

UNVENTED MAINS PRESSURE WATER HEATER  
WITH FTC6 CONTROL SYSTEM. FOR USE WITH  
ECODAN PUZ-(H)WM AIR SOURCE HEAT PUMP  
RANGE.

January 2025

Doc. No. 685702  
EDITION-2

## Installation, Operation, Service & Parts Manual

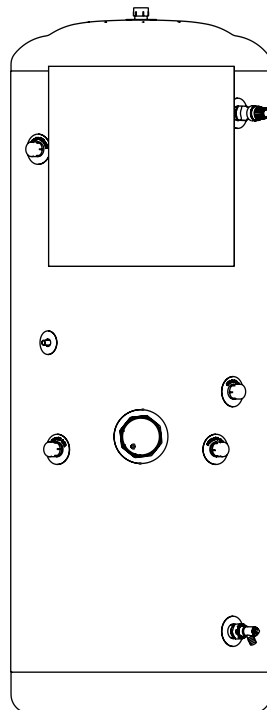
**EHPT18X-UKHLDWB**

**EHPT21X-UKHLDWB**

**EHPT21X-UKHDWB**

**EHPT25X-UKHDWB**

**EHPT30X-UKHDWB**



**IMPORTANT: PLEASE READ AND UNDERSTAND THESE INSTRUCTIONS  
BEFORE COMMENCING INSTALLATION , OPERATING THE UNIT OR  
PERFORMING ANY MAINTENANCE.  
PLEASE LEAVE THIS MANUAL WITH THE CUSTOMER FOR FUTURE REFERENCE.**

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## Abbreviations and Glossary

No.	Abbreviations/Word	Description
1	Compensation curve mode	Space heating incorporating outdoor ambient temperature compensation
2	COP	Coefficient of Performance - the efficiency of the heat pump
3	Cylinder unit	Indoor unvented DHW tank and component plumbing parts
4	DHW mode	Domestic hot water heating mode for showers, sinks etc.
5	Flow temperature	Temperature at which water is delivered to the primary circuit
6	Freeze stat. function	Heating control routine to prevent water pipes freezing
7	FTC	Flow temperature controller, the circuit board in charge of controlling the system
8	Heating mode	Space heating through radiators or underfloor heating
9	Legionella	Bacteria potentially found in plumbing, showers and water tanks that may cause Legionnaires' disease
10	LP mode	Legionella prevention mode – a function on systems with water tanks to prevent the growth of Legionella bacteria
11	Packaged model	Plate heat exchanger (Refrigerant - Water) in the outdoor heat pump unit
12	PRV	Pressure relief valve
13	Return temperature	Temperature at which water is delivered from the primary circuit
14	Split model	Plate heat exchanger (Refrigerant - Water) in the indoor unit
15	TRV	Thermostatic radiator valve – a valve on the entrance or exit of the radiator panel to control the heat output
16	Cooling mode	Space cooling through fan-coils or underfloor cooling

# Safety Precaution





Please read the following safety precautions carefully.


 **WARNING:**  
Precautions that must be observed to prevent injuries or death.

 **CAUTION:**  
Precautions that must be observed to prevent damage to unit.

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

## MEANINGS OF SYMBOLS DISPLAYED ON THE UNIT

	<b>WARNING</b> (Risk of fire)	This mark is for R32 refrigerant only. Refrigerant type is written on nameplate of outdoor unit. In case that refrigerant type is R32, this unit uses a flammable refrigerant. If refrigerant leaks and comes in contact with fire or heating part, it will create harmful gas and there is risk of fire.
	Read the OPERATION MANUAL carefully before operation.	
	Service personnel are required to carefully read the OPERATION MANUAL and INSTALLATION MANUAL before operation.	
	Further information is available in the OPERATION MANUAL, INSTALLATION MANUAL, and the like.	

 <b>WARNING</b>	
<b>Mechanical</b>	
The cylinder unit and outdoor unit 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 unit.	
The discharge pipework from the emergency devices of the cylinder unit 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.	
<b>Electrical</b>	
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.	
Discharge the condenser before the work involving the electric parts.	
<b>General</b>	
Keep children and pets away from both the cylinder unit 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 unit and the outdoor unit should be conducted by a qualified person.	
Do not place containers with liquids 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, relocating or servicing the cylinder unit, use only the heat pump's specified refrigerant 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 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 of the system, malfunction or unit breakdown. In the worst case, this could lead to a serious impediment to securing product safety.	
In heating mode, to avoid the heat emitters being damaged by excessively hot water, set the target flow temperature to a minimum of 2°C below the maximum allowable temperature of all the heat emitters. For Zone 2, set the target flow temperature to a minimum of 5°C below the maximum allowable flow temperature of all the heat emitters in Zone 2 circuit.	
Do not install the unit where combustible gases may leak, be produced, flow or accumulate. If combustible gas accumulates around the unit, fire or explosion may result.	
Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.	
The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).	
Do not pierce or burn.	
Be aware that refrigerants may not contain an odour.	
Pipework shall be protected from physical damage.	
The installation of pipework shall be kept to a minimum.	
Compliance with national gas regulations shall be observed.	
Keep any required ventilation openings clear of obstruction.	
Do not use low temperature solder alloy in the case of brazing the refrigerant pipes.	
In the case of a refrigeration leak, stop the operation of the unit, thoroughly ventilate the room and contact the installer.	

