MITSUBISHI ELECTRIC

# CYLINDER UNIT
# EHST20 series
# EHPT20 series

## INSTALLATION MANUAL
**FOR INSTALLER**

For safe and correct use, read this manual and the outdoor unit installation manual thoroughly before installing the cylinder unit. English is the original language. The other languages versions are translation of the original.

## INSTALLATIONSHANDBUCH
**FÜR INSTALLATEURE**

Aus Sicherheitsgründen und zur richtigen Verwendung vor der Installation des Speichers die vorliegende Bedienungsanleitung und die Installationsanleitung der Außeneinheit gründlich durchlesen. Die Originalsprache ist Englisch. Die anderen Sprachversionen sind vom Original übersetzt.

## MANUEL D'INSTALLATION
**POUR L'INSTALLATEUR**

Pour une utilisation correcte et sûre, lisez soigneusement ce manuel et le manuel d'installation de l'appareil extérieur avant d'installer le module hydraulique combiné. L'anglais est la langue originale. Les versions fournies dans d'autres langues sont des traductions de l'original.

## INSTALLATIEHANDLEIDING
**VOOR DE INSTALLATEUR**

Lees voor een veilig en juist gebruik deze handleiding en de installatiehandleiding van de buiten-unit aandachtig door voordat u met de installatie van de cilinder-unit begint. Engels is de oorspronkelijke taal. De andere taalversies zijn vertalingen van het origineel.

## MANUAL DE INSTALACIÓN
**PARA EL INSTALADOR**

Para un uso correcto y seguro, lea detalladamente este manual y el manual de instalación de la unidad exterior antes de instalar la unidad cilindro. El idioma original del documento es el inglés. Las versiones en los demás idiomas son traducciones del original.

## MANUALE DI INSTALLAZIONE
**PER L'INSTALLATORE**

Per un utilizzo sicuro e corretto, prima di installare l'unità del bollitore leggere attentamente questo manuale e quello di installazione dell'unità esterna. Il testo originale è redatto in lingua inglese. Le altre versioni linguistiche rappresentano traduzioni dell'originale.

## MANUAL DE INSTALAÇÃO
**PARA O INSTALADOR**

Para uma utilização segura e correcta, leia este manual e o manual de instalação da unidade exterior antes de instalar o cilindro. O idioma original é o inglês. As versões em outros idiomas são traduções do idioma original.

## INSTALLATIONSMANUAL
**TIL INSTALLATØREN**

Af hensyn til sikker og korrekt brug skal denne vejledning og vejledningen til udendørsenheden installation læses omhyggeligt, inden cylinderenheden installeres. Engelsk er det oprindelige sprog. De andre sprogversioner er oversættelser af originalen.

## INSTALLATIONSMANUAL
**FÖR INSTALLATÖREN**

För säker och korrekt användning, läs denna manual och utomhusenhetens installationsmanual innan du installerar tanken. Engelska är originalspråket. De övriga språkversionerna är översättningar av originalet.

## INSTALLERINGSHÅNDBOK
**FOR MONTØREN**

For å sikre en trygg og riktig bruk skal du lese denne håndboken og installeringshåndboken for utendørsenheten grundig før du monterer sylinderenheten. Engelsk er originalspråket. De andre språkversjonene er oversettelser av originalen.

## ASENNUSOPAS
**ASENTAJALLE**

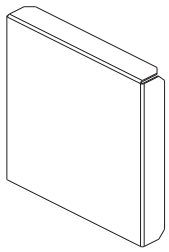
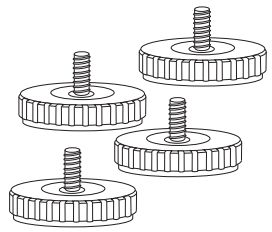
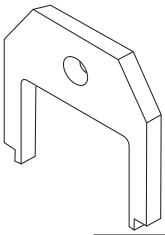
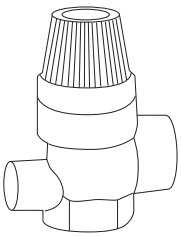
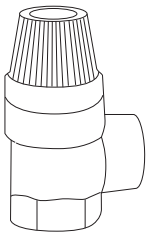
Lue turvallista ja asianmukaista käyttöä varten tämä opas ja ulkoyksikkö asennusopas huolellisesti ennen varaajayksikön asentamista. Alkuperäiskieli on englanti. Muut kieliversiot ovat alkuperäisen käännöksiä.


English
Deutsch
Français
Nederlands
Español
Italiano
Português
Dansk
Svenska
Norsk
Suomi

# Contents



Accessories (Included)

| Main controller cover | Adjustable feet | Immersion heater boss tool | Pressure relief valve (3 bar) | Pressure relief valve (10 bar) |
|---|---|---|---|---|
|  |  | EH*T20*-*M*HA model only  |  | Except EHPT20X-VM2HA  |
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**Abbreviations and glossary**

| Abbreviations/Word | Description |
|---|---|
| Ambient temperature | The outdoor temperature |
| Freeze stat. function | Heating to prevent water pipes freezing |
| ASHP/HP | Air source heat pump |
| COP | Coefficient of performance the efficiency of the heat pump |
| Cylinder unit | Indoor unvented DHW tank and component plumbing parts |
| DeltaT | Difference in temperature between two variables |
| DHW mode | Domestic hot water heating mode for showers, sinks, etc |
| Flow rate | Speed at which water circulates around the primary circuit |
| Flow temperature | Temperature at which water is delivered to the primary circuit |
| FTC3 | Flow temperature controller, the circuit board in charge of controlling the system |
| Compensation curve mode | Space heating incorporating outdoor temperature compensation |
| Heating mode | Space heating through radiators or UFH |
| Legionella | Bacteria potentially found in plumbing, showers and water tanks that may cause Legionnaires disease |
| LP mode | Legionella prevention mode – a function on systems with tanks to prevent the growth of legionella bacterium |
| Packaged model | Plate heat exchanger in the outdoor heat pump unit |
| Refrigerant | A compound used within the heat cycle that goes through a phase change from gas to liquid |
| Split model | Plate heat exchanger in the indoor unit |
| TRV | Thermostatic radiator valve – a valve on the entrance or exit of the radiator panel controlling the heat output |
| UFH | Under floor heating – a system of water carrying pipes under the floor, that warms the floor surface |

# 1 Safety Notices

**Please read the following safety precautions carefully.**

| ⚠ WARNING: | ⚠ CAUTION: |
|---|---|
| **Precautions that must be observed to prevent injuries or death.** | **Precautions that must be observed to prevent damage to unit.** |

**This installation manual along with the user manual should be left with the product after installation for future reference.**
**Mitsubishi Electric is not responsible for the failure of locally supplied parts.**

- **Be sure to perform periodical maintenance.**
- **Be sure to follow your local regulations.**
- **Be sure to follow the indications provided in this manual.**

## ⚠ WARNING

**Mechanical**

- The cylinder and outdoor units must not be installed, disassembled, relocated, altered or repaired by the user. Ask an authorised installer or technician. If the unit is installed improperly or modified after installation by the user water leakage, electric shock or fire may result.
- The outdoor unit should be securely fixed to a hard level surface capable of bearing its weight.
- The cylinder unit should be positioned on a hard level surface capable of supporting its filled weight to prevent excessive sound or vibration.
- Do not position furniture or electrical appliances below the outdoor unit or cylinder.
- The discharge pipework from the emergency devices of the cylinder should be installed according to local law.
- Only use accessories and replacement parts authorised by Mitsubishi Electric ask a qualified technician to fit the parts.

**Electrical**

- All electrical work should be performed by a qualified technician according to local regulations and the instructions given in this manual.
- The units must be powered by a dedicated power supply and the correct voltage and circuit breakers must be used.
- Wiring should be in accordance with national wiring regulations. Connections must be made securely and without tension on the terminals.
- Earth unit correctly.

**General**

- Keep children and pets away from both the cylinder and outdoor units.
- Do not use the hot water produced by the heat pump directly for drinking or cooking. This could cause illness to the user.
- Do not stand on the units.
- Do not touch switches with wet hands.
- Annual maintenance checks on both the cylinder and the outdoor unit should be done by qualified person.
- Do not place containers with liquids in on top of the cylinder unit. If they leak or spill onto the cylinder unit damage to the unit and or fire could occur.
- Do not place any heavy items on top of the cylinder unit.
- When installing or relocating, or servicing the cylinder unit, use only the specified refrigerant (R410A) to charge the refrigerant lines. Do not mix it with any other refrigerant and do not allow air to remain in the lines. If air is mixed with the refrigerant, then it can be the cause of abnormal high pressure in the refrigerant line, and may result in an explosion and other hazards.
  The use of any refrigerant other than that specified for the system will cause mechanical failure or system malfunction or unit breakdown. In the worst case, this could lead to a serious impediment to securing product safety.

## ⚠ CAUTION

- Use clean water that meets local quality standards on the primary circuit.
- The outdoor unit should be installed in an area with sufficient airflow according to the diagrams in the outdoor unit installation manual.
- The cylinder unit should be located inside to minimise heat loss.
- Water pipe-runs on the primary circuit between outdoor and indoor unit should be kept to a minimum to reduce heat loss.
- Ensure condensate from outdoor unit is piped away from the base to avoid puddles of water.
- Remove as much air as possible from the primary and DHW circuits.
- Refrigerant leakage may cause suffocation. Provide ventilation in accordance with EN378-1.
- Be sure to wrap insulation around the piping. Direct contact with the bare piping may result in burns or frostbite.
- Never put batteries in your mouth for any reason to avoid accidental ingestion.
- Battery ingestion may cause choking and/or poisoning.
- Install the unit on a rigid structure to prevent excessive sound or vibration during operation.
- Do not transport the cylinder unit with water inside the tank or coil. This could cause damage to the unit.
- If power to the cylinder unit is to be turned off (or system switched off) for a long time, the water should be drained.
- If unused for a long period, before operation is resumed, DHW tank should be flushed through with potable water.
- Preventative measures should be taken against water hammer, such as installing a Water Hammer Arrestor on the primary water circuit, as directed by the manufacturer.

# 1 Safety Notices

| ⚠ WARNING (SPLIT MODELS ONLY) |
|---|
| Do not discharge refrigerant into the atmosphere if refrigerant leaks during installation, ventilate the room. |
| Use appropriate tools for high pressure refrigerant. |
| When pumping down refrigerant , stop the compressor before disconnecting the refrigerant pipes. |
| During installation securely fasten the refrigerant pipes before starting the compressor. |
| Check that refrigerant gas does not leak after the completion of installation. |
| Use R410A refrigerant only. Do not allow air to enter the lines. Failure to observe these instructions will cause mechanical failure, system failure or, in the worst case, serious breach of product safety. |

| ⚠ CAUTION (SPLIT MODELS ONLY) |
|---|
| <Using R410A refrigerant air conditioners> |
| Use C1220 copper phosphorus, for copper and copper alloy seamless pipes, to connect the refrigerant pipes. Make sure the insides of the pipes are clean and do not contain any harmful contaminants such as sulfuric compounds, oxidants, debris, or dust. Use pipes with the specified thickness. (Refer to 4.5.) Note the following if reusing existing pipes that carried R22 refrigerant.<br>- Replace the existing flare nuts and flare the flared sections again.<br>- Do not use thin pipes. (Refer to 4.5.) |
| Store the pipes to be used during installation indoors and keep both ends of the pipes sealed until just before brazing. (Leave elbow joints, etc. in their packaging.) If dust, debris, or moisture enters the refrigerant lines, oil deterioration or compressor breakdown may result. |
| Use ester oil, ether oil, alkylbenzene oil (small amount) as the refrigeration oil applied to the flared sections. If mineral oil is mixed in the refrigeration oil, oil deterioration may result. |
| Do not use refrigerant other than R410A refrigerant. If another refrigerant is used, the chlorine will cause the oil to deteriorate. |
| Use the following tools specifically designed for use with R410A refrigerant. The following tools are necessary to use R410A refrigerant. Contact your nearest dealer for any questions. |

| Tools (for R410A) | |
|---|---|
| Gauge manifold | Flare tool |
| Charge hose | Size adjustment gauge |
| Gas leak detector | Vacuum pump adapter |
| Torque wrench | Electronic refrigerant charging scale |

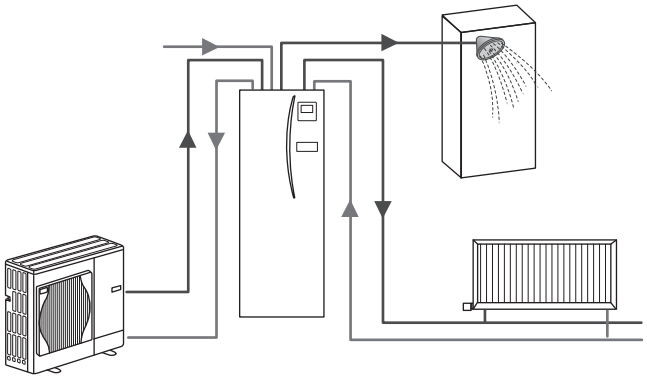
| |
|---|
| Be sure to use the correct tools. If dust, debris, or moisture enters the refrigerant lines, refrigeration oil deterioration may result. |
| Do not use a charging cylinder. If a charging cylinder is used, the composition of the refrigerant will change and the efficiency will be lowered. |

# 2 Introduction

The purpose of this installation manual is to instruct competent persons how to safely and efficiently install and commission the cylinder system. The target readers of this manual are competent plumbers and/or refrigeration engineers who have attended and passed the requisite Mitsubishi Electric product training and have appropriate qualifications for installation of an unvented hot water cylinder specific to their country.

## ■ Overview of the System

The Mitsubishi Electric Air to Water (ATW) for heat pump system with cylinder unit consists of the following components; outdoor heat pump unit and indoor cylinder unit incorporating the main controller.

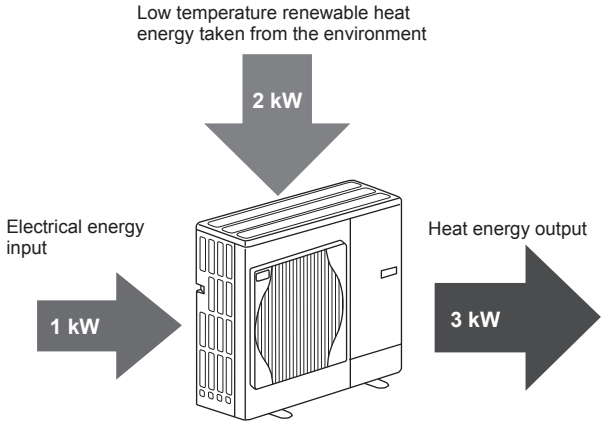


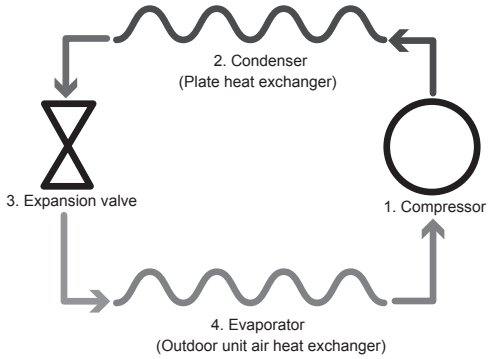
## ■ How the Heat Pump Works

**Space heating and DHW**

Heat pumps take electric energy and low grade heat energy from the outdoor air to heat refrigerant which in turn heats water for domestic use and space heating. The efficiency of a heat pump is known as the Coefficient of Performance or COP this is the ratio of heat delivered to power consumed.

The operation of a heat pump is similar to a refrigerator in reverse. This process is known as the vapour-compression cycle and the following is a more detailed explanation.




The first phase begins with the refrigerant being cold and low pressure.

1. The refrigerant within the circuit is compressed as it passes through the compressor. It becomes a hot highly pressurised gas. The temperature also rises typically to 60°C.

2. The hot refrigerant gas is then condensed as it passes across one side of a plate heat exchanger. Heat from the refrigerant gas is transferred to the cooler side (water side) of the heat exchanger. As the temperature of the refrigerant decreases its state changes from a gas to a liquid.

3. Now as a cold liquid it still has a high pressure. To reduce the pressure the liquid passes through an expansion valve. The pressure drops but the refrigerant remains a cold liquid.

4. The final stage of the cycle is when the refrigerant passes into the evaporator and evaporates. It is at this point when some of the free heat energy in the outside air is absorbed by the refrigerant.

It is only the refrigerant that passes through this cycle; the water is heated as it travels through the plate heat exchanger. The heat energy from the refrigerant passes through the plate heat exchanger to the cooler water which increases in temperature. This heated water enters the primary circuit and is circulated and used to serve the space heating system and DHW cylinder.

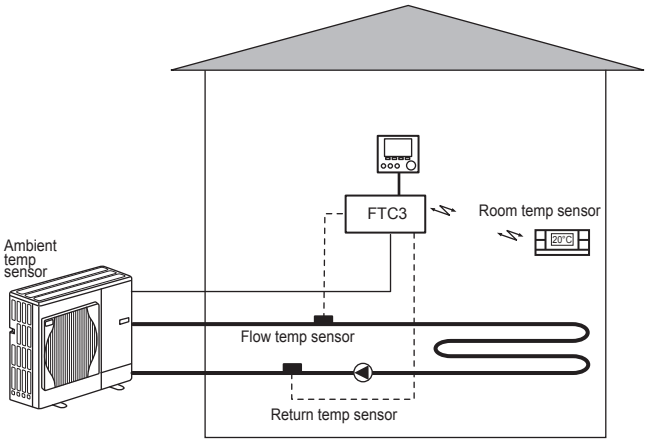
# 2 Introduction

## ■ Overview of the Controls

Built into the front of the indoor unit is the Flow Temperature Controller3 (FTC3). This device controls the function of both the outdoor heat pump unit and the indoor unit. The advanced technology means that by using an FTC3 controlled heat pump you can not only make savings compared to traditional fossil fuel type heating systems but also compared to many other heat pumps on the market.

As explained in the earlier section, 'How the Heat Pump Works,' heat pumps are most efficient when providing low flow temperature water. The FTC3's sophisticated technology enables the room temperature to be kept at the desired level whilst utilising the lowest possible flow temperature from the heat pump.

The controller uses temperature sensors around the heating system to monitor the air and flow temperatures. This data is regularly updated and compared to previous data by the controller to predict changes in room temperature and adjust the heat pump output accordingly. By monitoring not only the outdoor ambient, but the room and water circuit temperatures, the heating is more consistent and sudden spikes in required heating are reduced. This results in a lower overall flow temperature being required.




**<How it works>**

Temperature data is regularly received by the FTC3 from temperature sensors around the heating system. The most recent data is used with the previous temperature readings to predict the flow temperature required to keep the room temperature constant.
The room temperature sensor can either be wired or the Mitsubishi wireless remote controller can be used as it incorporates a temperature sensor. For more information on room temperature sensor options see section 'Remote Controller Options'. (Page 24)

| Model name | | | | EHST20C-VM6HA | EHST20C-YM9HA | EHST20C-VM6A | EHST20C-YM9A | EHST20C-VM6SA | EHPT20X-VM2HA | EHPT20X-VM6HA | EHPT20X-YM9HA | EHPT20X-VM6A | EHPT20X-YM9A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nominal domestic hot water volume | | | | 200L | | | | | | | | | |
| Overall unit dimensions | | | | 1600 x 595 x 680 mm (Height x Width x Depth) | | | | | | | | | |
| Weight (empty) | | | | 131 kg | 131 kg | 130 kg | 130 kg | 131 kg | 119 kg | 119 kg | 119 kg | 118 kg | 118 kg |
| Weight (full) | | | | 346 kg | 346 kg | 345 kg | 345 kg | 346 kg | 332 kg | 332 kg | 332 kg | 331 kg | 331 kg |
| Plate heat exchanger | | | | ✓ | ✓ | ✓ | ✓ | ✓ | × | × | × | × | × |
| Unvented expansion vessel (Primary heating) | | Nominal volume | | 12 L | | | | | | | | | |
| | | Charge pressure | | 1 bar | | | | | | | | | |
| Safety device | Water circuit (Primary) | Control thermistor | Heating | 25 - 60°C | | | | | | | | | |
| | | Pressure relief valve | | 0.3 MPa (3 bar) | | | | | | | | | |
| | | Flow switch | | Min flow 5.5 l/min | | | | | | | | | |
| | Booster heater | Control thermistor | | 80°C | | | | | | | | | |
| | | Manual reset thermostat | | 90°C | | | | | | | | | |
| | | Thermal Cut Off (for dry run prevention) | | 121°C | | | | | | | | | |
| | DHW tank | Control thermistor | | 40 - 70°C | | | | | | | | | |
| | | Temp & pressure relief valve | | 1.0 MPa (10 bar) | 1.0 MPa (10 bar) | 1.0 MPa (10 bar) | 1.0 MPa (10 bar) | 1.0 MPa (10 bar) | 90°C/ 0.7 MPa (7 bar) | 1.0 MPa (10 bar) | 1.0 MPa (10 bar) | 1.0 MPa (10 bar) | 1.0 MPa (10 bar) |
| Primary circuit circulating Pump | | | | Grundfos UPSO 25-70 180 | | | | | | | | | |
| Connections | | Water | | 28 mm compression primary circuit/ 22 mm compression DHW circuit/22 mm compression solar thermal (Ancillary heating) circuit | | | | | | | | | |
| | | Refrigerant (R410A) | Liquid | 9.52 mm | 9.52 mm | 9.52 mm | 9.52 mm | 9.52 mm | — | — | — | — | — |
| | | | Gas | 15.88 mm | 15.88 mm | 15.88 mm | 15.88 mm | 15.88 mm | | | | | |
| Operating ambient condition | | | | 0 (*1) - 35°C (≦ 80 %) | | | | | | | | | |
| Tank performance *2 | | Time to raise DHW tank temp 15 - 65°C | | 23 min | | | | | | | | | |
| | | Time to reheat 70% of DHW tank to 65°C | | 20.5 min | | | | | | | | | |
| Electrical data | | Control board | Power supply (Phase, voltage, frequency) | ~/N, 230 V, 50 Hz | | | | | | | | | |
| | | | Breaker (*when powered from independent source) | 10A | | | | | | | | | |
| | | Booster heater | Power supply (Phase, voltage, frequency) | ~/N, 230 V, 50 Hz | 3~, 400 V, 50 Hz | ~/N, 230 V, 50 Hz | 3~, 400 V, 50 Hz | ~/N, 230 V, 50 Hz | ~/N, 230 V, 50 Hz | ~/N, 230 V, 50 Hz | 3~, 400 V, 50 Hz | ~/N, 230 V, 50 Hz | 3~, 400 V, 50 Hz |
| | | | Capacity | 2 kW+4 kW | 3 kW+6 kW | 2 kW+4 kW | 3 kW+6 kW | 2 kW+4 kW | 2 kW | 2 kW+4 kW | 3 kW+6 kW | 2 kW+4 kW | 3 kW+6 kW |
| | | | Current | 26 A | 13 A | 26 A | 13 A | 26 A | 9 A | 26 A | 13 A | 26 A | 13 A |
| | | | Breaker | 32 A | 16 A | 32 A | 16 A | 32 A | 16 A | 32 A | 16 A | 32 A | 16 A |
| | | Immersion heater *3 | Power supply (Phase, voltage, frequency) | ~/N, 230 V, 50 Hz | | — | | | ~/N, 230 V, 50 Hz | | | — | |
| | | | Capacity | 3 kW | | — | | | 3 kW | | | — | |
| | | | Current | 13 A | | — | | | 13 A | | | — | |
| | | | Breaker | 16 A | | — | | | 16 A | | | — | |
| Solar (ancillary) connection | | | | × | × | × | × | ✓ | × | × | × | × | × |

<Table 3.1>

*1 The environment must be frost-free.

*2 Tested under BS7206 conditions .

