller for <b>EC fan</b>
 <p><b>Optional controller. Wired remote controller.</b> PAW-FC-903TC</p>	 <p><b>Optional controller. Advanced wired remote controller.</b> PAW-FC-RC1</p>
 <p><b>Optional controller. Wired remote controller for EC fans.</b> PAW-FC-907TC</p>	

### Casing

Made of galvanized steel insulated with closed cell polyethylene foam.

Access to internal components of the unit is facilitated by easy dismounting of the plastic cover. All models are equipped with a 3-top condensate drain pump to ensure optimal condensate draining and to minimize water retention. Condensate drain pan is made from galvanized sheet steel coated with closed cell polyethylene foam on external face. The drain pan is painted to ensure anticorrosion protection.

### Coil

The coil is made of staggered copper tubes, mechanically expanded into aluminium fins, assuring maximum heat transfer efficiency.

Each coil is supplied with headers having an air vent at the highest point and a drain plug at the lowest point.

### Filter

Units are equipped with filters consisting of cleanable synthetic media (sewn on wire frame), which are easily removable for cleaning or replacement.

### 4.1 Operating limits

<b>Power supply</b>	Nominal single phase voltage: Operating voltage limits:	230 V – 50/60 Hz min. 207 V – max. 253 V
<b>Ambient air conditions</b>	Minimum ambient temperature / relative humidity: Maximum ambient temperature / relative humidity:	+5 °C / 15% R.H. +32 °C / 70% R.H.
<b>Water circuit conditions</b>	Maximum operating pressure Minimum inlet temperature (100 % water) Maximum inlet temperature	14 bar +5 °C +80 °C
<b>Water quality</b>		

Risk of excessive clogging inside the coil tubes due to inadequate water quality.

Using untreated or unsuitable water can lead to excessive clogging inside the coil tubes (earth and mud deposits, corrosion, etc.) with major consequences on the thermal efficiency of the unit and irreversible damage to the equipment.

- Contact a specialised water treatment company for advice on establishing a suitable water quality and on any required water treatment.
- If treatment is required, make sure it works effectively.

- Ensure that a suitable water quality is maintained at all times, because the manufacturer and its representative decline all responsibility in the event of untreated or incorrectly treated water being used.

### Guidelines for water quality

Substance	Condition Effects	Recommended content
NH <sub>4</sub> <sup>+</sup>	No NH <sub>4</sub> <sup>+</sup> ammonium ions in the water, highly detrimental to copper.	< 10 mg/l
Cl <sup>-</sup>	Cl <sup>-</sup> chloride ions are detrimental to copper with a risk of puncture by picking corrosion.	< 10 mg/l
SO <sub>4</sub> <sup>2-</sup>	SO <sub>4</sub> <sup>2-</sup> sulphate ions may cause perforating corrosion	< 30 mg/l
Fluoride ions	No fluoride ions	< 0.1 mg/l
Fe <sup>2+</sup> and Fe <sup>3+</sup>	No Fe <sup>2+</sup> and Fe <sup>3+</sup> ions, particularly in case of dissolved oxygen. The presence of these ions with dissolved oxygen indicates corrosion of steel parts, likely to generate corrosion of copper parts under Fe deposits.	Fe < 5 mg/l; with dissolved oxygen < 5 mg/l
Dissolved silica	Silica is an acid element of water and may also cause corrosion.	< 1 mg/l
Total water hardness (TH)	Values between 10 and 25 may be recommended. This facilitates scaling deposits likely to limit copper corrosion. Excess TH values may lead to clogging the pipes.	10 °F < TH < 25 °F
Total alkalinity (TAC)		TAC < 100 mg/l
Dissolved oxygen	Prevent any sudden change in the water's oxygenation conditions. Also, avoid deoxygenating water by sparging inert gas as well as over oxygenating it by pure oxygen sparging. Disturbing oxygenation conditions destabilizes copper hydroxides and particle salting-out.	
Electrical Resistivity / Conductivity	The higher the resistivity, the slower the corrosion. Values above 3000 ohm/cm are preferred. A neutral environment favours maximum resistivity. For electrical conductivity, values around 200 ... 600 S/cm can be recommended.	
pH	neutral pH at 20°C	7 < pH < 8



## 4.2 Nomenclature

The nomenclature reflects each model's type, coil configuration, external static pressure configuration, size and service side.

**Example:**

		PAW-FC	2	A	-	U	040		
<b>Unit type</b>	PAW-FC = Fan Coil Unit								
<b>Number of pipes</b>	2 = 2-pipe configuration 4 = 4-pipe configuration								
<b>Fan motor type</b>	A = AC fan motor <sup>1</sup> E = EC fan motor <sup>2</sup> (electronically commutated)								
<b>Separator</b>	-								
<b>Model type</b>	U = cassette-type model D = ducted model with low external static pressure (ESP) F = ducted model with medium external static pressure (ESP) E = ducted model with high external static pressure (ESP) T = ceiling-mounted model P = floor-standing model U = cassette-type model K = wall-mounted model								
<b>Size</b>									
<b>Service side</b>	Blank = not applicable <sup>4</sup> L = left-hand service side configuration <sup>3</sup> R = right-hand service side configuration <sup>3</sup>								
<b>IR compatibility</b>	Blank = not applicable IR = IR receiver integrated <sup>5</sup> (supplied with compatible IR controller)								

1) AC fan motor not available for F-type models

2) EC fan motor not available for K-type models

3) Service side as seen from the unit's air discharge side

4) For U-type models: all connections on one side. For K-type models: connections always on #?left/right-hand?# side

5) Applicable for K-type models only

## 4.3 Unit nominal performance

PAW-AC fan 2-pipe			FC2A-U020	FC2A-U030	FC2A-U040	FC2A-U050	FC2A-U060	FC2A-U070
Total cooling capacity <sup>1)</sup>	Lo/Med/Hi	kW	1,5 / 1,8 / 2,4	1,9 / 2,7 / 4,0	2,8 / 3,5 / 4,7	3,4 / 4,4 / 6,1	3,7 / 5,4 / 7,2	4,0 / 6,5 / 8,6
Sensible cooling capacity <sup>1)</sup>	Lo/Med/Hi	kW	1,3 / 1,5 / 2,0	1,4 / 2,2 / 3,0	2,1 / 2,6 / 3,6	2,6 / 3,4 / 4,8	2,7 / 4,0 / 5,4	3,0 / 4,8 / 6,4
Water flow	Lo/Med/Hi	l/h	265 / 303 / 404	323 / 493 / 683	478 / 597 / 801	576 / 762 / 1042	636 / 937 / 1233	695 / 1111 / 1476
Water pressure drop	Lo/Med/Hi	kPa	4,3 / 6,8 / 10,9	3,6 / 8,5 / 14,4	6,9 / 11,2 / 18,3	8,4 / 13,0 / 21,9	3,4 / 7,5 / 11,5	5,6 / 13,0 / 20,5
Heating capacity <sup>2)</sup>	Lo/Med/Hi	kW	2,2 / 2,5 / 3,2	2,3 / 3,7 / 4,5	3,7 / 4,6 / 6,2	4,5 / 6,0 / 8,1	4,5 / 7,4 / 10,0	5,2 / 9,2 / 12,0
PAW-AC fan 4-pipe			FC4A-U020	FC4A-U030	FC4A-U040	-	FC4A-U060	FC4A-U070
Total cooling capacity <sup>1)</sup>	Lo/Med/Hi	kW	1,4 / 1,5 / 2,0	2,0 / 2,7 / 3,4	2,5 / 3,3 / 4,0	-	3,0 / 4,9 / 6,6	3,2 / 6,0 / 7,5
Sensible cooling capacity <sup>1)</sup>	Lo/Med/Hi	kW	1,2 / 1,4 / 1,8	1,5 / 2,1 / 2,6	2,0 / 2,6 / 3,2	-	2,3 / 3,8 / 5,1	2,5 / 4,6 / 5,9
Water flow	Lo/Med/Hi	l/h	232 / 258 / 359	342 / 465 / 576	437 / 563 / 683	-	511 / 851 / 1137	543 / 1030 / 1294
Water pressure drop	Lo/Med/Hi	kPa	6,6 / 8,9 / 13,6	4,4 / 8,3 / 11,6	6,7 / 11,2 / 15,3	-	6,0 / 13,9 / 22,2	7,1 / 18,9 / 27,5
Heating capacity <sup>2)</sup>	Lo/Med/Hi	kW	0,8 / 0,9 / 1,2	2,2 / 3,1 / 3,8	3,0 / 3,5 / 4,1	-	3,7 / 5,5 / 7,0	4,5 / 7,1 / 8,9
Water flow	Lo/Med/Hi	l/h	132 / 153 / 201	374 / 530 / 658	521 / 603 / 699	-	636 / 939 / 1210	776 / 1214 / 1540
Water pressure drop	Lo/Med/Hi	kPa	25,7 / 33,4 / 53,6	13,7 / 24,2 / 35,0	24,2 / 30,9 / 39,8	-	7,6 / 13,8 / 20,7	10,2 / 20,8 / 30,9

1) According to Eurovent standard. Air: 27°C DB / 19°C WB. Water in/out: 7°C / 12°C.


2) According to Eurovent standard. Air: 20°C. Water in/out: 45°C / 40°C.

PAW- EC fan 2-pipe			FC2E-U020	FC2E-U030	FC2E-U040	FC2E-U050	FC2E-U060	FC2E-U070
Total cooling capacity <sup>1)</sup>	Lo/Med/Hi	kW	1,6 / 1,8 / 2,4	1,9 / 2,9 / 4,0	2,8 / 3,5 / 4,7	3,4 / 4,4 / 6,1	3,7 / 5,5 / 7,2	4,1 / 6,5 / 9,6
Sensible cooling capacity <sup>1)</sup>	Lo/Med/Hi	kW	1,3 / 1,5 / 2,0	1,4 / 2,2 / 3,1	2,1 / 2,7 / 3,6	2,6 / 3,5 / 4,7	2,7 / 4,1 / 5,4	3,0 / 4,9 / 7,2
Water flow	Lo/Med/Hi	l/h	267 / 306 / 409	325 / 497 / 688	481 / 604 / 808	579 / 765 / 1050	640 / 944 / 1243	700 / 1119 / 1649
Water pressure drop	Lo/Med/Hi	kPa	4,2 / 6,9 / 11,2	3,5 / 8,6 / 14,6	6,8 / 11,4 / 18,6	8,4 / 13,1 / 22,2	3,4 / 7,6 / 11,7	5,8 / 13,1 / 24,6
Heating capacity <sup>2)</sup>	Lo/Med/Hi	kW	2,2 / 2,5 / 3,2	2,3 / 3,7 / 4,5	3,7 / 4,6 / 6,2	4,5 / 6,0 / 8,1	4,5 / 7,4 / 10,0	5,2 / 9,2 / 13,0
PAW- EC fan 4-pipe			FC4E-U020	FC4E-U030	FC4E-U040	-	FC4E-U060	FC4E-U070
Total cooling capacity <sup>1)</sup>	Lo/Med/Hi	kW	1,4 / 1,5 / 2,0	2,0 / 2,7 / 3,4	2,6 / 3,2 / 4,0	-	3,0 / 5,0 / 6,6	3,2 / 6,1 / 7,9
Sensible cooling capacity <sup>1)</sup>	Lo/Med/Hi	kW	1,2 / 1,4 / 1,9	1,5 / 2,1 / 2,6	2,1 / 2,6 / 3,3	-	2,3 / 3,8 / 5,1	2,6 / 4,7 / 6,3
Water flow	Lo/Med/Hi	l/h	234 / 262 / 344	344 / 464 / 581	442 / 556 / 690	-	516 / 858 / 1144	549 / 1041 / 1366
Water pressure drop	Lo/Med/Hi	kPa	6,6 / 9,1 / 14,0	4,4 / 8,2 / 11,7	6,7 / 10,9 / 15,5	-	6,0 / 14,1 / 22,4	7,2 / 19,2 / 30,1
Heating capacity <sup>2)</sup>	Lo/Med/Hi	kW	0,8 / 0,9 / 1,2	2,2 / 3,1 / 3,8	3,0 / 3,5 / 4,1	-	3,7 / 5,5 / 7,0	4,5 / 7,1 / 9,8
Water flow	Lo/Med/Hi	l/h	132 / 153 / 201	374 / 530 / 658	521 / 603 / 699	-	636 / 939 / 1210	776 / 1214 / 1686
Water pressure drop	Lo/Med/Hi	kPa	25,7 / 33,4 / 53,6	13,7 / 24,2 / 35,0	24,2 / 30,9 / 39,8	-	7,6 / 13,8 / 20,7	10,2 / 20,8 / 36

1) According to Eurovent standard. Air: 27°C DB / 19°C WB. Water in/out: 7°C / 12°C.

2) According to Eurovent standard. Air: 20°C. Water in/out: 45°C / 40°C.

## 5. Installation

	<p><b>CAUTION</b></p> <ul style="list-style-type: none"> <li>- The unit installation work must be done by qualified personnel according to the local rules and this manual.</li> <li>- The unit should not be installed in a bathroom, a laundry, a sauna or a swimming-pool.</li> </ul>
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### During the installation:

- Take care to avoid any rough handling or impacts when unloading and moving the appliance.
- Before hoisting into position, test lift to insure stability and balance. Avoid twisting or uneven lifting of the units.
- The units shall be carefully inspected before unit installation to make sure that no handling damage has occurred.
- All these sections have been inspected before leaving the factory. It is therefore important to insure that no bolts, screws or other fixing system are loosened or missing before the commissioning. During the handling of the machine it is mandatory to provide all the devices necessary to guarantee personal safety.

### 5.1 Unit location – Recommendations

Select the unit location with the following aspects in mind:

- Choose an area free from obstructions which may cause uneven air distribution and/or return.
  - Consider using an area where installation is easy.
  - Choose a position that allows for the clearances required.
  - Look for a position in the room which ensures the best possible air distribution.
  - Install unit in a position where condensate can easily be piped to an appropriate drain.
- Positions to avoid:**
- Exposure to direct sunlight.
  - Exposure to oil vapours.
  - Areas close to heat sources.
  - Installation in areas with high frequency waves.
  - On damp walls or in positions that may be exposed to water hazard.
  - Where curtains or furniture may obstruct free air circulation.
  - Positions too close to heating sources which may damage the unit.

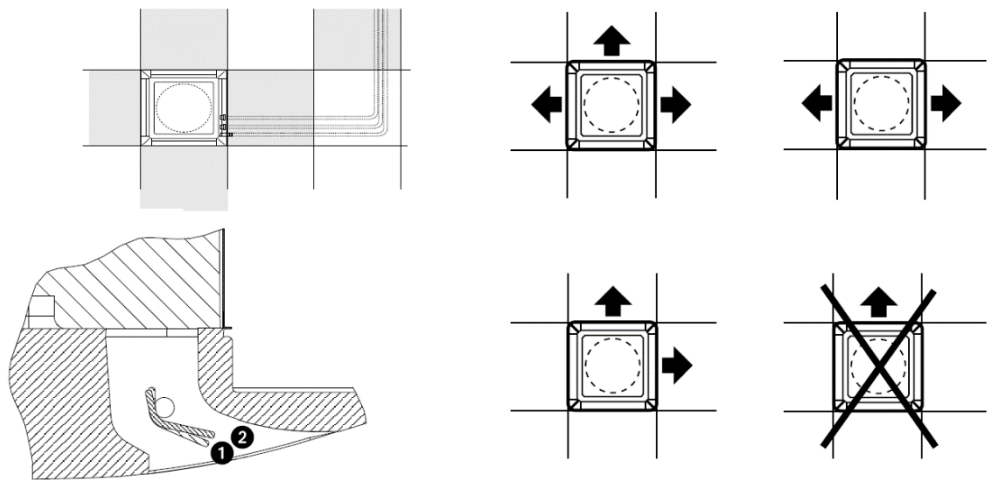
## 5.2 Clearance



**To avoid any obstruction of the unit air intake or supply grilles.**  
Keep free space for inspection and maintenance.

- Such device is not accessible to the public. It must be installed at least 2.5 m above ground level, unless it is installed inside engine rooms or in similar environments.
- Install the unit as centrally as possible in the room, the air flow direction can be controlled by manually regulating the louvres position, according to the operating mode (cooling or heating): this will ensure optimum distribution of the air in the room.
- During cooling mode operation the best position for the deflecting louvres is one which allows air diffusion close to the ceiling. In heating mode, the louvres should be positioned so that the air is directed towards the floor, in order to prevent layers of hot air forming in the upper part of the room.
- In order to allow easy and rapid installation and maintenance, make sure that in the selected position it is possible to remove the ceiling panels or, if the ceiling is constructed of masonry, that access to the unit is guaranteed.

