

Water Heating Unit

PQFY

FOR INSTALLERS

INSTALLATION MANUAL

For safe and correct use, please read this installation manual thoroughly before installing the PQFY unit.

mitsubishi
ELECTRIC

2

[Fig. 2.0.1]

A



B



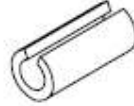
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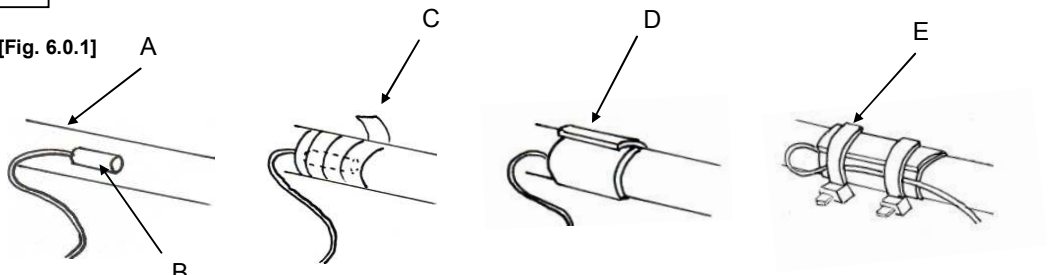
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- A Thermistor
- B Plastic clip
- C Nylon clip
- D Installation manual
- E Insulation

6

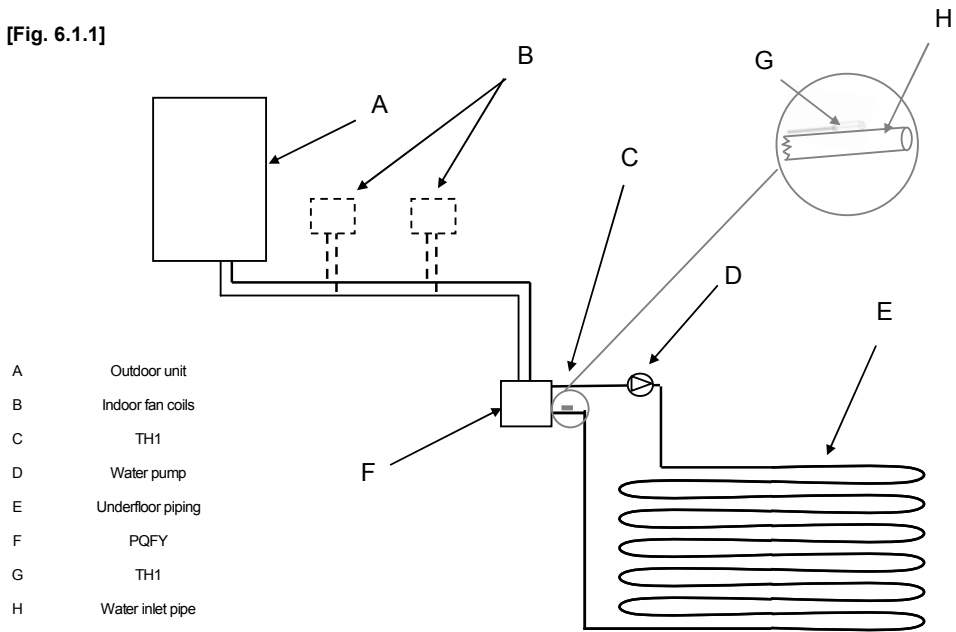
[Fig. 6.0.1]



- A Water pipe
- B Cooling/heating thermistor
- C Aluminium tape (field supply)
- D Insulation
- E Tie band

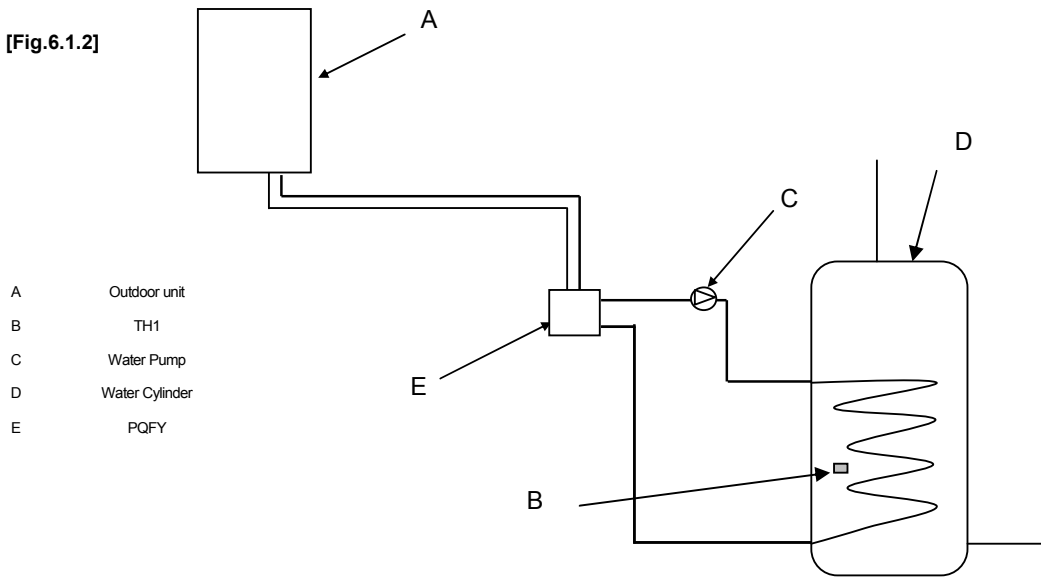
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[Fig. 6.1.1]