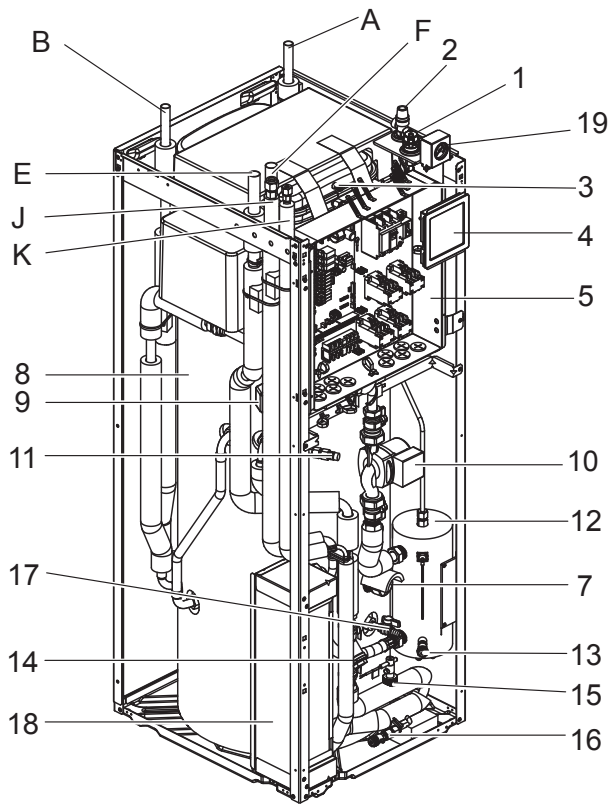
*3 Do not fit immersion heaters without thermal cutout.

**Optional extras**

- Wireless Remote Controller PAR-WT40R-E
- Wireless Receiver PAR-WR41R-E
- Immersion heater (1 Ph 3kW) PAC-IH03V-E
- EHPT Accessories for UK PAC-WK01UK-E
- Remote sensor PAC-SE41TS-E
- Joint pipe (15.88 → 12.7) PAC-SH50RJ-E
- Joint pipe (9.52 → 6.35) PAC-SH30RJ-E

## ■ Component Parts

### <EHST20C-*M*HA/*M*A> (Split model system)

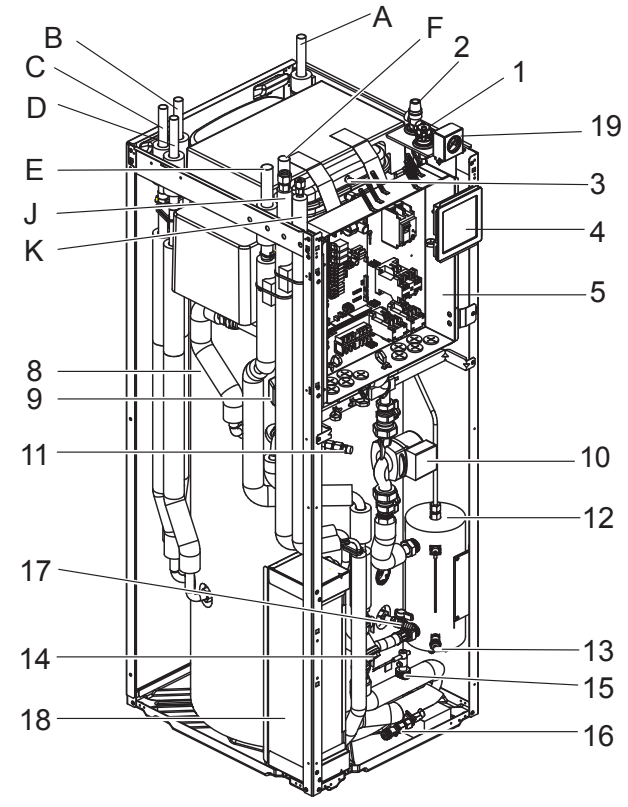



<Figure 3.1>

| Number | Component |
|---|---|
| 1 | Automatic air vent |
| 2 | Pressure relief valve |
| 3 | Expansion vessel |
| 4 | Main controller |
| 5 | Control and electrical box |
| 7 | Immersion heater (Only for EHST20C-*M*HA) |
| 8 | DHW tank |
| 9 | 3-way valve |
| 10 | Water circulation pump |
| 11 | Manual air vent |
| 12 | Booster heater |
| 13 | Drain cock (Booster heater) |
| 14 | Strainer valve |
| 15 | Flow switch |
| 16 | Drain cock (Primary circuit) |
| 17 | Drain cock (DHW tank) |
| 18 | Plate heat exchanger |
| 19 | Manometer |
| A | DHW outlet |
| B | Cold water inlet |
| E | Inlet from space heating |
| F | Outlet to space heating |
| J | Refrigerant (Gas) |
| K | Refrigerant (Liquid) |

<Table 3.2>

### <EHST20C-VM6SA> (Solar split model system)

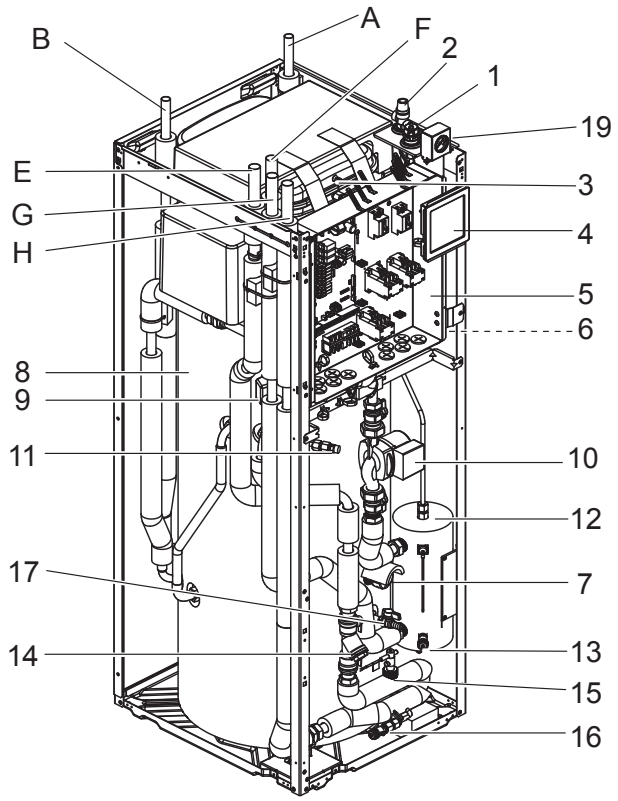



<Figure 3.2>

| Number | Component |
|---|---|
| 1 | Automatic air vent |
| 2 | Pressure relief valve |
| 3 | Expansion vessel |
| 4 | Main controller |
| 5 | Control and electrical box |
| 8 | DHW tank |
| 9 | 3-way valve |
| 10 | Water circulation pump |
| 11 | Manual air vent |
| 12 | Booster heater |
| 13 | Drain cock (Booster heater) |
| 14 | Strainer valve |
| 15 | Flow switch |
| 16 | Drain cock (Primary circuit) |
| 17 | Drain cock (DHW tank) |
| 18 | Plate heat exchanger |
| 19 | Manometer |
| A | DHW outlet |
| B | Cold water inlet |
| C | Outlet to solar |
| D | Inlet from solar |
| E | Inlet from space heating |
| F | Outlet to space heating |
| J | Refrigerant (Gas) |
| K | Refrigerant (Liquid) |

<Table 3.3>

### <EHPT20X-VM2HA> (UK Packaged model system)

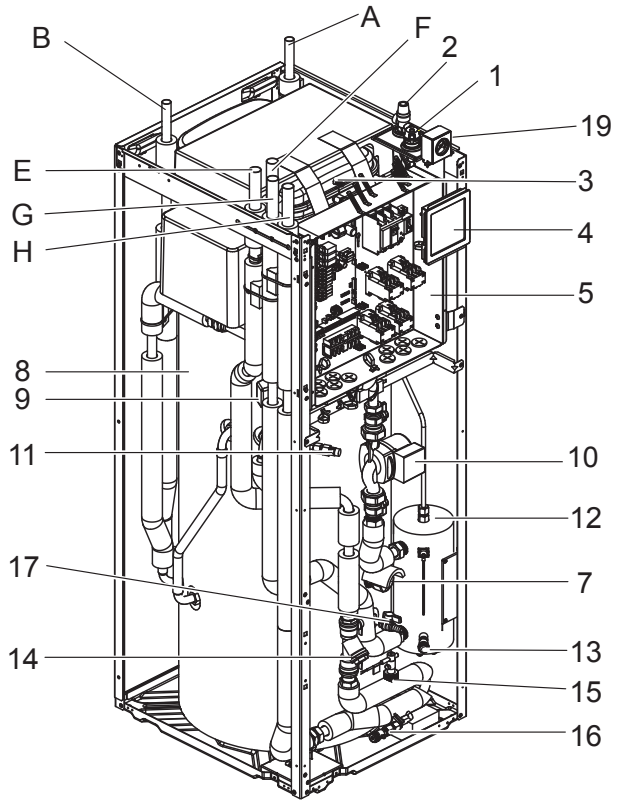



<Figure 3.3>

| Number | Component |
|---|---|
| 1 | Automatic air vent |
| 2 | Pressure relief valve |
| 3 | Expansion vessel |
| 4 | Main controller |
| 5 | Control and electrical box |
| 6 | Temperature and pressure relief valve (not visible) |
| 7 | Immersion heater |
| 8 | DHW tank |
| 9 | 3-way valve |
| 10 | Water circulation pump |
| 11 | Manual air vent |
| 12 | Booster heater |
| 13 | Drain cock (Booster heater) |
| 14 | Strainer valve |
| 15 | Flow switch |
| 16 | Drain cock (Primary circuit) |
| 17 | Drain cock (DHW tank) |
| 19 | Manometer |
| A | DHW outlet |
| B | Cold water inlet |
| E | Inlet from space heating |
| F | Outlet to space heating |
| G | Inlet from heat pump |
| H | Outlet to heat pump |

<Table 3.4>

### <EHPT20X-*M*HA/*M*A (except EHPT20X-VM2HA)> (Packaged model system)



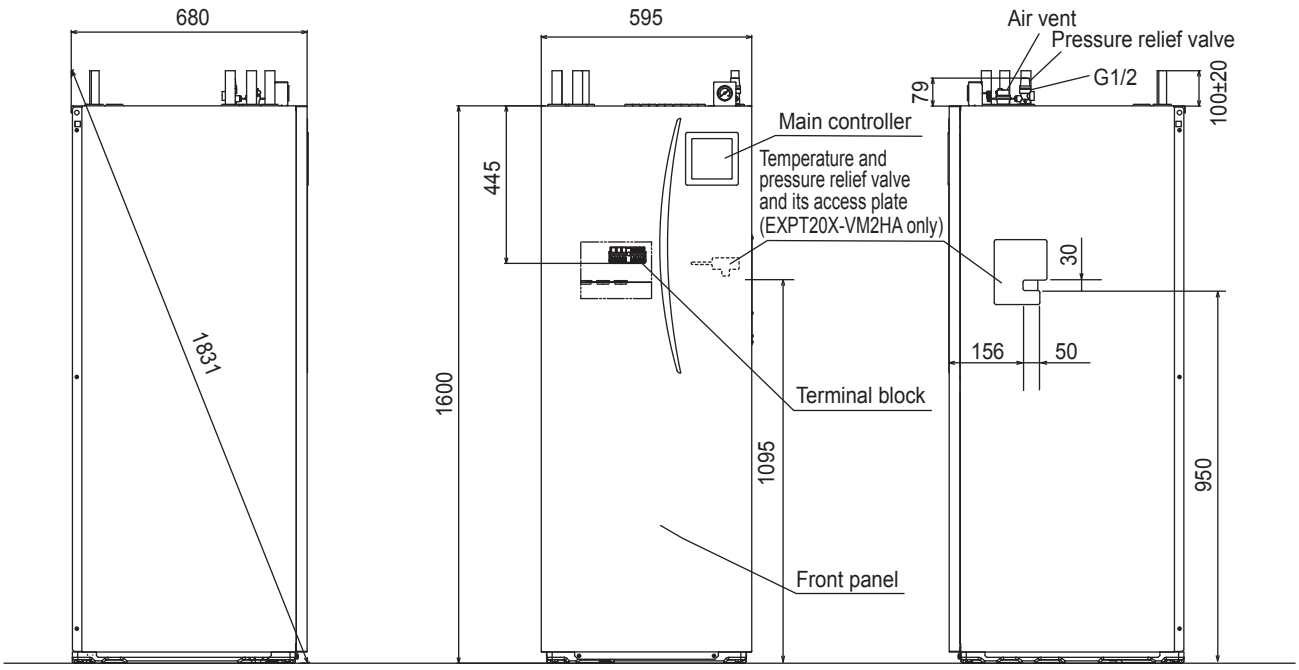

<Figure 3.4>

| Number | Component |
|---|---|
| 1 | Automatic air vent |
| 2 | Pressure relief valve |
| 3 | Expansion vessel |
| 4 | Main controller |
| 5 | Control and electrical box |
| 7 | Immersion heater (Only for EHPT20X-*M*HA) |
| 8 | DHW tank |
| 9 | 3-way valve |
| 10 | Water circulation pump |
| 11 | Manual air vent |
| 12 | Booster heater |
| 13 | Drain cock (Booster heater) |
| 14 | Strainer valve |
| 15 | Flow switch |
| 16 | Drain cock (Primary circuit) |
| 17 | Drain cock (DHW tank) |
| 19 | Manometer |
| A | DHW outlet |
| B | Cold water inlet |
| E | Inlet from space heating |
| F | Outlet to space heating |
| G | Inlet from heat pump |
| H | Outlet to heat pump |

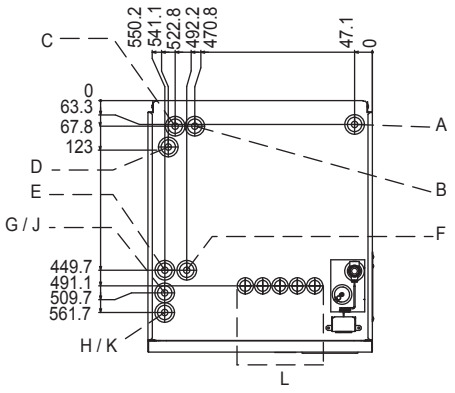
<Table 3.5>

## ■ Technical Drawings

<Unit: mm>




<Left side> <Front> <Right side>




<Top>

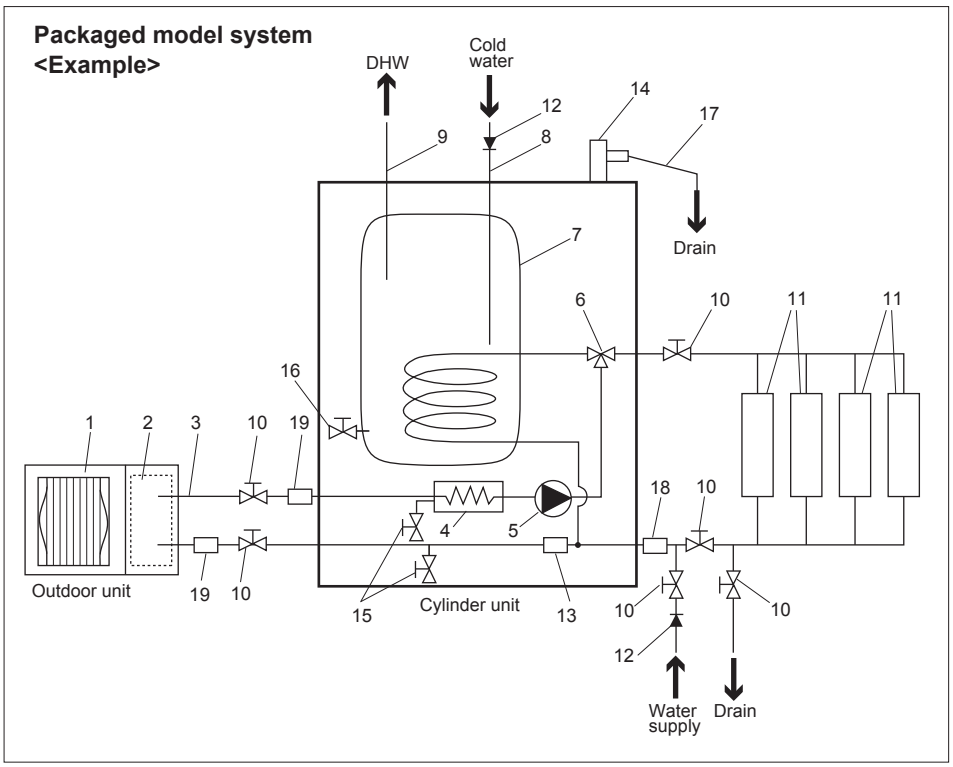
| Letter | Pipe description | Connection size/type |
|---|---|---|
| A | DHW outlet connection | 22 mm/Compression |
| B | Cold water inlet connection | 22 mm/Compression |
| C/D | Solar (ancillary heat source) connection | 22 mm/Compression |
| E | Space heating return connection | 28 mm/Compression |
| F | Space heating flow connection | 28 mm/Compression |
| G | Flow from heat pump connection (No plate heat exchanger) | 28 mm/Compression |
| H | Return to heat pump connection (No plate heat exchanger) | 28 mm/Compression |
| J | Refrigerant (GAS) (With plate heat exchanger) | 15.88 mm/Flare |
| K | Refrigerant (LIQUID) (With plate heat exchanger) | 9.52 mm/Flare |
| L | Electrical cable inlets | —<br>* The leftmost hole is for wireless receiver (option) (PAR-WR41R-E) |

<Table 3.6>

## ■ Unit Compatibility

| Outdoor unit \ Cylinder unit | | EHST20C-VM6HA | EHST20C-YM9HA | EHST20C-VM6A | EHST20C-YM9A | EHST20C-VM6SA | EHPT20X-VM2HA | EHPT20X-VM6HA | EHPT20X-YM9HA | EHPT20X-VM6A | EHPT20X-YM9A |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Packaged - type | PUHZ-W50-85<br>PUHZ-HW112-140 | | | | | | ○ | ○ | ○ | ○ | ○ |
| Split - type | PUHZ-RP35-140<br>PUHZ-HRP71-125 | ○ | ○ | ○ | ○ | ○ | | | | | |

<Table 3.7>

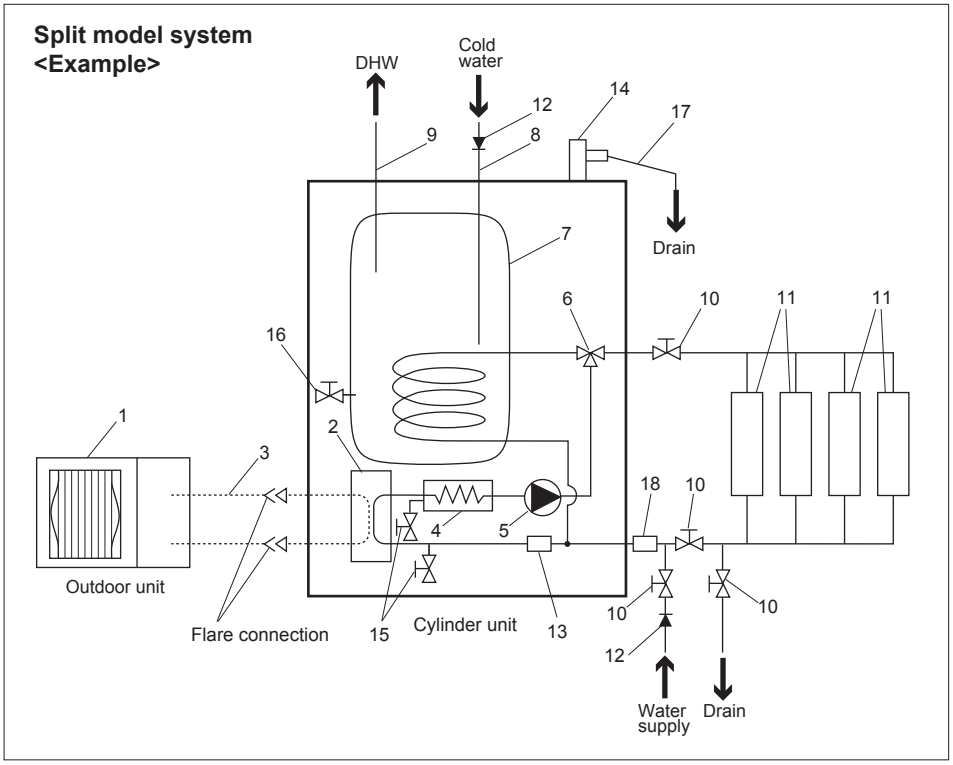



<Figure 3.5>

1. Outdoor unit
2. Plate heat exchanger
3. Interconnecting pipe work
   Packaged model system—Water
   Split model system—Refrigerant
4. Booster heater
5. Water circulation pump
6. 3-way valve
7. DHW Tank
8. Cold water inlet pipe
9. DHW outlet connection
10. Isolating valve (field supply)
11. Heat emitters
    (E.g. Radiator, Floor heating, Fan coil)
12. Back flow prevention device (field supply)
13. Strainer
14. Pressure relief valve
15. Drain cock (primary circuit)
16. Drain cock (DHW tank)
17. Drain pipe (field supply)
18. **Magnetic filter is recommended. (field supply)**

**For new pipework — FERNOX Boiler Buddy**
**For existing pipework — FERNOX Total Filter TF1**

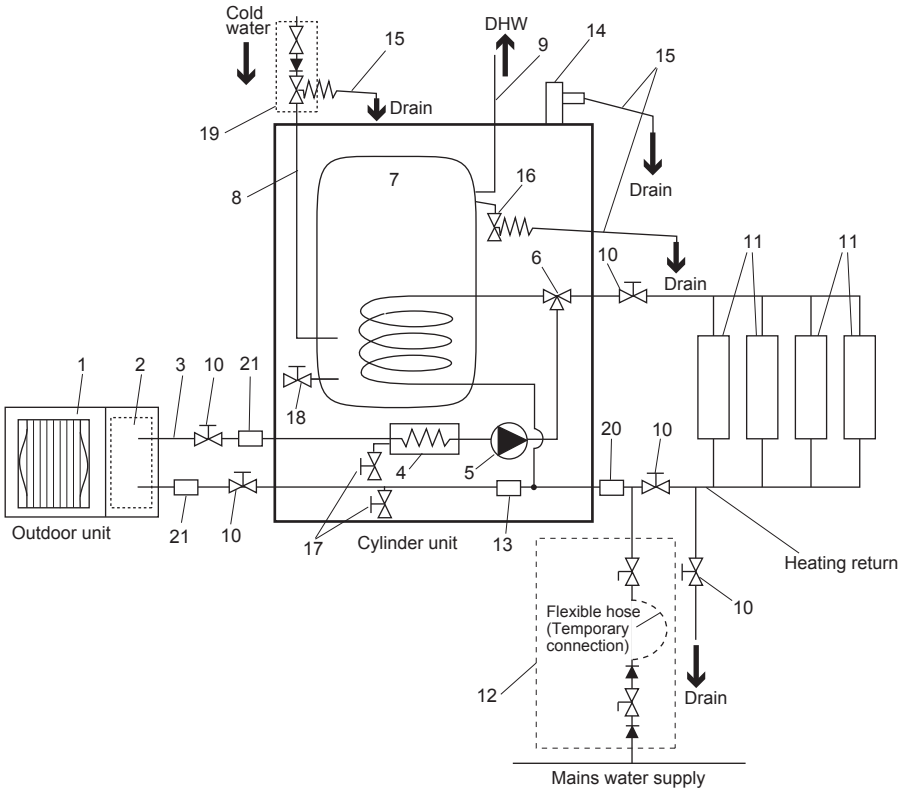
19. Strainer (field supply)




<Figure 3.6>

Note
- To enable draining of the cylinder unit an isolating valve should be positioned on both the inlet and outlet pipework.
- Be sure to install a strainer, on the inlet pipe work to the cylinder unit.
- Suitable drain pipe work should be attached to all relief valves in accordance with your country's regulations.
- A backflow prevention device must be installed on the cold water supply pipework (IEC 61770)
- When using components made from different metals or connecting pipes made of different metals insulate the joints to prevent a corrosive reaction taking place which will damage the pipework.