**Max. 2 louvres closed**



## 5.3 Mounting the unit



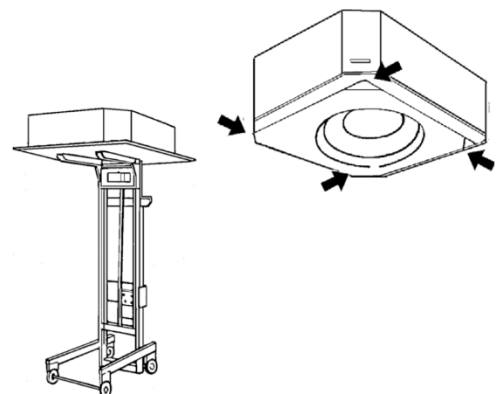
**All installation equipment and mounting material must be provided by the installer.**

### Prior to installation

It is advisable to place the unit as close as possible to the installation site before removing it from the packaging. The grille panel and the control are separately packed for maximum protection.

### IMPORTANT:

- Do not lift the unit by the condensate drain discharge pipe; hold it by its four corners only.
- Unit installation will be facilitated using a stacker.
- Plastic diffuser only: If plaster board ceiling panels are installed the maximum dimensions of the unit housing must not exceed:
  - o 660 x 660 mm (mod. PAW-FC\*\*-U020 to PAW-FC\*\*-U040) and;
  - o 900 x 900 mm (mod. PAW-FC\*\*-U050 to PAW-FC\*\*-U070).
- In rooms with high humidity, brackets should be insulated by self-adhesive insulation supplied.



## Installation

Mark the position of the hangers, connection lines and condensate drain pipe, power supply cables and remote control cable (see dimensions); the cardboard template (supplied with the kit) may be of assistance for this operation.

<p>1</p>	<p>Depending on the type of ceiling the hangers can be fixed as shown in the drawing.</p>	
<p>2</p>	<p>Once the threaded hangers have been positioned, do not tighten the nuts, and insert the washers as shown in the drawing.</p>	
<p>3</p>	<p>Once the hydraulic connections are in place, remove the "T" bar in order to facilitate installation operations – see figure -.</p>	
<p>4</p>	<p>Carefully lift the unit (without the frame) using the four suspension brackets (or the four corners), inserting it into the false ceiling.</p> <p>If the "T" bar cannot be removed the unit may need to be tilted (this operation may only be carried out with false ceilings with a minimum height of 300 mm).</p>	
<p>5</p>	<p>Align and level the unit by adjusting the nuts and locknuts on the threaded hangers, maintaining a distance of 25 -30 mm between the sheet metal body and the underside of the false ceiling.</p> <p>Reposition the "T" bar and align the unit in relation to the bar by tightening the nuts and locknuts. After the condensate drain pipe and the water ducts have been connected, check to make sure that the unit is level.</p>	

## 6. Hydraulic connections



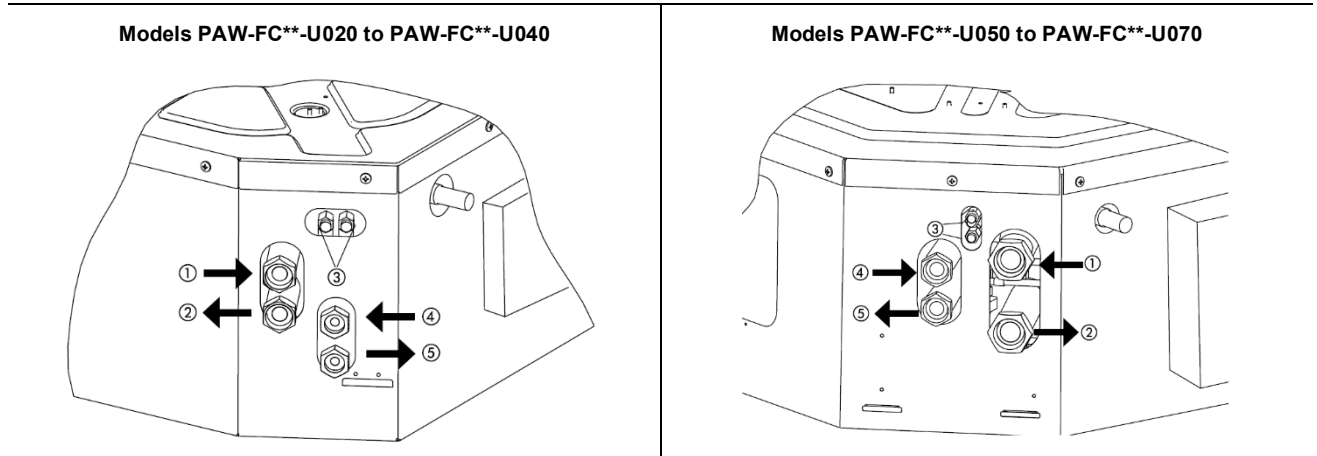
### CAUTION:

All installation equipment and mounting material must be provided by the installer.  
Flexible pipes are recommended for connecting the coils to prevent transmission of vibration.

The unit is provided with inlet and outlet female connections for both 2 and 4 pipe models.  
An air bleed valve is also provided (See figure), which can be adjusted using an 8 mm wrench.

### IMPORTANT

To make water connections to the heat exchanger or the valves use threaded joints and suitable materials that can ensure perfect tightness.



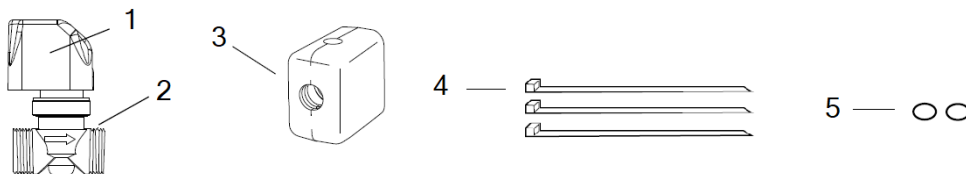
Ref.	Description	2-pipe		4-pipe	
		PAW-FC2*-U020 to PAW-FC2*-U040	PAW-FC2*-U050 to PAW-FC2*-U070	PAW-FC4*-U020 to PAW-FC4*-U040	PAW-FC4*-U050 to PAW-FC4*-U070
1	Water inlet C (C/H)	3/4"	3/4"	3/4"	3/4"
2	Water outlet C (C/H)	3/4"	3/4"	3/4"	3/4"
3	Air bleeding valves	-	-	-	-
4	Water inlet H	-	-	1/2"	3/4"
5	Water outlet H	-	-	1/2"	3/4"

### IMPORTANT

- When making the hydraulic connections, ensure that no impurities are introduced into the pipework.

### 6.1 2-way regulating valve - accessory

The water flow has to be controlled by installing the motorized thermo-electric valves supplied an accessory or by installing motorized field supplied valves.



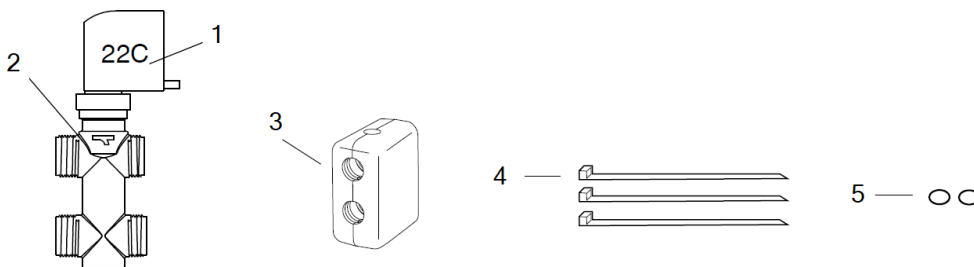
Ref.	Description	2-pipe		4-pipe	
		PAW-FC2*-U020 to PAW-FC2*-U040	PAW-FC2*-U050 to PAW-FC2*-U070	PAW-FC4*-U020 to PAW-FC4*-U040	PAW-FC4*-U050 to PAW-FC4*-U070
1	Actuator	1	1	2	2
2	Valve 1/2"	-	-	1	-
	Valve 3/4"	1	-	1	1
	Valve 1"	-	1	-	1
3	Shell	1	1	1	1
4	Clips	3	3	3	3
5	Gasket	2	2	4	4

### IMPORTANT

Using a 2-way regulating valve **MANDATORILY** requires the fitting of additional balancing valves in the water circuit, to prevent water from circulating in the unit when the fan is not operating and to maintain a steady water flow in the rest of the water circuit.

## 6.2 Installing the 3-way regulating valve - accessory

The water flow has to be controlled by installing the motorized thermo-electric valves supplied an accessory or by installing motorized field supplied valves.

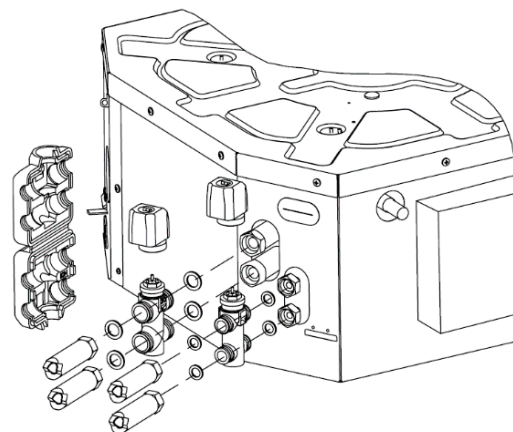


Ref.	Description	2-pipe		4-pipe	
		PAW-FC2*-U020 to PAW-FC2*-U040	PAW-FC2*-U050 to PAW-FC2*-U070	PAW-FC4*-U020 to PAW-FC4*-U040	PAW-FC4*-U050 to PAW-FC4*-U070
1	Actuator	1	1	2	2
2	Valve 1/2"	-	-	1	-
	Valve 3/4"	1	-	1	1
	Valve 1"	-	1	-	1
3	Shell	1	1	1	1
4	Clips	3	3	3	3
5	Gasket	2	2	4	4

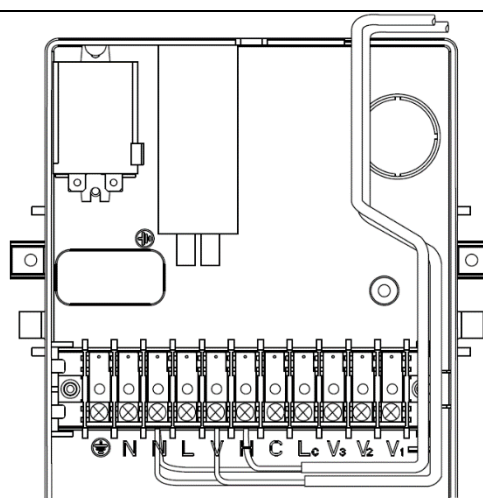
- With 4-pipes models, first install the valve assembly for the cold circuit followed by the valve assembly for the hot circuit.
- Connect the valve assemble to the coil and fasten it by a 30Nm torque.
- Insulate the valve assembly.

Gasket type	Torque [Nm]
Rubber	10 / 12
Fibre	25 / 30

- Fit the actuator on the valve body, route the valve cable through the box and connect it to the terminal block as shown in the figure below.

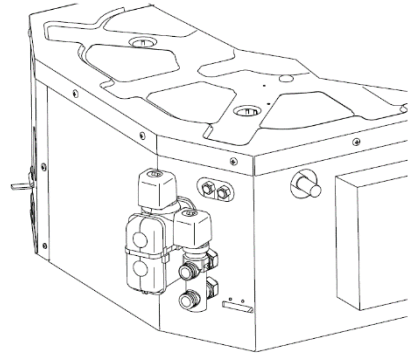


<b>N</b>	Neutral
<b>L</b>	Phase
<b>Lc</b>	Condensate Pump phase
<b>H</b>	Heating
<b>C</b>	Default contact condensate pump
<b>V</b>	Cooling valve
<b>V1, V2, V3</b>	Motor speed



Cables routing

- To connect the steel pipes to the system, ensure they are aligned and supported to avoid excess strain on the unit. If the system is filled with water, check all fitting seals.
- After ending the hydraulic connections, make sure there are no leaks. Insulate the valve using the shell, fix it by means of the clips and make sure that all cold parts are insulated (see figure).
- For 4-pipe hot water, repeat all the operations with gas adaptors, as per the table on the previous page.



**CAUTION:**

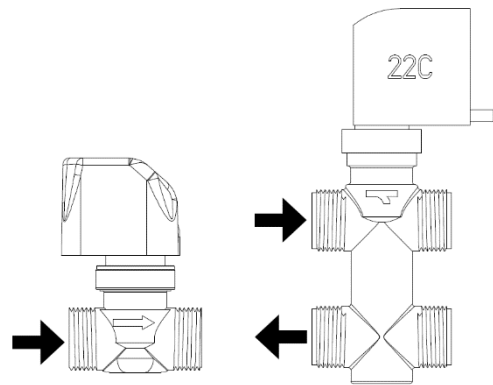


- **When the system is filled with water, verify all couplings for tightness.**
- **The manufacturer does not accept responsibility for the tightness of the field - installed valve assembly and this is not tested in the factory. He declines any responsibility for non-functioning of these assemblies and for damage due to dripping.**

**6.3 Operation of the thermo-electric valve**

- This 2 or 3-way valve is of the OPEN/CLOSE type with very slow stroke. It is not a modulating valve so it has no PTC. This valve is driven, as a sensible element, by the ambient thermostat of the "cassette" unit.
- The 2-way valve is normally closed to the coil with no powered actuator side. The 3-way valve is normally closed to the coil with no powered actuator side while is open to the bypass way side. When the room temperature does not satisfy the thermostat, the valve opens after about 3 minutes about to allow water to circulate in the coil.
- If the room temperature satisfies the thermostat or if the electric power has been switched off, the valve is closed after about 3 minutes towards the coil and is opened towards the bypass.

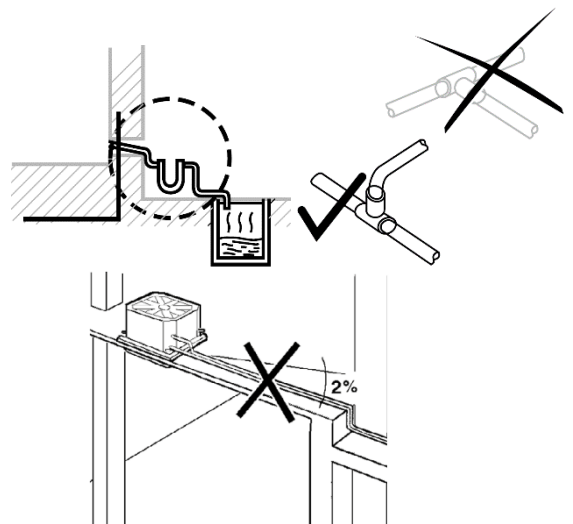
- If an emergency occurs, the valve may be manually opened, removing the electric head, unscrewing the ring nut. When the emergency ends, remember to reset the valve to automatic operation, repositioning the electric head; failure to do this can result in condensate formation due the water pipes, even if the unit is switched off.



**6.4 Connecting the condensate evacuation pipe to the drain tray**

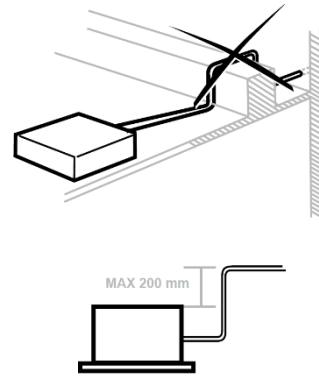
A condensate tray is supplied with a 5/8" exterior diameter copper drain hole, which must be connected to the main evacuation pipe, to ensure that the condensed water will drain properly from the tray.

- Connecting condensate piping to sewage system drain with appropriate trap. Trap height must be calculated according to the unit discharge head in order to allow sufficient and continuous water evacuation (See figure).
- To avoid horizontal sections or curves of condensate drain piping. The slope **must be greater than 2%**.
- To avoid ascending sections of condensate drain



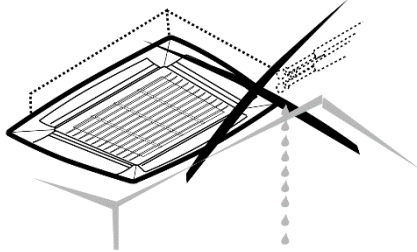
piping. These may only be used near the unit with a

maximum height difference of 200 mm from the top of the unit (See figure).