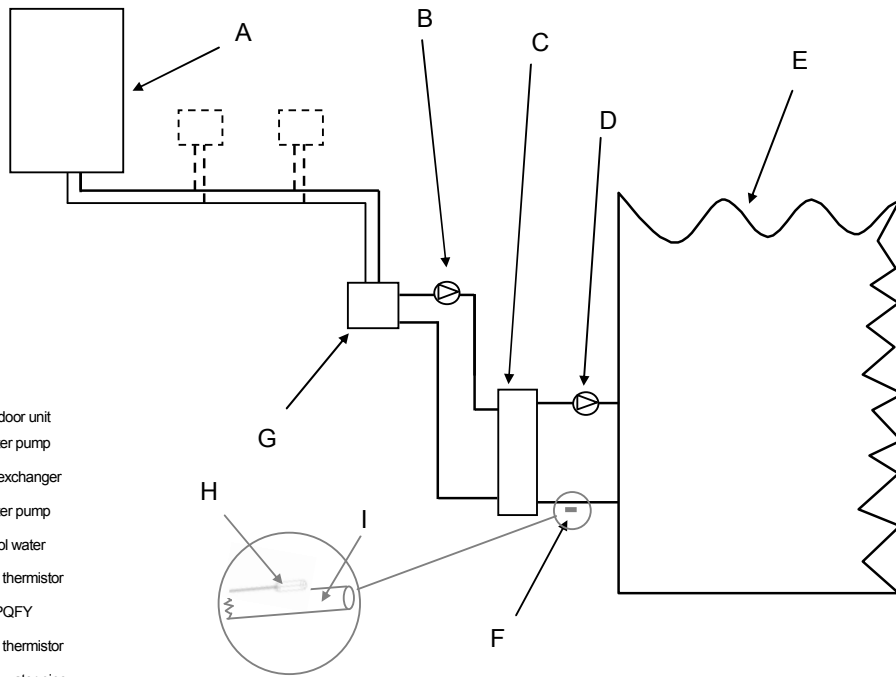
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[Fig.6.1.2]



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[Fig. 6.1.3]

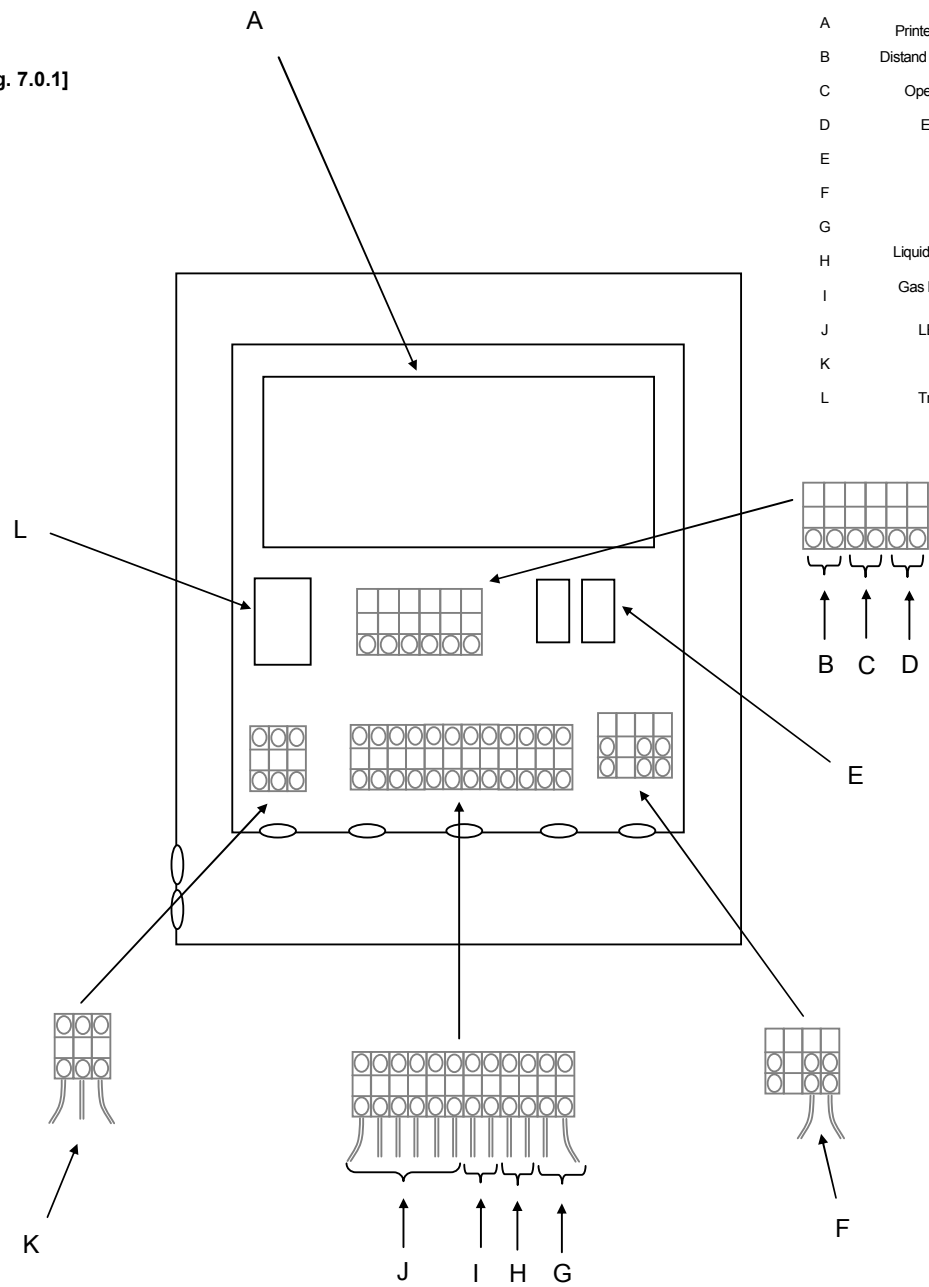


- A Outdoor unit
- B Water pump
- C Heat exchanger
- D Water pump
- E Pool water
- F TH1H thermistor
- G PQFY
- H TH1H thermistor
- I Return water pipe

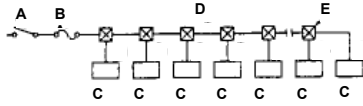
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[Fig. 7.0.1]

- A Printed circuit board
- B Distand signal (ON/OFF)
- C Operation Signal
- D Error signal
- E Relays
- F M Net
- G TH1H
- H Liquid line thermistor (internal)
- I Gas line thermistor (internal)
- J LEV Control
- K Power
- L Transformer

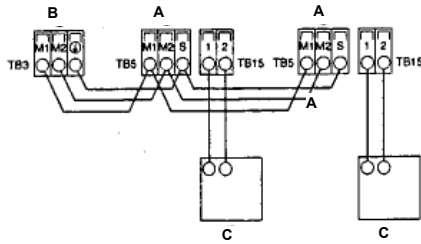


[Fig 7.1.1]