**UK Packaged model system**
**<Example>**




<Figure 3.7>

| Model name | EHPT20X-VM2HA |
|---|---|
| Maximum supply pressure to the pressure reducing valve | 16 bar |
| Operating pressure (Potable side) | 3.5 bar |
| Expansion vessel charge setting pressure (Potable side) | 3.5 bar |
| Expansion valve setting pressure (Potable side) | 6.0 bar |
| Immersion heater specification (Potable side)<br>* EN60335/Type 3000W single phase 230V 50Hz, length 460mm<br>** Use only Mitsubishi Electric service parts as a direct replacement. | 3000 W, 230 V |
| Domestic hot water tank capacity | 200 L |
| Mass of the unit when full | 332 kg |
| Maximum primary working pressure | 2.5 bar |

<Table 3.7>

1. Outdoor unit
2. Plate heat exchanger
3. Interconnecting pipe work (WATER)
4. Booster heater
5. Water circulation pump
6. 3-way valve
7. DHW Tank
8. Cold water inlet pipe
9. DHW outlet connection
10. Isolating valve
11. Heat emitters
    (E.g. Radiator, Floor heating, Fan coil)
12. Filling loop (ball valves, check valves and flexible hose) supplied with UK model only*
13. Strainer
14. Pressure relief valve (primary circuit)
15. Drain pipe (field supply)
16. T&P valve (factory fitted)
17. Drain cock (primary circuit)
18. Drain cock (DHW tank)
19. Inlet control group supplied with UK model ONLY*

* Please refer to PAC-WK01UK-E Installation Manual for more information on accessories.

**20. Magnetic filter is recommended. (field supply)**

**For new pipework — FERNOX Boiler Buddy**
**For existing pipework — FERNOX Total Filter TF1**

21. Strainer (field supply)

Note
- To enable draining of the cylinder unit an isolating valve should be positioned on both the inlet and outlet pipework. No valve should be fitted between the expansion valve (item 19) and the cylinder (safety matter).
- Be sure to install a strainer, on the inlet pipe work to the cylinder unit.
- Suitable drain pipe work should be attached to all relief valves in accordance with your country's regulations.
- When using components made from different metals or connecting pipes made of different metals insulate the joints to prevent a corrosive reaction taking place which may damage the pipework.
- Filling loop's flexible hose must be removed following the filling procedure. Item provided with unit as loose accessory.

# 4 Installation

### <Preparation before the installation and service>

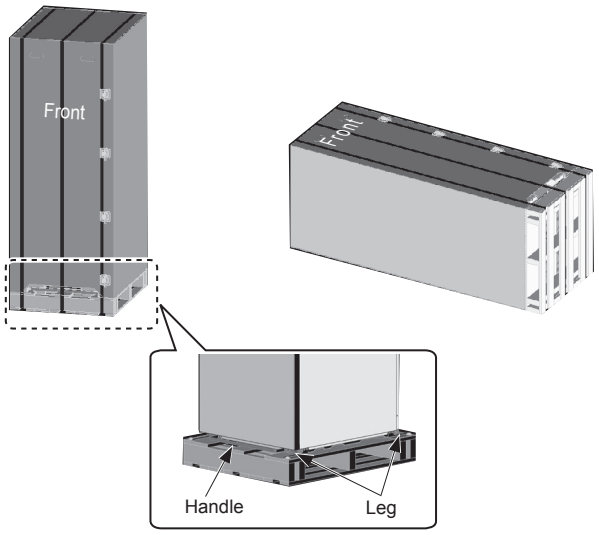
- Prepare the proper tools.
- Prepare the proper protection.
- Allow parts to cool before attempting any maintenance.
- Provide adequate ventilation.
- After stopping the operation of the system, turn off the power-supply breaker and remove the power plug.
- Discharge the condenser before commencing work involving the electric parts.

### <Precautions during service>

- Do not perform work involving electric parts with wet hands.
- Do not pour water into the electric parts.
- Do not touch the refrigerant.
- Do not touch the hot or cold areas in the refrigerant cycle.
- When the repair or the inspection of the circuit needs to be done without turning off the power, exercise great caution not to touch the live parts.

## 4.1 Location

### ■ Transportation and Handling




<Figure 4.1.1>

Cylinder unit is delivered on a wooden pallet base with cardboard protection.

Care should be taken when transporting the cylinder unit that the casing is not damaged by impact. Do not remove the protective packaging until cylinder has reached its final location. This will help protect the structure and control panel.

- The cylinder unit can be transported either vertically or horizontally. If transported horizontally the panel marked 'Front' must be facing **UPWARDS** <Figure 4.1.1>.
- The cylinder unit should ALWAYS be moved by a minimum of 2 people.
- When carrying the cylinder use the handles provided.
- Before using the handles, make sure they are securely attached.
- **Please remove front handle, fixing legs, wooden base and any other packaging once the unit is in installation location.**
- **Keep the handles for future transportation.**

### ■ Suitable Location

Before installation the cylinder unit should be stored in a frost-free weatherproof location. Units must **NOT** be stacked.

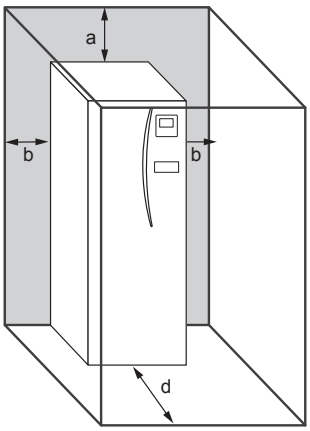
- The cylinder unit should be installed indoors in a frost free weather proof location.
- The cylinder unit should be positioned on a level surface capable of supporting it's filled weight. (Adjustable feet (accessory parts) can be used to ensure unit is level)
- When using the adjustable feet, ensure that the floor is strong enough.
- Care should be taken that minimum distances around the unit for service access are observed <Figure 4.1.2>.
- Secure the cylinder unit to prevent it being knocked over accidentally or during earthquakes.
- Install the cylinder unit where it is not exposed to water.

### ■ Service access diagrams

| Service access | |
|---|---|
| Parameter | Dimension (mm) |
| a | 300 |
| b | 150 |
| c (distance behind unit not visible in Figure 4.1.2) | 10 |
| d | 500 |

<Table 4.1.1>

Sufficient space MUST be left for the provision of discharge pipework as detailed in National and Local building regulations.




<Figure 4.1.2>
Service access

The cylinder unit must be located indoors and in a frost-free environment, for example in a utility room, to minimise heat loss from stored water.

### ■ Room Thermostat

If fitting a new room thermostat for this system;

- Position out of direct sunlight and draughts
- Position away from internal heat sources
- Position in a room without a TRV on the radiator
- Position on an internal wall

Note: Do not position the thermostat excessively close to the wall. The thermostat may detect the temperature of the wall, which could prevent appropriate control over the room temperature.

- Position approx. 1.5 m from floor level

### ■ Repositioning

If you need to move the cylinder unit to a new position FULLY DRAIN the cylinder and the internal coil before moving to avoid damage to the unit.

## 4.2 Water Quality and System Preparation

### ■ General

- Water quality should be to European Directive 98/83 EC standards.
  - ► pH value of 6.5-8.0 (Recommended: pH6.5 - 7.5)
  - ► Calcium ≤ 100 mg/l
  - ► Chlorine ≤ 100 mg/l
  - ► Iron/Manganese ≤ 0.5 mg/l
- In known hard water areas, to prevent/minimise scaling, it is beneficial to restrict the routine stored water temperature (DHW max. temp.) to 55°C.

### ■ New Installation

- Before connecting outdoor unit, thoroughly cleanse pipe work of building debris, solder etc using a suitable chemical cleansing agent.
- Flush the system to remove chemical cleanser.
- For all packaged systems add a combined inhibitor and anti-freeze solution to prevent damage to the pipe work and system components.
- For split systems the responsible installer should decide if anti-freeze solution is necessary for each site's conditions. Corrosion inhibitor however should always be used.

### ■ Existing Installation

- Before connecting outdoor unit the existing heating circuit MUST be chemically cleansed to remove existing debris from the heating circuit.
- Flush the system to remove chemical cleanser.
- For all packaged systems add a combined inhibitor and anti-freeze solution to prevent damage to the pipe work and system components.
- For split systems the responsible installer should decide if anti-freeze solution is necessary for each site's conditions. Corrosion inhibitor however should always be used.

When using chemical cleansers and inhibitors always follow manufacturer's instructions and ensure the product is appropriate for the materials used in the water circuit

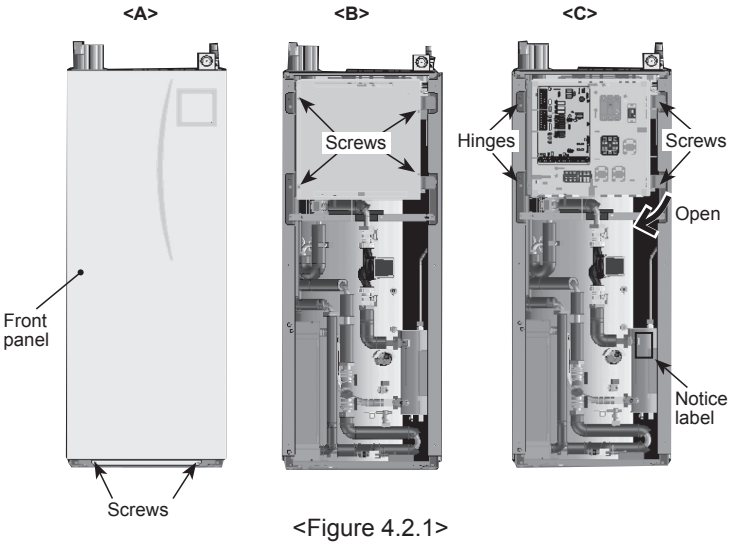
### ■ How to access Internal Components and Control Box

<A> Opening the front panel
1. Remove the two lower screws.
2. Slide front panel upwards to open.
3. **Disconnect main controller cable from quick release connector.**

<B> Opening the control box cover
1. Remove the four screws.
2. Remove the control box cover.

<C> Accessing the back of the control box
The control box is hinged on the left hand side and has two holding screws on the right.
1. Remove the two holding screws on the control box.
2. The control box can then be swung forward on the left hand hinges.

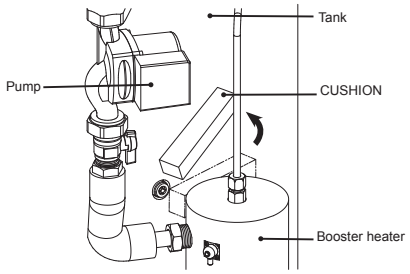
Note:
1. Before accessing back of control box release cables from cable straps and bendable clamp to avoid damage.
2. After servicing re-secure all cables using straps provided and reconnect main controller cable to quick release connector.




<Figure 4.2.1>

**<Before water pipe work>**

When installing the cylinder unit, be sure to remove polystyrene cushion that is attached to the booster heater, as shown in the figure below.
When removing the cushion do not touch the pipes.
After removing the cushion peel off the notice label that is stuck on the booster heater.




<Figure 4.2.2>

## 4.3 Water Pipe work

### ■ Hot Water Pipe work

**The cylinder unit is UNVENTED.** When installing unvented hot water systems building regulations part G3 (England and Wales), P3 (Scotland) and P5 (Northern Ireland) should be adhered to. If outside of the UK please adhere to your own country's regulations for unvented hot water systems.

Connect the flow for the DHW to pipe A (Component diagrams).
The function of the following safety components of the cylinder should be checked on installation for any abnormalities;
- Pressure relief valve
- Temperature and pressure relief valve (EHPT20X-VM2HA ONLY)
- Expansion vessel pre-charge

The instruction on the following pages regarding safe discharge of hot water from Safety devices should be followed carefully.
- The pipe work will become very hot, so should be insulated to prevent burns.
- When connecting pipe work, ensure that no foreign objects such as debris or the like do not enter the pipe

### ■ Cold Water Pipe work

Cold water of a suitable standard (see section 4.2) should be introduced to the system by connecting pipe B (Fig 3.1) using appropriate fittings.

### ■ Hydraulic filter work (ONLY EHPT series)

Install a hydraulic filter or strainer (field supply) at the water intake ("Pipe G" in Fig.3.3, Fig.3.4)

## ■ Pipe work Connections

Connections to the cylinder unit should be made using the 22 mm or 28 mm compression as appropriate.
Do not over-tighten compression fittings as this will lead to deformation of the olive ring and potential leaks.
Note: To weld the pipes in the field, cool the pipes on the cylinder unit using wet towel etc.

## ■ Insulation of Pipe work

- All exposed water pipe work should be insulated to prevent unnecessary heat loss and condensation. To prevent condensate entering the cylinder unit, the pipe work and connections at the top of the cylinder unit should be carefully insulated.
- Cold and hot water pipe work should not be run close together where possible, to avoid unwanted heat transfer.
- Pipe work between outdoor heat pump unit and cylinder should be insulated with suitable pipe insulation material with a thermal conductivity of ≤ 0.04 W/m.K.

## ■ Filling the System (Primary Circuit)

Filling

1. Check all connections including factory fitted ones are tight.
2. Insulate pipe work between cylinder and outdoor unit.
3. Thoroughly clean and flush, system of all debris. (see section 4.2 for detailed instructions.)
4. Fill cylinder with potable water. Fill primary heating circuit with water and suitable anti-freeze and inhibitor as necessary. **Always use a filling loop with double check valve when filling the primary circuit to avoid back flow contamination of water supply.**

- Anti-freeze should always be used for package systems. It is the responsibility of the installer to decide if anti-freeze solution should be used in split systems depending on each site's conditions. Corrosion inhibitor should be used in both split and package systems.
- When connecting metal pipes of different materials insulate the joints to prevent a corrosive reaction taking place which will damage the pipework.

5. Check for leaks. If leaks are found, retighten the screws on the connections.
6. Pressurise system to 1 bar.
7. Release all trapped air using air vents during and following heating period.
8. Top up with water as necessary. (If pressure is below 1 bar)

## ■ Sizing Expansion Vessels

To size the expansion vessel for the heating circuit the following formula and graph can be used.

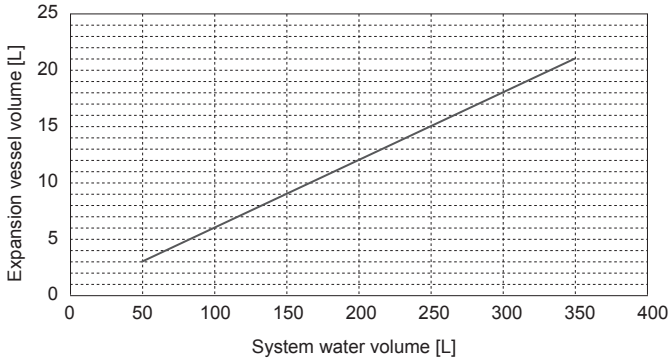
$$V = \frac{\varepsilon \times G}{1 + \frac{P_1 + 0.098}{P_2 + 0.098}}$$

Where;
V : Necessary expansion vessel volume
ε : Water expansion coefficient
G : Total volume of water in the system
$P_1$ : Expansion vessel setting pressure
$P_2$ : Max pressure during operation

Graph below is for the following values

ε : at 65 °C = 0.0198
$P_1$ : 0.1 MPa
$P_2$ : 0.3 MPa
*A 30% safety margin has been added.

**Expansion vessel sizing**




<Figure 4.3.1>

## ■ Water Circulation Pump Characteristics

Pump speed can be selected on the pump (see <Figure 4.3.2>).
Adjust the pump speed setting so that the flow rate in the primary circuit is appropriate for the outdoor unit installed see Table 4.3.1. It may be necessary to add an additional pump to the system depending on the length and lift of the primary circuit.

<Second pump >
If a second pump is required for the installation please read the following carefully.
If a second pump is used in the system it can be positioned in 2 ways.
The position of the pump influences which terminal of the FTC3 the signal cable should be wired to. If the additional pump(s) have current greater than 1A please use appropriate relay. Pump signal cable can either be wired to TBO.1 1-2 or CNP1 but not both.

Option 1 (Space heating only)
If the second pump is being used for the heating circuit only then the signal cable should be wired to TBO.1 terminals 3 and 4 (OUT2). In this position the pump can be run at a different speed to the cylinder unit's in-built pump.

Option 2 (Primary circuit DHW and space heating)
If the second pump is being used in the primary circuit between the cylinder unit and the outdoor unit (Package system ONLY) then the signal cable should be wired to TBO.1 terminals 1 and 2 (OUT1). In this position the pump speed **MUST** match the speed of the cylinder unit's in-built pump.

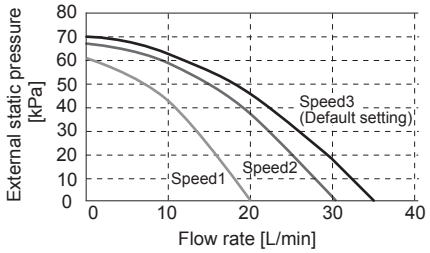
Note:
Refer to 5.2 Connecting external input/output.

| Outdoor heat pump unit | | Water flow rate range [L/min] |
|---|---|---|
| Packaged | PUHZ-W50 | 7.1 - 14.3 |
| | PUHZ-W85 | 10.0 - 25.8 |
| | PUHZ-HW112 | 14.4 - 27.7 |
| | PUHZ-HW140 | 17.9 - 27.7 |
| Split | PUHZ-RP35 | 7.1 - 11.8 |
| | PUHZ-RP50 | 7.1 - 17.2 |
| | PUHZ-RP60 | 8.6 - 20.1 |
| | PUHZ-(H)RP71 | 10.2 - 22.9 |
| | PUHZ-(H)RP100 | 14.4 - 27.7 |
| | PUHZ-(H)RP125 | 17.9 - 27.7 |
| | PUHZ-RP140 | 20.1 - 27.7 |

<Table 4.3.1>

* If the water flow rate is less than 7.1 L/min, the flow switch will be activated.
If the water flow rate exceeds 27.7 L/min, the flow speed will be greater than 1.5 m/s, which could corrode the pipes.

**Water circulation pump characteristics**




<Figure 4.3.2>

## ■ Safety Device Connections

The expansion relief valve on the secondary hot water side, and the temperature and pressure (T&P) relief valve (*1), situated part way down the tank on the right hand side, both need appropriate discharge pipe work. In accordance with Building Regulations a tundish must be fitted into the pipework within 500 mm of the safety device. Due to the distance between the two safety devices it may be necessary to fit each safety device with its own tundish before you run the pipework together to a safe discharge (see Figure 4.3.3). The right side panel has a window (*2) so that connection can be made to the factory fitted temperature and pressure relief valve. If you wish to make the connection in a different position you will have to cut a hole in the side panel yourself. However it remains necessary that the drainage parameters outlined in the appropriate Building Regulations are complied with.

*1 Temperature and pressure relief valve fitted on EHPT20X-VM2HA ONLY.
*2 Unscrew the plate on the right-side panel, connect the T&P valve to the pipework, and refit the plate. Always replace the plate so that no gaps exist between the plate and side panel and the plate and drain pipe to avoid heat loss.

Note:
Alternatively the discharges from the expansion relief valve and T&P relief valve may commonly discharge to a singular tundish, so long as this tundish is located within 500 mm of the T&P relief valve. When connecting discharge pipes to the safety devices, beware not to strain the inlet connections.

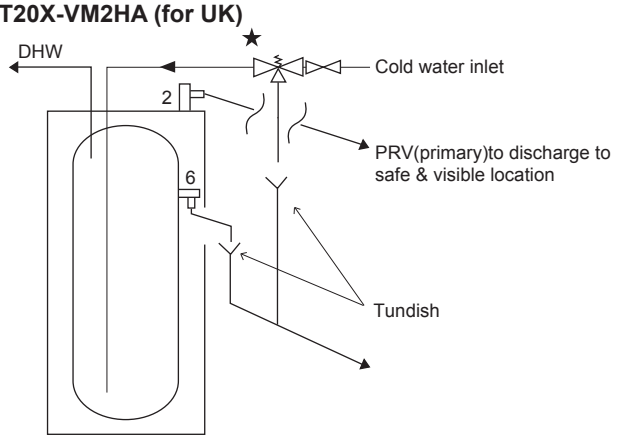
| Diagram part No. | Description | Connection size | Connection type |
|---|---|---|---|
| 2 | Pressure relief valve | G 1/2 | Female |
| 6 | Temperature and pressure relief valve (Factory fitted) | 15 mm | Compression |
| ★ | Expansion relief valve (part of inlet control group) | 15 mm | Compression |

<Table 4.3.2>

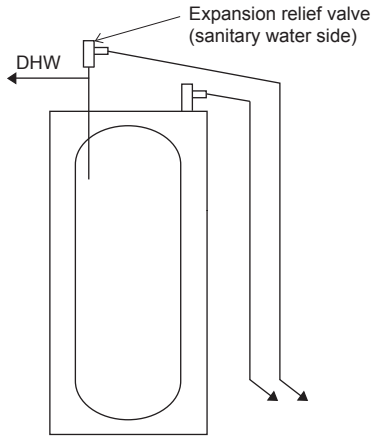
Always refer to local regulations when installing discharge pipework.
Install discharge pipe work in a frost-free environment.
It is necessary to provide appropriate drainage from the pressure relief valve situated on top of the cylinder to prevent damage to the unit and the surrounding area from any steam or hot water released. Relief valves MUST NOT be used for any other purpose.

For UK use WK01UK-E kit, for other countries please see below;
• Any discharge pipework should be capable of withstanding discharge of hot water. Discharge pipework should be installed in a continuously downward direction. Discharge pipework must be left open to the environment.

**EHPT20X-VM2HA (for UK)**




**Other models** • • • The expansion vessel on the sanitary water side shall be installed as necessary in accordance with your local regulations.




<Figure 4.3.3>

**<Pressure relief valve included with the cylinder unit>**
**Applicable model:**
**EHPT20X-VM2HA**

| | Item | Quantity |
|---|---|---|
| ① | Pressure relief valve (0.3 MPa (3 bar)) | 1 |

Install the pressure relief valve (0.3 MPa (3 bar)) on the local piping connected to the space heating flow.
The connecting size is G1/2" (the drain connection size G1/2").
The space heating flow can be identified on the diagram label on top of the cylinder unit.

**Applicable models:**
**EHST20C-VM6HA, EHST20C-YM9HA, EHST20C-VM6A, EHST20C-YM9A,**
**EHST20C-VM6SA, EHPT20X-VM6HA, EHPT20X-YM9HA, EHPT20X-VM6A, EHPT20X-YM9A**

| | Item | Quantity |
|---|---|---|
| ① | Pressure relief valve (0.3 MPa (3 bar)) | 1 |
| ② | Pressure relief valve (1.0 MPa (10 bar)) | 2 |

Install the pressure relief valve (0.3 MPa (3 bar)) on the local piping connected to the space heating flow.
The connecting size is G1/2" (the drain connection size G1/2").
The space heating flow can be identified on the diagram label on top of the cylinder unit.
Install the two pressure relief valves (1.0MPa (10 bar)) on the local piping connected to the cold water inlet.
The pressure relief valves should be installed between the pressure reducing valve and the cylinder unit.
The connection size is G1/2" (the drain connection size G3/4").
The cold water inlet can be identified on the diagram label on top of the cylinder unit.

<Accessory location>
The pressure relief valve accessory pack can be found inside the cylinder unit, taped to the base.

## 4.4 Safety Device Discharge Arrangements (G3)

**The following instructions are a requirement of British building regulations and must be adhered to. For other countries please refer to local legislation. If you are in any doubt please seek advice from local building planning office.**

1. Position the inlet control group so that discharge from both safety valves can be joined together via a 15 mm end feed Tee.
2. Connect the tundish and route the discharge pipe as shown in Figure 4.4.1.
3. The tundish should be fitted vertically and as close to the safety device as possible and within 500 mm of the device.
4. The tundish should be visible to occupants and positioned away from electrical devices.
5. The discharge pipe (D2) from the tundish should terminate in a safe place where there is no risk to persons in the vicinity of the discharge, be of metal construction and:

A) Be at least one pipe size larger than the nominal outlet size of the safety device unless its total equivalent hydraulic resistance exceeds that of a straight pipe 9 m long i.e. discharge pipes between 9 m and 18 m equivalent resistance length should be at least two sizes larger than the nominal outlet size of the safety device, between 18 and 27 m at least 3 sizes larger, and so on. Bends must be taken into account in calculating the flow resistance. Refer to Figure 4.4.1, Table 4.4.1 and the worked example. An alternative approach for sizing discharge pipes would be to follow BS 6700: 1987 specification for design installation, testing and maintenance of services supplying water for domestic use within buildings and their cartilages.