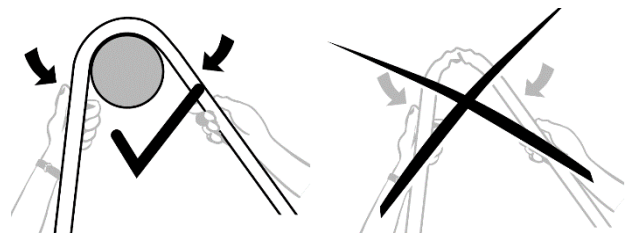


**IMPORTANT**

Non-level installation will cause condensate dripping



Do not flatten or crush the condensate drain pipe



**7. Installation of the plastic diffuser**

Carefully unpack the assembly and check for damage sustained in transit.

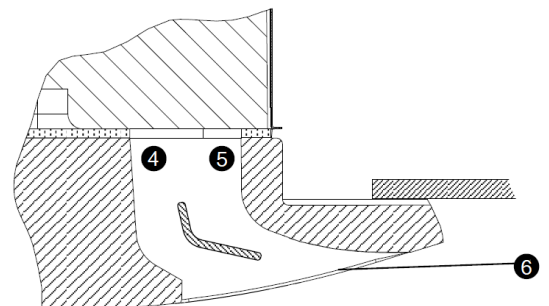
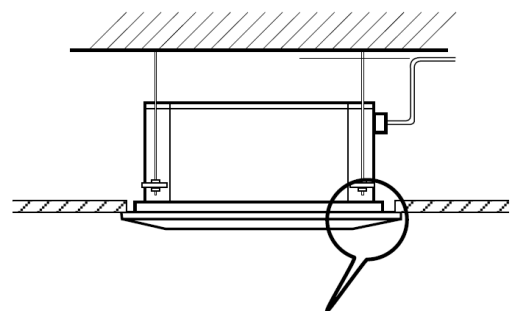
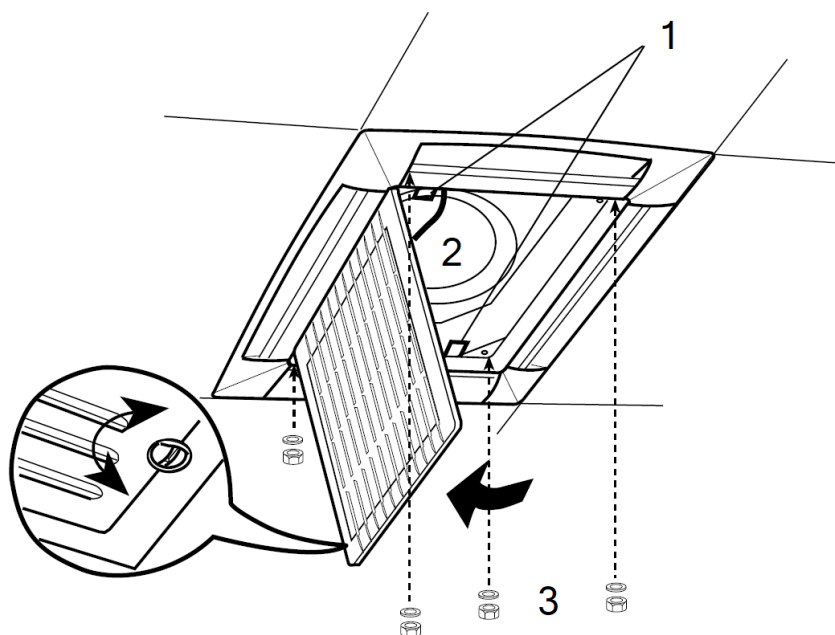
Attach the assembly to the unit, fastening it onto its two fixing supports (ref. 1), then locking the four fixing nuts with their spacers (ref. 3).



**CAUTION:**  
To fasten the frame use only the screws supplied with it.

Ensure that the frame is not distorted by excessive tightening, that it is aligned with the false ceiling and above all that there is a seal between the air inlet and outlet.

In the drawing gasket "4" prevents return air from mixing with the supply air and gasket "5" prevents the supply air from leaking into the ceiling void. On completion, the gap between the unit frame and the false ceiling must not be more than 5 mm.





## 8. Electrical connections

### WARNING



**Danger to life from electric shock.**

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

The devices are operated with 230-V alternating voltage. Any contact with live conductors can present a danger to life from electric shock.

- Electrical installation work must be undertaken by a trained electrician.
- Ensure that you have disconnected the electricity supply before you carry out installation work. Secure the electricity supply against being switched on again unintentionally.

### 8.1 Fuse protection

All unit must be installed with a fuse for machine protection. Refer to the following table for fuse installation and replacement:

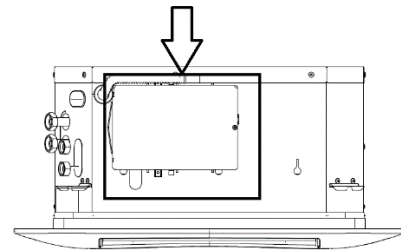
PAW-AC / EC fan 2-pipe / 4-pipe			FC**-U020	FC**-U030	FC**-U040	FC**-U050	FC**-U060	FC**-U070
Fuse type	<b>AC FAN</b>	-	gF	gF	gF	gF	gF	gF
Fuse type	<b>EC FAN</b>	-	gG	gG	gG	gG	gG	gG
Fuse rating		Amps	1,0	1,0	1,0	1,0	1,0	1,0

### 8.2 Connecting the power supply cable

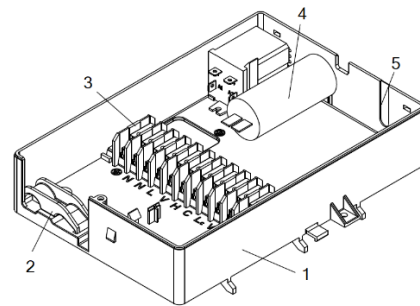
All Cassette units are designed for operation with 230 volts, single phase, 50 or 60 cycles.

Each Cassette unit is supplied with a terminal board. Mains voltage and extra-low voltage wiring must each be done in accordance with the applicable local electrical code and the wiring diagram corresponding to the unit model.

The **control box panel** is positioned on the external side of the unit (see figure). Remove the fixing screws and the cover of the control box panel. The control box panels contain the terminal blocks for connections as shown in the wiring diagrams.



1	Electrical box
2	Cable holder
3	Terminal block
4	Capacitor
5	Valve cable inlet



**Control box – internal view**

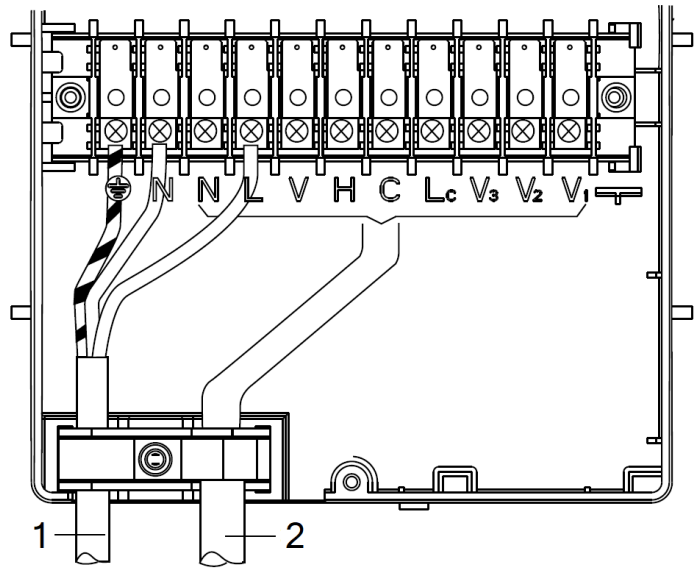
The power supply cable shall be selected in accordance with the following criteria:

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

#### **IMPORTANT**

- All cables for connection to the unit, as well as its accessories, must be H05 VV-F with PCV insulation in compliance with EN60335-2-40.
- Disconnect all circuits from power supply before acting on energized components.
- Make earthing before any other electric connections.

<b>N</b>	Neutral
<b>L</b>	Phase
<b>Lc</b>	Condensate Pump phase
<b>H</b>	Heating
<b>C</b>	Default contact condensate pump
<b>V</b>	Cooling valve
<b>V1, V2, V3</b>	Motor speed



1 – Power supply cable  
2 – Auxiliary cable

**Z**  
Connect power supply **L** (line), **N** (neutral) and (earthing) according to the wiring diagram and respect the polarities shown on the bottom of the electrical boxes.

### 8.3 Terminal block

The unit can be equipped with two different screw clamp terminal connector types:

1 - U shape

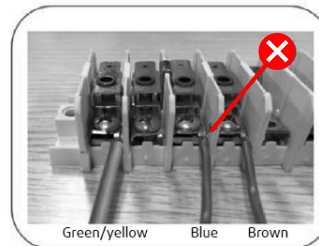
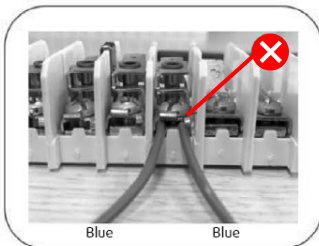
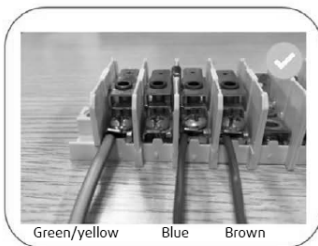
2 - Hook shape



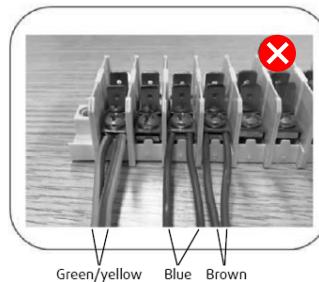
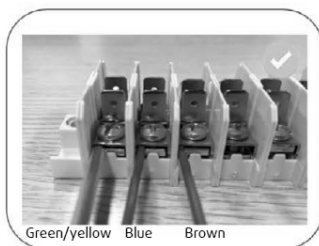
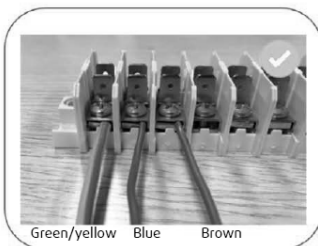
#### WARNING



When connecting power supply it is forbidden to put more than one wire end per screw clamp terminal with «hook» shape connector or more than one wire end per screw clamp terminal with «U» shape connector (cf. Daisy chain section).



**Right hook side use is forbidden**

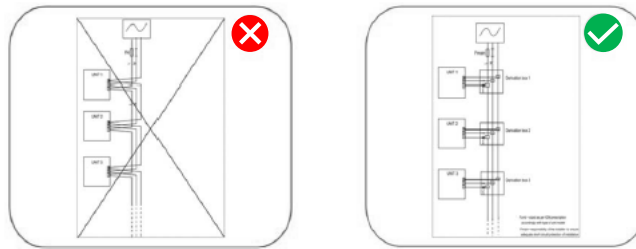




## WARNING

### Daisy chain

**WARNING: it is forbidden to supply other units from the terminal block.**



## 8.4 Connecting a field-supplied controller

**When installing a field-supplied controller, keep the following aspects in mind:**

- Make sure the device and the electricity supply are switched off prior to installation / service.
- Do not install the controller in locations that can be affected by radiant heat or in places with high levels of sunlight.
- Do not install the controller behind doors or in corners.
- Install the controller approximately 1.5 m above the floor. In the event that the controller is intended for use by wheelchair users, please refer to local regulations
- Protect the device from water/debris to avoid damaging the controller.

**Mount the controller according to the following instructions:**

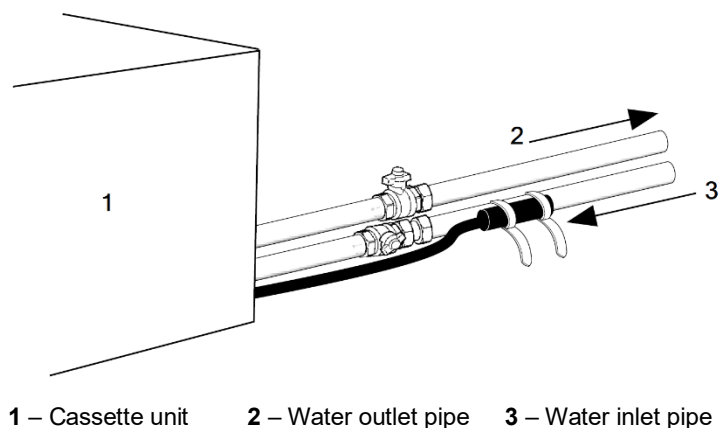
1. If the controller is not to be embedded into the wall, proceed to the next step. Otherwise, first make sure that the concealed wiring for the controller and the hole in the wall for installing a hollow installation box have been prepared. Then lead the controller wiring into the hollow installation box and place the installation box in the hole in the wall.
2. If the controller terminal board is accessible from outside, proceed to the next step. Otherwise, open the controller housing and separate its front part including the display from its back part including the controller terminal board.
3. Connect the wires of the Fan Coil wiring with the controller terminal board (→ *Electrical connections, section 7.1*).
4. Fix the one-part controller or the back part of the controller housing with screws to the installation box or, if no installation box is to be used, to the wall.
5. For two-part controllers, re-connect the controller front part to the back part and close the controller housing carefully.

### IMPORTANT

If the local control includes a remote ambient temperature sensor and/or a set temperature adjustment module, these shall be connected with shielded cable and shall not pass through the same conduits as the power supply cables, because the voltages induced may create reliability faults in the unit's operation.

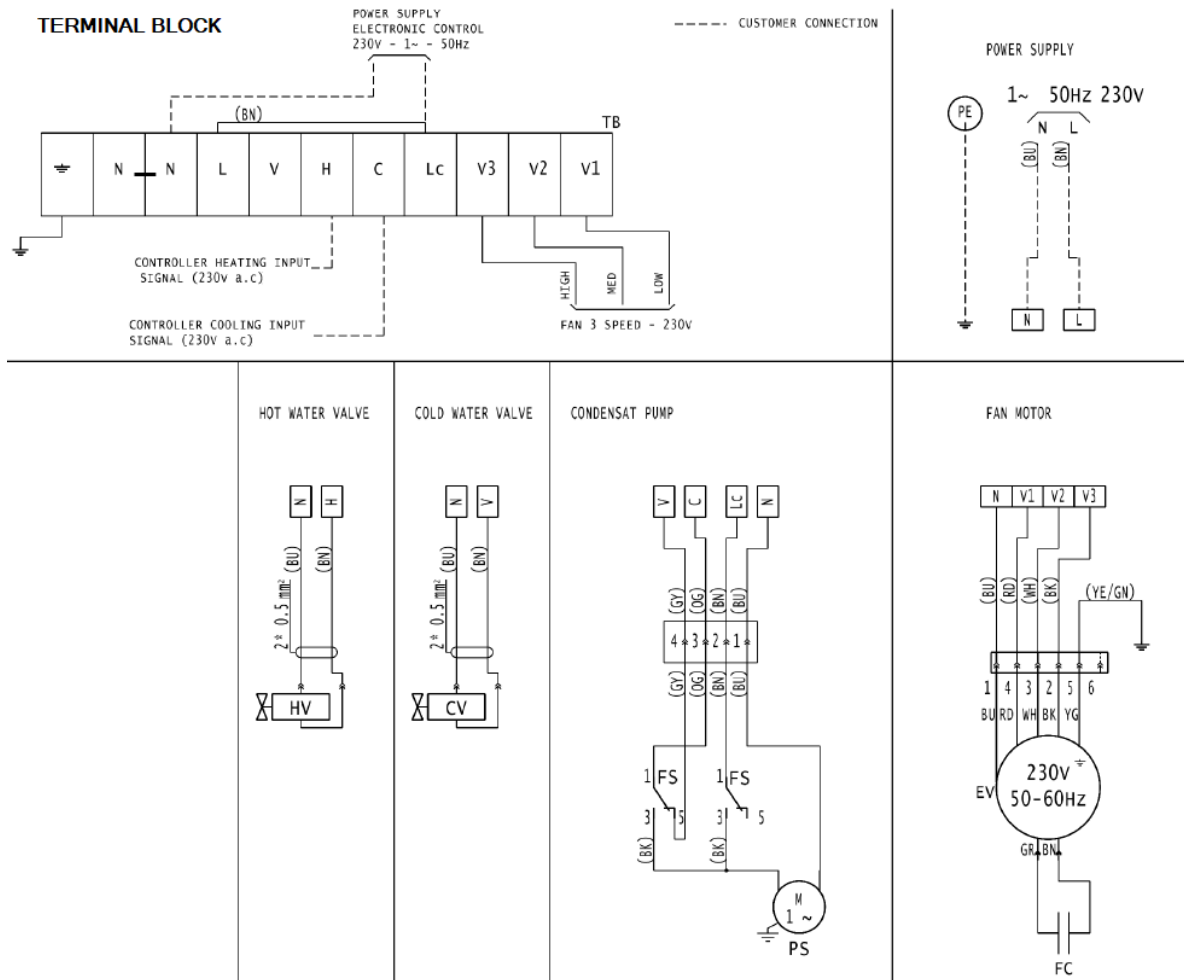
If a field-supplied thermostat or temperature sensor is to be used, mount it according to the following instructions:

- Choose the desired mounting position for the sensor bulb on the Fan Coil unit's water inlet pipe as shown in the scheme here on the right.
- At the chosen position, coat the pipe with heat conducting paste to guarantee good thermal transfer.
- Mount the sensor bulb at the chosen position on the water inlet pipe.
- Wire the sensor bulb to the Fan Coil unit's terminal board as described in the sensor's installation instructions.