**⚠ 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 units 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 DHW tank. 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 tanks 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.

As for the handling of refrigerant, refer to the outdoor unit installation manual.

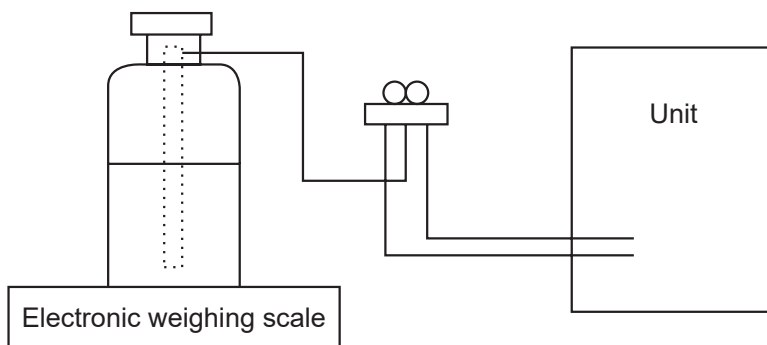
**[1] Cautions for service**

- (1) Perform service after recovering the refrigerant left in unit completely.
- (2) Do not release refrigerant in the air.
- (3) After completing service, charge the cycle with specified amount of refrigerant.
- (4) If moisture or foreign matter might have entered the refrigerant piping during service, ensure to remove them.

**[2] Additional refrigerant charge**

**When charging directly from refrigerant cylinder**

- (1) Check that cylinder for R410A or R32 on the market is syphon type.
- (2) Charging should be performed with the cylinder of syphon stood vertically. (Refrigerant is charged from liquid phase.)



**[3] Service tools**

Use the service tools below as exclusive tools for R410A or R32 refrigerant.

No.	Tool name	Specifications
1	Gauge manifold	R410A or R32
		Use the existing fitting specifications (UNF1/2).
		Use high-tension side pressure of 5.3 MPa·G or over.
2	Charge hose	R410A or R32
		Use pressure performance of 5.09 MPa·G or over.
3	Electronic weighing scale	—
4	Gas leak detector	Use the detector for R134a, R407C, R410A or R32.
5	Adaptor for reverse flow check	Attach on vacuum pump.
6	Refrigerant charge base	—
7	Refrigerant cylinder	R410A or R32
		Top of cylinder (Pink)
		Cylinder with syphon
8	Refrigerant recovery equipment	—

### CAUTION

- Do not use sharp objects to press the buttons of the main remote controller as this will cause damage to the buttons.
- If power to unit is to be turned off for a long time, the water should be drained.
- Do not place a container etc. filled with water on the top panel.

## Disposal of the Unit



**Note: This symbol mark is for EU countries only. This symbol mark is according to the directive 2012/19/EU Article 14 Information for users and Annex IX, and/or to the directive 2006/66/EC Article 20 Information for end-users and Annex II.**

This symbol indicates that this product must not be disposed of with general household waste, to prevent damage to the environment and risk to personal health.

Instead, it is your responsibility to ensure the product is decommissioned and disposed of safely by isolating the electricity supply to the immersion heater and heat pump, before draining the cylinder and safely disconnecting all fixtures and fittings. You must then dispose of the cylinder by handing it over to a designated recycling centre for domestic waste electrical equipment. Contact your local council or waste disposal office for your nearest collection point or to arrange a collection.

## Introduction

### IMPORTANT NOTE TO THE INSTALLER

Read these instructions before commencing installation. Unvented cylinders are a controlled service as defined in the latest edition of the building regulations and should only be fitted by a competent person.

You must ensure the installation complies with the current Building Regulations and/or Technical Standards Documents for England, Scotland or Wales.

### IMPORTANT NOTE

All goods are sold subject to Mitsubishi Electric's Terms and Conditions of Sale.