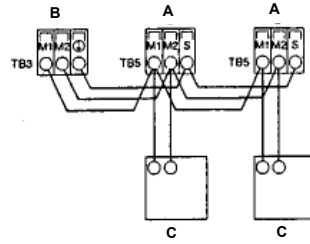


- A. Switch 16A
- B. Over current protection 16A
- C. Indoor unit
- D. Total operating current be less than 16A
- E. Pull box

[Fig 7.2.1]

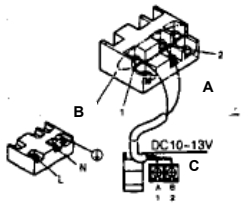


[Fig 7.2.2]

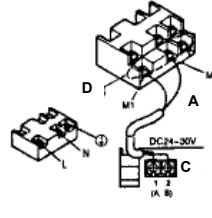


- A. Terminal block for AHU controller/indoor transmission cable
- B. Terminal block for outdoor transmission cable
- C. Remote controller

[Fig 7.2.3]

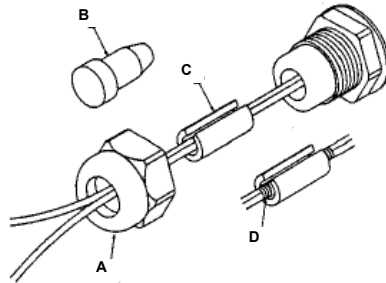


[Fig 7.2.4]



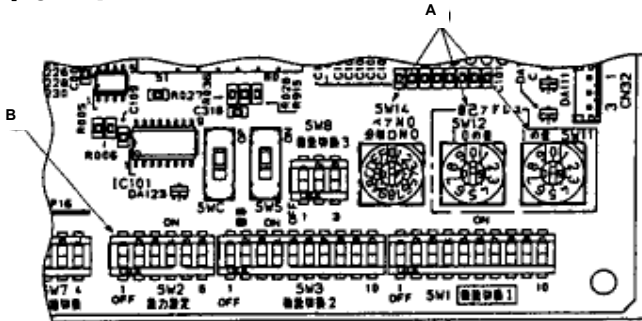
- A. Non-polarized
- B. Upper level (TB15)
- C. Remote controller
- D. Lower level (TB5)

[Fig 7.4.1]



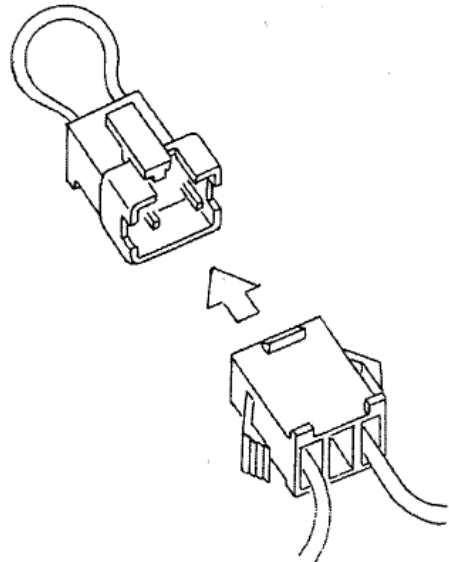
- A. Bunch of wires
- B. Plug
- C. Tube
- D. Insulation tape

[Fig 8.1.1]



- A. Address switch
- B. SW2

[Fig 10.0.1]



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1. Safety precautions

1.1. Before installation and electric work

- Before installing the unit, make sure you read all the “Safety precautions”.
- The “Safety precautions” provide very important points regarding safety. Make sure you follow them.

Symbols used in the text

 **Warning:**

Describes precautions that should be observed to prevent danger of injury or death to the user.

 **Caution:**

Describes precautions that should be observed to prevent damage to the unit.

-  **Warning:**
Carefully read the labels affixed to the main unit.

⚠ Warning:

- **Ask the dealer or an authorised technician to install the unit.**
 - Improper installation by the user may result in water leakage, electric shock, or fire.
- **Use the specified cables for wiring. Make the connections securely so that any outside forces acting on the cables are not applied to the terminals.**
 - Inadequate connection and fastening may generate heat and cause a fire.
- **Prepare for typhoons and other strong winds and earthquakes and install the unit at the specified place.**
 - Improper installation may cause the unit to topple and result in injury.
- **Never repair the unit. If the controller must be repaired, consult the dealer.**
 - If the unit is repaired improperly, electric shock, or fire may result.
- **When handling this product, always wear protective equipment. EG: Gloves, full arm protection namely boiler suit, and safety glasses.**
 - Improper handling may result in injury.
- **If refrigerant gas leaks during installation work, ventilate the room.**
 - If the refrigerant gas comes into contact with a flame, poisonous gases will be released.
- **Install the controller according to this Installation Manual.**
 - If the unit is installed improperly, electric shock, or fire may result.
- **Have all electric work done by a licensed electrician according to "Electric Facility Engineering Standard", "Interior Wire Regulations" and the instructions given in this manual and always use a special circuit.**
 - If the power source capacity is inadequate or electric work is performed improperly, electric shock and fire may result.
- **Keep the electric parts away from any water - washing water etc...**
 - Contact may result in electric shock, fire or smoke.
- **Securely install the outdoor unit terminal cover (panel).**
 - If the terminal cover (panel) is not installed properly, dust or water may enter the outdoor unit and fire or electric shock may result.
- **When installing and moving the air handling unit to another site, do not charge the unit with a refrigerant different from the refrigerant specified on the unit.**
 - If a different refrigerant or air is mixed with the original refrigerant, the refrigerant cycle may malfunction and the unit may be damaged.
- **If the air handling unit is installed in a small room, measures must be taken to prevent the refrigerant concentration from exceeding the safety limit even if the refrigerant should leak.**
 - Consult the dealer regarding the appropriate measures to prevent the safety limit from being exceeded. Should the refrigerant leak and cause the safety limit to be exceeded, hazards due to lack of oxygen in the room could result.
- **When moving and reinstalling the air handling unit, consult the dealer or an authorised technician.**
 - If the controller is installed improperly, electric shock, or fire may result.
- **After completing installation work, make sure that refrigerant gas is not leaking.**
 - If the refrigerant gas leaks and is exposed to a fan heater, stove, oven, or other heat source, it may generate noxious gases.
- **Do not reconstruct or change the settings of the protection devices.**
 - If the pressure switch, thermal switch, or other protection device is shorted or operated forcibly, or parts other than those specified by Mitsubishi Electric are used, fire or explosion may result.
- **To dispose of this product, consult your dealer.**
- **Do not use a leak detection additive.**