# Wiring diagram - Models PAW- FC\*A-U\*\*\*

## AC Fan motor



### Wire colouring code

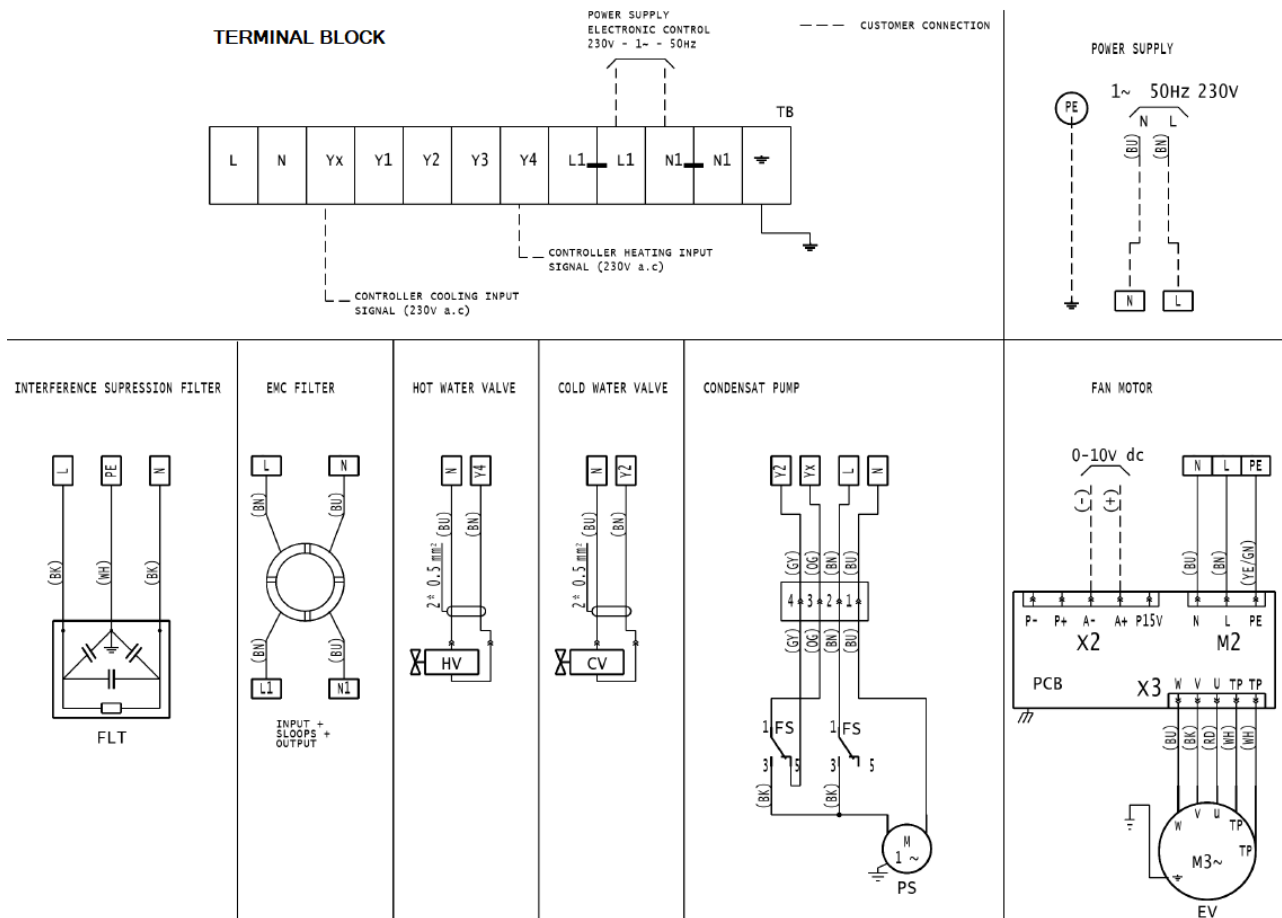
<b>BK</b>	Black	<b>OG</b>	Orange
<b>BN</b>	Brown	<b>YE</b>	Yellow
<b>RD</b>	Red	<b>GN</b>	Green
<b>BU</b>	Blue	<b>VI</b>	Violet
<b>GY</b>	Grey	<b>WH</b>	White

### Electrical data - Models PAW- FC\*A-U\*\*\*

PAW- AC fan 2/4-pipe			FC*A-U020	FC*A-U030	FC*A-U040	FC*A-U050	FC*A-U060	FC*A-U070
Power supply	Voltage	V	230	230	230	230	230	230
	Phase		Single phase	Single phase	Single phase	Single phase	Single phase	Single phase
	Frequency	Hz	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60
Power consumption 2-pipe	Lo/Med/Hi	W	25 / 35 / 38	17 / 34 / 58	38 / 58 / 99	28 / 41 / 66	34 / 61 / 88	44 / 92 / 125
Power consumption 4-pipe	Lo/Med/Hi	W	25 / 35 / 38	17 / 34 / 58	38 / 58 / 99	-	34 / 61 / 88	44 / 92 / 125

# Wiring diagram - Models PAW- FC\*E-U\*\*\*

## EC Fan motor



### Wire colouring code

<b>BK</b>	Black	<b>OG</b>	Orange
<b>BN</b>	Brown	<b>YE</b>	Yellow
<b>RD</b>	Red	<b>GN</b>	Green
<b>BU</b>	Blue	<b>VI</b>	Violet
<b>GY</b>	Grey	<b>WH</b>	White

### Electrical data - Models PAW- FC\*E-U\*\*\*

PAW- EC fan 2/4-pipe			FC*E-U020	FC*E-U030	FC*E-U040	FC*E-U050	FC*E-U060	FC*E-U070
Power supply	Voltage	V	230	230	230	230	230	230
	Phase		Single phase	Single phase	Single phase	Single phase	Single phase	Single phase
	Frequency	Hz	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60
Power consumption 2-pipe	Lo/Med/Hi	W	9 / 13 / 29	7 / 14 / 32	13 / 22 / 57	7 / 12 / 25	9 / 23 / 25	11 / 40 / 115
Power consumption 4-pipe	Lo/Med/Hi	W	9 / 13 / 29	7 / 14 / 32	13 / 22 / 57	-	9 / 23 / 46	11 / 40 / 115

## 8.5 Safety requirements for electric appliances

1. The electrical power supply of the appliance must correspond to that indicated on the data plate and the power supply cable must be suitably sized.
2. Do not drag the power cable.
3. It should be reliably earthed, and it should be connected to the special earth device, the installation work should be operated by a suitably qualified professional.
4. The min. distance from the unit and any combustible surface is 1.5 m.
5. The appliance shall be installed in accordance with national wiring regulations.
6. An all-pole disconnection switch having a contact separation of at least 3 mm in all poles should be connected in fixed wiring.

**Note:** Check line, neutral and earth connections.

## 8.6 Ground requirements

1. Air conditioner is a type I electric appliance, thus please do conduct reliable grounding measures.
2. The yellow-green two-colour wire in air conditioner is the earthing conductor and cannot be used for any other purpose. It is not allowed to make cuts or fix screws on the structure to connect the grounding. Use the special clamp for the ground connection.
3. The earth resistance should follow the local code.
4. The power source must offer a reliable grounding terminal. The earthing conductor must not be connected to any of the following:
  - Tap water pipe.
  - Gas pipe.
  - Contamination pipe.
  - Other places that professional personnel consider unreliable.
5. The type and rated values of fuse is justified according to the silk print on the fuse or PCB.

## 9. Accessories: 2 way or 3 way ON/OFF valves

A 2-way valve or 3-way regulating valve, whose installation is mandatory to ensure that the appliance operates correctly, can be obtained from the supplier as accessory.

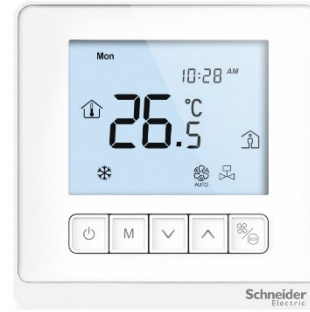
The following table shows which valve model must be chosen for the relevant Fan Coil Cassette model.

Fan Coil Cassette units			Valves	
Model	Pipe configuration	Size	2-way valve	3-way valve
PAW-FC**-U***	2-pipe configuration	U020 – U040	PAW-FC2-2WY-U020	PAW-FC2-3WY-U020
		U050 – U070	PAW-FC2-2WY-U050	PAW-FC2-3WY-U050
	4-pipe configuration	U020 – U040	PAW-FC4-2WY-U020	PAW-FC4-3WY-U020
		U050 – U070	PAW-FC4-2WY-U050	PAW-FC4-3WY-U050

## 10. Optional Wired remote controller: PAW-FC-903TC

The **PAW-FC-903TC** thermostat is optimized for office building, hotel, hospital and residential applications. It can be used for 2-pipe or 4-pipe applications and is available in a housing finish with white glass display with mechanical buttons on a white base.

The PAW-FC-903TC thermostat is both easy to operate and install. The devices feature microprocessor-based control and large backlit LCD screens which display operation status (cooling, heating, and ventilation), fan speed, room temperature and set-point.



**WARNING: HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH.**

- Follow safe electrical work practices and applicable local codes.
- Read and understand the instructions before installing the product. Follow the instructions during installation.
- Installation, wiring, testing or service must be performed only by qualified persons in accordance with all applicable codes and regulations.
- Do not use the product for life or safety applications.
- Do not install the product in hazardous or classified locations.
- Do not exceed the product's ratings or maximum limits.
- The product may use multiple voltage/power sources.
- Turn off ALL power supplying equipment before working on or inside the equipment.
- Use a properly rated voltage sensing device to confirm that all power is off.
- Do NOT depend on the product for voltage indication.
- Products rated only for basic insulation must be installed on insulated conductors.
- Current transformer secondaries (current mode) must be shorted or connected to a burden at all times.
- Remove all wire scraps and tools, replace all doors, covers and protective devices before powering the equipment.

**Failure to follow these instructions will result in death or serious injury.**

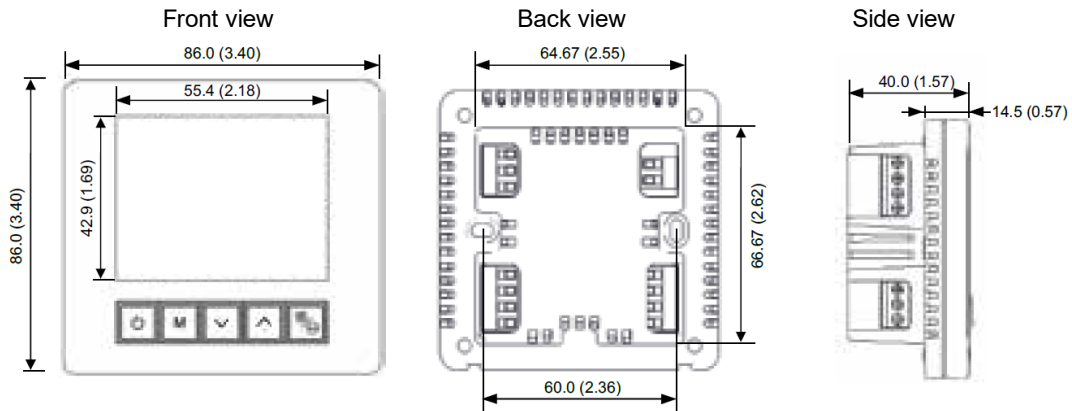
A qualified person is one who has skills and knowledge related to the construction and operation of this electrical equipment and installations, and has received safety training to recognize and avoid the hazards involved.

If this product is used in a manner not specified by the manufacturer, the protection provided by the product may be impaired. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

## 10.1 Specifications

Built-in sensing element	100 kΩ NTC, type 3	Housing	Flame-retardant PC
Accuracy	±1 °C	Dimensions	86 x 86 x 14.5 mm (3.40" x 3.40" x 0.57")
Set-point range	5 to 35 °C	Wall box	BS wall box, min. 35 mm depth
Display range	0 to 50 °C (shown in 0.5 °C increments)	Hole pitch	60 mm (standard)
Operating temp.	0 to 50 °C	Control pollution degree	Pollution Degree 2
Operating humidity	5 to 95 %RH (non-condensing)	Operation type	Type 1.B
Power consumption	< 1 W	Terminal sizing	Max: 2 x 1.5 mm <sup>2</sup> or 1 x 2.5 mm <sup>2</sup> conductors
Power supply	90 to 240 Vac, 50/60Hz	Pollution degree	2
Relay & load	Relay rating 5A Load rating 2A resistive, 1A Inductive	Agency approvals	European conformance CE: IEC/EN 60730-1 IEC/EN 60730-2-9
Protection class	IP20		

## 10.2 Dimensions



## 10.3 Functions

### Set-point Adjustment

The set-point buttons allow users to adjust the setpoint (in 0.5 °C increments) for the space.

### Fan Speed

Users can select a fan speed (High, Medium, Low or Automatic) by a short press of the FAN/ECO button.

### Mode Control

Users can switch operating modes (Heating, Cooling, or Ventilation) by pressing the Mode button.

### Eco Mode

To begin Eco mode, do a short press of the FAN/ECO button until the ECO icon flashes in the lower right corner of the LCD display. In Cooling mode, the set-point is automatically adjusted to 26 °C and the fan speed is set to Low. In Heating mode, the set-point is automatically adjusted to 18 °C and the fan speed is set to Low. To exit Eco mode, do a short press of the FAN/ECO button to choose any other fan speed, as desired.

### Button Lockout Function

This function allows the buttons to be deactivated to prevent thermostat operation by others.

### Low Temperature Protection

If the room temperature drops below 5 °C, Heating mode will start automatically and the fan speed will be set to High. Once the temperature reaches 7 °C, the thermostat will switch off the output.

### Alert

In the event of an operating exception, the thermostat will attempt to command the valve to close and place the device in an inoperative state. The display will indicate the current status with one of five diagnostic messages:

- EEPROM: **EE**
- Temperature sensor short-circuit: **E1**
- Temperature sensor open-circuit: **E2**
- Ambient temperature is higher than 50°C: **HI**
- Ambient temperature is lower than 0°C: **LO**



### 10.4 Installation

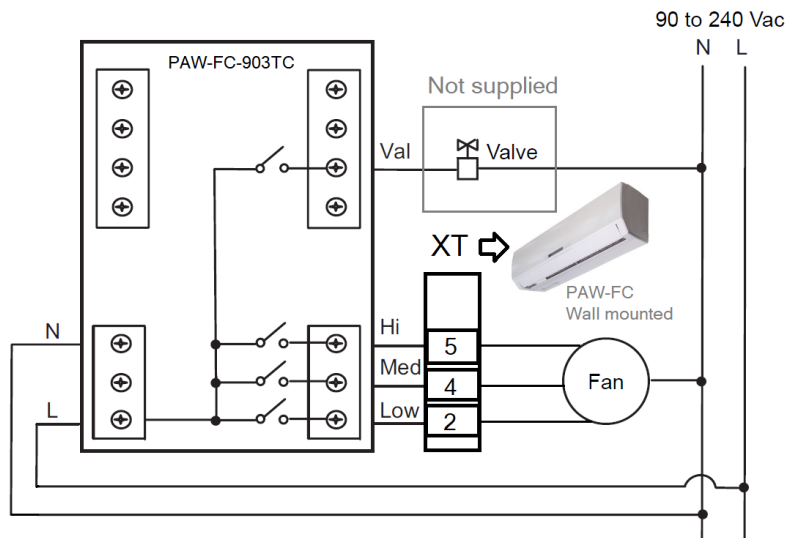
- Install the thermostat about 1.5 m (59") above the floor. In the event that the controller is intended for use by wheelchair users, please refer to local regulations
- Make sure the device is powered off prior to installation/service
- Do not install in locations that can be affected by radiant heat or in places with high levels of sunlight
- Do not install thermostats behind doors or in corners
- Protect from water/debris to avoid damaging the Thermostat

### 10.5 Mounting

<p><b>1</b></p> <p>Insert a 3.5 mm flat head screwdriver along the bevel into the slot. Pry upwards with appropriate force to release the two hooks</p>	<p><b>2</b></p> <p>Remove the display from the base module. Carefully remove the wire connections, if required.</p>
<p><b>3</b></p> <p>Connect the wires according to the appropriate wiring diagram shown above. Ensure the polarity of the mains supply is correct.</p>	<p><b>4</b></p> <p>Mount the base module onto the wall box using the two screws supplied.</p>
<p><b>5</b></p> <p>Fit the display module onto the base module. Align upper hooks between the two modules. Carefully replace the wiring connection if it has been removed. Click display module onto base module using the two lower hooks.</p>	






### 10.6 Wiring

Provide an approved disconnecting means and overcurrent protection to supply conductors. The disconnecting device(s) shall meet the relevant requirements of IEC 60947-1 and IEC 60947-3 and shall be suitable for the application. Locate and mark per local requirements.