B) Have a vertical section of pipe at least 300 mm long, below the tundish before any elbows or bends in the pipe work.

C) Be installed with a continuous fall.

D) Have discharges visible at both the tundish and the final point of discharge but where this is not possible or is practically difficult there should be clear visibility at one or other of these locations. Examples of acceptable discharge arrangements are:

***i***. Ideally below a fixed grating and above the water seal in a trapped gully.

***ii***. Downward discharges at low level; i.e. up to 100 mm above external surfaces such as car parks, hard standings, grassed areas etc. are acceptable providing that where children may play or otherwise come into contact with discharges a wire cage or similar guard is positioned to prevent contact, whilst maintaining visibility.

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

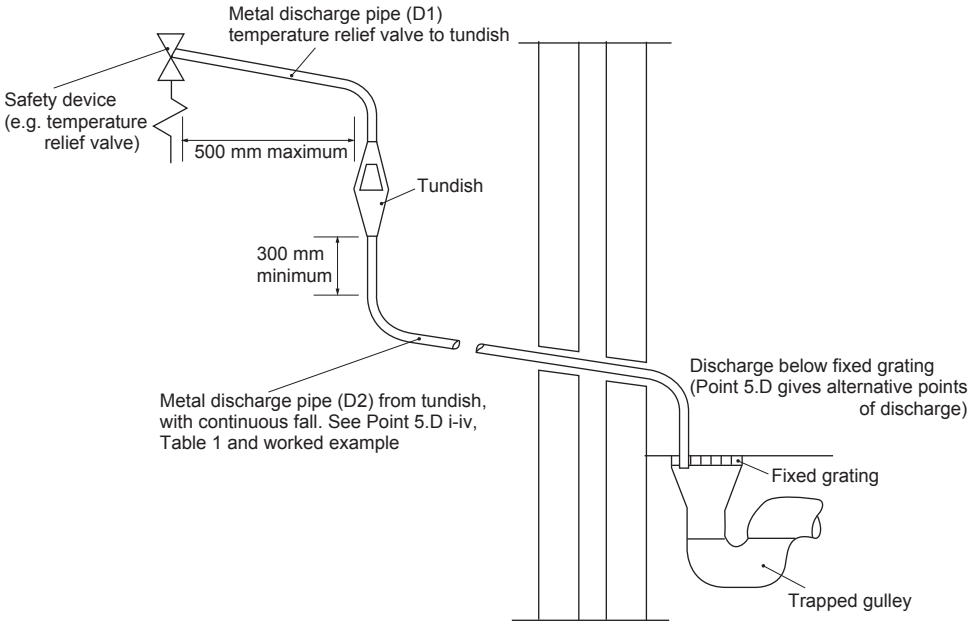
***iv***. Where a single pipe serves a number of discharges, such as in blocks of flats, the number served should be limited to not more than 6 systems so that any installation discharging can be traced reasonably easily. The single common discharge pipe should be at least one pipe size larger than the largest individual discharge pipe (D2) to be connected. If unvented hot water storage systems are installed where discharges from safety devices may not be apparent i.e. in dwellings occupied by blind, infirm or disabled people, consideration should be given to the installation of an electronically operated device to warn when discharge takes place.

**Note: The discharge will consist of scalding water and steam. Asphalt, roofing felt and nonmetallic rainwater goods may be damaged by such discharges.**

**Worked example:** The example below is for a G½ temperature relief valve with a discharge pipe (D2) having 4 No. elbows and length of 7 m from the tundish to the point of discharge.

From Table 4.4.1: Maximum resistance allowed for a straight length of 22 mm copper discharge pipe (D2) from a G½ temperature relief valve is: 9.0 m subtract the resistance for 4 No. 22 mm elbows at 0.8 m each = 3.2 m. Therefore the maximum permitted length equates to: 5.8 m. 5.8 m is less than the actual length of 7 m, therefore calculate the next largest size. Maximum resistance allowed for a straight length of 28 mm pipe (D2) from a G½ temperature relief valve equates to: 18 m

Subtract the resistance for 4 No. 28 mm elbows at 1.0 m each = 4 m. Therefore the maximum permitted length equates to: 14 m. As the actual length is 7 m, a 28 mm (D2) copper pipe will be satisfactory.




<Figure 4.4.1>

| Valve outlet size | Minimum size of discharge pipe D1 | Minimum size of discharge pipe D2 from tundish | Maximum resistance allowed, expressed as a length of straight pipe (no elbows or bends) | Resistance created by each elbow or bend |
|---|---|---|---|---|
| G 1/2 | 15 mm | 22 mm | Up to 9 m | 0.8 m |
| | | 28 mm | Up to 18 m | 1.0 m |
| | | 35 mm | Up to 27 m | 1.4 m |
| G 3/4 | 22 mm | 28 mm | Up to 9 m | 1.0 m |
| | | 35 mm | Up to 18 m | 1.4 m |
| | | 42 mm | Up to 27 m | 1.7 m |
| G1 | 28 mm | 35 mm | Up to 9 m | 1.4 m |
| | | 42 mm | Up to 18 m | 1.7 m |
| | | 54 mm | Up to 27 m | 2.3 m |

<Table 4.4.1>

## 4.5 Refrigerant Pipe work (Split Model Systems only)

Installation of refrigerant pipe work **MUST** only be done by a technician with relevant qualifications. Installation requirements may differ depending on the outdoor unit selected. Please also refer to outdoor unit installation manual when connecting refrigerant pipe work.

| Gas side pipe size (mm) | Liquid side Pipe size (mm) |
|---|---|
| ø15.88 | ø9.52 |

### ■ Precautions

For devices that use R410A refrigerant

- Use ester oil, ether oil or alkylbenzene oil (small amount) as the refrigeration oil applied to the flared sections.
- Use C1220 copper phosphorus for copper and copper alloy seamless pipes, to connect the refrigerant pipes. Use refrigerant pipes with the thicknesses specified in the table below. Make sure the insides of the pipes are clean and do not contain any harmful contaminants such as sulfuric compounds, oxidants, debris, or dust.

**⚠ Warning:**
**When installing or moving the air conditioner, use only the specified refrigerant (R410A) to charge the refrigerant lines. Do not mix it with any other refrigerant and do not allow air to remain in the lines. Air enclosed in the lines can cause pressure peaks resulting in a rupture and other hazards.**

| | RP35, 50 | RP60-140/HRP71-125 |
|---|---|---|
| Liquid pipe | ø6.35 thickness 0.8 mm | ø9.52 thickness 0.8 mm |
| Gas pipe | ø12.7 thickness 0.8 mm | ø15.88 thickness 1.0 mm |

**• Do not use pipes thinner than those specified above.**

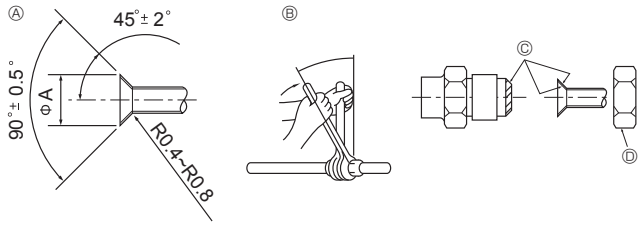
### ■ Connecting pipes (Figure 4.5.1)

- When commercially available copper pipes are used, wrap liquid and gas pipes with commercially available insulation materials (heat-resistant to 100 °C or more, thickness of 12 mm or more).
- Apply thin layer of refrigerant oil to pipe and joint seating surface before tightening flare nut.
- Use two wrenches to tighten piping connections.
- Use refrigerant piping insulation to insulate indoor unit connections.

Ⓑ Flare nut tightening torque

| Copper pipe O.D. (mm) | Flare nut O.D. (mm) | Tightening torque (N·m) |
|---|---|---|
| ø6.35 | 17 | 14 - 18 |
| ø6.35 | 22 | 34 - 42 |
| ø9.52 | 22 | 34 - 42 |
| ø12.7 | 26 | 49 - 61 |
| ø12.7 | 29 | 68 - 82 |
| ø15.88 | 29 | 68 - 82 |
| ø15.88 | 36 | 100 - 120 |

Ⓒ Apply refrigerating machine oil over the entire flare seat surface.
Ⓓ Use correct flare nuts matching the pipe size of the outdoor unit.

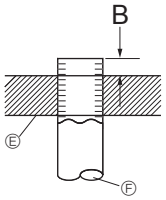



Ⓐ Flare cutting dimensions
Ⓑ Flare nut tightening torque

<Figure 4.5.1>

Ⓐ Flare cutting dimensions

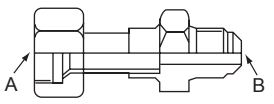
| Copper pipe O.D. (mm) | Flare dimensions øA dimensions (mm) |
|---|---|
| ø 6.35 | 8.7 - 9.1 |
| ø9.52 | 12.8 - 13.2 |
| ø12.7 | 16.2 - 16.6 |
| ø15.88 | 19.3 - 19.7 |




Ⓔ Die
Ⓕ Copper pipe

<Figure 4.5.2>

| Copper pipe O.D. (mm) | B (mm) Flare tool for R410A Clutch type |
|---|---|
| ø6.35 (1/4") | 1.0 - 1.5 |
| ø9.52 (3/8") | 1.0 - 1.5 |
| ø12.7 (1/2") | 1.0 - 1.5 |
| ø15.88 (5/8") | 1.0 - 1.5 |




<Cylinder unit side> <Extension pipe side>

<Figure 4.5.3>

Match the outer diameter of the refrigerant pipe between the outdoor unit and cylinder unit with that of the refrigerant pipe on the outdoor unit.
If they do not match, connect the following adapter to the refrigerant pipe on the cylinder unit.

| Model name | Connected pipes diameter (mm) | Diameter A (mm) | Diameter B (mm) |
|---|---|---|---|
| PAC-SH50RJ-E | ø15.88 → ø12.7 | ø15.88 (5/8 F) | ø12.7 (1/2 F) |
| PAC-SH30RJ-E | ø9.52 → ø6.35 | ø 9.52 (3/8 F) | ø 6.35 (1/4 F) |

## 4.6 Electrical Connection

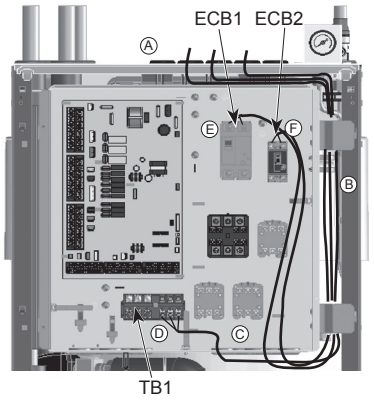
All electrical work should be carried out by a suitably qualified technician. Failure to comply with this could lead to electrocution, fire, and death. It will also invalidate product warranty. All wiring should be according to national wiring regulations.

| Breaker abbreviation | Meaning |
|---|---|
| ECB1 | Earth leakage breaker booster heater |
| ECB2 | Earth leakage breaker immersion heater |
| TB1 | Terminal bed 1 |

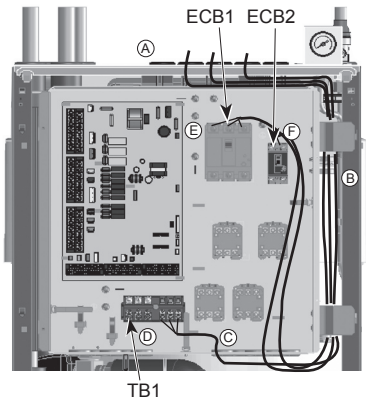
The cylinder unit can be powered in two ways.
1. Power cable is run from the outdoor unit to the cylinder unit.
2. Cylinder unit has independent power source

Connections should be made to the terminals indicated in the following figures depending on the phase.

Booster heater and immersion heater should be connected independently from one another to dedicated power supplies.




<1 phase (with immersion heater)>

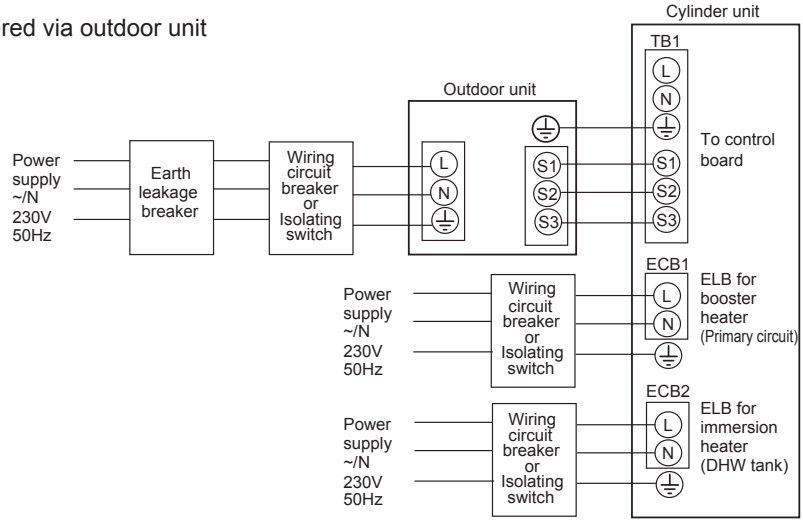



<3 phase (with immersion heater)>

Ⓐ Locally supplied wiring should be inserted through the inlets situated on the top of the cylinder unit.
Ⓑ Wiring should be fed down the right hand side of the electrical box and clamped in place using clips provided.
Ⓒ The wires should be inserted through the cable inlets on the base of the electrical box.
Ⓓ Connect the outdoor unit – cylinder unit connecting cable to TB1.
Ⓔ Connect the power cable for the booster heater to ECB1
Ⓕ If immersion heater is present, connect the power cable to ECB2.

- Make sure that ECB1 and ECB2 are ON.
- On completion of wiring ensure main controller cable is connected to the quick release connector.

Option 1: Cylinder unit powered via outdoor unit
**<1 phase>**




* Affix label A that is included with the manuals near each wiring diagram for cylinder unit and outdoor units.

<Figure 4.6.1>
Electrical connections 1 phase

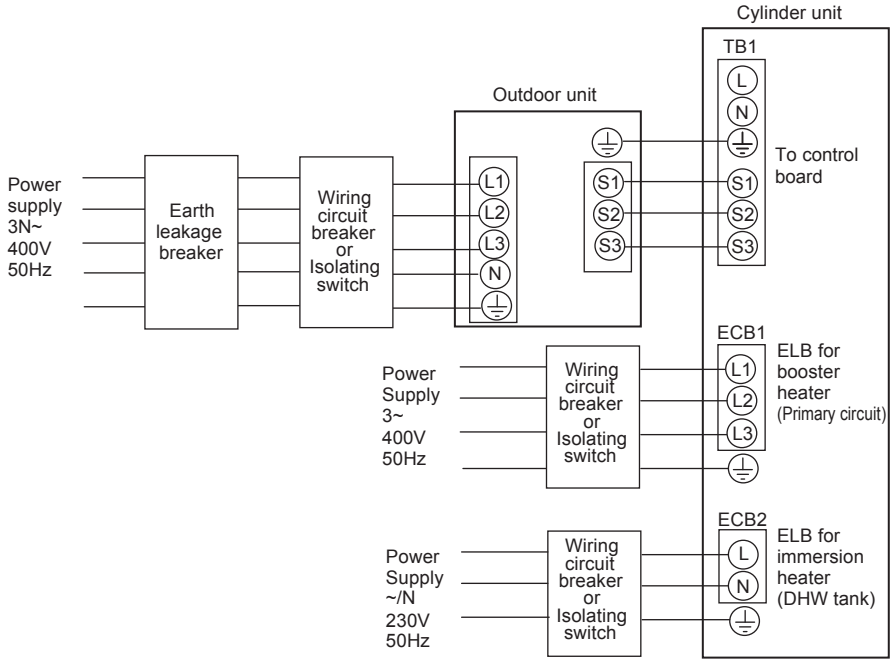
| Description | Power supply | Capacity (Indoor unit Ref.) | Breaker | Wiring |
|---|---|---|---|---|
| Booster heater (Primary circuit) | ~/N 230 V 50 Hz | 2 kW (E******-VM2**) | 16 A *1 | 2.5 mm² |
| | | 6 kW (E******-VM6**) | 32 A *1 | 6.0 mm² |
| Immersion heater (DHW tank) | ~/N 230 V 50 Hz | 3 kW (E******-VM*H*) | 16 A *1 | 2.5 mm² |

| | | | |
|---|---|---|---|
| Wiring (Wiring No. × size (mm²)) | Cylinder unit - Outdoor unit | *2 | 3 × 1.5 (polar) |
| | Cylinder unit - Outdoor unit earth | *2 | 1 × Min. 1.5 |
| Circuit rating | Cylinder unit - Outdoor unit S1 - S2 | *3 | AC230V |
| | Cylinder unit - Outdoor unit S2 - S3 | *3 | DC24V |

*1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV). The breaker shall be provided to ensure disconnection of all active phase conductors of the supply.
*2. Max. 45 m
If 2.5 mm² used, Max. 50 m
If 2.5 mm² used and S3 separated, Max. 80 m
*3. The values given in the table above are not always measured against the ground value.

**Notes:**
**1. Wiring size must comply with the applicable local and national codes.**
**2. Indoor unit/outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60245 IEC 57) Indoor unit power supply cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60227 IEC 53)**
**3. Install an earth longer than other cables.**
**4. Please keep enough output capacity of power supply for each heaters. The lack of the power supply capacity might cause chattering.**

**<3 phase>**




* Affix label A that is included with the manuals near each wiring diagram for cylinder unit and outdoor units.

<Figure 4.6.2>
Electrical connections 3 phase

| Description | Power supply | Capacity (Indoor unit Ref.) | Breaker | Wiring |
|---|---|---|---|---|
| Booster heater (Primary circuit) | 3~ 400V 50Hz | 9 kW | 16 A *1 | 2.5 mm² |
| Immersion heater (DHW tank) | ~/N 230 V 50 Hz | 3kW (E******-VM*H*) | 16 A *1 | 2.5 mm² |

| | | | |
|---|---|---|---|
| Wiring (Wiring No. × size (mm²)) | Cylinder unit - Outdoor unit | *2 | 3 × 1.5 (polar) |
| | Cylinder unit - Outdoor unit earth | *2 | 1 × Min. 1.5 |
| Circuit rating | Cylinder unit - Outdoor unit S1 - S2 | *3 | AC230V |
| | Cylinder unit - Outdoor unit S2 - S3 | *3 | DC24V |

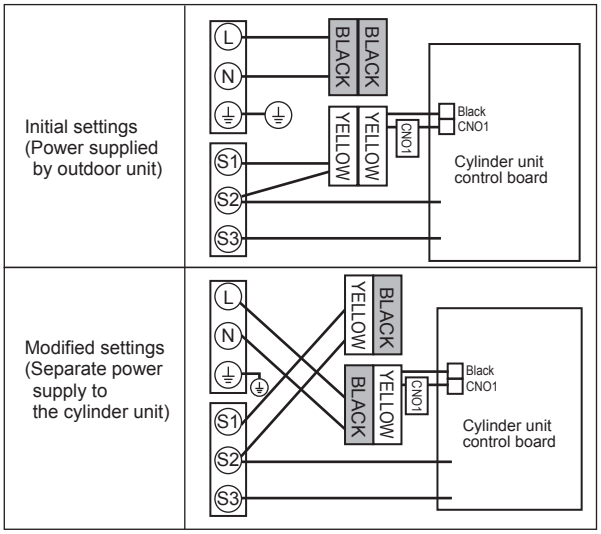
*1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV).
The breaker shall be provided to ensure disconnection of all active phase conductors of the supply.
*2. Max. 45 m
If 2.5 mm² used, Max. 50 m
If 2.5 mm² used and S3 separated, Max. 80 m
*3. The values given in the table above are not always measured against the ground value.

**Notes:**
**1. Wiring size must comply with the applicable local and national codes.**
**2. Indoor unit/outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60245 IEC 57)**
**Indoor unit power supply cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60227 IEC 53)**
**3. Install an earth longer than other cables.**

Option2: Cylinder unit powered by independent source.

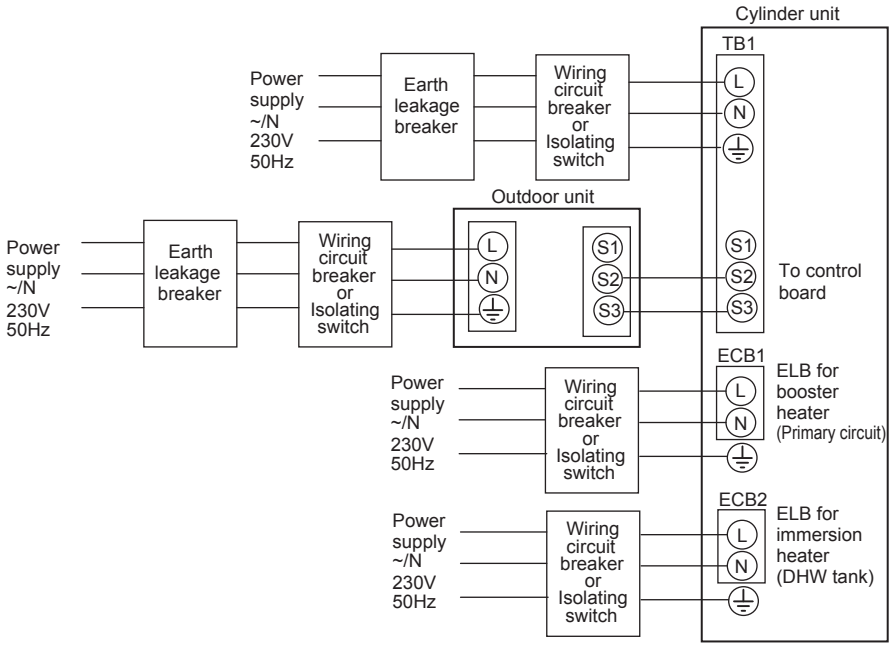
If the cylinder and outdoor units have separate power supplies, the following requirements MUST be carried out:

- **Cylinder unit electrical box connector connections changed (see Figure 4.6.3)**
- **Outdoor unit DIP switch settings changed to SW8-3 ON**
- **Turn on the outdoor unit before the cylinder unit.**




<Figure 4.6.3>

**<1 phase>**




* Affix label B that is included with the manuals near each wiring diagram for cylinder unit and outdoor units.