1.2. Precautions for devices that use R410A refrigerant

⚠ Caution:

- **Do not use the existing refrigerant piping.**
 - The old refrigerant and refrigerator oil in the existing piping contains a large amount of chlorine which may cause the refrigerator oil of the new unit to deteriorate.
- **Use refrigerant piping made of C1220 (CU-DHP) phosphorus deoxidized copper as specified in the JIS H3300 "Copper and copper alloy seamless pipes and tubes". In addition, be sure that the inner and outer surfaces of the pipes are clean and free of hazardous sulphur, oxides, dust/dirt, shaving particles, oils, moisture, or any other contaminant.**
 - Contaminants on the inside of the refrigerant piping may cause the refrigerant residual oil to deteriorate.
- **Store the piping to be used during installation indoors and keep both ends of the piping sealed until just before brazing. (Store elbows and other joints in a plastic bag.)**
 - If dust, dirt, or water enters the refrigerant cycle, deterioration of the oil and compressor problems may result.
- **Use ester oil, ether oil or alkylbenzene (small amount) as the refrigerator oil to coat flares and flange connections.**
 - The refrigerator oil will degrade if it is mixed with a large amount of mineral oil.
- **Use liquid refrigerant to fill the system.**
 - It gas refrigerant is used to seal the system, the composition of the refrigerant in the cylinder will change and performance may drop.
- **Do not use a refrigerant other than R410A.**
 - If another refrigerant (R22, etc.) is used, the chlorine in the refrigerant may cause the refrigerator oil to deteriorate.
- **Use a vacuum pump with a reverse flow check valve.**
 - The vacuum pump oil may flow back into the refrigerant cycle and cause the refrigerator oil to deteriorate.
- **Do not use the following tools that are used with conventional refrigerants. (Gauge manifold, charge hose, gas leak detector, reverse flow check valve, refrigerant charge base, vacuum gauge, refrigerant recovery equipment.)**
 - If the conventional refrigerant and refrigerator oil are mixed in the R410A, the refrigerant may deteriorate.
 - If water is mixed in the R410A, the refrigerator oil may deteriorate.
 - Since R410A does not contain any chlorine, gas leak detectors for conventional refrigerants will not react to it.
- **Do not use a charging cylinder.**
 - Using a charging cylinder may cause the refrigerant to deteriorate.
- **Be especially careful when managing the tools.**
 - If dust, dirt, or water gets in the refrigerant cycle, the refrigerant may deteriorate.

1.3. Before installation

⚠ Caution:

- **Do not install the unit where combustible gas may leak.**
 - If the gas leaks and accumulates around the unit, an explosion may result.
- **Do not use the air conditioner where food, pets, plants, precision instruments, or artwork are kept.**
 - The quality of the food, etc. may deteriorate.
- **Do not use the air conditioner in special environments.**
 - Oil, steam, sulphuric smoke, etc. can significantly reduce the performance of the air conditioner or damage its parts.

- **When installing the unit in a hospital, communication station, or similar place, provide sufficient protection against noise.**
 - The inverter equipment, private power generator, high-frequency medical equipment, or radio communication equipment may cause the air conditioner to operate erratically, or fail to operate. On the other hand, the air conditioner may affect such equipment by creating noise that disturbs medical treatment or image broadcasting.
- **Ensure that all plumbing and associated works are carried out by qualified personal.**
 - Installation by unqualified personnel could lead to serious injury, flooding or electric shock.
 - Ensure that all government guidelines and legislation are followed when installing the water side connections and associated works.
 - Ensure that correct personal protective equipment is used at all time during the installation.

1.4. Before installation - electrical work

Caution:

- **Ground the unit.**
 - Do not connect the ground wire to gas or water pipes, lightning rods, or telephone ground lines. Improper grounding may result in electric shock.
- **Install the power cable so that tension is not applied to the cable.**
 - Tension may cause the cable to break and generate heat which may, in turn, cause fire.
- **Install a leak circuit breaker, as required.**
 - If a leak circuit breaker is not installed, electric shock may result.
- **Use power line cables of sufficient current carrying capacity and rating.**
 - Cables that are too small may leak, generate heat, and cause a fire.
- **Use only a circuit breaker and fuse of the specified capacity.**
 - A fuse or circuit breaker of a larger capacity or a steel or copper wire may result in a general unit failure or fire.
- **Do not wash the air conditioner units.**
 - Washing them may cause an electric shock.
- **Be careful that the installation base is not damaged.**
 - If the damage is left uncorrected, the unit may fall and cause personal injury or property damage.
- **Be very careful regarding product transportation.**
 - Two people should be used to carry products of 20kg or more.
 - Some products use PP bands for packaging. Do not use any PP bands for a means of transportation.
 - Do not touch the heat exchanger fins. Doing so may cut your fingers.
 - When transporting the outdoor unit, suspend it at the specified positions on the unit base. Also support the outdoor unit at four points so that it cannot slip sideways.
- **Safely dispose of the packing materials.**
 - Packing materials, such as nails and other metal or wooden parts, may cause stabs or other injuries.
 - Tear apart and throw away plastic packaging bags so that children will not play with them - If children play with a plastic bag which has not been torn apart, they face the risk of suffocation.

1.5. Before starting the test run

Caution:

- **Turn on the power at least 12 hours before starting operation.**
 - Initiating operation immediately after turning on the main power switch can result in severe damage to internal parts. Keep the power switch turned on during the operational season.
- **Do not touch the switches with wet fingers.**
 - Touching a switch with wet fingers can cause electric shock.
- **Do not touch the refrigerant pipes during and immediately after operation.**
 - During and immediately after operation, the refrigerant pipes may be hot or cold, depending on the condition of the refrigerant flowing through the refrigerant piping, compressor, and other refrigerant cycle parts. Your hands may suffer burns or frostbite if you touch the refrigerant pipes.
- **Do not operate the air conditioner with the panels and guards removed.**
 - Rotating, hot, or high-voltage parts can cause injuries.
- **Do not turn off the power immediately after stopping operation.**
 - Always wait at least five minutes before turning off the power. Otherwise, water leakage and other problems may occur.