## 10.7 Operation instructions

The meaning of each key is shown below.



	<b>On/Off</b>
	<b>M - Mode selection</b>
	<b>Down</b>
	<b>Up</b>
	<b>Fan speed / Eco Mode</b>







### Power On/Off

A short press of the **On/Off** button will turn the power on. Another short press of the **On/Off** button will turn off the power, fan coil and motorized valve (if installed). If no buttons are pressed for 10 seconds, the thermostat backlight turns off. Press any button to turn the backlight back on.


### Temperature Setting

With the power on, press **Down** to decrease the temperature setting and **Up** to increase temperature in steps of 0.5°C. The icon  will appear on the display. If no buttons are pressed for six seconds, the icon  is displayed, indicating the setpoint is confirmed.

### Mode selection

With the power on, press **M** to switch the operation mode. The display indicates cooling with , heating with  and ventilation with . Auto mode can be selected in the parameter settings and is indicated on the display with .

### Fan Speed Selection






With the power on,  to select a fan wind/air speed of high, medium, low or automatic. In automatic mode, the fan speed changes automatically. For a difference of 1°C, the fan will automatically switch to low fan speed. For a difference of 2°C, the fan will automatically switch to medium fan speed. For a difference of 3°C or more, the fan will automatically switch to high speed.

### Motorized Valve Control (2-Pipe Models)



In cooling (or heating) mode, the motorized valve will be switched on when the room temperature is higher than (or lower than) the temperature setting by 1°C. It will switch off when the room temperature reaches the temperature setting.



### Energy Saving Functions

#### Eco Mode




Press the button  to turn on Eco mode. The display will show the  and  icons. If the thermostat is in Cooling mode, the temperature is automatically set to 26°C with the fan running at low speed. If the thermostat is in Heating mode, the temperature is automatically set to 18°C with the fan running at low speed. To turn Eco mode off, press the **Up** or **Down** buttons to change the temperature setting or press the FAN/ECO  or ECO  buttons.

#### Unoccupied Energy Saving Mode

Unoccupied Energy Saving mode can be entered via a hotel room key card. Example: after a hotel room key card is removed from the reader,  and  are displayed. If the thermostat is in cooling mode, the temperature is automatically set to 28 °C with the fan running at low speed. If the thermostat is in heating mode, the temperature is

automatically set to 16 °C with the fan running at low speed. When the key card is returned to the reader, the indoor  display and ECO  icon turn off and the thermostat returns to the previously set mode.


### Sleep Energy Saving Mode

At 12:00 a.m. the  icon turns on. The temperature setpoint increases or decreases automatically every hour by 1°C until 3:00 a.m. Example: if the thermostat is in cooling mode, the setpoint will increase 1°C per hour until 3:00 a.m. then decreases 1°C per hour until the original setpoint is reached at 7:00 a.m. and turns  off. If the thermostat is in heating mode, the setpoint will decrease 1°C per hour until 3:00 a.m. and then increases 1°C per hour until the original setpoint is reached at 7:00 a.m. and  turns off. The cooling setpoint will not rise above 26°C and the heating setpoint will not drop below 18°C in Sleep Energy Saving Mode.


### Time Setting Function

During power-on, press and hold **M** for six seconds to enter the Time Setting mode. Press the mode button **M** again to select the hour, minute and week. Press the **Up** and **Down** buttons to adjust this parameter. Time Setting mode is exited automatically if no button is pushed for six seconds.


### Button Lockout Function

Press and hold the **Up** and **Down** buttons at the same time for six seconds to activate the keypad lockup function to prevent thermostat operation by others. While lockout is active, the lock icon  will be displayed on the screen. To deactivate the lockout function, press and hold the **Up** and **Down** buttons at the same time for six seconds to unlock the system.

### Low Temperature Protection Function

If the thermostat is switched off and the room temperature drops below 5°C, the thermostat will start automatically for heating and display the  symbol. The fan will run at high speed automatically and the motorized valve will be opened. When the room temperature rises to 7°C, the low temperature protection function is cancelled and the thermostat will stop automatically, returning to its previously switched off state.

### Low Temperature Protection Function

In the event of an operating exception with the temperature sensor (either built-in or external, depending on which is selected), the thermostat will attempt to command the fan and valve to close, place the device in an inoperative state and display the  icon and an 'E1' or 'E2' alert.

E1: Sensor short-circuit alert

E2: Sensor open-circuit alert

'Hi' will be displayed if the temperature is higher than 50°C.

'Lo' will be displayed if the temperature is lower than 0°C.

## 11. Optional Advanced wired remote controller: PAW-FC-RC1

PAW-FC-RC1 is a 230 VAC electronic fan-coil thermostat for room temperature control. It is suitable for every kind of building where reduced energy consumption and high comfort need to be met. The ability to switch between control modes depending on occupancy, makes it particularly suitable for public spaces, such as hotel rooms, offices, schools, hospitals, etc. The modular design makes it easy to install and the flush mounting gives the unit a discreet appearance.



**WARNING: HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH.**

- Follow safe electrical work practices and applicable local codes.
- Read and understand the instructions before installing the product. Follow the instructions during installation.
- Installation, wiring, testing or service must be performed only by qualified persons in accordance with all applicable codes and regulations.
- Do not use the product for life or safety applications.
- Do not install the product in hazardous or classified locations.
- Do not exceed the product's ratings or maximum limits.
- The product may use multiple voltage/power sources.
- Turn off ALL power supplying equipment before working on or inside the equipment.
- Use a properly rated voltage sensing device to confirm that all power is off.
- Do NOT depend on the product for voltage indication.
- Products rated only for basic insulation must be installed on insulated conductors.
- Current transformer secondaries (current mode) must be shorted or connected to a burden at all times.
- Remove all wire scraps and tools, replace all doors, covers and protective devices before powering the equipment.

**Failure to follow these instructions will result in serious injury or death.**

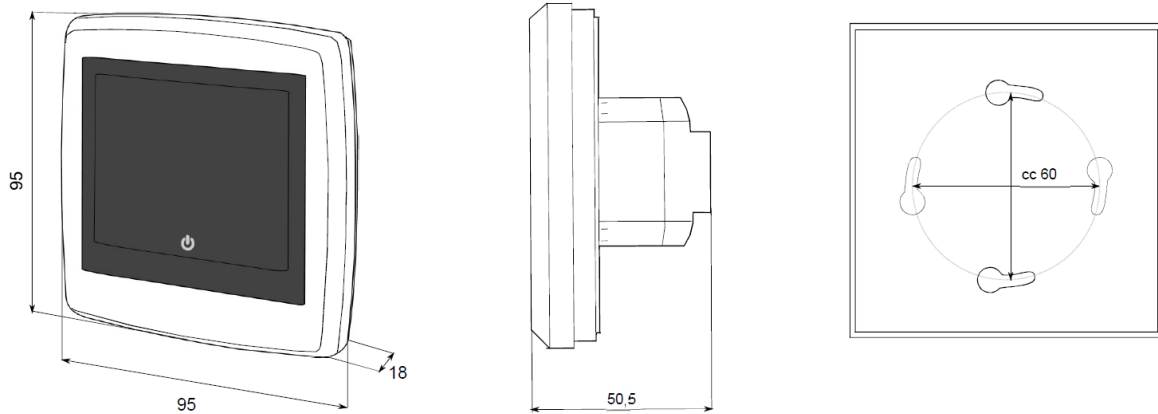
A qualified person is one who has skills and knowledge related to the construction and operation of this electrical equipment and installations, and has received safety training to recognize and avoid the hazards involved.

If this product is used in a manner not specified by the manufacturer, the protection provided by the product may be impaired. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

### 11.1 Specifications

Supply voltage	230 V ~ (207...253 V ~ 50/60 Hz)	Analogue inputs (Temp / AI)	Max. 5 A 1 x PT1000 (standard: for the clamp-on sensor to install at the heat pump supply pipeline or for other functions)
Power consumption	< 2 VA	Change-over function	Manual or automatically via
Protection class	IP30	DI or Temp / AI	
Ambient humidity	10...90% R.H. (non-condensing)	Communication port	1
Ambient temperature	0...50°C	Internal serial port, type	RS485
Measuring range, temperature	0...50°C, external sensor at Temp / AI: 0...80°C	Internal serial port, built-in protocol	Modbus (RTU)
Sensor element, temperature	NTC	Internal serial port, commun. speed	9600 bps (4800...38400 bps)
Accuracy, temperature	±0.5 K	Internal serial port, parity	Even (Even, Odd, None)
Display	Built-in	Internal serial port, stop bit	1 (1 or 2)
Display type	LED-backlit LCD	Cable connection	Screw terminals max. 1.5 mm <sup>2</sup> (AWG 16)
Output signal, temperature	NTC	Dimensions, external (W x H x Da)	95 x 95 x 50.5 mm
Setpoint adjustment	5...35°C	Weight, incl. packaging	0.24 kg
Mounting	Room (flush-mounted with screw distance cc 60 mm)	Material, housing and base	Polycarbonate, PC
Installation	Fan-coils, 2 or 4-pipe	Material, fire resistance	UL 94 V-0
Digital inputs (DI)	1 x Closing potential-free contact	Color, housing and base	Signal white RAL 9003
Digital outputs (DO)	3 x Relay outputs for 3-step fan control, 230 VAC, Max. 5 A 2 x Relay outputs for On/Off valve actuators, 230 V AC,		

## 11.2 Dimensions

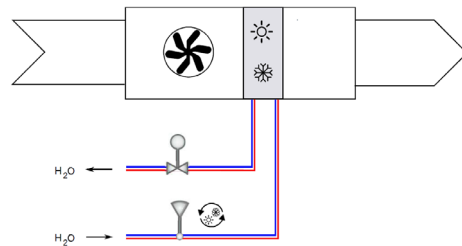


## 11.3 Functions

The room thermostat regulates heating and/or cooling in a room via digital outputs on/off for valves and for 3-speed fan control. The touch screen shows the actual operating state and is also used to access all parameters, such as setpoint, hysteresis, fan speed etc. The unit has a built-in room temperature sensor. The change-over (between heating and cooling at 2 pipe installation) can be controlled by selecting the mode on the display or via a digital input connected to any potential free contact (e.g. heat pump in COOL mode). Functions such as mould protection and automatic valve exercise ensures a proper functionality and a problem free work over the lifetime of the product.

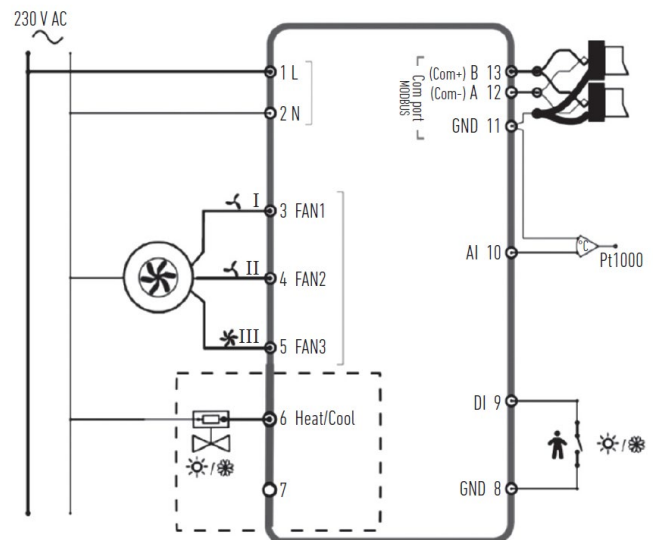
### Two pipe system

This control mode is suitable for room HVAC systems that use a 2-pipe fan coil as heating and cooling device (see figure). A change-over function makes it possible to use the thermostat in a 2-pipe changeover system, where warm or cold media flow in the same pipes and one valve is used to regulate both heating and cooling distribution. The thermostat is either in heating or cooling mode and switches between the modes according to the change-over function settings.



## 11.4 Installation

1. Install the attached clamp-on temperature sensor at the supply pipeline from the heat pump. Extend the cable if necessary up to 50m with J-Y (St)Y 2x2x0,8.
2. Separate the back plate from the display part with a small screwdriver. Insert him in the grooves at the bottom of the display part and turn it slightly.
3. Connect the wires to the terminals.
4. Place the back plate over the electrical wall box and fasten it on the wall using the mounting holes.
5. Clip the display back on to the back plate. Switch on the power supply. Controller starts in Off state. Press On/Off button to switch to On state



Terminal	Description	Terminal	Description
L	Supply voltage 230V AC Phase	FAN 1	Fan speed 1, digital output
N	Supply voltage 230V AC Neutral	FAN 2	Fan speed 2, digital output
GND	Ground /reference potential for AI, DI and Modbus Com N	FAN 3	Fan speed 3, digital output
Heat	Heating and Cooling valve actuator	DI	External potential-free contact, digital input
Cool	Cooling valve actuator at 4-pipe installation, digital output	A	Serial communication port Com A, Modbus RTU
AI	External temperature sensor, analogue input	B	Serial communication port Com B, Modbus RTU

## 11.5 Operation instructions

The display behaves differently depending on the mode and the state that the controller is currently operating in.

The thermostat can be in one of the following states:

**Off:** Energy stop state where the controller neither heats nor cools. No background light is lit, only the On/Off button is shown and usable.

**Occupied:** Comfort (Standard) state or if a presence detector is connected and someone is in the room. Optimal heating and cooling takes place.

**Standby:** Energy saving state where reduced heating or cooling takes place.

**Meaning of the buttons**

Symbol	Description
	On/Off button
	Arrow <b>Up</b> = increase button for setpoint adjustment (+)
	Arrow <b>Down</b> = decrease button for setpoint adjustment (-)
	Changeover button to switch between heating and cooling via the display
	Fan button to regulate the fan speed via the display between AUTO / MAN (off/1/2/3)



The display can be in 3 modes, when controller state is *Occupied* or *Standby*:

- **Active mode:** The controller is activated, but no changes are made now. The display shows either the current room temperature (standard) or the calculated setpoint (if parameter P045 is set to 0).
- **Setpoint mode:** This mode is activated when pressing one of the arrows when in Active mode. Either the calculated setpoint ± adjustment (standard) or the current user defined setpoint adjustment (if P046 = 1) are shown.
- **Idle mode:** The controller has been inactive during a set time span (activatable with P044 > 0 seconds). All buttons and segments, except the two arrows, are dimmed down in the display.

**11.6 Settings**

Starting from display is in active mode, the controller settings can be edit in the following way:

1. Press both arrow buttons together until the display shows 0000.
2. Then press short “up”, to show P001 = Parameter 1.
3. Use “up” or “down” to step through the parameter list.
4. Press shortly the On/Off button to go in edit mode.
5. Setting value is shown and flashes.
6. Edit the value by arrow buttons “up” or “down”.
6. Confirm your edit with press the On/Off button. Display jumps back to the parameter number.

If the display is left in the Parameter menu for more than 10 seconds without any activity (buttons pressed), the controller will automatically exit the parameter menu. To leave the parameter menu you can also select “EXIT” and confirm with On/Off.