<Figure 4.6.4>
Electrical connections 1 phase

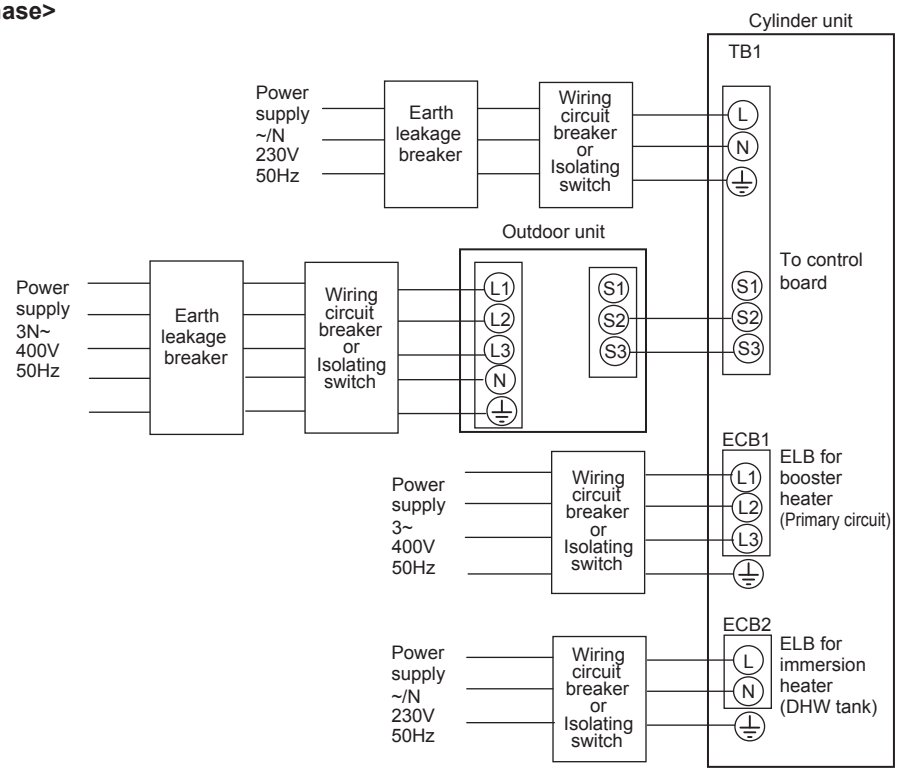
| Description | Power supply | Capacity (Indoor unit Ref.) | Breaker | Wiring |
|---|---|---|---|---|
| Booster heater (Primary circuit) | ~/N 230 V 50 Hz | 2 kW (E******-VM2**) | 16 A *1 | 2.5 mm² |
| | | 6 kW (E******-VM6**) | 32 A *1 | 6.0 mm² |
| Immersion heater (DHW tank) | ~/N 230 V 50 Hz | 3kW (E******-VM*H*) | 16 A *1 | 2.5 mm² |

| | | | |
|---|---|---|---|
| Cylinder unit power supply | | | ~/N 230 V 50 Hz |
| Cylinder unit input capacity Main switch (Breaker) | | *1 | 16 A |
| Wiring Wiring No. × size (mm²) | Cylinder unit power supply | | 2 × Min. 1.5 |
| | Cylinder unit power supply earth | | 1 × Min. 1.5 |
| | Cylinder unit - Outdoor unit | *2 | 2 × Min. 0.3 |
| | Cylinder unit - Outdoor unit earth | | — |
| Circuit rating | Cylinder unit L - N | *3 | AC230V |
| | Cylinder unit - Outdoor unit S1 - S2 | *3 | — |
| | Cylinder unit - Outdoor unit S2 - S3 | *3 | DC24V |

*1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV). The breaker shall be provided to ensure disconnection of all active phase conductors of the supply.
*2. Max. 120 m
*3. The values given in the table above are not always measured against the ground value.

**Notes: 1. Wiring size must comply with the applicable local and national codes.**
**2. Indoor unit/outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60245 IEC 57)**
**Indoor unit power supply cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60227 IEC 53)**
**3. Install an earth longer than other cables.**

**<3 phase>**




* Affix label B that is included with the manuals near each wiring diagram for cylinder unit and outdoor units.

<Figure 4.6.5>
Electrical connections 3 phase

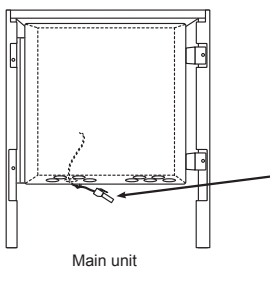
| Description | Power supply | Capacity (Indoor unit Ref.) | Breaker | Wiring |
|---|---|---|---|---|
| Booster heater (Primary circuit) | 3~ 400V 50Hz | 9 kW | 16 A *1 | 2.5 mm² |
| Immersion heater (DHW tank) | ~/N 230 V 50 Hz | 3kW (E******-VM*H*) | 16 A *1 | 2.5 mm² |

| | | | |
|---|---|---|---|
| Cylinder unit power supply | | | ~/N 230 V 50 Hz |
| Cylinder unit input capacity Main switch (Breaker) | | *1 | 16 A |
| Wiring Wiring No. × size (mm²) | Cylinder unit power supply | | 2 × Min. 1.5 |
| | Cylinder unit power supply earth | | 1 × Min. 1.5 |
| | Cylinder unit - Outdoor unit | *2 | 2 × Min. 0.3 |
| | Cylinder unit - Outdoor unit earth | | — |
| Circuit rating | Cylinder unit L - N | *3 | AC230V |
| | Cylinder unit - Outdoor unit S1 - S2 | *3 | — |
| | Cylinder unit - Outdoor unit S2 - S3 | *3 | DC24V |

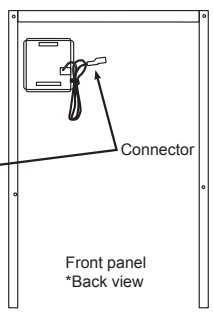
*1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV). The breaker shall be provided to ensure disconnection of all active phase conductors of the supply.
*2. Max. 120 m
*3. The values given in the table above are not always measured against the ground value.

**Notes:**
**1. Wiring size must comply with the applicable local and national codes.**
**2. Indoor unit/outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60245 IEC 57) Indoor unit power supply cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 60227 IEC 53)**
**3. Install an earth longer than other cables.**

**<Before system set up>**
At factory setting, the main controller cable (Fig. 4.6.6) on the main unit is not connected to the connector (Fig. 4.6.7) on the front panel.
After completing installation and wiring in the field, connect the main controller cable to the connector, then turn on the power.




<Figure 4.6.6>

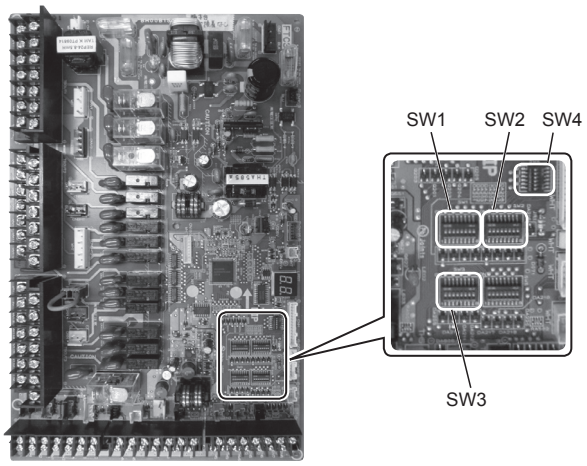



<Figure 4.6.7>

## 5.1 Dip Switch Functions

Located on the FTC3 printed circuit board are 4 sets of small white switches known as Dip switches. The Dip switch number is printed on the circuit board next to the relevant switches. The word ON is printed on the circuit board and on the Dip switch block itself. To move the switch you will need to use a pin or the corner of a thin metal ruler or similar.

Dip switch settings are listed below in Table 5.1.1.



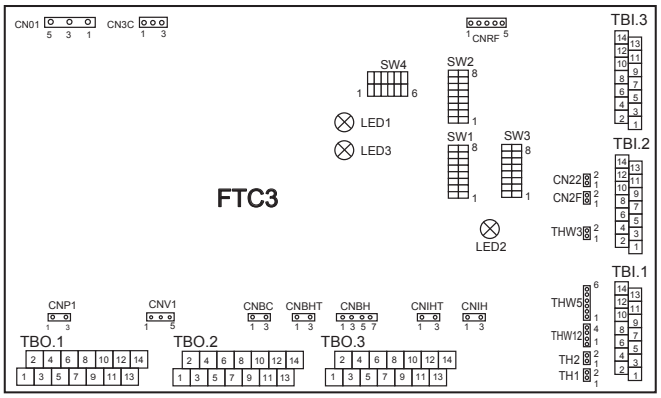

<Figure 5.1.1>

| Dip switch | | Function | OFF | ON | Default (Indoor unit Ref.) |
|---|---|---|---|---|---|
| SW1 | SW1-1 | — | — | — | OFF |
| | SW1-2 | Heat pump maximum outlet water temperature | 55 °C | 60 °C | OFF:EHS****-*M** (✻1)<br>ON :EHP****-*M** |
| | SW1-3 | DHW tank | WITHOUT DHW tank | WITH DHW tank | ON |
| | SW1-4 | Immersion heater | WITHOUT immersion heater | WITH immersion heater | OFF:EH*****-*M**<br>ON :EH*****-*M*H* |
| | SW1-5 | Booster heater | WITHOUT booster heater | WITH booster heater | ON |
| | SW1-6 | Booster heater function | For heating only | For heating and DHW | ON |
| | SW1-7 | Outdoor unit type | Split type | Packaged type | OFF:EHS****-*M**<br>ON :EHP****-*M** |
| | SW1-8 | Wireless remote controller | WITHOUT wireless remote controller | WITH wireless remote controller | OFF |
| SW2 | SW2-1 | Room thermostat input (IN1) logic change | Operation stop at thermostat short | Operation stop at thermostat open | OFF |
| | SW2-2 | Flow switch input (IN2) logic change | Failure detection at short | Failure detection at open | ON |
| | SW2-3 | Booster heater capacity restriction | Inactive | Active | OFF<br>ON: EHPT20X-VM2HA |
| | SW2-4 | — | — | — | OFF |
| | SW2-5 | Automatic switch to backup heater only operation (When outdoor unit stops by error) | Inactive | Active (✻3) | OFF |
| | SW2-6 | — | — | — | OFF |
| | SW2-7 | — | — | — | OFF |
| | SW2-8 | — | — | — | OFF |
| SW3 | SW3-1 | — | — | — | OFF |
| | SW3-2 | — | — | — | OFF |
| | SW3-3 | — | — | — | OFF |
| | SW3-4~8 | — | — | — | OFF |
| SW4 | SW4-1~4 | — | — | — | OFF |
| | SW4-5 | Emergency mode (Heater only operation) | Normal | Emergency mode (Heater only operation)<br>(To be activated only when powered ON) | OFF (✻2) |
| | SW4-6 | — | — | — | OFF |

<Table 5.1.1>

**Notes:** **✻1. For packaged model system, the max outlet water temperature is always 60°C so default Dip switch SW1-2 is ON.**
**For split model system, the max outlet water temperature is usually 55°C except in the case of PUHZ-HRP outdoor model where the max outlet water temperature is 60°C and DIP switch SW1-2 should be changed to ON.**
**✻2. If emergency mode is no longer required, please turn off both outdoor and indoor unit power supply before returning SW4-5 to OFF position.**
**✻3. For safety reasons, this function is not available for certain errors. (System operation must be stopped and only pump keeps running.)**
**External output (OUT11) will be available.**

## 5.2 Connecting external input/output




<Figure 5.2.1>

**When connecting the terminals use the ring terminals and also insulate the cables of adjoining terminals when wiring to terminal block.**

### ■ External input

| Name | Terminal block | Connector | Item | OFF (Open) | ON (Short) |
|---|---|---|---|---|---|
| IN1 | TBI.2 5-6 | — | Room thermostat input | Refer to SW2-1 (Page 22) | |
| IN2 | TBI.2 7-8 | CN2F | Flow switch input | Refer to SW2-2 (Page 22) | |
| IN3 | — | — | — | — | — |
| IN4 | TBI.2 13-14 | — | Heat source OFF | Normal | Heat source OFF |
| IN5 | TBI.3 7-8 | — | Outdoor thermostat input (*1) | Standard operation | Heater operation |

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.

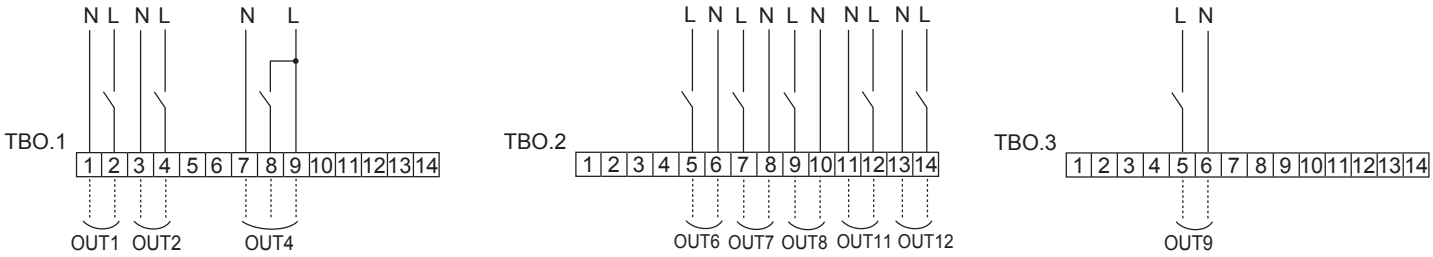
**Wiring specification and field supply parts**

| Item | Name | Model and specifications |
|---|---|---|
| External input function | External input signal wire | Use sheathed vinyl coated cord or cable.<br>Max. 10 m<br>Wire type: CV, CVS or equivalent<br>Wire size: Stranded wire 0.5 mm² to 1.25 mm²<br>Solid wire: ø 0.65 mm to ø1.2 mm |
| | Switch | Non-voltage “a” contact signals<br>Remote switch: minimum applicable load DC 12V, 1mA |

### ■ External output

| Name | Terminal block | Connector | Item | OFF | ON | Signal/Max current |
|---|---|---|---|---|---|---|
| OUT1 | TBO.1 1-2 | CNP1 | Water circulation pump1(AC) output (Space heating & DHW) | OFF | ON | AC230V 1.0A Max |
| OUT2 | TBO.1 3-4 | — | Water circulation pump2(AC) output (Space heating ONLY) | OFF | ON | AC230V 1.0A Max |
| OUT3 | — | — | — | — | — | — |
| OUT4 | TBO.1 7-9 | CNV1 | 3-way valve1 output | Heating | DHW | AC230V 0.1A Max |
| OUT5 | — | — | — | — | — | — |
| OUT6 | TBO.2 5-6 | CNBH 1-3 | Booster heater1 output | OFF | ON | AC230V 0.5A Max (Relay) |
| OUT7 | TBO.2 7-8 | CNBH 5-7 | Booster heater2 output | OFF | ON | AC230V 0.5A Max (Relay) |
| OUT8 | TBO.2 9-10 | — | Booster heater2+ output | OFF | ON | AC230V 0.5A Max (Relay) |
| OUT9 | TBO.3 5-6 | CNIH | Immersion heater output | OFF | ON | AC230V 0.5A Max (Relay) |
| OUT10 | — | — | — | — | — | — |
| OUT11 | TBO.2 11-12 | — | Error output | Normal | Error | AC230V 0.5A Max |
| OUT12 | TBO.2 13-14 | — | Defrost output | Normal | Defrost | AC230V 0.5A Max |

**Do not connect to the terminals that are indicated as “—” in the “Terminal block” field.**




**Wiring specification and field supply parts**

| Item | Name | Model and specifications |
|---|---|---|
| External output function | External output signal wire | Use sheathed vinyl coated cord or cable.<br>Max. 50 m<br>Wire type: CV, CVS or equivalent<br>Wire size: Stranded wire 0.5 mm² to 1.25 mm²<br>Solid wire: ø 0.65 mm to ø1.2 mm |
| | Relay, etc. | AC 230V signal 0.5 A or less |

**Notes:**

**1. When connecting a pump with an electric current of ≥1A or multiple pumps, use (a) relay(s).**

**2. Do not connect pumps to both TBO.1 1-2 and CNP1 at the same time.**

**<When connecting field supply optional pumps please note the following>**

**Option 1. (Power supply from outdoor unit)**

**If the total current is ≥3A then the fuse on the OUTDOOR unit PCB will blow.**

**Option 2. (Independent power supply)**

**If the total current for pumps is ≥2A the fuse on the cylinder unit (FTC3) PCB will blow. The total current allowed for parts except pumps is 3A.**

**To avoid the fuses blowing please avoid having a total current of 3A or greater.**

## 5.3 Remote Controller Options

The cylinder unit comes factory fitted with a main controller. This incorporates a thermistor for temperature monitoring and a graphical user interface to enable set-up, view current status and input scheduling functions. The main controller is also used for servicing purposes. This is accessed via password protected service menus.

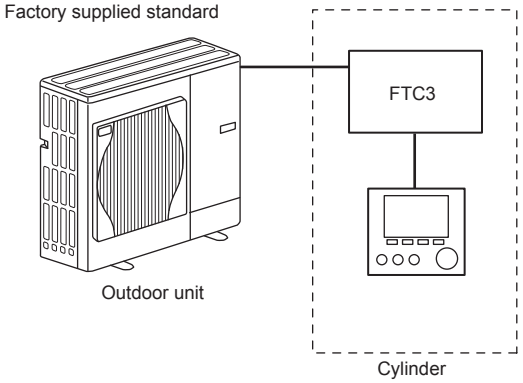
To provide the best efficiency Mitsubishi Electric recommends using automatic adaptation function based on room temperature. To use this function a room thermistor needs to be present in a main living area. This can be done in a number of ways the most convenient are detailed below.

**Refer to heating section of this manual for instructions on how to set compensation curve, flow temp or room temp (Auto adaptation).**

**For instructions on how to set the thermistor input for the FTC3 please refer to initial settings section.**

The factory setting for space heating is room temp (auto adaptation). If there is no room sensor present in the system, this setting must be changed to either compensation curve mode or flow temp mode.

Factory supplied standard



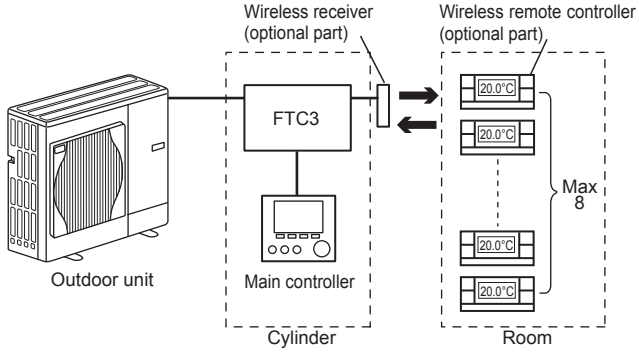

**Control option A**

This option features the main controller and the Mitsubishi Electric wireless remote controller. The wireless remote controller is used to monitor room temperature and can be used to make changes to the space heating settings, boost DHW and switch to holiday mode without having to directly use the main controller.

If more than one wireless remote controller is used, the most recent temperature settings entered will be used regardless of which controller is used to enter the settings.

The wireless receiver must be connected to the FTC3 as detailed in the wireless controller instruction manual.

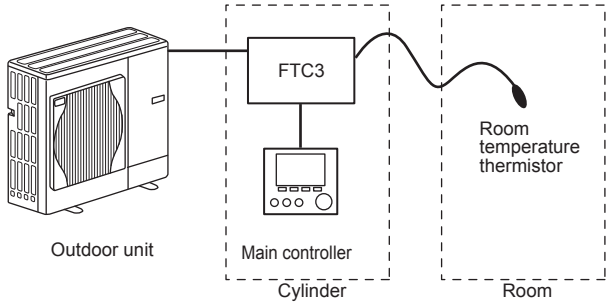
**DIP SW1-8 should be ON.** Before operation wireless controller should be configured to transmit and receive data as detailed in the wireless controller installation manual.




**Control option B**

This option features the main controller and the Mitsubishi Electric thermistor wired to the FTC3. The thermistor is used to monitor room temperature but can not make any changes in control operation. Any changes to DHW must be made using main controller mounted on the cylinder unit.

The thermistor is wired to the FTC3 using TH1 terminal on the terminal block TBI.1. Only 1 room temperature thermistor can be connected to the FTC3 at any one time.



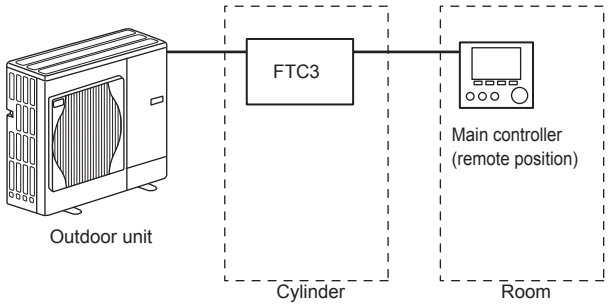

**Control option C**

This option features the main controller being removed from the cylinder unit and situated in a different room. All features of the main controller are still available and the inbuilt thermistor can be used for monitoring the temperature of the room in which it is installed for Auto Adaptation function.

The main controller and the FTC3 are connected by a 2 core, 0.3 mm² , non polar cable (local supply) maximum length of 500 m.

If using the sensor in the main controller it should be detached from cylinder unit. Otherwise it will detect the temperature of the cylinder unit instead of room temperature. This will influence the output of the space heating.

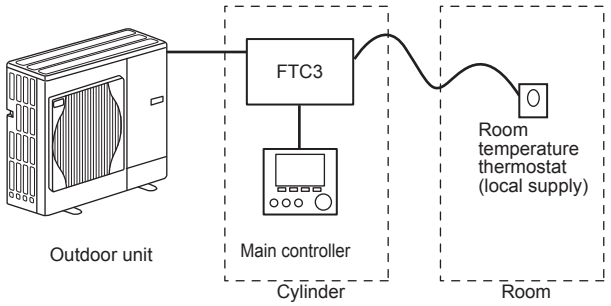
Mitsubishi Electric main control cover blank accessory should be used to fill the resultant gap on the cylinder left by the removal of the control panel.




**Control option D (Flow temp. or compensation curve only)**

This option features the main controller and locally supplied thermostat wired to the FTC3. The thermostat is used to set the upper limit of space heating. Any changes to DHW must be made using main controller mounted on the cylinder unit.

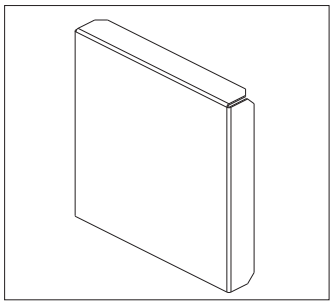
The thermostat is wired to the FTC3 using IN1 terminal on the terminal block TBI.2. Only 1 thermostat can be connected to the FTC3 at any one time.



## ■ Remote Installation of Main Controller

The following instructions are related to a system controlled as in Control option C.

**<Accessory>**

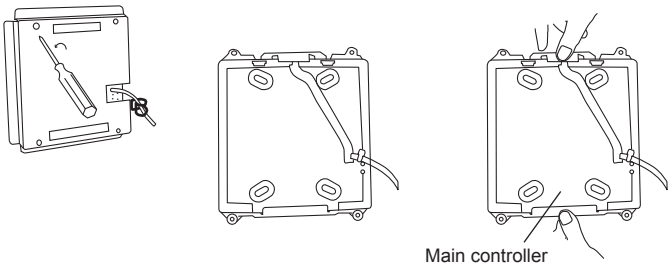


Main controller cover

**<Removing the main controller from the cylinder unit>**

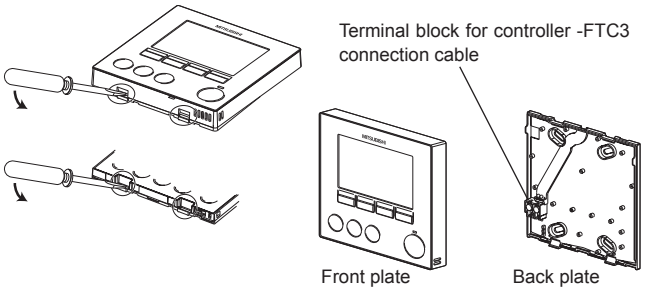
1. Open front panel of cylinder unit.
2. Remove the four screws from the metal back plate of main controller using a screwdriver.
3. Untwist wire clip and lift off the metal back plate.
4. Gently pull apart the clips holding the main controller in place. Be careful not to use too much force as this may break the holding clips.
5. Lift out the main controller from the front panel of the cylinder unit.

After removing the main controller, fill the resulting hole using the main controller cover.




<Figure 5.3.1>
Removing main controller

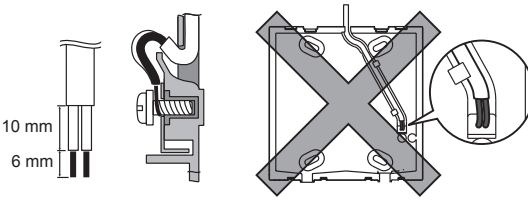
6. Separate the back and front panel using a flat head screwdriver as shown in Figure 5.3.2.



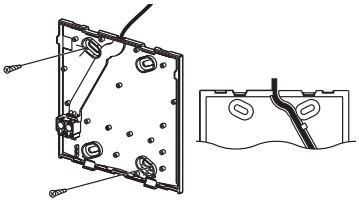

<Figure 5.3.2>
Opening the main controller

7. Fix the 2 core cable from the FTC3 into the terminal. Ensure the wires make good contact and are securely screwed into the terminal block.
8. The inner core wires should not be visible from the outside of the back plate.
9. The sheathed cable should be pressed into the sunken channel so it is flush with the base plate.
10. Once the connection cable is in place screw the back plate to the wall using screws suitable for use on the chosen wall (local supply).
11. Finally replace the front cover plate.