Important Note:

Included with the Ecodan product is information about how to register the Mitsubishi Electric user guarantee. Please direct the end user to register within 3 months of commissioning to ensure they benefit from the applicable standard guarantee for their Ecodan heat pump and any cylinder or interfacing equipment purchased from Mitsubishi Electric by you as installer.

The guarantee applies where the installation address is in England, Scotland or Wales only and for domestic use. This registration should be completed only by the end user/system owner so please ensure that the information about how to register the Mitsubishi Electric user guarantee reaches them. There are various options to register the guarantee and details can be found online at <https://les.mitsubishielectric.co.uk>. The registration is logged by our warranty department. In the unlikely event of failure of the Ecodan heat pump or any such cylinder or interfacing equipment purchased from Mitsubishi Electric, registration of the guarantee ensures that warranty claims are processed efficiently. For further information on the Mitsubishi Electric user guarantee please contact us (see contact details on back page).

Please Note:

If you do not register the Mitsubishi Electric user guarantee then the product will only be guaranteed to the user by Mitsubishi Electric for 12 months from the date of commissioning. Our commercial guarantee to your user does not affect your user's statutory rights or any consumer rights under applicable national legislation.

This range of unvented water heaters is specifically designed for use with the Ecodan PUZ- (H)WM Air Source Heat Pump range.

The cylinders are fitted with a cylinder thermostat, a cylinder thermal cut-out, Wi-Fi adapter and Mitsubishi Electric FTC6 controller, an electric immersion heater, temperature and pressure relief valve and drain cock. Also supplied but not fitted are a 3-way diverter valve, hot water expansion vessel, cold water combination valve, tundish, Wi-Fi adapter harness and Mitsubishi main remote control.

# Specification Details

The unvented cylinders are made from Duplex stainless steel for corrosion resistance, are encased in a strong rust-proofed steel case and are highly insulated with environmentally-friendly foam. Further details are below.

## Materials

- Inner shell – Duplex stainless steel
- Coil – 22mm diameter stainless steel  
28mm diameter stainless steel
- Bosses – stainless steel
- Polyurethane CFC- and HCFC-free foam insulation. This insulation has an Ozone Depletion Potential of Zero and a Global Warming Potential of 1
- Casing – galvanized steel, durable finish
- Anode – none required

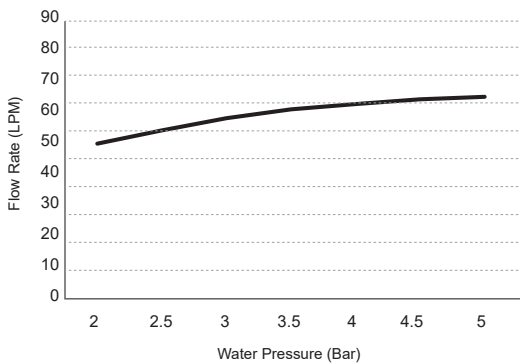
All cylinders are welded using a controlled oxygen purged process to maximise the corrosion resistant qualities of the high-grade Duplex stainless steel. Every cylinder is checked using 15 bar pressure testing.

## Immersion heater

- 1 3/4" BSP parallel threaded head
- Titanium long life low noise element
- Brazed construction
- Safety cut-out
- Element rating 3kW at 230-240 Volt A/C

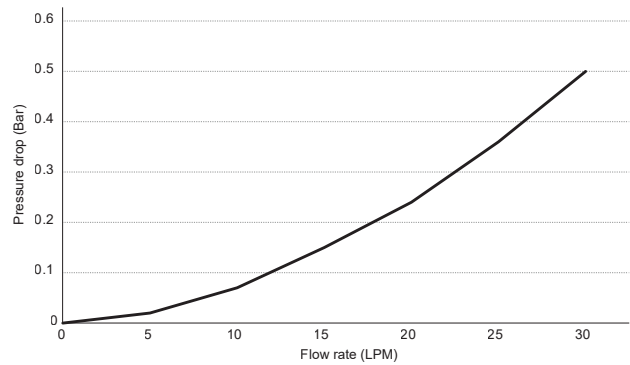
## Flow rates

The graph below illustrates the speed at which hot water can be distributed reliably throughout the home.