2. Accessories

The unit is provided with the following accessories:
[Fig. 2.0.1] (P.1)

No.	Accessories	PQFY-P140	PQFY-P250
A	Thermistor	1	1
B	Plastic clip (1 spare)	1	1
C	Nylon clip (2 spares)	1	1
D	Installation manual	1	1
E	Insulation	1	1

3. Selecting an installation site

- Avoid locations in direct sunlight.
- Avoid locations exposed to steam or oil vapour.
- Avoid locations where combustible gas may leak, settle or be generated.
- Avoid installation near machines emitting high-frequency waves.
- Avoid places where acidic solutions are frequently handled.
- Avoid places where sulphur-based or other sprays are frequently used.
- Avoid areas of high humidity (when cooling operation is required)
- Install inside in a water proof housing (field Supplied)

4. Refrigerant pipe specifications

- To avoid dew formation, provide sufficient anti-sweating and insulating work to the refrigerant pipes.
- When using commercially available refrigerant pipes, be sure to wind commercially available insulating material (with a heat-resisting temperature of more than 100 °C and thickness given below) onto both liquid and gas pipes. Be also sure to wind commercially available insulating material (with a form polyethylene's specific gravity of 0.03 and thickness given below) onto all pipes which pass through rooms.

The below thicknesses of insulating material should be used for the refrigerant piping.

Pipe Size	Insulation thickness
6.4 mm to 25.4 mm	More than 10 mm

- If the unit is used on a particularly high building and under conditions of high temperature and humidity, it is necessary to insulate to a greater thickness than that given in the table above.
- If there are insulation manufacturer's specifications these should be followed.

5. Connecting refrigerant pipes

5.1. Refrigerant piping work

Piping work must be done in accordance with the installation manuals for both outdoor unit and where applicable the BC controller.

- Heat Pump Series, PUMY-P100/125/140YMH, PUMY-P100/125/140VMH, PUHY-P200/250/300/350/400/500/650YGM-A are designed to operate in a system with two refrigerant pipes one liquid and one gas connecting from the outdoor unit to the indoor unit.
- R2 Series, PURY-P200/250/300/350/400/500/650YGM-A are designed to operate in a system where the refrigerant pipe from an outdoor unit is received by BC controller and branches at the BC controller to connect between indoor units, again liquid and gas.
- For constraints on pipe length and allowable difference of elevation, refer to the outdoor unit manual.

Cautions on refrigerant piping

- **Be sure to use non-oxidative brazing to ensure that no foreign matter or moisture enter into the pipe.**
- **Be sure to apply refrigerating machine oil over the flare connection seating surface and tighten the connection using a double spanner.**
- **Provide a metal brace to support the refrigerant pipe so that no load is imported to the indoor unit and pipe. This metal brace should be provided 50 mm away from the indoor unit's flare connection.**

Warning:

When installing and moving the unit, do not charge it with refrigerant other than the refrigerant specified on the unit.

- Mixing of a different refrigerant, air, etc. may cause the refrigerant cycle to malfunction and result in severe damage.

Caution:

- **Use refrigerant piping made of C1220 (CU-DHP) phosphorus deoxidized copper as specified in the JIS H3300 "Copper and copper alloy seamless pipes and tubes". In addition, be sure that the inner and outer surfaces of the pipes are clean and free of hazardous sulphur, oxides, dust/dirt, shaving particles, oils, moisture, or any other contaminant.**
- **Never use existing refrigerant piping.**
 - The large amount of chlorine in conventional refrigerant and refrigerator oil in the existing piping will cause the new refrigerant to deteriorate.
- **Store the piping to be used during installation indoors and keep both ends of the piping sealed until just before brazing.**
 - If dust, dirt, or water gets into the refrigerant cycle, the oil will deteriorate and the compressor may fail.
- **Use ester oil, ether oil or alkylbenzene (small amount) as the refrigerator oil to coat flares and flange connections. (For models using R410A or R407C)**
 - The refrigerant used in the unit is highly hygroscopic and mixes with water and will degrade the refrigerator oil.

Cautions on water piping and connection.

Ensure that all water piping and the connection to the unit is in accordance with the relevant government guidelines and legislation.

Ensure that sufficient allowance has been made for the expansion of the water in the design of the water piping.

Ensure that national Legionella legislation has been strictly adhered to at all times for the system design.

Ensure that sufficient pressure relief has been allowed for in the design of the water circuit.

6. Thermistor setting work

⚠ Caution:

The heating water temperature monitoring Thermistor (TH1H) must make very good contact with either the water piping or the cylinder containing the water to be heated. The insulation provided should be used to ensure that the thermistor reads the correct temperature without any heat loss.

6.1. Hot water thermistor TH1H

Locate the thermistor on the water pipe or water cylinder at the point at which the water temperature is to be monitored. Turn the lead wire of the thermistor downward, and wind the adhesive insulation provided around the thermistor.

Tighten the thermistor in position using the supplied tie band. Fold the lead wire of the thermistor at the bottom, and fix it with the insulation material using the tie band as shown in figure [Fig. 6.0.1] (P.2)

6.1.1 Heat Pump system with Under Floor Heating and DX Fan Coil Cooling

- The outlet water temperature supplied from the unit to the under floor heating will be 45°C degrees. The water temperature thermistor should be located on the return water pipe to the unit.
- Setting the desired return water temperature is performed on commissioning and is explained in section 7.3.
- When the under floor heating requires heating, a volt free contact (closed / short circuit) is required on Terminal Block A1 and A2 on the PQFY Control Panel. This is the same control as a 3 wire adaptor.
- The TH1H sensor should be attached to the return water pipe on the PQFY to avoid cycling the unit on and off unnecessarily.
- The design flow temperature of the PQFY is 45°C degrees; the return temperature will be designed depending on the flow rate of the water typically 30 to 35°C degrees.
- On commissioning, the desired water return flow temperature should be set on the controller. Please see section 7.3, commissioning for details setting the desired water set point.

[Fig. 6.1.1] (P.3)

Note:

THE ROOM TEMPERATURE MUST BE THERMOSTATICALLY CONTROLLED BY THE UNDER FLOOR SYSTEM. THE PQFY WILL PROVIDE HOT WATER AT 45 DEGREES UNTIL SIGNALLED TO DO OTHERWISE. THERE IS NO ROOM TEMPERATURE CONTROL ON THE PQFY.

Note: Water pumps are not supplied by Mitsubishi Electric.

6.1.2 Heat Pump system with Domestic Hot Water

The system should be set up as shown in Figure 6.1.2 with the TH1H strapped to the cylinder or inserted into a pocket in the water cylinder. The desired temperature normally the hottest, 45 Degrees equals 28 degrees on the PAR 21 remote controller.