**Note:**
**Wiring for main controller cable shall be (5 cm or more) apart from power source wiring so that it is not influenced by electric noise from power source wiring. (Do not insert main controller cable and power source wiring in the same conduit.)**

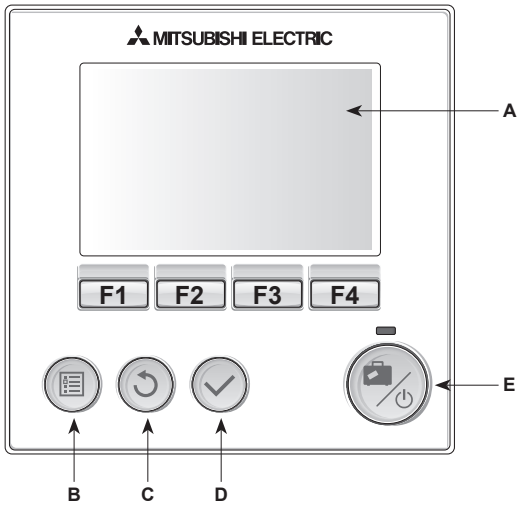


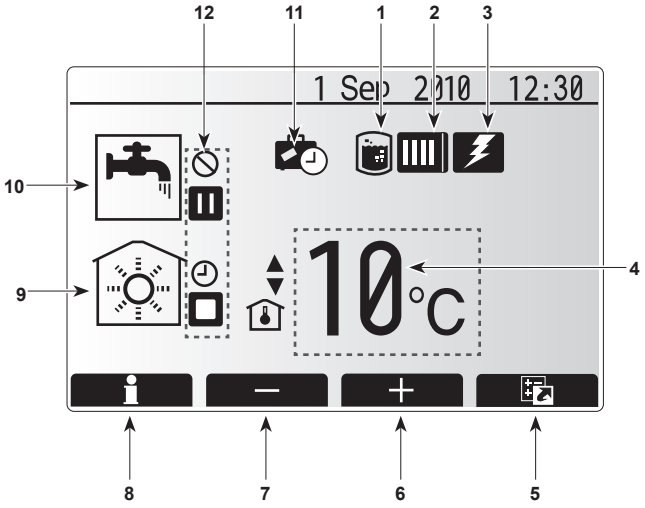

<Figure 5.3.3>
Securing the connection cable



<Figure 5.3.4>
Securing the base plate to the wall

## 5.4 Main Controller



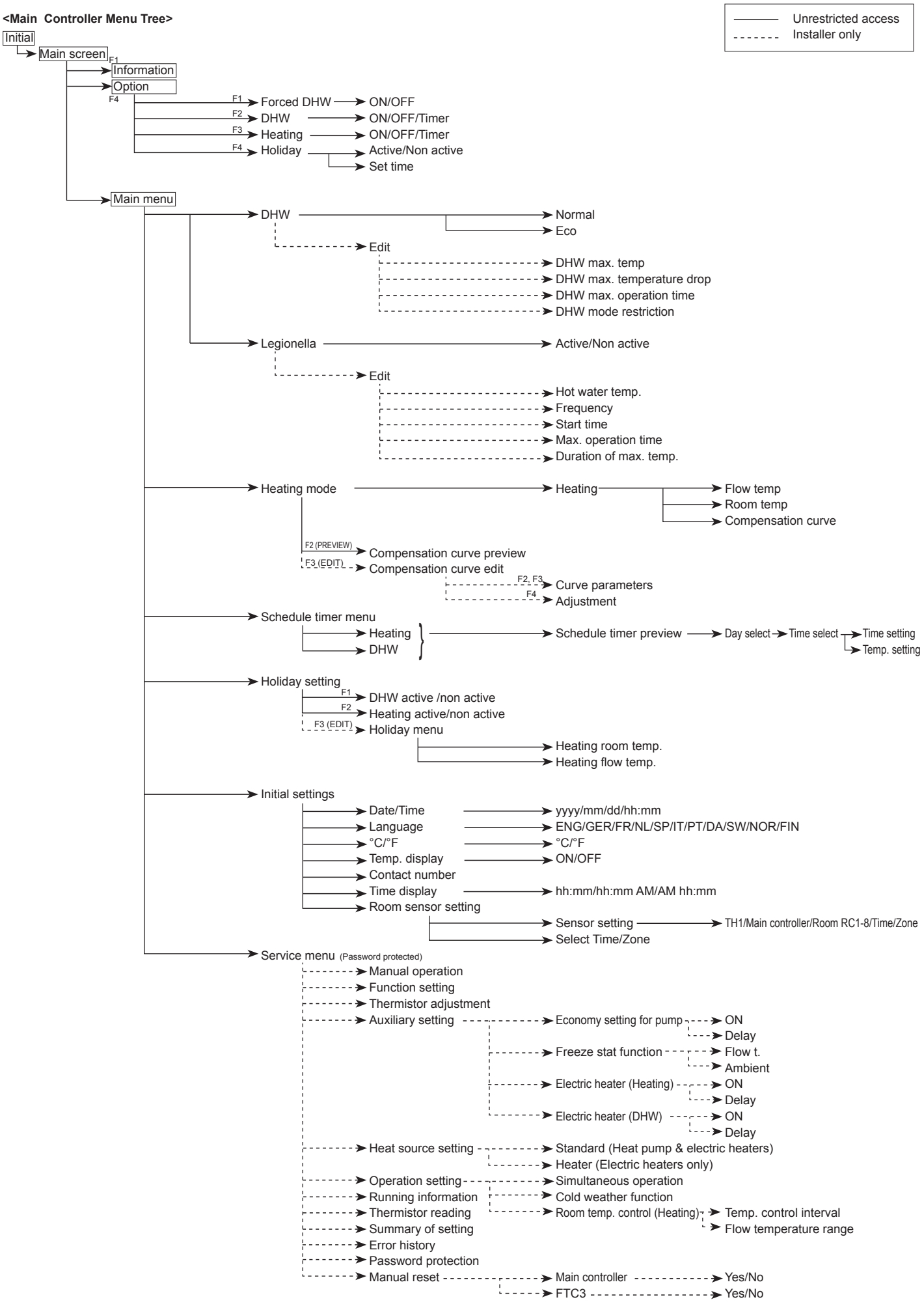

**<Main controller parts>**

| Letter | Name | Function |
|---|---|---|
| A | Screen | Screen in which all information is displayed |
| B | Menu | Access to system settings for initial set up and modifications. |
| C | Back | Return to previous menu. |
| D | Confirm | Used to select or save. (Enter key) |
| E | Power/Holiday | If system is switched off pressing once will turn system on. Pressing again when system is switched on will enable Holiday Mode. Holding the button down for 3 secs will turn the system off. (***1**) |
| F1-4 | Function keys | Used to scroll through menu and adjust settings. Function is determined by the menu screen visible on screen A. |

***1**
**When the system is switched off or the power supply is disconnected, the cylinder protection functions (e.g. freeze stat. function) will NOT operate. Please beware that without these safety functions in operation the cylinder may be damaged.**

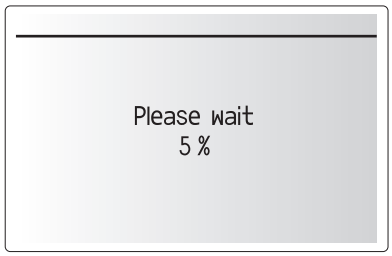
**<Main screen icons>**

| | Icon | Description |
|---|---|---|
| 1 | Legionella prevention | When this icon is displayed 'Legionella prevention mode' is active. |
| 2 | Heat pump | When this icon is displayed the 'Heat pump' is in use. |
| 3 | Electric heater | When this icon is displayed the 'Electric heaters' are in use. |
| 4 | Target temperature | Target flow temperature |
| | | Target room temperature |
| | | Compensation curve |
| 5 | OPTION | Pressing the function button below this icon will display the quick view menu. |
| 6 | + | Increase desired temperature. |
| 7 | - | Decrease desired temperature. |
| 8 | Information | Pressing the function button below this icon displays the information screen. |
| 9 | Space heating mode | Heating mode |
| 10 | DHW mode | Normal or ECO mode |
| 11 | Holiday mode | When this icon is displayed 'Holiday mode' activated. |
| 12 | | Timer |
| | | Prohibited |
| | | Stand-by |
| | | Stop |
| | | Operating |


<Main Controller Menu Tree>
Unrestricted access
Installer only
Initial
Main screen
F1
Information
Option
F4
F1 Forced DHW
ON/OFF
F2 DHW
ON/OFF/Timer
F3 Heating
ON/OFF/Timer
F4 Holiday
Active/Non active
Set time
Main menu
DHW
Normal
Eco
Edit
DHW max. temp
DHW max. temperature drop
DHW max. operation time
DHW mode restriction
Legionella
Active/Non active
Edit
Hot water temp.
Frequency
Start time
Max. operation time
Duration of max. temp.
Heating mode
Heating
Flow temp
Room temp
Compensation curve
F2 (PREVIEW)
Compensation curve preview
F3 (EDIT)
Compensation curve edit
F2, F3
Curve parameters
F4
Adjustment
Schedule timer menu
Heating
DHW
Schedule timer preview
Day select
Time select
Time setting
Temp. setting
Holiday setting
F1
DHW active /non active
F2
Heating active/non active
F3 (EDIT)
Holiday menu
Heating room temp.
Heating flow temp.
Initial settings
Date/Time
yyyy/mm/dd/hh:mm
Language
ENG/GER/FR/NL/SP/IT/PT/DA/SW/NOR/FIN
°C/°F
°C/°F
Temp. display
ON/OFF
Contact number
Time display
hh:mm/hh:mm AM/AM hh:mm
Room sensor setting
Sensor setting
TH1/Main controller/Room RC1-8/Time/Zone
Select Time/Zone
Service menu (Password protected)
Manual operation
Function setting
Thermistor adjustment
Auxiliary setting
Economy setting for pump
ON
Delay
Freeze stat function
Flow t.
Ambient
Electric heater (Heating)
ON
Delay
Electric heater (DHW)
ON
Delay
Heat source setting
Standard (Heat pump & electric heaters)
Heater (Electric heaters only)
Operation setting
Simultaneous operation
Running information
Cold weather function
Thermistor reading
Room temp. control (Heating)
Temp. control interval
Flow temperature range
Summary of setting
Error history
Password protection
Manual reset
Main controller
Yes/No
FTC3
Yes/No

## ■ Setting the Main Controller

After the power has been connected to the outdoor and cylinder units (See chapter 4.6) the initial system settings can be entered via the main controller.




**1. Power supply**

i. Check all breakers and other safety devices are correctly installed and turn on power to the system.
ii. Main controller will automatically start up.
Wait approximately 6 mins whilst the control menus load.

**2. Controller settings**

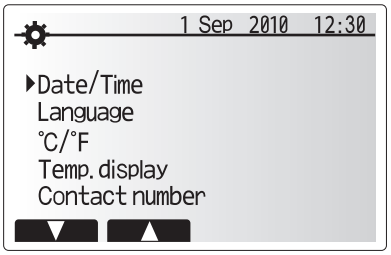
When the controller is ready a blank screen with a line running across the top will be displayed.

i. Press button E (Power)
If this is the first time the controller has been switched on you will automatically be directed to the Initial settings menu.

* When the system is off, freeze stat. function is not performed.

## ■ Initial Settings

From the initial settings menu the installer can set the language, date/time, temperature unit (°C/°F), emergency contact number, room sensor setting, and display options.




1. Use buttons F1 and F2 to move scroll through the menu list. When the title is highlighted press CONFIRM to edit.
2. Use function buttons appropriate to edit each setting then press CONFIRM to save the setting.
3. For room sensor setting it is important to choose the correct room sensor depending on the heating mode the system will operate in.

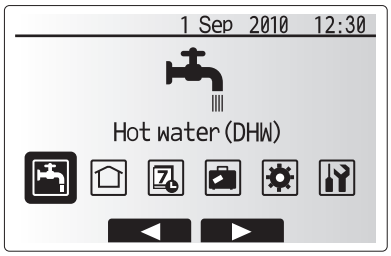
| Control option (p24) | Corresponding initial settings room sensor |
|---|---|
| A | Room RC1-8 (only 1 can be selected) |
| B | TH1 |
| C | Main controller |
| D | N/A (Option D uses a thermostat with off/on signal only, temperature is not detected by FTC3) |

NOTE
If you wish to operate in time/zone mode please select this from the room sensor setting menu then edit the schedule under 'Select Time/Zone' to reflect which room sensor you want operational for the given time period.

Once the controller initial settings are complete, settings for the main modes can be entered. To return to the main settings menu screen from the initial settings screen, press the BACK button.

## ■ Main Settings Menu

The main settings menu can be accessed by pressing the MENU button. To reduce the risk of untrained end users altering the settings accidentally **there are two access levels** to the main settings; and the service section menu is password protected.




**User Level – Short press**
If the MENU button is pressed once for a short time the main settings will be displayed but without the edit function. This will enable the user to view current settings but **NOT** change the parameters.

**Installer Level – Long press**
If the MENU button is pressed down for 3 secs the main settings will be displayed with all functionality available.

The following items can be viewed and/or edited (dependent on access level).

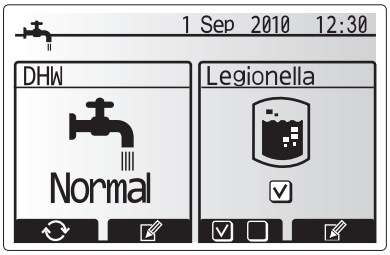
- Domestic Hot water (DHW)
- Heating
- Schedule timer
- Holiday mode
- Initial settings
- Service (Password protected)

Use the F2 and F3 buttons to move between the icons. The highlighted icon will appear as a larger version in the centre of the screen. Press CONFIRM to select and edit the highlighted mode.

| Icon | Description |
|---|---|
| | Hot water (DHW) |
| | Heating |
| | Schedule timer |
| | Holiday mode |
| | Initial setting |
| | Service |

## ■ Mode 1 - Domestic Hot Water (DHW)/Legionella Prevention

The domestic hot water and legionella prevention menus control the operation of domestic hot water tank heat ups.



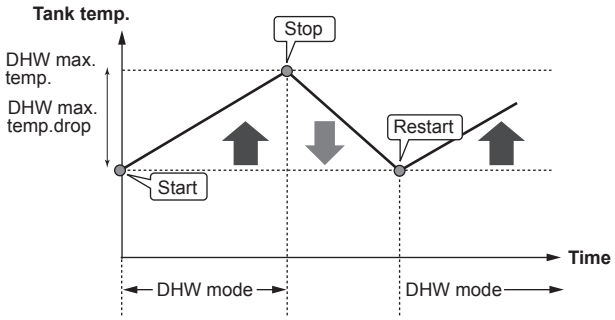

**<DHW mode settings>**

1. Highlight the hot water icon and press CONFIRM.
2. Use button F1 to switch between Normal and ECO heating modes.
3. To edit the mode press F2 to display the HOT WATER (DHW) SETTING menu.
4. Use F2 and F3 keys to scroll through the menu selecting each component in turn by pressing CONFIRM. See the table below for description of each setting.
5. Enter the desired number using the function keys and press CONFIRM.

| Menu subtitle | Function | Range | Unit | Default value |
|---|---|---|---|---|
| DHW max. temp | Desired temperature of stored hot water | 40–60 | °C | 50 |
| DHW max. temperature drop | Difference in temperature between DHW max. temp and the temperature at which DHW mode starts | 5–30 | °C | 10 |
| DHW max. operation time | Max time allowed for stored water heating DHW mode | 30–120 | min | 60 |
| DHW mode restriction | The time period after DHW mode when space heating has priority over DHW mode temporarily preventing further stored water heating (Only when DHW max. operation time has passed.) | 30–120 | min | 30 |

**<Explanation of DHW operation>**

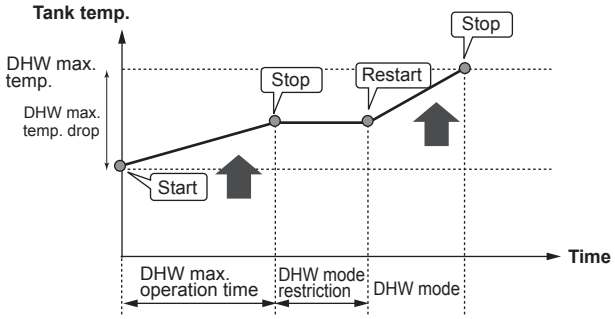
- When the tank temperature drops from “DHW max. temp” by more than the “DHW max. temperature drop” (set by installer), DHW mode operates and the flow from the primary heating circuit is diverted to heat the water in the storage tank.
- When the temperature of the stored water reaches the ‘DHW max. temp.’ set by the installer or if the ‘DHW max. operation time’ set by the installer is exceeded DHW mode ceases to operate.
- Whilst DHW mode is in operation hot water is not directed to the space heating circuit.
- Directly after DHW max. operation time ‘DHW mode restriction’ will operate. The duration of this feature is set by the installer and during its operation DHW mode can not be reactivated, allowing time for the system to deliver hot water to the space heating if required.
- After the ‘DHW mode restriction’ operation the DHW mode can operate again and tank heating will continue according to system demand.




**<Eco mode>**

DHW mode can run in either ‘Normal’ or ‘Eco’ mode. Normal mode will heat the cylinder quickly using the full power of the heat pump. Eco mode takes a little longer to heat the cylinder but the energy used is reduced. This is because heat pump operation is restricted using signals from the FTC3 based on measured cylinder temperature.

**Note:**
**The actual energy saved in Eco mode will vary according to outdoor temperature.**

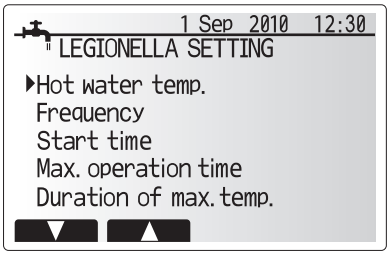



Return to the DHW/legionella prevention menu.

### Legionella Prevention Mode settings (LP mode)

1. Use button F3 to chose legionella mode active YES/NO.
2. Use button F4 to edit the legionella function.
3. Use F2 and F3 keys to scroll through the menu selecting each subtitle in turn by pressing CONFIRM. See the table below for description of each setting.
4. Enter the desired number using the function keys and press CONFIRM.

During Legionella Prevention Mode the temperature of the stored water is increased above 60°C to inhibit legionella bacterium growth. It is strongly recommended that this is done at regular intervals. Please check local regulations for the recommended frequency of heat ups.



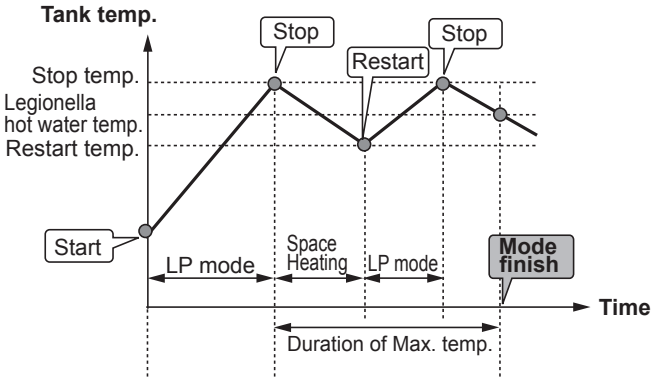

Note: When failures occur on the cylinder unit, the LP mode may not function normally.

| Menu subtitle | Function | Range | Unit | Default value |
|---|---|---|---|---|
| Hot water temp. | Desired temp of stored hot water | 60–70 | °C | 65 |
| Frequency | Time between LP mode tank heat ups | 1–30 | day | 15 |
| Start time | Time when LP mode will begin | 0:00–23:00 | - | 03:00 |
| Max. operation time | Maximum time allowed for LP mode tank heat | 1–5 | hour | 3 |
| Duration of max. temp. | The time period after LP mode max. water temp has been reached | 1–120 | min | 30 |

**<Explanation of Legionella Prevention Mode operation>**

- At the time entered by the installer 'Start time' flow of useful heat from the system is diverted to heat the water in the storage tank.
- When the temperature of the stored water exceeds the 'Hot Water temp.' set by the installer (above 65°C) water is no longer diverted to the tank.
- Whilst LP mode is in operation hot water is not directed to the space heating circuit.
- Directly after LP mode operation 'Duration of max. temp' will operate. The duration of this feature is set by the installer and during its operation stored water temperature will be monitored.
- If stored water temperature should drop to LP restart temp, LP mode will restart and water flow from the plate heat exchanger will be directed to the tank to boost the temperature. Once the set time for Duration of Max. temp has passed LP mode will not recur for the set interval (set by installer).
- It is the responsibility of the installer to ensure the settings for legionella prevention are compliant with local and national guidelines.

Please note that LP mode uses the assistance of electric heaters (if present) to supplement the energy input of the heat pump. Heating water for long periods of time is not efficient and will increase running costs. The installer should give careful consideration to the necessity of legionella prevention treatment whilst not wasting energy by heating the stored water for excessive time periods. The end user should understand the importance of this feature.
**ALWAYS COMPLY WITH LOCAL AND NATIONAL GUIDANCE FOR YOUR COUNTRY REGARDING LEGIONELLA PREVENTION.**



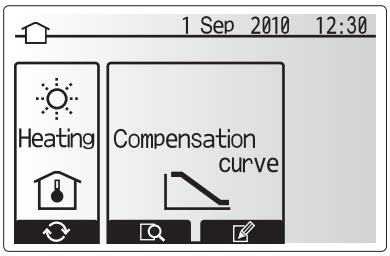

( LP mode : Legionella Prevention Mode )

### Forced DHW

The forced DHW function is used to force the system to operate in DHW mode. In normal operation the water in the DHW tank will be heated either to the set temperature or for the maximum DHW time, whichever occurs first. However should there be a high demand for hot water 'Forced DHW' function can be used to prevent the system switching to space heating and continue to provide DHW tank heating.
Forced DHW mode is activated by pressing button F1 when the 'Option Screen' is displayed. Following operation the system will automatically return to normal operation.

## ■ Mode 2 - Heating

The heating menu deals with space heating using either a radiator or under-floor system depending on the installation.




From the main settings menu

1. Use F1 and F2 buttons to highlight heating icon then press CONFIRM.
2. The heating menu will be displayed.
3. To select the sub-menus press the function button below the icon required. E.g. for MODE change press F1

Heating

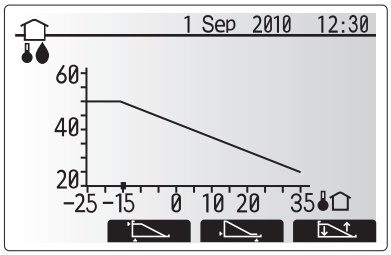
1. Under this sub-menu the mode of heating is selected.
2. Choose between
   - Flow temperature ( )
   - Room temperature ( )
   - Compensation curve ( )
3. To choose between the different modes for heating highlight the mode preferred and press select.
4. Press the BACK button to return to the heating menu.

If compensation curve mode was selected as the heating mode please read the following instructions.

**<Compensation curve setting>**

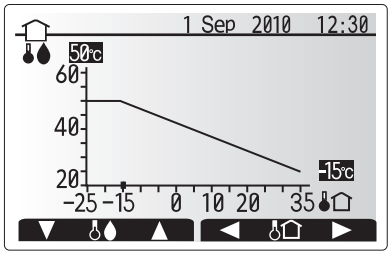
1. From the heating menu select edit using the F3 function button.
2. The compensation curve setting screen will be displayed.
3. Press F2 to alter the Hi parameter (when flow temp is maximum and outdoor temp is minimum).
4. Press F3 to alter the Lo parameter (when flow temp is minimum and outdoor temp is maximum).
5. Press F4 to add an extra point (adjust).

Pressing F2-4 will cause the relevant edit screen to be displayed. Editing Lo and Hi parameters is done in the same way; please see the following for more detailed explanation of parameter editing.