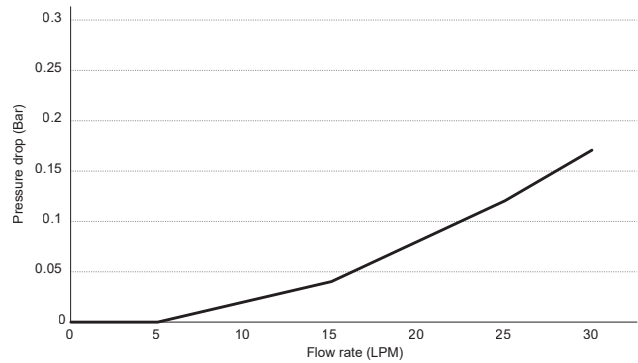


## Coil Pressure Drop

### Slimline Cylinders



### Standard Cylinders



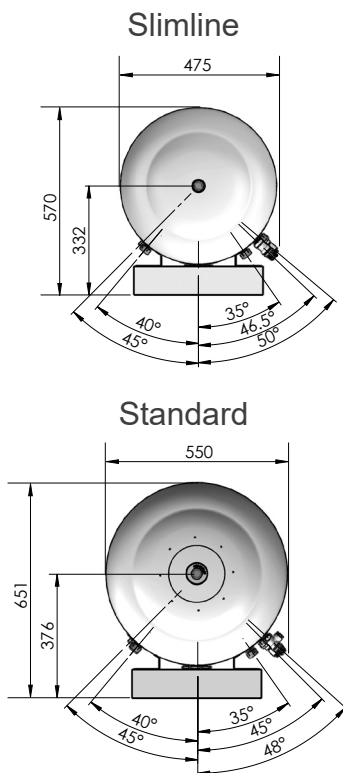
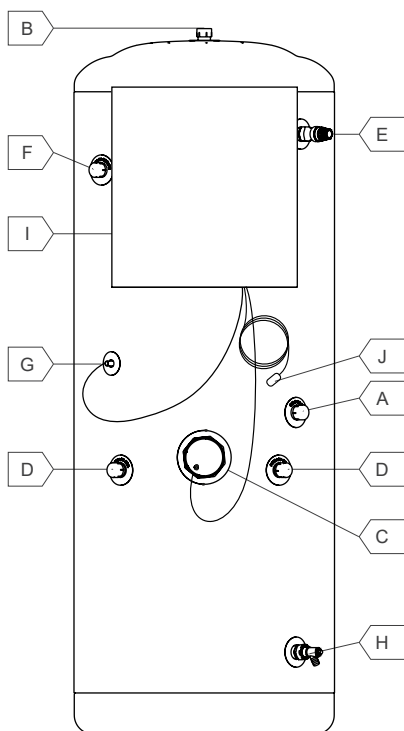
### Pressure specifications - The Unvented Cylinder

Maximum Inlet Water Pressure	12.0 bar
Operating Pressure/Maximum Design Pressure	3.0 bar
Expansion Valve Opening Pressure	6.0 bar
Expansion Vessel Charge Pressure	3.0 bar
Maximum Operating Pressure	3.0 bar
Opening Pressure of T & P Valve	7.0 bar
Opening Temperature of T & P Valve	90°C
Maximum Coil Pressure	3.5 bar

### Immersion Element specifications

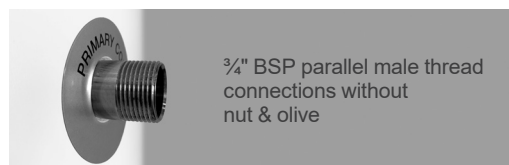
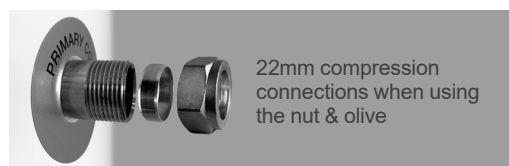
Element Rating	3kW 230-240 Volt
Thread Type	1 3/4" BSP
Fuse Requirement (Via FTC6)	16A
Control Thermostat (Via FTC6)	75°C
High Limit Thermostat Set Point	85°C

# Product Diagrams



## Connections

- A Cold feed - 22mm / 3/4" BSP
- B Hot water outlet - 22mm / 3/4" BSP
- C 3kW 14" Immersion heater - 1 1/4" BSP
- D Heat pump coil connections - 22mm / 3/4" BSP
- E 7 Bar 90°C Temperature & pressure relief valve - 1/2" NPT x 15mm
- F Secondary return - 22mm / 3/4" BSP (Excluding EHPT18X-UKHLDWB)
- G Dry stat pocket - 10mm (with thermostat probe fitted)
- H Drain cock
- I FTC6 Controller
- J Wi-Fi Adaptor (installer to locate and mount)