- The Par 21 should be set to Heating 28 Degrees to achieve a hot water temperature of 45 degrees.
- For further control of Immersion heaters please see the product ACH1.

NOTE , Stagnant hot water should not be stored at 45degrees due to risk of Legionella,

NOTE If a direct cylinder is used in conjunction with a Plate heat exchanger with brass pump, the TH1H water temperature thermistor should be strapped to the cylinder water pipe connecting to the inlet to the plate heat exchanger.

6.1.3 Heat Pump system with a Swimming Pool

- The outlet water temperature supplied to the swimming pool from the unit will be 45°C degrees. The TH1 water temperature thermistor should be located on the return water pipe from the swimming pool i.e. the actual swimming pool water temperature.
- Setting the desired return water temperature is performed on commissioning and is explained in section 10.
- When the swimming pool requires heating, a volt free contact (Closed / Short Circuit) is required on Terminal Block A1 and A2 on the PQFY Control Panel. This is the same control as a 3 wire adaptor.
- The TH1H sensor should be attached to the return water pipe from the swimming pool to avoid cycling the unit on and off unnecessarily.
- The PQFY will heat up the pool until the set temperature, typically until 30°C is reached.
- On commissioning, the controller should be set to heating and the corresponding controller temperature to the desired water temperature. See section 7.3 for the corresponding controller temperature.

[Fig. 6.1.3] (P.4)

6.2.4 Heat Pump system with any combination of Under Floor Heating, Under Floor Cooling and Domestic Hot Water

This application is possible but the system design and installation will vary per application. The additional controller ACH1 is required for this, please see the ACH1 installation manual for information.

6.3. *Setting the desired water temperatures*

On commissioning it is necessary to use a remote controller - see section 8.2 for more details.

Depending on the desired water temperature the remote controller can be set from 19°C to 28°C and every 1 degree increment in between. The corresponding water temperature the water will be heated to is shown below.

6.3.1 Commissioning of Controller and Set point.

The table below shows the remote controller set point correlation to the water set point.

Please note that when a heating and cooling demand i.e. auto changeover is required a PAR 21 must be used and must be set to 28°C Auto, this is used in conjunction with an ACH1 Controller - sold separately.

Actual temperature (°C)	Set temperature (°C)
45	28
43	27
41	26
39	25
38	24
36	23
34	22
33	21
31	20
29	19
28	18
26	17

7. Electrical wiring

Precautions on electrical wiring

Warning:

Electrical work should be done by qualified electrical engineers / electrician in accordance with "Engineering Standards For Electrical Installation" and supplied installation manuals. Dedicated circuits should also be used. If the power circuit lacks capacity or has an installation failure, it may cause a risk of electric shock or fire.

1. Be sure to take power from the special branch circuit.
2. Be sure to install an earth leakage breaker to the power.
3. Install the unit to prevent any of the control circuit cables (remote controller, transmission cables) coming into direct contact with the power cable outside the unit.
4. Ensure that there is no slack on all wire connections.
5. Some cables (power, remote controller, transmission cables) above the ceiling may be bitten by mice. Insert the cables into metal pipes for protection.
6. Never connect the power cable to leads for the transmission cables. This will damage the transmission cable.
7. Be sure to connect control cables to the indoor unit, remote controller (when used), and the outdoor unit.
8. Ground the unit on the outdoor unit side.
9. Select control cables from the conditions given in page 10.

Caution:

Be sure to put the unit to the ground on the outdoor unit side. Do not connect the earth cable to any gas pipe, water pipe, lightning rod, or telephone earth cable. Incomplete grounding may cause a risk of electric shock.

Types of control cables

Wiring transmission cables

- Types of transmission cables
Design wiring in accordance with the following table
- Cable diameter
More than 1.25 mm²

Connecting wiring

[Fig. 7.0.1] (P.5)

7.1. Power supply wiring

- Power supply cords of appliances shall not be lighter than design 245 IEC 57 or 227 IEC 57.
 - A switch with at least 3 mm contact separation in each pole shall be provided by the Air conditioner installation.
- Power cable size: more than 1.5 mm**

[Fig. 7.1.1] (P.6)

[Selecting non-fuse breaker (NF) or earth leakage breaker (NV)]

To select NF or NV instead of a combination of Class B fuse with switch, use the following:

- In the case of Class B fuse rated 15 A or 20 A.
NF model name (MITSUBISHI): NF30-CS (15 A) (20 A)
NV model name (MITSUBISHI): NV30-CA (15 A) (20 A)

Use an earth leakage breaker with a sensitivity of less than 30 mA 0.1 s.

Caution:

Do not use anything other than the correct capacity breaker and fuse. Using fuse, wire or copper wire with too large capacity may cause a risk of malfunction or fire.

7.2. Connecting remote controller, PQFY and outdoor transmission cables

(Remote controller is available as an option.)

A remote controller is required to perform initial setting. No remote controller is required after the initial setting provided that only heating or cooling are required and there will be no need to change between the two modes or change the set point. The unit is designed to receive control signals from other appliances via volt free contact. Initial setting can be performed using the ME or MA remote controllers. Other indoor units can have ME remote controllers connected.

- Connect PQFY controller TB5 and outdoor unit TB3. (Non-polarized 2-wire)
- The "S" on PQFY controller TB5 is a shielding wire connection. For specifications about the connecting cables, refer to the outdoor unit installation manual.
- Install a remote controller following the manual supplied with the remote controller.
- Connect the "1" and "2" on PQFY controller TB15 to an MA remote controller. (Non-polarized 2-wire)
- Connect the "M1" and "M2" on PQFY controller TB5 to an M-NET remote controller. (Non-polarized 2-wire)
- Connect the remote controller's transmission cable within 10 m using a 0.75 mm² core cable. If the distance is more than 10 m, use a 1.25 mm² junction cable. Note the remote controller can be located inside the outer cover of the unit if external changes to the mode and set point are not desired.

- [Fig. 7.2.1] (P.6) MA Remote controller
- [Fig. 7.2.2] (P.6) M-NET Remote controller
 - DC 9 to 13 V between 1 and 2 (MA remote controller)
 - DC 24 to 30 V between M1 and M2 (M-NET remote controller)
- [Fig. 7.2.3] (P.6) MA Remote controller
- [Fig. 7.2.4] (P.6) M-NET Remote controller

- The MA remote controller and the M-NET remote controller cannot be used at the same time or interchangeably.