In the parameter (Lo/Hi) edit screen the flow temperature and outdoor temperature for the compensation curve graph can be set and altered for the 2 extremes of Hi and Lo.

1. Press F1 and F2 to change the flow temperature (y-axis of compensation curve).
2. Pressing F1 will raise the flow temperature for the set outdoor temperature.
3. Pressing F2 will lower the flow temperature for the set outdoor temperature.
4. Press F3 and F4 to change the outdoor temperature (x-axis of compensation curve).
5. Pressing F3 will lower the outdoor temperature for the set flow temperature.
6. Pressing F4 will raise the outdoor temperature for the set flow temperature.




**< Explanation of compensation curve >**

During late spring and summer usually the demand for space heating is reduced. To prevent the heat pump from producing excessive flow temperatures for the primary circuit the compensation curve mode can be used to maximise efficiency and reduce running costs.

The compensation curve is used to restrict the flow temperature of the primary space heating circuit dependent on the outdoor temperature. The FTC3 uses information from both an outdoor temperature sensor and a temperature sensor on the primary circuit supply to ensure the heat pump is not producing excessive flow temperatures if the weather conditions do not require it.

**<Holiday mode>**

Holiday mode can be activated in 2 ways. Both methods will result in the holiday mode activation screen being shown.

**Option 1.**

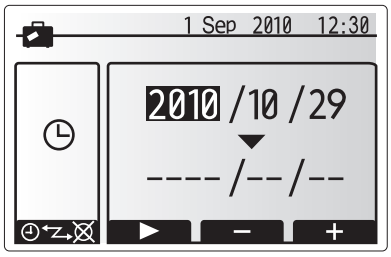
From the main menu screen button E should be pressed. Be careful not to hold down button E for too long as this will turn off the controller and system.

**Option 2.**

From the main menu screen press button F4. The current settings screen will be displayed. Press button F4 again to access the holiday mode activation screen.

Once the holiday mode activation screen is displayed you can activate/deactivate and select the duration that you would like holiday mode to run for.

- Press button F1 to activate or deactivate holiday mode.
- Use buttons F2, F3 and F4 to input the date which you would like holiday mode to activate or deactivate for space heating.

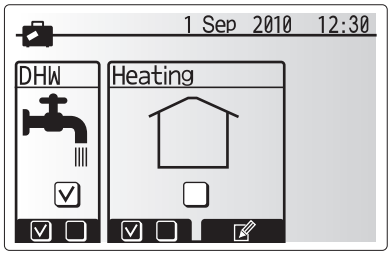



Holiday Mode activation screen

**<Editing holiday mode>**

To change the holiday mode settings e.g. the flow temp, you must access the holiday mode menu from the main settings menu.

1. From main menu screen press button B.
2. Use buttons F2 and F3 to scroll through menu until Holiday Mode is highlighted.
3. Press CONFIRM button.
4. The holiday mode status screen is displayed.
5. To change the flow temperature or room temperatures on heating mode press button F3.
6. A list of variables will be displayed. Choose the one you wish to modify using buttons F1/F2 then press CONFIRM.
7. Adjust the temperature using buttons F3 and F2 and press CONFIRM button to save changes.

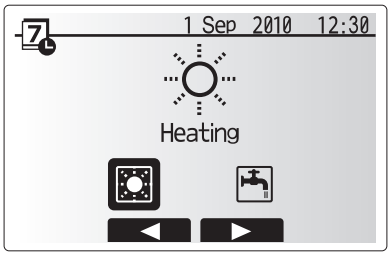



Holiday Mode status screen

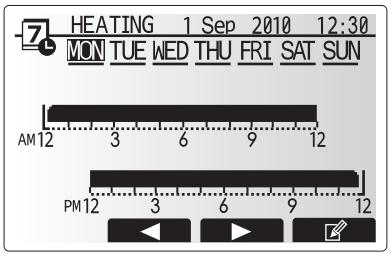
## ■ Mode 3 - Schedule timer

The schedule timer mode allows daily and weekly space heating and DHW patterns to be entered.

1. From the main settings menu use F2 and F3 to highlight the schedule timer icon then press CONFIRM.
2. The schedule timer sub menu will be displayed. The icons show the following modes;
   • Heating
   • DHW
3. Use F2 and F3 buttons to move between mode icons press CONFIRM to be shown the PREVIEW screen for each mode.

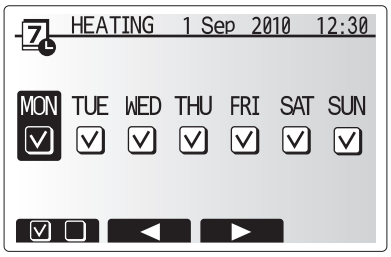



The PREVIEW screen allows you to view the current settings. Days of the week are displayed across the top of the screen. Where day appears underlined the settings are the same for all those days underlined.
Hours of the day and night are represented as a bar across the main part of the screen. Where the bar is solid black heating/DHW (whichever is selected) is allowed.




**<Setting the schedule timer>**

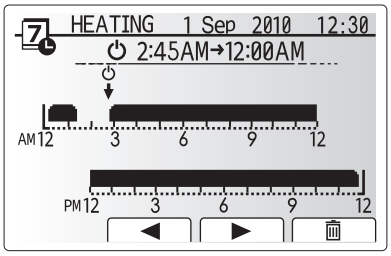
1. In the PREVIEW menu screen press F4 button.
2. First select the days of the week you wish to schedule.
3. Press F2/F3 buttons to move between days and F1 to check or uncheck the box.
4. When you have selected the days press CONFIRM.
5. The time bar edit screen will be displayed.
6. Use buttons F2/F3 to move to the point at which you do not want the selected mode to be active press CONFIRM to start.
7. Use F3 button to set the required time of inactivity then press CONFIRM.
8. You can add up to 4 periods of inactivity within a 24 hour interval.
9. Press F4 to save settings.

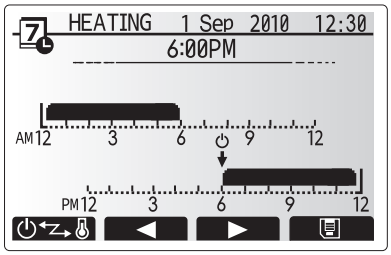



When scheduling heating, button F1 changes the scheduled variable between time and temperature. This enables a lower temperature to be set for a number of hours e.g. a lower temperature may be required at night when the occupants are sleeping.

**Notes:**

- **The schedule timer for space heating and DHW are set in the same way. However for DHW only time can be used as scheduling variable.**
- **A small rubbish bin character is also displayed choosing this icon will delete the last unsaved action.**
- **It is necessary to use the SAVE function F4 button to save settings. CONFIRM does NOT act as SAVE for this menu.**



## ■ Service Menu

The service menu provides functions for use by installer or service engineer. It is NOT intended the home owner alters settings within this menu. It is for this reason password protection is required to prevent unauthorised access to the service settings.

1. From the main setting menu use F2 and F3 to highlight the service icon then press CONFIRM.
2. You will be prompted to enter a password. **THE FACTORY DEFAULT PASSWORD IS 0000.**
3. Press CONFIRM.
   (It takes approx. 30 secs to load the service menu.)

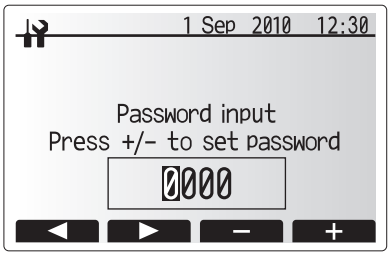
The service menu is navigated using the F1 and F2 buttons to scroll through the functions. The menu is split across two screens and is comprised of the following functions;

1. Manual operation
2. Function setting
3. Thermistor adjustment
4. Auxiliary setting
5. Heat source setting
6. Operation setting
7. Running information
8. Thermistor reading
9. Summary of setting
10. Error history
11. Password protection
12. Manual reset

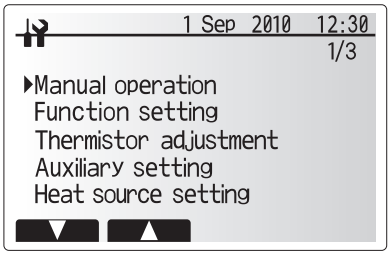
In this Installation Manual instructions will be given only for the following functions;

1. Auxiliary setting
2. Manual operation
3. Heat source setting
4. Password protection
5. Manual reset

Information on the other functions can be found by consulting the technical or service manuals.




Screen 1 of service menu

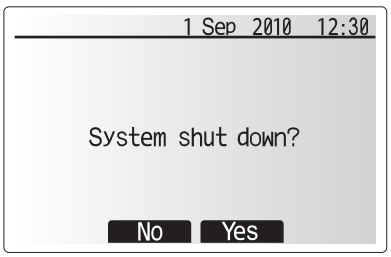



Screen 2 of service menu

**<General operation>**

Many functions can not be set whilst the indoor unit is running. The installer should turn **OFF** the unit before trying to set these functions. If the installer attempts to change the settings whilst the unit is running the main controller will display a reminder message prompting the installer to stop operation before continuing. By selecting Yes the unit will cease operation and changes can be made to the service settings.

If text is displayed in white on a black background CONFIRM button must be pressed to save this choice.



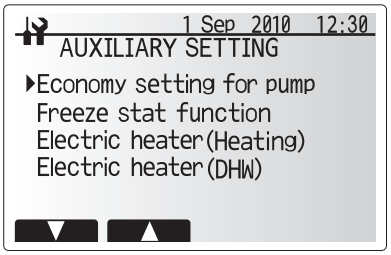

System off prompt screen


Action requires confirmation  Action is confirmed

## Auxiliary Setting

This function is used to set the parameters for any auxiliary parts used in the system.

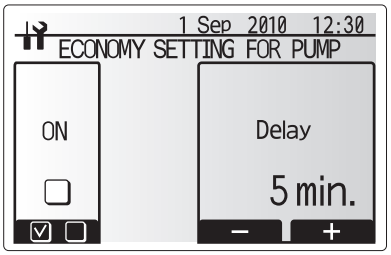
From the service menu use F1 and F2 buttons to highlight Auxiliary setting then press CONFIRM.




Auxiliary setting menu screen

**<Economy settings for pump>**

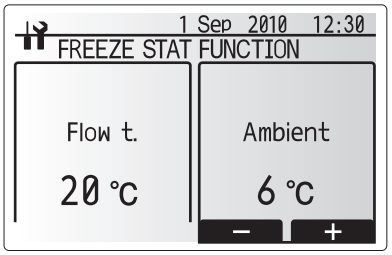
1. From the Auxiliary setting menu highlight Economy Settings for pump.
2. Press CONFIRM.
3. The economy settings for pump screen will be displayed.
4. Use button F1 to switch the pump ON/OFF.
5. Use buttons F3 and F4 to adjust the time the pump will run. (3 - 60 mins)




Economy settings for pump screen

**<Frost prevention>**

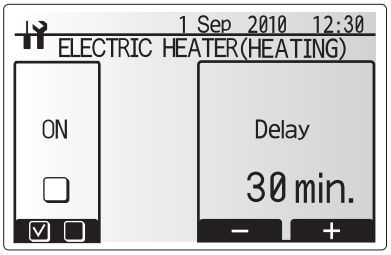
1. From the Auxiliary setting menu highlight Freeze Stat Function.
2. Press CONFIRM.
3. The freeze stat function screen will be displayed.
4. Use buttons F3 and F4 to adjust the minimum outdoor temperature which freeze stat function will begin to operate, (3 - 20 °C) or choose ✻.
   If asterisk (✻) is chosen freeze stat function is deactivated.




Freeze stat function screen

**<Electric heater (Heating)>**

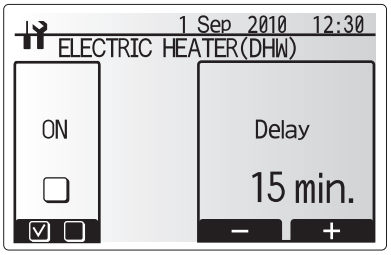
1. From the Auxiliary Setting menu highlight Electric heater (Heating).
2. Press CONFIRM.
3. The Electric heater (Heating) screen is displayed.
4. Press F1 button to switch the function ON/OFF.
5. Use F3 and F4 buttons to adjust the time period of Heat pump only operation before the booster heater will assist in space heating. (5 -180mins)




Electric heater (Heating) screen

**<Electric heater (DHW)>**

1. From the Auxiliary Setting menu highlight Electric heater (DHW).
2. Press CONFIRM.
3. The Electric heater (DHW) screen is displayed.
4. Press F1 button to switch the function ON/OFF.
5. Use F3 and F4 buttons to adjust the time period of Heat pump only operation before the booster heater and the immersion heater (if present) will assist in DHW heating. (15 -30mins)

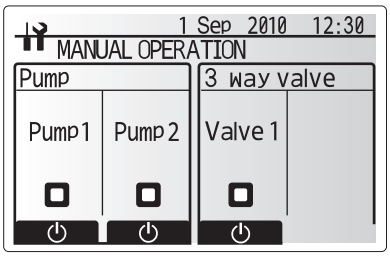



Electric heater (DHW) screen

**<Manual operation>**
During the filling of the system the pump and 3-way valve can be manually overridden using manual operation mode.
When manual operation is selected a small timer icon appears in the screen. The function selected will only remain in manual operation for a maximum of 2 hours. This is to prevent accidental permanent override of the FTC3.

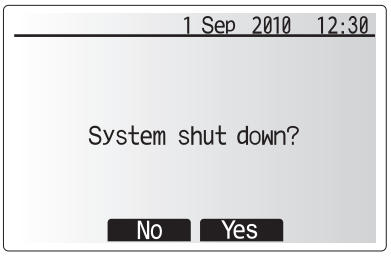
1. From the service menu use F1 and F2 buttons to scroll through list until Manual Operation is highlighted.
2. Press CONFIRM.
3. Manual operation menu screen is displayed.
4. To activate manual operation press the function button under the desired part.
5. To return to service menu press MENU or BACK button.

►Example
Pressing F3 button will switch manual operation mode ON for the main 3-way valve. When filling of the tank is complete the installer should access this menu again and press F3 to deactivate manual operation of the part. Alternatively after 2 hours manual operation mode will no longer be active and FTC3 will resume control of the part.



Manual operation menu screen

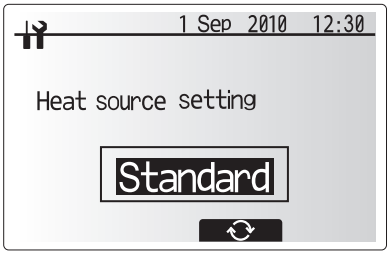
**NOTE:**
**Manual operation and heat source setting can not be selected if the system is running. A screen will be displayed asking the installer to stop the system before these modes can be activated.**
**The system automatically stops 2 hours after last operation.**



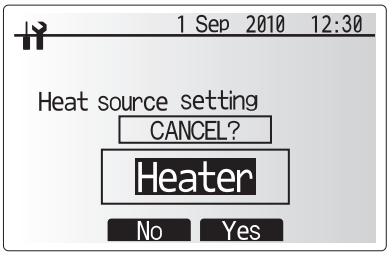
System off prompt screen

**<Heat source setting>**
The default heat source setting is heat pump and all electric heaters present in the system to be operational. This is referred to as Standard operation on the menu.

1. From the service menu use F1 and F2 buttons to scroll through list until *Heat Source Setting* is highlighted.
2. Press CONFIRM.
3. Heat source setting menu screen is displayed.
4. Press F3 button until preferred heat source is displayed.
5. Press CONFIRM.
6. To return to service menu press MENU or BACK button.
7. If you wish to return to the service menu without saving the setting press return button. You will be asked if you are sure you wish to cancel the changes. Choose Yes or No as appropriate.



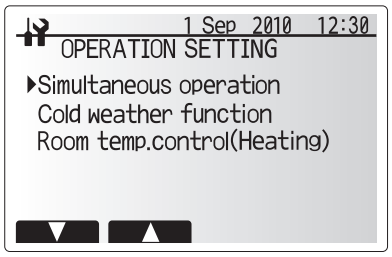
Heat source setting screen



Cancel last action screen

## Operation Setting Menu

1. To access the Operation setting menu use F1 and F2 buttons to scroll through the service menu until Operation setting is highlighted.
2. Press CONFIRM.
3. Operation setting menu is displayed.




Operation setting menu screen

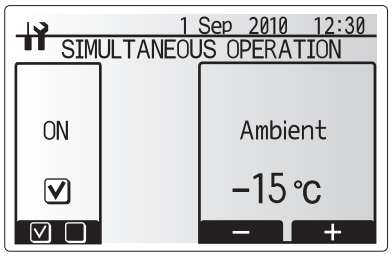
**<Simultaneous Operation>**

For periods of very low outside temperature this mode can be used. Simultaneous operation allows both DHW and space heating to run together by using the heat pump to provide space heating whilst the immersion heater provides heating for DHW. This operation is only available if BOTH a DHW tank AND immersion heater are present on the system.

1. From the Operation setting menu use F1 and F2 buttons to scroll through the list until Simultaneous operation is highlighted.
2. Press CONFIRM.
3. Simultaneous operation screen is displayed.
4. To switch simultaneous operation ON/OFF press F1.
5. To alter the temperature at which simultaneous operation starts use F3 and F4.

Note: Range of ambient (outdoor) temperature is -15°C to 10°C (default -15°C).

6. To return to Operation setting menu press BACK.




Simultaneous operation screen

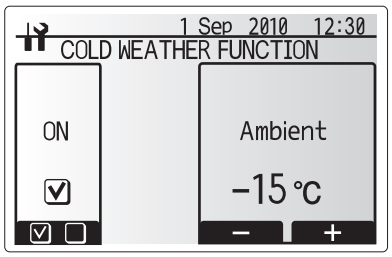
**<Cold weather function>**

For extremely low outdoor temperature conditions when the heat pump's capacity is restricted the heating or DHW is provided by the electric booster heater (and immersion if present). This function is for use during extreme cold periods only. Extensive use of direct electrical heaters ONLY will result in higher electric usage and may reduce working life of heaters and related parts.

1. From the Operation setting menu use F1 and F2 buttons to scroll through the list until Cold weather function is highlighted.
2. Press CONFIRM.
3. Cold weather function screen is displayed.
4. To switch Cold weather function ON/OFF press F1.
5. To alter the temperature at which heater switching function starts use F3 and F4.

Note: Range of ambient (outdoor) temperature is -15°C to -10°C (default -15°C)

6. To return to Operation setting menu press BACK.




Cold weather function screen

**<Room Temp Control (Heating)>**

This function allows operational setting of flow temperature range from the Ecodan and also the time interval at which the FTC3 collects and processes data for the auto adaptation mode.

1. From the Operation setting menu use F1 and F2 buttons to scroll through the list until Room temp. control (HEATING) is highlighted.
2. Press CONFIRM.
3. Room temp. control (HEATING) screen is displayed.
4. To alter the time period at which date will be collected use F1 and F2 buttons to highlight 'Temp. control interval'.
5. Press CONFIRM.
6. Use F3 and F2 buttons to alter the time interval.

Note: Range 10 – 60 minutes at 10 minute intervals (default 10 minutes).

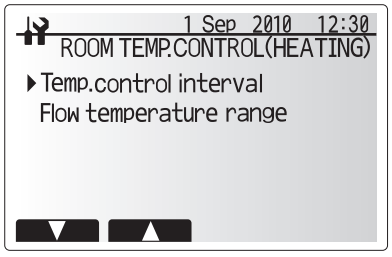
7. To alter the flow temperature limits use F1 and F2 buttons to highlight 'Flow temperature range'.
8. Press CONFIRM.
   Flow temperature range screen is displayed.
9. To alter minimum flow temp. use F1 and F2 buttons.

Note: Range of minimum flow temp. is 25°C to 40°C (default 30°C).

10. To alter maximum flow temp. use F3 and F4 buttons.

Note: Range of maximum flow temp. is 35°C to 60°C (default 50°C)

11. To return to Operation setting menu press BACK twice.




Room temp. control (HEATING) screen

**<Password protection>**
Password protection is available to prevent unauthorised access to the service menu by untrained persons.

1. From the service menu use F1 and F2 buttons to scroll through list until *Password protection* is highlighted.
2. Press CONFIRM.
3. When password input screen is displayed use buttons F1 and F2 to move left and right between the four digits, F3 to lower the selected digit by 1, and F4 to increase the selected digit by 1.
4. When you have input your password press CONFIRM.
5. The password verify screen is displayed.
6. To verify your new password press button F3.
7. Your password is now set and the completion screen is displayed.
8. To return to service menu press MENU or BACK button.

Password input screen

**<Resetting the password>**
If you forget the password you entered, or have to service a unit somebody else installed, you can reset the password to the factory default of **0000**.

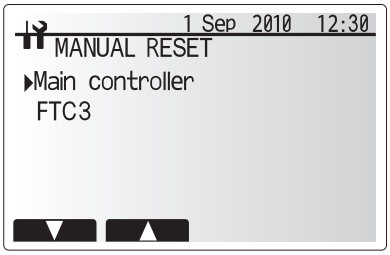
1. From the main settings menu scroll down the functions until Service Menu is highlighted.
2. Press CONFIRM.
3. You will be prompted to enter a password.
4. Hold down buttons F3 and F4 together for 3 secs
5. You will be asked if you wish to continue and reset the password to default setting.
6. To reset press button F3.
7. The password is now reset to **0000**.

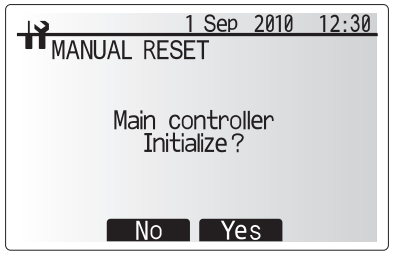
Password verify screen

Completion screen

**<Manual reset>**
Should you wish to restore the factory settings at any time you should use the manual reset function. Please note this will reset ALL functions to the factory default settings.

1. From the service menu use F1 and F2 buttons to scroll through list until Manual Reset is highlighted.
2. Press CONFIRM.
3. The manual reset screen is displayed.
4. Choose either Manual Reset for FTC3 or Main Controller.
5. Press F3 button to confirm manual reset of chosen device.



# 6 Commissioning

## ■ Pre-commissioning exercises- potable/DHW circuit

Initial fill procedure:
Ensure all pipe joints and fittings are tight and secure.
Open the most distant DHW tap/outlet.
Slowly/gradually open the mains water supply to begin filling unit and DHW pipework.
Allow most distant tap to run free and release/purge residual air from installation.
Close tap/outlet to retain fully charged system.

Initial flush procedure:
Energise system to heat-up cylinder contents to a temperature of approx. 30 – 40°C.
Flush/drain the water contents to remove any residue/impurities resulting from the installation works. Use the cylinder drain cock to safely discharge the warmed water to drain via a suitable hose.
On completion, close drain cock, re-fill system and resume system commissioning.

## ■ Pre-commissioning Checklist

Before commissioning the cylinder system complete the following table to ensure the necessary checks are carried out.

| No | System commissioning checklist | | | | | Notes |
|---|---|---|---|---|---|---|
| 1 | Installation location | Air flow around the unit | Outdoor unit | Good/Poor | | |
| 2 | | Maintenance access | Cylinder unit | Good/Poor | | |
| | | | Outdoor unit | Good/Poor | | |
| 3 | Pipe work | Total pipe length | Outdoor to indoor | m | | |
| 4 | | Height difference | Outdoor to indoor | m | | |
| 5 | | System chemically cleansed and flushed | | Yes/No | | |
| 6 | | Insulation type and thickness | | | | |
| 7 | Electrical wiring | Correct cables used | | | | |
| 8 | | Electrical maintenance access | | Good/Poor | | |
| 9 | | Connection of mains power source | Outdoor unit electric cable | | | |
| | | | | Type | | |
| | | | | Size | | |
| | | | Indoor unit electric cable | | | |
| | | | | Type | | |
| | | | | Size | | |
| 10 | | Connection of control cable | | | | |
| 11 | Anti-freeze | Refer to product guidelines. | | % | | |
| 12 | Check pre-charge in the expansion vessel(s) | | | Yes/No | | |
| 13 | Pressurise circuit to 1 bar | | | Yes/No | | |
| 14 | Release air from system | | | Yes/No | | |

| Outdoor unit (PACKAGE type) operation checklist | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 15 | Outdoor unit details | | Model No. | | | | Serial No. | |
| 16 | Power source (V) | 1ø | L - N | | | | | |
| | | 3ø | L1 - L2 | | L2 - L3 | | L3 - L1 | |
| 17 | Excessive vibration/noise | | Compressor | | Yes/No | | | |
| | | | Fan | | Yes/No | | | |
| 18 | Unit mounted on anti-vibration pads (Tico Pads) | | | | | Yes/No | | |
| 19 | Provision made for condensate removal | | | | | Yes/No | | |

For installation in hard water areas, see advice in section 4.2 General.