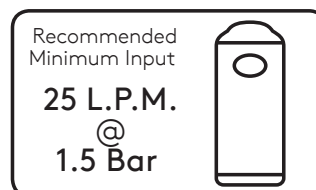
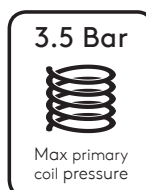
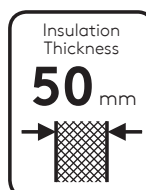
Product Codes	Total Height (mm)	Diameter (mm)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H	FTC6 Controller	
											Bottom	Top
EHPT18X-UKHLDWB	1712	475	726	1712	756	668	1479	N/A	864	158	1156	1578
EHPT21X- UKHLDWB	2025	475	726	2025	769	668	1795	1615	1020	158	1156	1578
EHPT21X-UKHDWB	1495	550	680	1495	584	558	1273	1150	768	173	1018	1440
EHPT25X-UKHDWB	1745	550	680	1745	654	558	1523	1400	893	173	1156	1578
EHPT30X-UKHDWB	2058	550	680	2058	654	558	1836	1600	1050	173	1156	1578

## Fiche - Technical Performance Data

Nominal Capacity (Litres)	Product Codes	Energy Rating	Standing Loss (W)	Total Height (mm)	Diameter (mm)	Weight Empty (kg)	Weight Full (kg)	Actual Cylinder Capacity (Litres)	Expansion Vessel (Litres)	Heat-up Time (Min.)	Heat Loss (kW/24Hr)	Coil Primary Flow (L.P.M.)	Coil Pressure Drop (Bar)	Coil Surface Area (m²)	Coil Capacity (Litres)	Coil (kW Rating)
<b>Heat pump slimline unvented hot water cylinders</b>																
180	EHPT18X-UKHLDWB	C	72	1712	475	45	218	173	19	20	1.72	15	0.14	1.7	8.0	32
210	EHPT21X-UKHLDWB	C	87	2025	475	51	259	208	19	24	2.08	15	0.14	1.7	8.0	32
<b>Heat pump unvented hot water cylinders</b>																
210	EHPT21X-UKHDWB	C	75	1495	550	48	242	195	19	24	1.79	15	0.08	2.3	14.3	32
250	EHPT25X-UKHDWB	C	84	1745	550	53	288	235	24	29	2.02	15	0.08	2.3	14.3	32
300	EHPT30X-UKHDWB	C	93	2058	550	60	345	285	24	34	2.24	15	0.08	2.3	14.3	32

The energy efficiency class of these products are C with a range from A+ to F

Tested in accordance with BS EN 12897:2016+A1:2020 Water supply. Specification for indirectly heated unvented (closed) storage water heaters.



# Preparing To Install the Cylinder

## Storage prior to installation

The unvented cylinder should be stored in its original packaging in an upright position in a dry, frost-free environment.

## Handling product

The unvented cylinder should be carried upright where possible. Assessments of risks for carrying the unit should be conducted. Use more than one person for carrying where appropriate. Never carry the cylinder using the pre-fitted components such as the T&P valve or immersion heater. Always follow latest guidelines for lifting techniques to avoid injury or damage to the product.

## Water supply

The unvented cylinder operates at 3 bar (controlled by the cold water combination valve) and is capable of delivering over 50 litres per minute. The cold water combination valve has been designed to make the most of the flow rates available, however the performance of any unvented system is only as good as the mains water supply. The maximum possible water demand should be assessed, taking into consideration that both hot and cold services are supplied simultaneously from the mains.

The water supply should be checked to ensure it can meet these requirements. If necessary, consult the local water company regarding the likely pressure and flow rate availability.

If measuring the water pressure, note that a high static (no flow) mains pressure is no guarantee of good flow availability. In a domestic installation 1.5 bar and 25 L/min. should be regarded as the minimum. The maximum mains pressure that the cold water combination valve can accept is 12 bar.

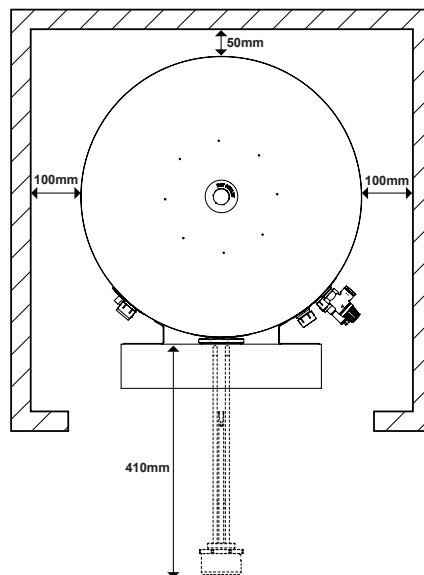
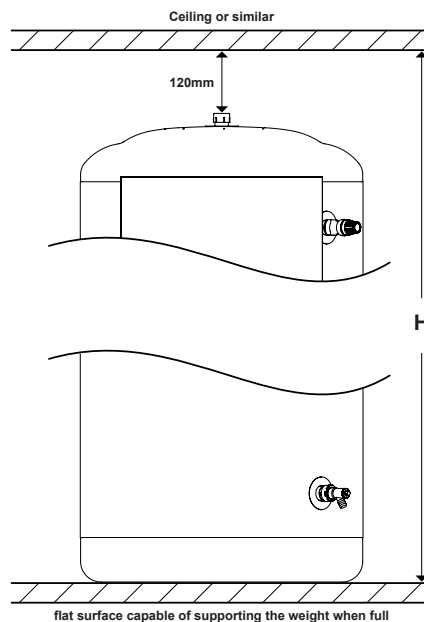
Consideration should be given to upgrading existing ½" (15mm) cold mains pipework to a larger size if the recommended minimum pressure/flow rate is not being achieved.