The most important parameters are:

Code	Description	Default	Min	Max
P001	Basic setpoint (SPbasic)	20°C	5	50
P002	Hysteresis used for setpoint calculation at Occupied state (heating and cooling)	1K	1	10
P003	Hysteresis used for setpoint calculation at Standby state (heating and cooling)	5K	1	30
P008	Controller mode 0 = 2-pipe systems 1 = 4-pipe systems	0	0	1
P009	Change-over mode, fan release function via heat pump supply sensor at AI 4 = manual setting in the display via button 5 = manual Heat 6 = manual Cool 7 = automatic via digital input DI	4	0	7
P010	Temperature difference between the current room temperature and the water temperature (AI1) to release the fan at Heat mode	3K	1	50
P011	Temperature difference between the current room temperature and the water temperature (AI1) to release the fan at Cool mode	3K	1	50

Code	Description	Default	Min	Max
P012	Operating mode for DI 0 = no contact connected 1-2 = not used 3 = presence detector connected (switches between Standby and Occupied state) 4 = change-over (heat pump in COOL mode)	0	0	4
P044	Inactive delay Delay for the display to dim down and enter Idle mode. If set to 0 (Basic) the display never dims down.	0s	0	600
P045	Display setting Active mode, shows current... 0 = setpoint 1 = room temperature	1	0	1
P046	Display setting Setpoint (SP) mode, shows ... 0 = calculated SP 1 = SP adjustment	0	0	1
P047	Maximum setpoint adjustment increase	3K	0	20
P048	Maximum setpoint adjustment decrease	3K	0	20
P049	Brightness of segment at Active and Setpoint mode as well as in the parameter list	100%	0	100
P055	Version number, device type dependent			
EXIT	Leave the parameter menu, confirm with On/Off			

## 11.7 Error messages

The controller shows an error message, if the measured temperature is outside the limits or there is no connection to the sensor. The following messages may appear:

Value	Description	To do
LO	Measured value at AI less than low limit 0°C	Check the temperature of the pipeline and the value of the disconnected sensor (must HI Measured value at AI exceeds high limit 80°C be between 1k Ω and 1,309k Ω)
HI	Measured value at AI exceeds high limit 80°C	
ERR	Error: short circuit or open connection at AI	Check the cable between controller AI and the sensor

## 12. Modbus communication protocol PAW-FC-RC1

The Modbus protocol is a general-purpose protocol for data exchange between for instance control units, Building Management Systems, instruments and electricity meters. It's an asynchronous, serial Master Slave protocol. It's widely used, well documented and simple to understand. A Modbus master can communicate with up to 247 slave units with the device ID 1-247. A protocol like Modbus consists of several layers (OSI-model). The bottom layer is always the physical layer; the number of wires and signal levels. The next layer describes the communication digits (number of data bits, stop-bits, parity etc.). Next are the layers describing the Modbus-specific functions (number of digits per message, the meaning of different messages, etc.).

### 12.1 Modbus register types

- |                            |                     |
|----------------------------|---------------------|
| 1. Discrete Input Register | 3. Input Register   |
| 2. Coils Register          | 4. Holding Register |

Supported Modbus functions:

- |                               |                              |                                      |
|-------------------------------|------------------------------|--------------------------------------|
| ✓ 0x01 Read Coils             | ✓ 0x04 Read Input Registers  | ✓ 0x0F Write Multiple Coils          |
| ✓ 0x02 Read Discrete Inputs   | ✓ 0x05 Write Single Coil     | ✓ 0x10 Write Multiple Registers      |
| ✓ 0x03 Read Holding Registers | ✓ 0x06 Write Single Register | ✓ 0x17 Read/Write Multiple Registers |

### 12.2 Discrete Input Register

Variable address	Description
1	<i>Not used</i>
2	<i>Not used</i>
3	Presence detected 0 = Presence <b>not</b> detected 1 = Presence detected Active if presence detector is configured at terminal <i>DI</i> .
4	Change-over heating/cooling 0 = Change-over heating      1 = Change-over cooling Active if Change-over sensor is configured at terminal <i>DI</i> .
5	Fan speed 1 0 = Fan speed 1 is <b>not</b> active on DO <i>FAN1</i> 1 = Fan speed 1 is active on DO <i>FAN1</i>
6	Fan speed 2 0 = Fan speed 2 is <b>not</b> active on DO <i>FAN2</i> 1 = Fan speed 2 is active on DO <i>FAN2</i>
7	Fan speed 3 0 = Fan speed 3 is <b>not</b> active on DO <i>FAN3</i> 1 = Fan speed 3 is active on DO <i>FAN3</i>
8	Heat valve 0 = Heat valve is <b>not</b> active on DO <i>Heat</i> 1 = Heat valve is active on DO <i>Heat</i>
9	Cool valve 0 = Cool valve is <b>not</b> active on DO <i>Cool</i> 1 = Cool valve is active on DO <i>Cool</i>
10	Indicates the current change-over state of the controller 0 = Heating   1 = Cooling This value may be set by either <i>DI</i> or <i>Temp</i> change-over control
11-19	<i>Not used</i>
20	Actual value on <i>DI</i> , before filters such as NC/NO
21	<i>Not used</i>
22	Actual value on DO <i>FAN1</i> , after filters such as NC/NO
23	Actual value on DO <i>FAN2</i> , after filters such as NC/NO
24	Actual value on DO <i>FAN3</i> , after filters such as NC/NO
25	Actual value on DO <i>Heat</i> , after filters such as NC/NO
26	Actual value on DO <i>Cool</i> , after filters such as NC/NO

## 12.3 Coils Register

Variable address	Description
1	Minimum fan speed. The fan runs at least at speed 1, except in <i>Off</i> state. 0 = Not Active      1 = Active
2	Mould protection 0 = Not Active      1 = Active
3-9	<i>Not used</i>
10	NC/NO for terminal <i>Dl</i> 0 = NO 1 = NC
11-14	<i>Not used</i>
15	NC/NO for terminal <i>Heat</i> 0 = NO 1 = NC
16	NC/NO for terminal <i>Cool</i> 0 = NO 1 = NC

## 12.4 Input Register

Variable address	Description	Scale
1	Regin Model number (= 1715)	1
2-3	<i>Not used</i>	
4	Status 0 = Beta status 1 = Released version	1
5-7	<i>Not used</i>	
8	Heating/cooling mode 0 = <i>Not used</i> 1 = Heating 2 = Cooling	1
9	Controller state 0 = Off 1 = <i>Not used</i> 2 = Standby 3 = <i>Not used</i> 4 = Occupied	1
10	Room temperature The current room temp, from the internal or the external sensor.	10
11	Change-over temperature or fan release temperature The current change-over temperature. Shows NaN! if no sensor is connected.	10
12-19	<i>Not used</i>	
20	Room temperature (internal) The value from the internal temperature sensor.	10
21	Room temperature (external) The value from the external temperature sensor. Shows a value if a temperature sensor is configured for <i>Temp/AI</i> , NaN! otherwise.	10
22	Change-over temperature The value from the external change-over temperature sensor. Shows a value if a change-over sensor is configured for <i>Temp/AI</i> , NaN! otherwise.	10
23-24	<i>Not used</i>	
25	<i>AI Temp Raw</i> Raw value of the terminal (before any filters). Shows NaN! if no sensor is connected.	10
26	<i>Not used</i>	
27	<i>AI Temp</i> Value of the Analog input after filters and scaling. Shows NaN! if no sensor is connected.	10
28	<i>Not used</i>	
29	Calculated setpoint The setpoint for the controller ( <i>SPcalc</i> ), calculated from the basic setpoint, setpoint adjustment and hysteresis.	10
30-32	<i>Not used</i>	

## 12.5 Holding Register

Variable address	Description	Unit	Default value	Scale	Min value	Max value
1	Basic setpoint ( <i>SPbasic</i> )	°C	200	10	50	500
2	Hysteresis to calculate Heating and Cooling setpoint at <i>Occupied</i> state	°C	10	10	10	400
3	Hysteresis to calculate Heating and Cooling setpoint at <i>Standby</i> state	K	50	10	10	400
4	DeltaT, temperature span for On/Off control	K	10	10	5	100
5	Controller mode 0 = 2-pipe 1 = 4-pipe	-	0	1	0	1
6	Fan control 0 = No fan control 1 = Fan is controlled by heat command 2 = Fan is controlled by cool demand 3 = Fan is controlled by both heat and cool demand	-	3	1	0	3
7-10	<i>Not used</i>					
11	Number of fan speed used 1 = 1 fan speed is used 2 = 2 fan speeds are used 3 = 3 fan speeds are used	-	3	1	1	3

Variable address	Description	Unit	Default value	Scale	Min value	Max value
12	Change-over mode (0-3) and fan release function (4-7) via heat pump supply sensor 0 = Manual setting in display1 = Manual Heat 2 = Manual Cool 3 = Automatic via analog or digital input 4 = manual setting in the display via button5 = Manual Heat 6 = Manual Cool 7 = Automatic via digital input DI	-	4	1	0	7
13	Temperature difference between the room temperature and the watertemperature to switch to heating (P009 = 3) or to release the fan at heat mode (P009 = 7)	K	30	10	10	250
14	Temperature difference between the room temperature and the watertemperature to switch to cooling (P009 = 3) or to release the fan at cool mode (P009 = 7)	K	30	10	10	250
15	Switch on delay for terminal <i>DI</i>	min	0	1	0	120
16	Switch off delay for terminal <i>DI</i>	min	0	1	0	120
17	Remote setting of the current controller state0 = Off 1 = No Action2 = Standby 3 = No Action4 = Occupied 5 = No remote control	-	5	1	0	5
18-29	<i>Not used</i>					
30	Manual or Auto control of output for Heat valve (terminal <i>Heat</i> ) 0 = Manual Off 1 = Manual On 2 = Auto (output is controlled by the heat demand)	-	2	1	0	2
31	Manual or Auto control of output for Cool valve (terminal <i>Cool</i> ) 0 = Manual Off 1 = Manual On 2 = Auto (output is controlled by the cool demand)	-	2	1	0	2
32-33	<i>Not used</i>					
34	Manual/Auto Fan control, 3-speed fan0 = No fan speed active 1 = Fan speed 1 is active on DO <i>FAN1</i> 2 = Fan speed 2 is active on DO <i>FAN2</i> 3 = Fan speed 3 is active on DO <i>FAN3</i> 4 = Auto. Fan speed follows heat or cool demand according to the application.	-	4	1	0	4
35-36	<i>Not used</i>					
37	User defined setpoint adjustment ( <i>SPadj</i> ) set by using the buttons on the front. Can be reset remotely. 0 = No current setpoint adjustment made.	K	0	10	-200	200
38	Positive user defined setpoint adjustment. The maximum allowed setpoint adjustment ( <i>SPadj</i> ) increase.	K	30	10	0	200
39	Negative user defined setpoint adjustment. The maximum allowed setpoint adjustment ( <i>SPadj</i> ) decrease.	K	30	10	0	200
40-43	<i>Not used</i>					
44	Heat valve exercise hour, 0 – 23h	h	23	1	0	23
45	Cool valve exercise hour, 0 – 23h	h	23	1	0	23
46	Sensor connected to AI <i>Temp</i> 0 = No sensor connected (Internal room sensor is used) 1 = Room temperature sensor 2 = Change-over temperature sensor or fan release function	-	2	1	0	2
47	<i>Not used</i>					
48	Contact/detector connected to the terminal <i>DI</i> 0 = No contact connected 1-2 = <i>Not used</i> 3 = Presence detector (activate <i>Occupied</i> state) 4 = Change-over contact	-	0	1	0	4
49-52	<i>Not used</i>					
53	Display inactive delay Delay for the display to dim down to <i>Idle</i> mode. If set to 0 the display never dims down.	s	0	30	0	600
54	Calibration of the external temperature sensor (terminal <i>Temp</i> ) Is used to eliminate cable resistance for the temperature measuring and thus correct the temperature reading from <i>Temp</i> if needed.	-	0	10	-100	100



Variable address	Description	Unit	Default value	Scale	Min value	Max value
55	Filter factor for temperature on analog input <i>Temp</i> Low pass filter to avoid temperature spikes and flickering.	%	20	1	0	100
56	Calibration of the internal temperature sensor Is used to correct the internal temperature reading if necessary.	-	0	10	-100	100
57	Display setting for <i>Active</i> mode 0 = Show the calculated setpoint ( <i>SPcalc</i> ) 1 = Show the room temperature	-	1	1	0	1
58	Display setting for the <i>Setpoint</i> mode 0 = Show the calculated setpoint ( <i>SPcalc</i> ) 1 = Show the user defined setpoint adjustment ( <i>SPadj</i> )	-	0	1	0	1
59	Intensity or "brightness" of display when in <i>Active</i> or <i>Setpoint</i> mode	%	70	1	0	100
60	Intensity or "brightness" of display when in <i>Idle</i> mode	%	25	1	0	100
61	The Modbus address the controller uses	-	1	1	1	254
62	Modbus stop bits and parity 0 = 8N2 1 = 8O1 2 = 8E1 3 = 8N1	-	2	1	0	3
63	Timeout should be at least 1.5 times a character, i.e. at least 2 ms (@9 600 baud)	ms	3	1	1	500
64	Answer delay should be at least 3.5 times a character, i.e. at least 5 ms (@9 600 baud)	ms	5	1	1	500
65	0 = 4800 bps            1 = 9600 bps 2 = 19200 bps        3 = 38400 bps	-	1	1	0	3

### 13. Optional Wired remote controller for EC fan: PAW-FC-907TC

The **PAW-FC-907TC** thermostat is optimized for office building, hotel, hospital and residential applications. It can be used for 2-pipe or 4-pipe applications and is available in a housing finish with white glass display with mechanical buttons on a white base.

The PAW-FC-907TC thermostat is both easy to operate and install. The devices feature microprocessor-based control and large backlit LCD screens which display operation status (cooling, heating, and ventilation), fan speed, room temperature and setpoint.



#### **WARNING: HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH.**

- Follow safe electrical work practices and applicable local codes.
- Read and understand the instructions before installing the product. Follow the instructions during installation.
- Installation, wiring, testing or service must be performed only by qualified persons in accordance with all applicable codes and regulations.
- Do not use the product for life or safety applications.
- Do not install the product in hazardous or classified locations.
- Do not exceed the product's ratings or maximum limits.
- The product may use multiple voltage/power sources.
- Turn off ALL power supplying equipment before working on or inside the equipment.
- Use a properly rated voltage sensing device to confirm that all power is off.
- Do NOT depend on the product for voltage indication.
- Products rated only for basic insulation must be installed on insulated conductors.
- Current transformer secondaries (current mode) must be shorted or connected to a burden at all times.
- Remove all wire scraps and tools, replace all doors, covers and protective devices before powering the equipment.

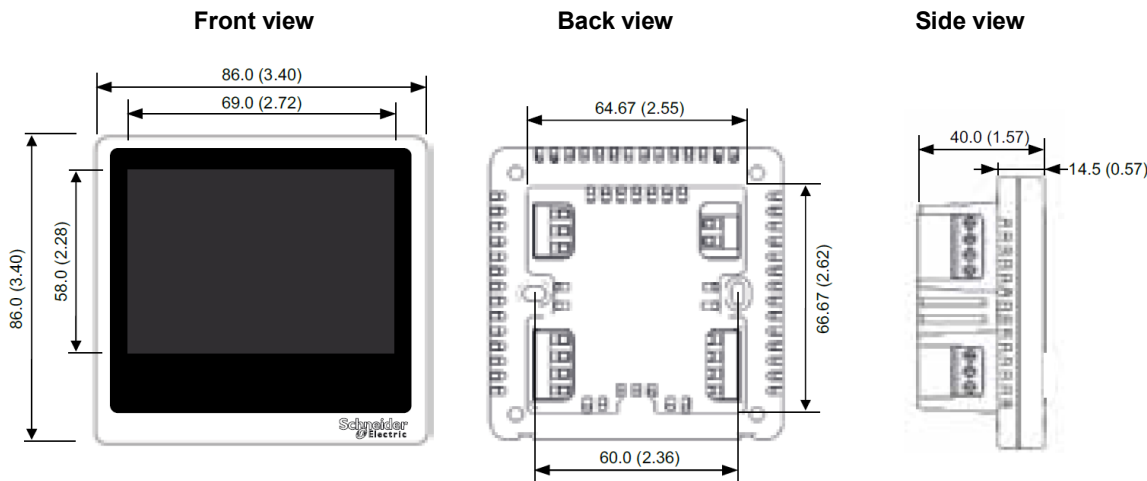
#### **Failure to follow these instructions will result in death or serious injury.**

A qualified person is one who has skills and knowledge related to the construction and operation of this electrical equipment and installations, and has received safety training to recognize and avoid the hazards involved. If this product is used in a manner not specified by the manufacturer, the protection provided by the product may be impaired. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

### 13.1 Specifications

Built-in sensing element	100 kΩ NTC, type 3	Housing	Flame-retardant PC
Accuracy	±1 °C	Dimensions	86 x 86 x 14.5 mm (3.40" x 3.40" x 0.57")
Set-point range	5 to 35 °C	Wall box	BS wall box, min. 35 mm depth
Display range	0 to 50 °C (shown in 0.5 °C increments)	Hole pitch	60 mm (standard)
Operating temp.	0 to 50 °C	Control pollution degree	Pollution Degree 2
Operating humidity	5 to 95 %RH (non-condensing)	Operation type	Type 1.B
Power consumption	< 1 W	Terminal sizing	Max: 2 x 1.5 mm <sup>2</sup> or 1 x 2.5 mm <sup>2</sup> conductors
Power supply	90 to 240 Vac, 50/60Hz	Pollution degree	2
Relay & load	Relay rating 5A Load rating 2A resistive, 1A Inductive	Agency approvals	European conformance CE: IEC/EN 60730-1 IEC/EN 60730-2-9
Protection class	IP20		

### 13.2 Dimensions



### 13.3 Functions

#### Set-point Adjustment

The set-point buttons allow users to adjust the setpoint (in 0.5 °C increments) for the space.