Notes/Comments:

# 7 Service and Maintenance

The indoor cylinder unit is UNVENTED. Under UK law* the system must be serviced **once a year** by a qualified individual. Servicing and maintenance of the outdoor unit should only be done by a Mitsubishi Electric trained technician with relevant qualifications and experience. Any electrical work should be done by a tradesperson with the appropriate electrical qualifications. Any maintenance or 'DIY' fixes done by a non-accredited person could invalidate the Warranty and/or result in damage to the cylinder unit and injury to the person.

* Building regulations – England & Wales Part G3, Scotland P3, Northern Ireland P5. If outside of the UK please refer to local building regulations regarding unvented hot water storage.

## ■ Basic Troubleshooting for Cylinder Unit

| Fault symptom | Possible cause | Solution |
|---|---|---|
| Cold water at tap | Direct – Booster heater cut out has triggered. | Check booster heater thermostat and press reset button if safe. Reset button is covered with white rubber cap see component parts diagram page 6 for position. |
| | Direct – Booster heater breaker (ECB1) has tripped. | Check the cause of the trip and reset if safe. |
| | Direct – The booster heater thermal cut-out has operated and can not be reset using the Manual reset button. | Check the resistance of the thermal cut out, if 0 then the connection is broken and the booster heater will have to be replaced. Please contact your Mitsubishi Electric dealer. |
| | Direct – Immersion heater cut out has triggered. | Check immersion heater thermostat and press reset button, located on immersion heater boss, if safe. If the heater has been operated with no water inside it may have failed, so please replace it with a new one. |
| | Direct – Immersion heater breaker (ECB2) has tripped. | Check the cause of the trip and reset if safe. |
| | Indirect – 3-way valve fault | Check plumbing/wiring to 3-way valve. |
| | Indirect – Heat pump not working. | Check heat pump – consult outdoor unit service manual. |
| | All hot water used. | Ensure DHW mode is operating and wait for tank to reheat. |
| Water discharges from expansion relief valve | If continual – locally supplied pressure reducing valve not working. | Check function of pressure reducing valve and replace if necessary. |
| | If continual – expansion relief valve seat may be damaged. | Remove cartridge – check seat and renew if necessary. |
| | If intermittent – expansion vessel charge may have reduced/bladder perished. | Check pressure in expansion vessel. Recharge to 1 bar if necessary. If bladder perished replace vessel. |
| | Unit is being back pressurised. | With cylinder cold check pressure in cylinder. If this is the same as the incoming mains pressure then you are getting backfeed. Install a balanced cold supply. |
| Water discharges from temperature and pressure relief valve (EHPT20X-VM2HA only) | Unit has overheated – thermal controls have failed. | Switch off power to the heat pump and immersion heaters. Leave water supply on. Wait until discharge stops. Isolate water supply and replace if faulty. |
| Milky/Cloudy water | Oxygenated water | Water from any pressurised system will release oxygen bubbles when flowing. The bubbles will settle out. |
| No hot water flow | Cold main off. | Check and open stop cock. |
| | Strainer blocked . | Isolate water supply and clean strainer. |
| Noise during hot water draw off typically worse in the morning | Loose airing cupboard pipework. | Install extra pipe fastening clips. |
| Noisy pump | Air in pump. | Use manual and automatic air vents to remove air from system. Top up water if necessary to achieve 1bar on primary circuit. |
| Pump runs for a short time for no reason. | Pump jam prevention mechanism to inhibit the build up of scale. | Normal operation no action necessary. |
| Hot or warm water from cold tap | If tap runs cold after a minute or so the pipe is picking up heat from heating pipe work. | Insulate/re-route pipe work. |
| Heating system does not get up to set temperature. | Prohibit, schedule timer or holiday mode selected. | Check settings and change as appropriate. |
| | Incorrectly sized radiators | Contact installer |
| | The room in which the temperature sensor is located is at a different temperature to the rest of the house. | Reposition the temperature sensor to a more suitable room. |
| | Battery problem *wireless control only | Check the battery power and replace if flat. |
| Mechanical noise heard coming from the cylinder unit. | Heaters switching on/off | Normal operation no action required. |
| | 3-way valve changing position between DHW and heating mode. | Normal operation no action necessary. |
| After DHW operation room temperature rises a little. | At the end of the DHW mode operation the 3-way valve diverts hot water away from the cylinder into space heating circuit. This is done to prevent the cylinder unit components from overheating. The amount of hot water directed into the space heating circuit is dependent on the type of system and the pipe run between the plate heat exchanger and the cylinder unit. | Normal operation no action necessary. |
| Heating mode has been on standby for a long time (does not start operation smoothly.) | Duration is set to excessively short time at "Economy setting for pump". (Go to "Service menu" → "Auxiliary setting" → "Economy setting for pump"). | Set "Economy setting for pump" longer. |
| Heating emitter is hot in the DHW mode. (The room temperature rises.) | The 3-way valve may have foreign objects in it, or hot water may flow to the heating side due to malfunctions. | Manually override the 3-way valve several times to check whether the problem will be solved. (Refer to the service manual.) If the problem persists replace the 3-way valve coil with a new one. If still no change replace the entire 3-way valve with a new one. |

# 7 Service and Maintenance

## ■ Annual Maintenance

It is essential that the cylinder unit is serviced at least once a year by a qualified individual any spare parts required should be purchased from Mitsubishi Electric. **NEVER** bypass safety devices or operate the unit without them being fully operational.

**<Draining the cylinder unit and its primary heating circuit (local)>**
**WARNING: DRAINED WATER MAY BE VERY HOT**

1. Before attempting to drain the cylinder isolate from the electrical supply to prevent the immersion and booster heaters burning out.
2. Isolate cold water feed to tank.
3. Attach a hose to the tank drain cock (No. 17 on Figure 3.1 - 3.4). The hose should be able to withstand heat as the emptied water could be very hot. The hose should drain to a place lower than the tank bottom to encourage siphoning.
   Open a hot water tap to start draining without a vacuum.
4. When the tank is drained close drain cock and hot tap.
5. Attach hose to booster heater drain cock and water circuit drain cock (No.13 and No. 16 on Figure 3.1 - 3.4). The hose should be able to withstand heat as the emptied water could be very hot. The hose should drain to a place lower than the booster heater drain cock to encourage siphoning. Open the pump valves and the strainer valves.
6. Water remains in the strainer still after the cylinder unit was drained.
   Drain the strainer by removing the strainer cover.

**<Annual maintenance points>**
Use the Annual Maintenance Log Book as a guide to carrying out the necessary checks on the cylinder and outdoor unit.

## ■ Error Codes

| Code | Error | Action |
|---|---|---|
| L1 | Booster heater overheat detection | Flow rate may be reduced check for;<br>• Water leakage<br>• Strainer blockage<br>• Pump function (Error code may display during filling of primary circuit, complete filling and reset error code.) |
| L2 | Booster heater thermistor (THW3) failure | Check the resistance of the thermistor. |
| L3 | Circulation water temperature overheat protection | See Action for L1. |
| L4 | Tank water temperature overheat protection | Check the immersion heater and it's contactor. |
| L5 | Indoor unit temperature thermistor (TH1, TH2, THW1, THW2, THW5B) failure | Check the resistance of the thermistor. |
| L6 | Circulation water freeze protection | See Action for L1. |
| L7 | 3-way valve failure | Check the motion of the 3-way valve. |
| L8 | Heating operation error | Re-attach any thermistors that have become dislodged. |
| L9 | Low primary circuit flow rate detected by flow switch | See Action for L1. If the flow switch itself does not work, replace it.<br>The pump valves may be hot, please take care. |
| J0 | Communication failure between FTC3 and wireless receiver | Check connection cable for damage or lose connections. |
| J1 - J8 | Communication failure between wireless receiver and wireless remote controller | Check wireless remote controller's battery is not flat.<br>Check the pairing between wireless receiver to wireless remote controller.<br>Test the wireless communication. (See the manual of wireless system) |
| E0 - E5 | Communication failure between main controller and FTC3 | Check connection cable for damage or loose connections. |
| E6 - EF | Communication failure between FTC3 and outdoor unit | Check that the outdoor unit has not been turned off.<br>Check connection cable for damage or loose connections.<br>Refer to outdoor unit service manual. |
| E9 | Outdoor unit receives no signal from indoor unit. | Check both units are switched on. Check connection cable for damage or loose connections. Refer to outdoor unit service manual. |
| U*, F* | Outdoor unit failure | Refer to outdoor unit service manual. |

**Note: To cancel error codes please switch system off (Press button E, on Main Controller, for 3 secs).**

## ■ Engineers Forms

Should settings be changed from default please enter new setting in 'Field Setting' column. This will ease resetting in the future should the system use change or the circuit board need to be replaced.

**Commissioning/Field settings record sheet**

| | | | | | Parameters | Default setting | Field setting | Notes |
|---|---|---|---|---|---|---|---|---|
| **Main** | Option | | Forced DHW operation | | On/Off | Off | | |
| | | | DHW | | On/Off/Timer | On | | |
| | | | Heating | | On/Off/Timer | On | | |
| | | | Holiday mode | | Active/Non active/Set time | Non active | | |
| **Setting** | DHW | | Operation mode | | Normal/Eco | Normal | | |
| | | | DHW max. temp | | 40°C – 60°C | 50°C | | |
| | | | DHW temperature drop | | 5°C – 30°C | 10°C | | |
| | | | DHW max. operation time | | 30 – 120 mins | 60 mins | | |
| | | | DHW mode restriction | | 30 – 120 mins | 30 mins | | |
| | Legionella prevention | | Active | | Yes/No | Yes | | |
| | | | Hot water temp | | 60°C – 70°C | 65°C | | |
| | | | Frequency | | 1 – 30 days | 15 days | | |
| | | | Start time | | 00.00 – 23.00 | 03.00 | | |
| | | | Max. operation time | | 1 – 5 hours | 3 hours | | |
| | | | Duration of maximum temperature | | 1 – 120 mins | 30 min | | |
| | Heating | | Operation mode | Heating | Flow temp/Compensation curve/Room temp | Room temp | | |
| | | | Heating room temp | | 10°C – 30°C | 20°C | | |
| | | | Heating flow temp | | 25°C – 60°C | 45°C | | |
| | Compensation curve | Lo set point | Outdoor ambient temp | | -15°C – 35°C | 35°C | | |
| | | | Flow temp | | 25°C – 60°C | 25°C | | |
| | | Hi set point | Outdoor ambient temp | | -15°C – 35°C | -15°C | | |
| | | | Flow Temp | | 25°C – 60°C | 50°C | | |
| | | Adjust | Outdoor Ambient Temp | | -14°C – 34°C | — | | |
| | | | Flow temp | | 25°C – 60°C | — | | |
| | Schedule timer | | Active | | Yes/No | No | | |
| | Holiday | | DHW | | Active/Non active | Non active | | |
| | | | Heating | | Active/Non active | Active | | |
| | | | Heating room temp | | 10°C – 30°C | 15°C | | |
| | | | Heating flow temp | | 25°C – 60°C | 35°C | | |
| | Initial settings | | Language | | ENG/PT/NOR/FIN/NL/DA/IT/SP/SW/GER/FR | ENG | | |
| | | | °C/°F | | °C/°F | °C | | |
| | | | Temp display | | On/Off | Off | | |
| | | | Time display | | hh:mm/hh:mm AM/AM hh:mm | — | | |
| | | | Room sensor setting | | TH1/Main RC/Room RC1-8/(Time/Zone) | TH1 | | |
| | Service menu | | Manual operation | | Supplementary pump or 3 way valve On/Off | Off | | |
| | | | Thermistor adjustment | | -10°C — +10°C | 0°C | | |
| | | | Auxiliary setting | Economy setting for pump | Active/Not active | Active | | |
| | | | | | Time before pump switched off (3 – 60 mins)*1 | 10 mins | | |
| | | | | Freeze stat function | Outdoor ambient temperature (3 – 20°C) | 5°C | | |
| | | | | Electric heater (Heating) | Space heating: Used/Not Used | Used | | |
| | | | | | Electric heater delay timer (5 – 180 mins) | 30 mins | | |
| | | | | Electric heater (DHW) | DHW: Used/Not Used | Used | | |
| | | | | | Electric heater delay timer (15 – 30 mins) | 15 mins | | |
| | | | Heat source setting | | Standard/Heater | Standard | | |
| | | | Operation setting | Simultaneous operation | Active/Inactive | Inactive | | |
| | | | | | Outdoor ambient temperature (-15 – 10°C) | -15°C | | |
| | | | | Cold weather function | Active/Inactive | Inactive | | |
| | | | | | Outdoor ambient temperature (-15 – -10°C) | -15°C | | |
| | | | | Room temp control (Heating) | Temperature control interval (10 – 60 mins) | 10 mins | | |
| | | | | | Flow temperature range (Maximum temp.) (35 – 60°C) | 50°C | | |
| | | | | | Flow temperature range (Minimum temp.) (25 – 40°C) | 30°C | | |

*1 Decreasing "time before pump switched off" may increase the duration of stand-by in Heating mode.

# 7 Service and Maintenance

## ■ Annual Maintenance Log Book

| | | | |
|---|---|---|---|
| Contractor name | | Engineer name | |
| Site name | | Site number | |

| Cylinder maintenance record sheet | | | |
|---|---|---|---|
| Warranty number | | Model number | |
| | | Serial number | |
| No. | Mechanical | Frequency | Notes |
| 1 | Turn OFF water supply, drain tank, remove mesh from strainer clean and replace in strainer. *1 | | |
| 2 | Keep water supply OFF, open hot water taps and check the expansion vessel charge pressure. Top up if necessary (1 bar). | | |
| 3 | Turn water supply ON, open the pressure relief valve and then the expansion valve in turn. Check for unrestricted discharge to the tundish and that the valves reseat correctly. Check there are no blockages in the tundish and associated pipe work. | | |
| 4 | In hard water areas de-scaling of the immersion heaters may be required. | | |
| 5 | Drop the primary/heating system pressure to zero check and if necessary top up the expansion vessel (1 bar). Air valve of expansion vessel is TR-412. | | |
| 6 | Check and if necessary top up the concentration of anti-freeze/inhibitor (if used in the system). | | |
| 7 | Top up the primary/heating system using the filling loop and re-pressurise to 1 bar. | | |
| 8 | Heat system and check pressure does not rise above 3 bar and no water is released from the safety valves. | | |
| 9 | Release any air from the system. | | |
| 10 | To check the 3-way valve for inside leaks, confirm that the temperature of the heat emitter does not rise when running the DHW mode. | | |
| | Refrigerant SA models only | Frequency | Notes |
| 1 | Refer to outdoor unit manual. | | |
| | Electrical | Frequency | Notes |
| 1 | Check condition of cables. | | |
| 2 | Check rating and fuse fitted on the electricity supply. | | |
| | Controller | Frequency | Notes |
| 1 | Check field settings against factory recommendations. | | |
| 2 | Check operation of motorized valves ensure they reseat correctly. | | |
| 3 | Check battery power of wireless thermostat and replace if necessary. | | |
| Outdoor heat pump unit maintenance record sheet | | | |
| Model number | | Serial number | |
| | Mechanical | Frequency | Notes |
| 1 | Inspect grill and air inlet for trapped debris/damage. | | |
| 2 | Check condensate drain provision. | | |
| 3 | Check integrity of water pipe work and insulation. | | |
| 4 | Check all electrical connections. | | |
| 5 | Check and record the operation voltage. | | |

* Checks should be carried out once a year.
*1 Be sure to reattach the mesh after washing.

**Note:**
**Within the first couple of months of installation, remove and clean the strainer. This is especially important when installing on an existing system.**

---

In addition to annual servicing it is necessary to replace or inspect some parts after a certain period of system operation. Please see tables below for detailed instructions. Replacement and inspection of parts should always be done by a competent person with relevant training and qualifications.

**Parts which require regular replacement**

| Parts | Replace every | Possible failures |
|---|---|---|
| Pressure relief valve (PRV)<br>Air vent (Auto/Manual)<br>Drain cock (Primary circuit)<br>Flexible hose<br>Manometer<br>Inlet control group (ICG)* | 6 years | Water leakage due to copper corrosion (Dezincification) |

* OPTIONAL PARTS for UK

**Parts which require regular inspection**

| Parts | Check every | Possible failures |
|---|---|---|
| Immersion heater | 2 years | Earth leakage causing circuit breaker to activate (Heater is always OFF) |
| Pump | 20,000 hrs (3 years) | Pump failure |

**Parts which must NOT be reused when servicing**
* O-ring
* Gasket

Note:
Always replace the gasket for pump with a new one at each regular maintenance (every 20,000 hours of use or every 3 years).

# 8 Supplementary information

**Refrigerant recovery (pump down) for split systems only**

For split system the following procedures should be followed to recover system refrigerant:

**Note) Pump down operation can not be activated by switching the pump down switch (SWP) or test run switch on the outdoor unit PCB.**
**Ensure both the outdoor unit and the indoor unit are in emergency mode before carrying out the following.**
**For pump down operation in split systems both the indoor and the outdoor unit must be in emergency mode.**
**Please see the following instructions on how to activate emergency mode.**
**Before carrying out the pump down, ensure the water pump is functioning correctly and L9 error code is not displayed on the main controller.**
**If there is insufficient water circulation, the circuit may freeze causing damage to the plate HEX.**
**If there is a fault with the pump or L9 error code is displayed on the main controller, do not attempt pump down operation.**
**In this case a refrigerant recovery machine must be used.**

1. Isolate outdoor unit from power supply by switching OFF relevant circuit breaker.
   If the indoor unit is powered independently to the outdoor unit, ensure that both units are isolated from the power supply.

2. Fully close the stop valve on the refrigerant (liquid) pipe and attach the pressure gauge to the port on the low pressure side of the compressor refrigerant pipe work.
   Change the position of the connector CN31 to ON and change DipSW4-2 to OFF on the outdoor unit PCB.
   Change the DipSW4-5 on the indoor unit to ON.

3. Switch ON power to the outdoor unit.
   If the indoor unit is powered independently, switch on power to the indoor unit first, then switch on power to the outdoor unit.
   Outdoor and indoor unit will start operating in emergency mode.
   **Note) If the outdoor unit is operated whilst the indoor unit is switched off, this could cause serious damage to the plate HEX.**
   **Always ensure the indoor unit power supply is ON and water pump is operating before switching ON power to the outdoor unit.**
   **After reconnecting power supply, ensure the water pump is operating correctly.**
   **If the water pump is not operating normally, then this could cause the water circuit to freeze damaging the plate HEX.**

4. When the pressure gauge reads close to 0MPa (G), close the valve on the refrigerant (gas) pipe and then switch power to outdoor unit OFF.
   If the indoor unit is powered independently ensure power supply for unit is OFF.
   **Note) It is important that after closing the valve on the refrigerant (gas) pipe the power supply is quickly switched OFF.**
   **If the system is running at a pressure of 0MPa (G) or lower, it may cause damage to the compressor.**

5. After completing the pump down operation, return the position of the connector CN31 on the outdoor unit PCB to OFF.
   Change the Dip SW4-5 on the indoor unit to OFF.

EC DECLARATION OF CONFORMITY
EG-KONFORMITÄTSERKLÄRUNG
DÉCLARATION DE CONFORMITÉ CE
EG-CONFORMITEITSVERKLARING
DECLARACIÓN DE CONFORMIDAD CE
DICHIARAZIONE DI CONFORMITÀ CE
DECLARAÇÃO DE CONFORMIDADE CE
EU-OVERENSSTEMMELSESERKLÆRING
EG-DEKLARATION OM ÖVERENSSTÄMMELSE
CE-ERKLÆRING OM SAMSVAR
CE-VAATIMUSTENMUKAISUUSVAKUUTUS

**MITSUBISHI ELECTRIC AIR CONDITIONING SYSTEMS EUROPE LTD.**
**NETTLEHILL ROAD, HOUSTOUN INDUSTRIAL ESTATE, LIVINGSTON, EH54 5EQ, SCOTLAND, UNITED KINGDOM**

hereby declares under its sole responsibility that the heating system components described below for use in residential, commercial and light-industrial environments:
erklärt hiermit auf seine alleinige Verantwortung, dass die unten beschriebenen Zubehörteile für das Heizungs-System zur Benutzung im häuslichen, kommerziellen und leicht-industriellen Umfeld:
déclare par la présente et sous son entière responsabilité que les composants du système de chauffage décrits ci-dessous pour l'utilisation dans des environnements résidentiels, commerciaux et d'industrie légère :
verklaart hierbij als enige verantwoordelijke dat de componenten van het verwarmingssteem die hieronder worden beschreven, bedoeld zijn voor gebruik in woonomgevingen en in commerciële en licht industriële omgevingen:
declara por la presente bajo su responsabilidad exclusiva que los componentes del sistema de calefacción descritos a continuación para su uso en zonas residenciales, comerciales y para la industria ligera:
con la presente dichiara, sotto la sua esclusiva responsabilità, che i componenti dell'impianto di riscaldamento descritto di seguito, destinato all'uso in ambienti residenziali, commerciali e industriali:
através da presente declara sob sua única responsabilidade que os componentes do sistema de aquecimento abaixo descritos para uso residencial, comercial e de indústria ligeira:
erklærer hermed under eneansvar, at de herunder beskrevne komponenter til opvarmning til brug i privat boligbyggeri, erhvervsområder og inden for let industri:
intygar härmed att uppvärmningssystemkomponenterna som beskrivs nedan är för användning i bostäder, kommersiella miljöer och lätt industri:
erklærer hermed som sitt ansvar, ene og alene, at komponentene i varmesystemet som beskrives nedenfor og som er beregnet for bruk i bolig-, forretnings- og lettindustrimiljøer:
vakuuttaa täten asiasta yksin vastuussa, että alla kuvatut lämmitysjärjestelmän osat, jotka on tarkoitettu käytettäviksi asuin-, toimisto- ja kevyen teollisuuden ympäristöissä:

**MITSUBISHI ELECTRIC, EHST20C-VM6HA, EHST20C-YM9HA, EHST20C-VM6A, EHST20C-YM9A, EHST20C-VM6SA, EHPT20X-VM2HA, EHPT20X-VM6HA, EHPT20X-YM9HA, EHPT20X-VM6A, EHPT20X-YM9A**

Note: Its serial number is on the nameplate of the product.
Hinweis: Die Seriennummer befindet sich auf dem Kennschild des Produkts.
Remarque : Le numéro de série de l'appareil se trouve sur la plaque du produit.
Opmerking: het serienummer staat op het naamplaatje van het product.
Nota: El número de serie se encuentra en la placa que contiene el nombre del producto.
Nota: il numero di serie si trova sulla targhetta del prodotto.
Nota: o número de série encontra-se na placa que contém o nome do produto.
Bemærk: Serienummeret står på produktets fabriksskilt.
Obs: Serienumret finns på produktens namnplåt.
Merk: Serienummeret befinner seg på navneplaten til produktet.
Huomautus: Sen sarjanumero on tuotteen nimikilvessä.

Directives
Richtlinien
Directives
Richtlijnen
Directivas
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**2006/95/EC: Low Voltage**
**2006/42/EC: Machinery**
**2004/108/EC: Electromagnetic Compatibility**

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**HARMAN HOUSE, 1 GEORGE STREET, UXBRIDGE, MIDDLESEX UB8 1QQ, U.K.**
**Masami KUSANO**
**Product Marketing Director**

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| **Isuued** | **15 March , 2011** | **Akio FUKUSHIMA** |
| **LIVINGSTON** | | **President** |

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MITSUBISHI ELECTRIC CORPORATION

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