Note: the system must be fed from domestic mains water supply compliant with Water Regulations 2000 and the use of well water or a private borehole will void the cylinder's Warranty.

## Siting the unit

The unvented cylinder can supply outlets above it or at some distance from it. Site the unit to minimise "dead leg" distances, especially to the point of most frequent use. Outlets above the unvented cylinder will reduce the outlet pressure available by 0.1 bar for every 1m of height difference.

The unvented cylinder must be installed indoors in a frost-free environment and all exposed pipework should be insulated. The units must be installed in the correct orientation, i.e. vertically, on a flat base capable of supporting the weight of the cylinder when full. See the illustration and table for the minimum recommended cupboard size; take care to ensure the discharge pipe(s) from its safety valves can be correctly installed - see discharge arrangement on page 13 & 14.



Model	Cylinder Ø mm	Airing Cupboard Size		
		Width mm	Depth mm	Height mm
EHPT18X-UKHLDWB	475	675	675	1832
EHPT21X-UKHLDWB	475	675	675	2145
EHPT21X-UKHDWB	550	750	750	1615
EHPT25X-UKHDWB	550	750	750	1865
EHPT30X-UKHDWB	550	750	750	2178



# Preparing To Install the Cylinder

## Access

Consideration should be given to the position of discharge pipes (tundish) drain valves. Avoid positioning these too close to electrical devices and components. Also, allow sufficient space so that the cylinder can be inspected, maintained and serviced in the future.

The immersion heaters are 410mm long and care should be taken to ensure that they can be withdrawn, enabling the immersion heater to be replaced at the end of its working life and providing inspection access to the interior of the cylinder in servicing if required. The discharge pipework from the safety valves should fall continuously and terminate safely.

## AAV's

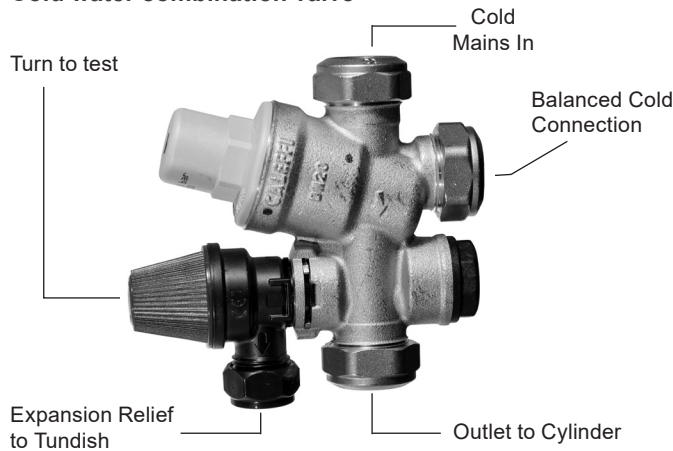
Additional automatic air vents (AAV) (not supplied) may be required at high points in the primary system where pipework is located above the level of the cylinder. After filling the system (primary circuit), release all trapped air using air vents during and following heating period and top up with water as necessary. After removing the air, automatic air vent(s) MUST be closed.

## Flushing the heating system (Retrofit installations)

Part L of the 2022 Building Regulations require that all central heating systems are cleaned and dosed with protective inhibitor whenever major works are carried out. First flush shall be performed prior to fitting any new equipment, such as the heat pump, to protect the equipment from damage. Ecodan heat pumps also require anti-freeze protection. Failure to do so will put the product Warranty at risk.

# Installation Instructions - Unvented Cylinders

## Cold water combination valve



Make the connection to the cold feed of the cylinder with the cold water combination valve positioned above the Temperature & Pressure Relief Valve (TPRV) mounted on the side of the cylinder. This ensures that the cylinder does not have to be drained down in order to service the cold water combination valve. Ensure that the arrow points in the direction of the water flow.