#### Fan Speed

Users can select a fan speed (High, Medium, Low or Automatic) by a short press of the FAN button.

#### Mode Control

Users can switch operating modes (Heating, Cooling, or Ventilation) by pressing the Mode button.

#### Eco Mode

To begin Eco mode, do a short press of the ECO button until the ECO icon flashes in the lower right corner of the LCD display. In Cooling mode, the set-point is automatically adjusted to 26 °C and the fan speed is set to Low. In Heating mode, the set-point is automatically adjusted to 18 °C and the fan speed is set to Low. To exit Eco mode, do a short press of the ECO button to cancel Eco mode.

#### Button Lockout Function

This function allows the buttons to be deactivated to prevent thermostat operation by others.

#### Low Temperature Protection

If the room temperature drops below 5°C, Heating mode will start automatically and the fan speed will be set to High. Once the temperature reaches 7°C, the thermostat will switch off the output.

#### Alert

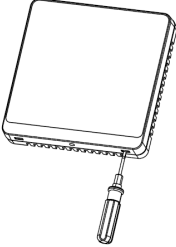
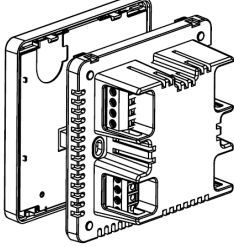
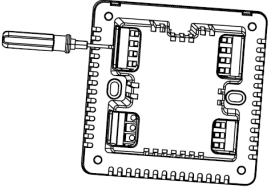
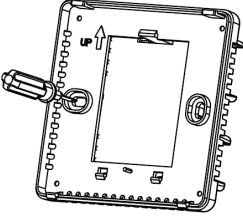

In the event of an operating exception, the thermostat will attempt to command the valve to close and place the device in an inoperative state. The display will indicate the current status with one of five diagnostic messages:

- EEPROM: **EE**
- Temperature sensor short-circuit: **E1**
- Temperature sensor open-circuit: **E2**
- Ambient temperature is higher than 50°C: **HI**
- Ambient temperature is lower than 0°C: **LO**

### 13.4 Installation

- Install the thermostat about 1.5 m (59") above the floor. In the event that the controller is intended for use by wheelchair users, please refer to local regulations
- Make sure the device is powered off prior to installation/service
- Do not install in locations that can be affected by radiant heat or in places with high levels of sunlight
- Do not install thermostats behind doors or in corners
- Protect from water/debris to avoid damaging the Thermostat

### 13.5 Mounting

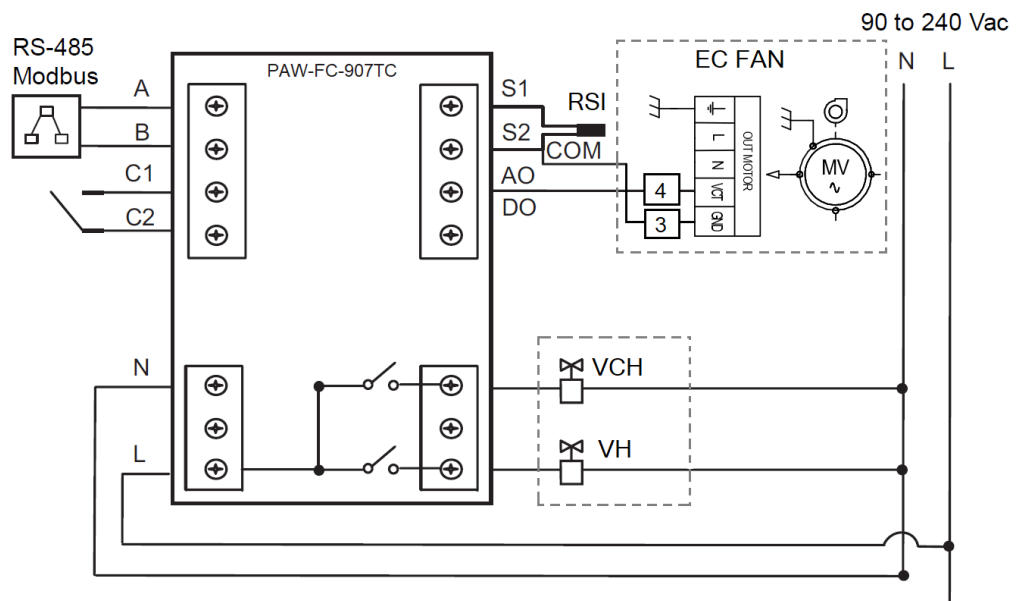
1	<p>Insert a 3.5 mm flat head screwdriver along the bevel into the slot. Pry upwards with appropriate force to release the two hooks</p> 	2	<p>Remove the display from the base module. Carefully remove the wire connections, if required.</p> 
3	<p>Connect the wires according to the appropriate wiring diagram shown above. Ensure the polarity of the mains supply is correct.</p> 	4	<p>Mount the base module onto the wall box using the two screws supplied.</p> 
5	<p>Fit the display module onto the base module. Align upper hooks between the two modules. Carefully replace the wiring connection if it has been removed. Click display module onto base module using the two lower hooks.</p> 		

### 13.6 Wiring

Provide an approved disconnecting means and overcurrent protection to supply conductors. The disconnecting device(s) shall meet the relevant requirements of IEC 60947-1 and IEC 60947-3 and shall be suitable for the application. Locate and mark per local requirements.

#### Legend

- RSI** Remote sensor input
- C1-C2** Energy saving input
- VCH** Cooling valve (4 pipes) or cooling/heating valve (2 Pipes)
- VH** Heating valve (4 pipes)





## 13.7 Operation instructions

### Power On/Off

A short press of the **On/Off** button will turn the power on. Another short press of the **On/Off** button will turn off the power, fan coil and motorized valve (if installed). If no buttons are pressed for 10 seconds, the thermostat backlight turns off. Press any button to turn the backlight back on.





### Temperature Setting

With the power on, press **Down** to decrease the temperature setting and **Up** to increase temperature in steps of 0.5°C.


The icon  will appear on the display. If no buttons are pressed for six seconds, the icon  is displayed, indicating the setpoint is confirmed.

### Mode selection

With the power on, press **M** to switch the operation mode.

The display indicates cooling with , heating with  and ventilation with . Auto mode can be selected in the parameter settings and is indicated on the display with .

### Fan Speed Selection





With the power on, press  to select a fan wind/air speed of high, medium, low or automatic. In automatic mode, the fan speed changes automatically. For a difference of 1°C, the fan will automatically switch to low fan speed. For a difference of 2°C, the fan will automatically switch to medium fan speed. For a difference of 3°C or more, the fan will automatically switch to high speed.

### Motorized Valve Control (2-Pipe Models)



In cooling (or heating) mode, the motorized valve will be switched on when the room temperature is higher than (or lower than) the temperature setting by 1°C. It will switch off when the room temperature reaches the temperature setting.



## Energy Saving Functions

### Eco Mode




Press the ECO button  to turn on Eco mode. The display will show the  and  icons. If the thermostat is in Cooling mode, the temperature is automatically set to 26°C with the fan running at low speed. If the thermostat is in Heating mode, the temperature is automatically set to 18°C with the fan running at low speed. To turn Eco mode off, press the **Up** or **Down** buttons to change the temperature setting or press the ECO  button.

### Unoccupied Energy Saving Mode

Unoccupied Energy Saving mode can be entered via a hotel room key card. Example: after a hotel room key card is removed from the reader,  and  are displayed. If the thermostat is in cooling mode, the temperature is automatically set to 28 °C with the fan running at low speed. If

the thermostat is in heating mode, the temperature is automatically set to 16 °C with the fan running at low speed. When the key card is returned to the reader, the indoor  display and ECO  icon turn off and the thermostat returns to the previously set mode.


### Sleep Energy Saving Mode

At 12:00 a.m. the  icon turns on. The temperature setpoint increases or decreases automatically every hour by 1°C until 3:00 a.m. Example: if the thermostat is in cooling mode, the setpoint will increase 1°C per hour until 3:00 a.m. then decreases 1°C per hour until the original setpoint is reached at 7:00 a.m. and turns  off. If the thermostat is in heating mode, the setpoint will decrease 1°C per hour until 3:00 a.m. and then increases 1°C per hour until the original setpoint is reached at 7:00 a.m. and  turns off. The cooling setpoint will not rise above 26°C and the heating setpoint will not drop below 18°C in Sleep Energy Saving Mode.


### Time Setting Function

During power-on, press and hold **M** for six seconds to enter the Time Setting mode. Press the mode button **M** again to select the hour, minute and week. Press the **Up** and **Down** buttons to adjust this parameter. Time Setting mode is exited automatically if no button is pushed for six seconds.


### Button Lockout Function

Press and hold the **Up** and **Down** buttons at the same time for six seconds to activate the keypad lockup function to prevent thermostat operation by others. While lockout is active, the lock icon  will be displayed on the screen. To deactivate the lockout function, press and hold the **Up** and **Down** buttons at the same time for six seconds to unlock the system.

### Low Temperature Protection Function

If the thermostat is switched off and the room temperature drops below 5°C, the thermostat will start automatically for heating and display the  symbol. The fan will run at high speed automatically and the motorized valve will be opened. When the room temperature rises to 7°C, the low temperature protection function is cancelled and the thermostat will stop automatically, returning to its previously switched off state.

### Low Temperature Protection Function

In the event of an operating exception with the temperature sensor (either built-in or external, depending on which is selected), the thermostat will attempt to command the fan and valve to close, place the device in an inoperative state and display the  icon and an 'E1' or 'E2' alert.

E1: Sensor short-circuit alert

E2: Sensor open-circuit alert

'HI' will be displayed if the temperature is higher than 50°C.

'Lo' will be displayed if the temperature is lower than 0°C.

## 14. Modbus communication protocol PAW-FC-907TC

The PAW-FC-907TC thermostat is equipped with Modbus communication. Modbus is an open, widespread and well established serial communication protocol used in building automation. The support of Modbus communication allows simple integration of the PAW-FC-907TC with a building management system using standard Modbus serial communication.

These parameters are defined for each thermostat in the **v**. If required, adjust the settings to disable the Modbus

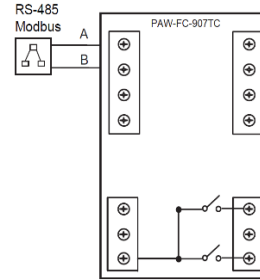
The thermostat communicates as a Modbus RTU slave device over a serial RS-485 connection, allowing for the transfer of real-time data.

The RS-485 communication parameters can be adjusted as follows:

- Baud Rate: 4800, 9600, 19200 and 38400 bps
- Parity check: Odd, Even and None
- Device Modbus Address: 01 to 64

connection. All of these settings can be completed under menu items 12 to 15.

Connection to the RS-485 network is made via dedicated terminals on the back of the thermostat and marked A (+) and B (-).



The following Modbus register types and formats are supported:

Code	Register Type	Data	Format
01	Read coils	Boolean	Binary/digital
02	Read discrete inputs	Boolean	Binary/digital
03	Read holding registers	Word	16-bit unsigned integer
04	Read input registers	Word	16-bit unsigned integer
06	Write single register	Word	16-bit unsigned integer

### Parameter Settings Table

#### Function Code 01

Reg.	Description	Definition
0	Cooling valve (4-pipe)	0 = Off, 1 = On
4	Fan speed status high	0 = Off, 1 = On
5	Fan speed status medium	0 = Off, 1 = On
6	Fan speed status low	0 = Off, 1 = On
7	Heating valve (4-pipe)	0 = Off, 1 = On

#### Function Code 02

Reg.	Description	Definition
2	Temp sensor, short circuit	0 = OK, 1 = Fault
3	Temp sensor, short circuit	0 = OK, 1 = Fault

#### Function Code 03/06

Reg.	Description	Definition
2	Thermostat mode	0 = Off, 1 = On, 02=Frost protection*
3	Operation mode	1 = Cool, 2 = Heat, 3 = Ventilation, 4 = Auto
4	Set-point	5 to 35 °C
5	Fan mode	00 = High, 01 = Medium, 02 = Low, 03 = Auto
6	Heating set-point, upper limit	5 to 35 °C
7	Cooling set-point, lower limit	5 to 35 °C
8	ECO mode	0 = Disable 1 = Enable
9	ECO mode, cooling set-point	22 to 32°C
10	ECO mode, heating set-point	10 to 21°C
11	Temperature compensation	-5 to 5°C
12	Setpoint, upper limit	2 to 49.5°C
13	Setpoint, lower limit	0 to 47.5°C
14	Sleep mode	0 = Disable 1 = Enable
15	Low temperature protection	0 = Disable 1 = Enable
16	Fan operation after setting temperature is reached	0 = Fan off 1 = Fan on
17	Power-on state	00 = Power-down memory 01 = No power-down memory 02 = Display on when powered
18	Differential	1 to 3°C
19	ECO mode differential	1 to 5°C
20	Auto dead-band	1 to 3°C
21	Operation mode configuration	0 = Heat only (heat & vent) 1 = Cool only (cool & vent) 2 = Heat and cool (heat, cool & vent) 3 = Auto 4 = 2-pipe mode
Reg.	Description	Definition

22	Auto fan	0 = Disable 1 = Enable
23	Display temperature	00 = Room temp. 01 = Set-point
24	Temperature sensor	00 = Built-in sensor 01 = External sensor
25	Modbus connection	0 - Disable 1 - Enable
26	Modbus address setting	1 to 64
27	Modbus baud rate	00 = 4800 bps 01 = 9600 bps 02 = 19200 bps 03 = 38400 bps
28	Modbus parity check	00 = Odd check 01 = Even check 02 = None
29	RTC clock display	0 = Disable 1 = Enable
30	12/24-hour clock	12 = 12-hour clock 24 = 24-hour clock
31	Auxiliary input close/open	00 = Occupied when short-circuit, unoccupied when open-circuit 01 = Unoccupied when short-circuit, occupied when open-circuit
32	Unoccupied mode, cooling setpoint	22 to 32 °C
33	Unoccupied mode, heating setpoint	10 to 21 °C
34	Unoccupied mode, fan speed	00 = High 01 = Medium 02 = Low
35	Temp. value from connection	00 = Local device 01 = Modbus connection
36	Temp. input	
37	Heating mode KP	1 to 99 s
38	Cooling mode KP	1 to 99 s
39	PID sampling time	1 to 99 s
40	KI	0 to 99 s
41	Span	1 to 99 s
42	Heating valve 2, output voltage	10x voltage (e.g., if voltage is 5.7 V, '57' is displayed)
43	Cooling valve 1, output voltage	10x voltage (e.g., if voltage is 5.7 V, '57' is displayed)
44	Low-speed fan output voltage	Range: 0 V to medium-speed setting
45	Medium-speed fan output voltage	Range: Low-speed setting to high-speed setting
46	High-speed fan output voltage	Range: Medium-speed setting to 10V

\*Read only

#### Function Code 04

Reg.	Description	Definition
0	Actual room temperature	0 to 50 °C

## 15. Commissioning

### 15.1 Performing pre-start checks

Once all components have been installed, you can start commissioning by performing the prestart checks.

CHECKING HYDRAULIC INSTALLATION	CHECKING ELECTRICAL INSTALLATION
The water inlet and outlet connections are correctly connected to the unit <input type="checkbox"/>	The electrical installation has been carried out according to the applicable local electrical code and the wiring diagram for the relevant model <input type="checkbox"/>
The hydraulic circuit is filled correctly and the fluid flows freely without any signs of leaks or air bubbles. When ethylene glycol anti-freeze is used, check that the concentration level is correct <input type="checkbox"/>	Correctly sized fuses or a circuit breaker have been installed on the main switchboard <input type="checkbox"/>
The water flow complies with the specifications. If this is not the case, adjust the water flow accordingly. <input type="checkbox"/>	The supply voltages match the voltages specified in the unit wiring diagram <input type="checkbox"/>
The water quality complies with the indicated standards. <input type="checkbox"/>	All cables are properly identified and tightly connected to the unit's terminal board <input type="checkbox"/>
The condensate drain hose is connected to the drain tray and the evacuation pipe and allows liquid to drain freely. <input type="checkbox"/>	All cables and wires are clear of or protected from pipework and sharp edges <input type="checkbox"/>

If any of the above conditions is not met, rectify the issue and repeat the check.