Note:

Ensure that the wiring is not pinched when fitting the terminal box cover. Pinching the wiring may cut it.

⚠ Caution:

Install wiring so that it is not tight and under tension. Wiring under tension may break, or overheat and burn.

- Fix power source wiring to control box by using buffer bushing for tensile force. (PG connection or the like.) Connect transmission wiring to transmission terminal block through the knockout hole of control box using ordinary bushing.
- After wiring is complete, make sure again that there is no slack on the connections, and attach the cover onto the control box in the reverse order from removal.

⚠ Caution:

Wire the power supply so that no tension is imparted. Otherwise disconnection, heating or fire result.

7.3. Connecting thermistor cable TH1H

8.3.1 Connecting thermistor cables

Pull the end of the wire through the bunch of wires (Thermistor) at the bottom of the controller.
Connect the thermistor to the water temperature terminals T1 and T2 on the terminal block.
When the lead wire is too long, cut it to the appropriate length.

Take proper measures not to miswire.

Note: If using more than one application (under floor heating / under floor cooling / domestic hot water), an ACH1 is required. See manual for set up of thermistor cables.

⚠ Caution:

Do not route the thermistor cables together with power cables.

7.4. Connecting distant signal line

Pull the wires for operation command, for operation signal and error signal through the flushing end glands (Distant signal) at the bottom of the controller.

Connect each wire to operation command: A1 and A2, to operation signal: D1 and D2, and to error signal: D11 and D12.

Notes:

- After connecting each wire to the terminal, tighten each nut tightly through which the wire runs.
- Check that the bunch of wires do not come off even if they are pulled strongly.

⚠ Caution:

- After the wiring work is completed, mount the inner cover. Tighten the screws.
- Operation signal cables, Error signal cables and Operation command cables must be routed at a distance of at least 20 cm from all other cables.
- When Operation signal, Error signal and distant signal are taken out, remove the plug inside the bunch of wires.
- Wind the supplied tube around the wire according to the size and number of the wire. If the wire comes off the tightened bunch of wires, wind the insulation tape around the wire to make the wire thicker.

[Fig. 7.4.1] (P.6)

8. Setting switches

8.1. Setting Addresses and Dip Switch Settings

Note: If an ON/OFF volt free signal and heating and cooling signal is needed, an alternative design is possible. Please see ACH1 install manual for details.

- In order to increase the output temperature of the water it is necessary to increase the condensing temperature of the Heat Pump. This is achieved by setting a Dip Switch as follows.
 - PUMY-P100/125/140VMH, PUMY-P100125140VMH, SW 6-6 to the ON position.
 - All City Multi P200 and above, SW3-7 to the ON position.
- When connecting the PQFY to a heat pump with heating and cooling required it is necessary to use a PAR21 in auto mode (See commissioning for further details) and to set the auto changeover dip switch in the outdoor unit.
 - PUMY Dip Switch SW2-5
 - PUHY Dip Switch SW 4-8
- A separate controller is also required "ACH1".
- It is necessary to set the Auto re-start dip switch setting on the PQFY PCB SW 1-9 ON.

- The PAR 21 must be set to auto 28°C degrees and then installed within the outer cover of the PQFY to avoid any changing of the set point or mode.
- Where the PQFY is being used to produce domestic hot water, when connected to a heat pump, it should be registered on the system as the lowest addressed fan coil, thus making it automatically the master.
 - This means that if fan coils on the same refrigerant system required cooling they will not produce cooling until the PQFY has been switched off.
- To avoid such conflict it is recommended that the PQFY be used to heat up domestic hot water during the night e.g. typically between 12am and 7am.
 - This will also use the cheaper night time electricity (economy 7 electricity).
- (Be sure to install and wire with the main power turned OFF.)

Setting the PQFY address:

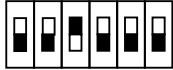
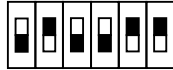
[Fig 8.1.1] (P.6)

- There are two types of rotary switch setting available: setting addresses 1 to 9 and over 10, and setting branch numbers.
 - How to set addresses
 - Example: If Address is "3", remain SW12 (for over 10) at "0", and match SW11 (for 1 to 9) with "3".
 - How to set branch numbers SW14 (Series R2 only)
 - Match the indoor unit's refrigerant pipe with the BC controller's end connection number. Remain other than R2 at "0".
- The rotary switches are all set to "0" when shipped from the factory. These switches can be used to set unit addresses and branch numbers at will.
- The determination of indoor unit addresses varies with the system at site. Set them referring to technical data.

8.2. Setting unit size - Indexing

- In the case of the connection of a **heat pump** to the PQFY-P140/250, if the PQFY is the only unit designed to run in heating at one time then measures should be taken to ensure the other water heating or air heating fan coils are not switched on at the same time. This is to ensure that sufficient capacity is available to heat the water.
- If other water heating or air heating fan coils are designed to run at the same time as the PQFY then the heat pump should be sized to cope with all of the heat loads at the design condition. It is recommended that no diversity be used in this design as poor heat capacity will result if the outdoor unit is under sized.
- In the case of the connection of a **heat recovery heat pump** to the PQFY-P140/250, if the PQFY is the only unit designed to run in heating at one time measures should be taken to ensure the other water heating or air heating fan coils are not switched on at the same time. This is to ensure that sufficient capacity is available to heat the water.
- If other water heating or air heating fan coils are designed to run at the same time as the PQFY then the heat pump should be sized to cope with all of the heat loads at the design condition. It is recommended that no diversity be used in this design as poor heat capacity will result if the outdoor unit is under sized.

The dip switches (SW2) on the control board should be set from the factory as shown in the chart below.

Type	Unit size	Capacity	Index	Setting switches (SW2)
PQFY	P140	14 kW	20	ON OFF 
	P250	25 kW	200	ON OFF 

8.3. Capacity setting of the PQFY

- To allow for the maximum use of the PQFY-P140, it is indexed electronically as size 20, thus allowing the system to utilise the maximum cooling capacity as it is expected that the PQFY will be ran mainly in heating and thus never conflict in terms of outdoor capacity with air handling fan coils in cooling. However the refrigerant pipe work etc, should be sized as a size 140-fan coil. See unit specification.
- HOWEVER THE OUTDOOR UNIT SHOULD BE SIZED TO THE MAXIMUM HEATING / COOLING CAPACITY REQUIRED.
Even though it is indexed as a 20 it still requires the heating / cooling capacity it was designed for.

e.g. 1

PUMY-P100VMH + 5 X P20 fan coils + PQFY-140

System Index is 120.