Select a suitable position for the potable water expansion vessel. Mount it to the wall using the bracket attached to the vessel. Use suitable fittings capable of supporting full vessel weight (and with appropriate consideration to wall material). Connect the expansion vessel to the cold feed pipework between the cold water combination valve and the cold inlet on the cylinder. Ensure that the top of the vessel is accessible for servicing.

## Cold mains pipework

Option 1: Run the cold mains through the building to the place where the unvented cylinder is to be installed.

Option 2. Where local Building Regulations do not permit the cylinder to be connected directly to mains supply, run the cold feed from a cold feed break tank using a suitable pump to boost pressure. The pump MUST be used in conjunction with a sensor in the feed tank to ensure tank does not drain empty and pull air. Take care to prevent heat pick-up by not running the cold pipe near hot water or heating pipework. This cold water supply pipe MUST be fitted with an isolating valve (not supplied). We recommend using a full bore quarter turn ball valve; alternatively a stopcock can be used, however this may reduce the flow rate. DO NOT use a "screwdriver slot" or similar service valve.

## Cylinder connections

The cylinder should be plumbed in using BS EN1057-R250 copper tube. Cut the tube square using a rotary tube cutter and ensure no sharp edges or burrs protrude. Slide both gland nut and olive onto the tube and push tube fully home into the connection, ensuring the tube end fully bottoms on the connection recess. Smear the outer wall of the olive with plumbing paste and tighten the gland nut in the prescribed manner.

Alternatively, if you are using imperial pipework, you may prefer to use a threaded imperial fitting and connect directly to the BSP thread on the cylinder boss.

Upon filling/commissioning, ensure all connections are completely watertight, including bosses and any pre-plumbed components.

Note: No control or isolation valve should be fitted between the expansion relief valve and the storage cylinder. The relief valve connections should not be used for any other purpose.

# Installation Instructions - Unvented Cylinders

## Balanced connections

A balanced hot and cold supply is necessary to stop one from overpressurisation of the other. This can be achieved by feeding all cold outlets from the 22mm balanced cold connection featured on the cold water combination valve. If you are not using this balanced cold connection and using an alternative method to balance the supply, you must cap off the cold water combination valve's balanced cold connection.

Where there are showers, bidets or monobloc mixing taps in the installation, these need to be installed to comply with the Water Supply (Water Fittings) Regulations 1999. If these devices have unbalanced supplies, there must be single check valves installed at both inlets.

## Hot water pipework

Run the first part of the hot water distribution pipework in 22mm/¾", only reducing pipe diameter near the outlet, if required to suit the type of tap for example. You should aim to keep the run length of any hot water pipework from the cylinder to outlet to a practical minimum so the time taken for the hot water to reach the outlet is as quick as possible. Then connect the hot water pipework to the hot water draw-off on the cylinder (Position B in the diagram on page 7).

## Connections - heat pump coil

The cylinders are suitable for use with Ecodan PUZ-(H)WM Air Source heat pumps; see compatibility table below.

Make the heat pump flow and return connections (Position D on page 7). Note, the primary flow from the heat pump MUST be pumped. Gravity circulation is not suitable.

The heat pump cannot be vented through the cylinder.

Solid fuel boilers or any other boiler in which the energy input is not under effective thermostatic control, unless additional and appropriate safety measures are installed, should NOT be used. The primary circuit must be a sealed system type, maximum primary circuit pressure 3 bar, fitted with a correctly sized expansion vessel for the size of the heating system. Ecodan R32 heat pumps include an integral 3 bar PRV. No additional PRV's should be added to the circuit.

The primary flow pipework shall include the supplied 3-way diverter valve before the coil flow connection to control the heating of the cylinder.

## Water Quality and System Preparation

### General

The water in both primary and sanitary circuit should be clean and with pH value of 6.5-8.0.

The following are the maximum values:

- Calcium: 100 mg/L, Ca hardness: 250 mg/L, Chloride: 100 mg/L, Copper: 0.3 mg/L
- Other constituents should be to European Directive 98/83 EC standards.
- 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.

### Anti-freeze

Anti-freeze solutions MUST use propylene glycol with a toxicity rating of Class 1 as listed in Clinical Toxicology of Commercial Products, 5th Edition.

### Notes:

- 1) Ethylene glycol is toxic and MUST NOT be used in the primary water circuit in case of any cross-contamination of the potable circuit.
- 2) For 2-zone valve ON/OFF control, propylene glycol MUST be used.

### New and existing installations (primary water circuit)

Before connecting outdoor unit, thoroughly cleanse pipework of building debris, solder etc. using a suitable chemical cleansing agent.