### 15.2 Performing a test run

When all pre-start checks and the final visual check have been completed successfully, put the Cassette unit into operation and ensure that the following conditions are met:

1. There are no unusual noises or vibrations in the running components, particularly not in the indoor fan drive system.
2. The voltage measured at unit supply terminals matches the specified design voltage.
3. The unit is wired for correct control of unit fan, cooling and heating modes.

If any of the above conditions is not met, rectify the issue and repeat the check.

### 15.3 Performing the final tasks

When the test run has been completed successfully, perform the following final tasks:

1. If needed, fix the cables and the pipes on the wall with clamping collars.
2. Ensure that the unit is clean and free of remainder installation material.
3. Ensure that the plastic cover is in place and secured.
4. Operate the unit in the presence of the user and explain all functions.
5. Show the user how to remove, clean and place back the filters.
6. Hand this manual over to the user and remind him that it must be kept in a safe place.

## 16. Maintenance



### IMPORTANT

The user is responsible for ensuring that the unit is in perfect working order and that the technical installation and minimum annual maintenance operations have been performed by a qualified technician in accordance with the procedures described in this manual.

These units have been designed for minimum maintenance through the use of permanently lubricated components. However, there are operational maintenance requirements that require regular attention to ensure optimum performance. Depending on actual operational constraints and regulatory changes, the installer might recommend increased maintenance operations and more frequent inspections.

### 16.1 Regular servicing tasks



### WARNING

#### Danger to life from electric shock

The devices are operated with 230-V alternating voltage. Any contact with live conductors can present a danger to life from electric shock.

- Electrical maintenance work must be undertaken by a trained electrician.
- Ensure that you have disconnected the electricity supply before you carry out any maintenance work. Secure the electricity supply against being switched on again unintentionally.

In order to ensure the safe and trouble-free operation of the Fan Coil unit, perform the following maintenance tasks at regular intervals.

#### General inspection

- Carry out a visual inspection of the complete installation in service.
- Check and ensure the general cleanness of the installation.
- Check the condition of the condensate tray by pulling it out of the casing, and ensure that the condensate evacuation pipe is not blocked.

### Air filter

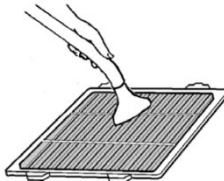
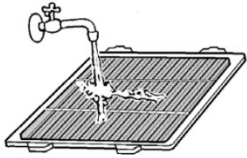


#### IMPORTANT

To open the unit grille: turn the two screws through 90° (1/4 turn).  
Changing the filter is a maintenance operation that should only be performed by qualified personnel.

To avoid clogging of the air filter, it is recommended to clean it regularly. The acrylic air filter is washable in water. Filter changes are required at regular intervals. The time period between changes will depend upon the specific operating conditions. Some applications such as hotels, where there is a lot of lint from carpeting, will require more frequent filter changes. If light cannot be seen through the filter, when held up to sunlight or a bright light, it should be washed or changed.

#### Remove and re-mount the air filter according to the following instructions:

1	Extract the filter.		
2	First vacuum clean the filter, then wash under tap water.		
3	Let the filter dry re-mount it. Make sure that the attachment systems are safely relocked in place after changing the filter.		

#### Prolonged shutdown: Condensate drain pan removal

Check that the drain hole, evacuation pipe and siphon are not blocked.  
During the removal operation of the condensate drain pan protect the floor with a plastic sheet under the unit.

- Remove the frame-grille assembly by loosening the screws.
- Remove the four fixing brackets on the side of the drain pan and carefully remove the condensate drain pan

#### Prolonged shutdown: System drainage

If the system needs to be emptied, remember that a water head always remains into the coil and it may freeze in case temperature goes below 0 °C thus causing the coil failure. The coil can be totally emptied by opening the valves and blowing in air in each valve for 90 seconds at a minimum pressure of 6 bar.

#### Coil

Check that the fins are not clogged or damaged.  
To avoid the coils becoming mouldy with an accumulation of tiny impurities, it is recommended that they are cleaned regularly. If necessary, brush the coils with an appropriate tool. Take care not to damage the fins during cleaning.

#### Fan motor



#### CAUTION:

**Securely isolate the power before starting any operation.**  
**Never clean the unit with by spraying it with water, it can result in electric shock.**

The fan motor assembly does not require any particular maintenance. All Cassette units utilize permanently lubricated fan motor bearings or sliding bearing. Adding oil is not necessary.

#### Electrical equipment





**CAUTION:**

**Securely isolate the power before performing the following operations.**

1. Check that the main power supply cable is not damaged or altered in such a way as to affect the insulation.
2. Check the tightness of the screw terminals.
3. Check the general tightness of all cable connections.
4. Perform a visual check of the condition of the contacts.
5. Inspect the relay contact surfaces and the contactors and replace them if necessary.
6. Check nominal current draw and the condition of the fuses and replace them if necessary.
7. Clean the control box with compressed air to remove any build-ups of dust or dirt.
8. Ensure that the earth grounding connection is intact.

**Water circuit**

Once a year, drain the water pipes and check for scale formation. De-scale the pipes if required.

Ensure that the hydraulic circuit is filled correctly and that the fluid circulates freely without any sign of leaks or air bubbles.

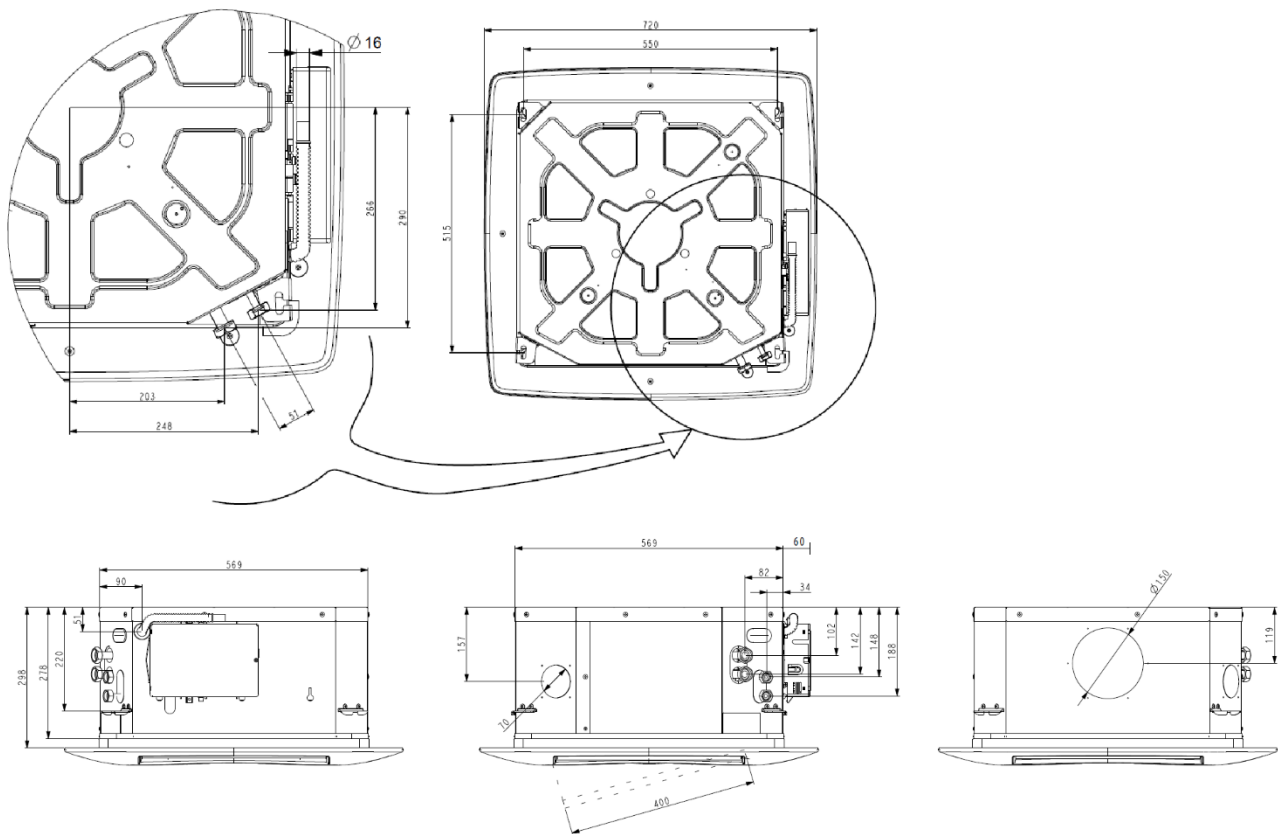
# APPENDIX

## ———— Contents ————

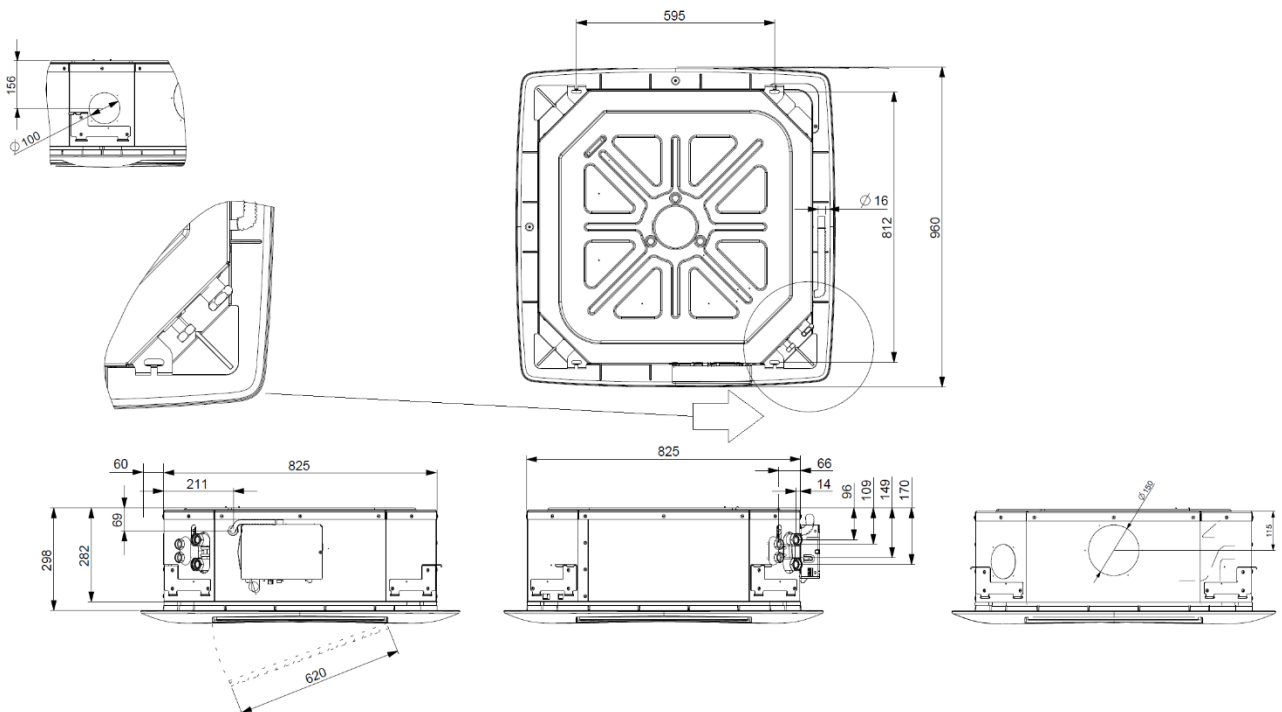
Dimensions.....	43
Hydraulic connections .....	Errore. Il segnalibro non è definito.

## Dimensions and weights

### Unit dimensions Models PAW- FC\*\*-U020 to PAW- FC\*\*-U040



### Unit dimensions Models PAW- FC\*\*-U050 to PAW- FC\*\*-U070



Weights		PAW- FC**-U020	PAW- FC**-U030	PAW- FC**-U040	PAW- FC**-U050	PAW- FC**-U060	PAW- FC**-U070
<b>2-pipe</b>							
Weight of base unit (without valve)	[Kg]	14,8	16,5	16,5	37,1	37,1	39,6
<b>4-pipe</b>							
Weight of base unit (without valve)	[Kg]	17,8	19,5	19,5	42,1	42,1	44,6

## Information requirements for fan coil units

Performances provided according to COMMISSION REGULATION (EU) 2016/2281 of 30 November 2016 implementing Directive 2009/125/EC of the European Parliament and of the Council establishing a framework for the setting of ecodesign requirements for energy-related products, with regard to ecodesign requirements for air heating products, cooling products, high temperature process chillers and fan coil units.

Fan speed setting	Low						Medium						High						
	Ps kW	Pl kW	Pc kW	Ph kW	Pe W	Lw dB(A)	Ps kW	Pl kW	Pc kW	Ph kW	Pe W	Lw dB(A)	Ps kW	Pl kW	Pc kW	Ph kW	Pe W	Lw dB(A)	
Unit PAW-FC-																			
2A-U020	1,29	0,25	1,54	1,92	25	38	1,48	0,28	1,76	2,17	35	42	1,98	0,38	2,36	2,74	58	49	
2A-U030	1,41	0,46	1,87	1,94	17	35	2,17	0,70	2,87	3,15	34	47	3,04	0,95	3,99	3,68	58	53	
2A-U040	2,08	0,70	2,78	3,16	38	42	2,67	0,82	3,49	3,92	58	48	3,62	1,07	4,69	5,28	99	57	
2A-U050	2,52	0,83	3,35	3,80	28	35	3,35	1,08	4,43	5,08	41	40	4,47	1,60	6,07	6,84	66	49	
2A-U060	2,67	1,02	3,69	3,85	34	38	4,06	1,40	5,46	6,26	61	46	5,42	1,76	7,18	8,51	88	54	
2A-U070	2,97	1,07	4,04	4,38	44	40	4,85	1,63	6,48	7,95	92	52	6,34	2,27	8,61	10,28	125	59	
2E-U020	1,30	0,25	1,55	1,92	9	36	1,49	0,28	1,77	2,17	13	40	2,00	0,38	2,38	2,74	29	49	
2E-U030	1,42	0,46	1,88	1,94	7	35	2,18	0,70	2,88	3,15	14	44	3,05	0,95	4,00	3,68	33	53	
2E-U040	2,09	0,70	2,79	3,16	13	42	2,69	0,82	3,51	3,92	23	48	3,64	1,07	4,71	5,28	57	57	
2E-U050	2,53	0,83	3,36	3,80	7	35	3,36	1,08	4,44	5,08	12	40	4,49	1,60	6,09	6,84	25	49	
2E-U060	2,69	1,02	3,71	3,85	9	38	4,08	1,40	5,48	6,26	23	46	5,44	1,76	7,20	8,51	45	54	
2E-U070	2,98	1,07	4,05	4,38	11	40	4,88	1,63	6,51	7,95	40	52	7,21	2,40	9,61	11,03	115	61	
4A-U020	1,18	0,11	1,29	1,09	25	37	1,38	0,10	1,48	1,27	35	41	1,84	0,13	1,97	1,67	58	49	
4A-U030	1,49	0,50	1,99	3,10	17	35	2,07	0,61	2,68	4,40	34	47	2,65	0,72	3,37	5,46	58	53	
4A-U040	2,03	0,52	2,55	4,32	38	42	2,58	0,63	3,21	5,00	58	48	3,30	0,70	4,00	5,80	99	57	
4A-U050	2,23	0,74	2,97	5,28	34	38	3,77	1,19	4,96	7,79	61	46	5,06	1,57	6,63	10,04	88	54	
2A-U060	2,38	0,79	3,17	6,43	44	40	4,68	1,33	6,01	10,07	92	52	5,95	1,60	7,55	12,77	125	59	
4E-U020	1,19	0,11	1,30	1,09	9	36	1,39	0,10	1,49	1,27	13	40	1,86	0,13	1,99	1,67	29	49	
4E-U030	1,50	0,50	2,00	3,10	7	35	2,08	0,61	2,69	4,40	14	44	2,66	0,72	3,38	5,46	32	53	
4E-U040	2,04	0,52	2,56	4,32	13	42	2,60	0,63	3,23	5,00	22	48	3,32	0,70	4,02	5,80	57	57	
4E-U050	2,25	0,74	2,99	5,28	9	38	3,79	1,19	4,98	7,79	23	46	5,08	1,57	6,65	10,04	46	54	
4E-U060	2,39	0,79	3,18	6,43	11	40	4,71	1,33	6,04	10,07	40	52	6,34	1,63	7,97	13,99	115	61	







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