So long as the PQFY is never run at the same time as the fan coils the system will run with no problems. But if the fan coils run at the same time as the PQFY i.e. in heating, the total heating capacity of the system will be a little over 12kW.

e.g. 2

PUHY-P250YGM-A can give up to 31.5kW of heating, if a PQFY-P140 (15kW of heating) is connected then the maximum capacity of heating fan coils that can be running in heating at the same time as the PQFY is 16.5kW.

- For this same purpose the PQFY-P250 is indexed electronically as a size 200, thus allowing the system to utilise the maximum cooling capacity of DX fan coils. However the refrigerant pipe work etc should be sized as a size 250-fan coil.
- THE ABOVE TWO EXAMPLES APPLY TO THE PQFY-P250 AS WELL. Nominally the PQFY will produce 25kW of water heating and therefore require 25kW of heating from the outdoor unit.

9. Initial setting and test run

- After the installation work (which was performed in accordance with the outdoor unit installation manual and after the PQFY refrigerant piping work, drain piping work, electrical wiring work, PQFY controller wiring work and switch setting), turn on the main power at least 12 hours before starting operation in accordance with the outdoor unit installation manual.
- Run the system PQFY with the water pumps (field supplied) and ensure that the water is heating.

9.1. Setting Auto Mode on PAR 21

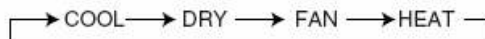
The following settings can be made.

- ① ON (default): Auto mode is displayed when selecting an operation mode only if the unit to be connected is supported by the auto mode.

However, this does not apply if the unit to be connected is not supported by the auto mode.
Operation mode can be switched from one to another:

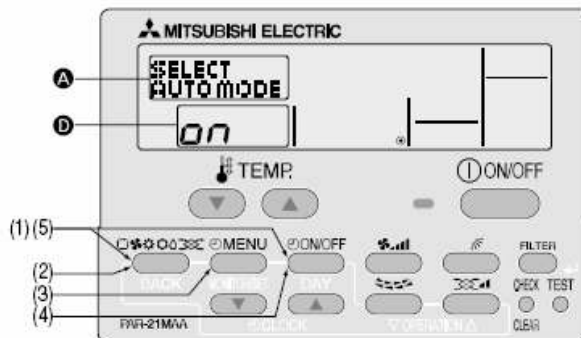


- ② OFF: Even if the unit is supported by the auto mode, auto mode is not displayed when selecting an operation mode.
Operation mode can be switched from one to another:



How to Set Auto Mode

■ Display example



- (1) While pressing the **MODE** button, press the **ON/OFF** button for two seconds to activate the remote controller's function selection mode.

- (2) Press the **MODE** button to select **FUNCTION SELECTION** on the screen (at **A**).



- (3) Press the **MENU** button so that **SELECT AUTO MODE** appears on the screen (at **B**).

* The current setting is displayed.

- (4) Press the **ON/OFF** button to select whether auto mode is to be used (on) or not (off).



- (5) While pressing the **MODE** button, press the **ON/OFF** button for two seconds to return to normal mode. Setting is now complete.

* If you press the **ON/OFF** button before the **MODE** button, the settings you have made will be cancelled.

● **Screen display when auto mode is set to ON**

(1) Press the **ON/OFF** button.

The ON lamp lights up and operating contents are displayed on the LCD.

(2) Press the **MODE** button.

Each time the **MODE** button is pressed, the operation mode switches from one to another. "AUTO" is also displayed.



*1: If your air conditioner is designed for cool operation only, "AUTO" and "HEAT" will not be displayed, nor will it be possible to select them.

■ **Display example when auto mode is set to ON**



If AUTO MODE DISP C/H is ON (see 4.4.3), it takes about 10 seconds before the display is switched from one mode to another.



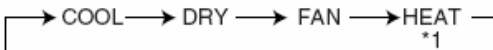
● **Screen display when auto mode is set to OFF**

(1) Press the **ON/OFF** button.

The ON lamp lights up and operating contents are displayed on the LCD.

(2) Press the **MODE** button.

Each time the **MODE** button is pressed, the operation mode switches from one to another, but "AUTO" is not displayed.



*1: If your air conditioner is designed for cool operation only, "HEAT" will not be displayed.

10. Commissioning

[Fig 10.0.1] (P.6)

- In order to set the mode and the temperature set point it is necessary to remove the orange plug which has printing on it stating "when using a remote controller remove this plug." Following this, switch on the power to the outdoor and the indoor unit. Allow the system to address and then turn on the remote controller and set the desired temperature and heating mode (auto 28 if using an ACH1 for changeover from heating to cooling).
- Depending on the application the remote controller can be left on the system or it can be removed and a volt free contact across terminals A1 and A2 can be used to start the unit (if using an ACH1 the controller must be left on the system)
- With the remote controller, the PQFY will operate as requested just like a normal fan coil.
- To use a volt free contact, first turn off the power to the indoor and outdoor, then remove the controller. Replace the orange plug and turn on the outdoor and indoor unit. Terminal A1 and A2 now becomes a start / stop volt free contact. When the two terminals are closed / shorted then the unit will start in the same mode and set point as was set on the remote controller.
- When using a remote controller, if the orange plug is re-inserted, the volt free contact will over-ride the remote controller and start/stop the unit.

NOTE:

THE ROOM TEMPERATURE MUST BE THERMOSTATICALLY CONTROLLED BY THE UNDER FLOOR SYSTEM. THE PQFY WILL PROVIDE HOT WATER OR COLD WATER UNTIL SIGNALLED TO DO OTHERWISE. THERE IS NO ROOM TEMPERATURE CONTROL ON THE PQFY.

This product is designed and intended for use in the residential, commercial and light-industrial environment.

The product at hand is based on the following EU regulations:

- Low Voltage Directive 73/23/EEC
- Electromagnetic Compatibility Directive 89/336/EEC

Please be sure to put the contact address/telephone number on this manual before handing it to the customer.

mitsubishi electric uk

MITSUBISHI ELECTRIC UK, TRAVELLERS LANE, HATFIELD HERTFORDSHIRE, AL10 8XB.