Flush the system to remove chemical cleanser.

Add a combined inhibitor and anti-freeze solution to prevent damage to the pipework and system components.

Corrosion inhibitor should always be used.

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

## Heat Pump to Cylinder Compatibility

	Slimline		Standard		
	EHPT18X-UKHLDWB	EHPT21X-UKHLDWB	EHPT21X-UKHDWB	EHPT25X-UKHDWB	EHPT30X-UKHDWB
PUZ-WM50 VHA(-BS)	●	●	●		
PUZ-WM60 VAA(-BS)	●	●	●	●	
PUZ-WM85 (V-Y)AA(-BS)	●	●	●	●	●
PUZ-WM112 (V-Y)AA(-BS)	●	●	●	●	●
PUZ-HWM140(V-Y)HA	●	●	●	●	●

# Installation Instructions - Unvented Cylinders

## Minimum required water volume and required primary flow rates

Outdoor heat pump unit	Min. water volume	Required flow rate
PUZ-WM50VHA	7L	14.3L/min
PUZ-WM60VAA	9L	17.2L/min
PUZ-WM85(V-Y)AA	12L	24.4L/min
PUZ-WM112(V-Y)AA	16L	32.1L/min
PUZ-HWM140(V-Y)HA	20L	40.1L/min

If the interlock operation of primary and secondary pump is not available, ensure required additional water in only primary circuit. If the interlock operation of primary and secondary pump is available, ensure total water amount in primary and secondary circuit. In the case of shortage of required water amount, install a buffer tank.

## Secondary circulation connection

The cylinders can be used with secondary circulation if required. Use an appropriate WRAS approved bronze or stainless steel circulator in conjunction with a WRAS approved non-return valve to prevent backflow. On large secondary circulation systems it may be necessary to incorporate an extra expansion vessel into the circuit to accommodate the increased system water volume.

**Important:** Immersion to be wired via FTC6. For full instructions on wiring and fitting of the immersion heater refer to diagram opertit.

## Electrical supply to the immersion heater

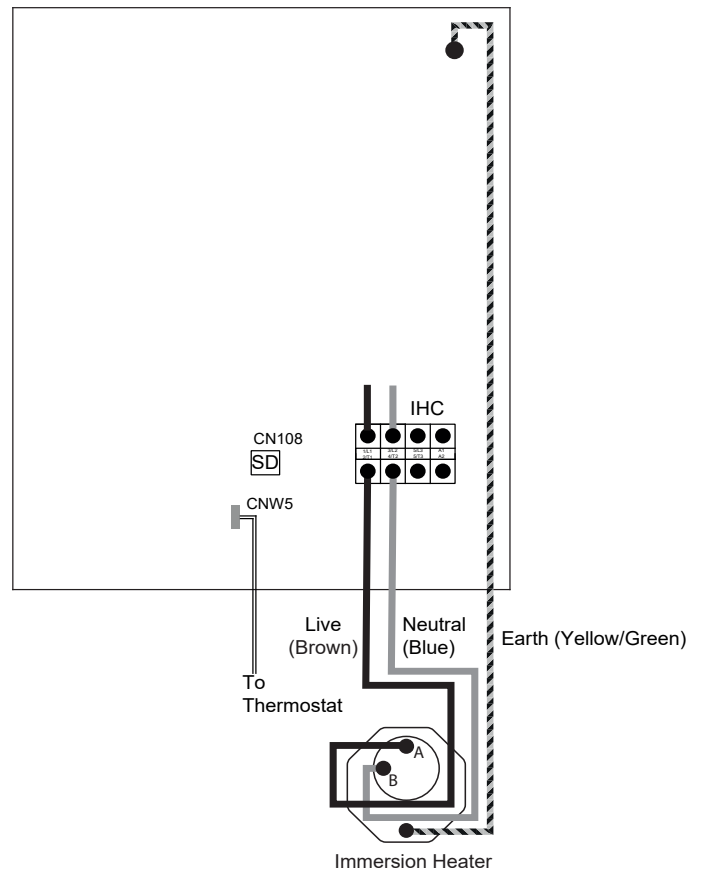
The unvented cylinder requires 230-240 Volt electrical supply for the immersion element. The electrical supply to the immersion heater must be fused at 16A via a double pole isolating switch that meets the current BS Standards. A breaker with at least 3.0mm contact separation in each pole shall be provided. Use an earth leakage breaker (NV). The breaker shall be provided to ensure the disconnection of all active phase conductors of the supply. The cable must be at least 2.5mm<sup>2</sup> heat resistant (85°C HOFR) sheathed flex complying to the current BS Standards.

## Electrical supply to the 3-way diverter valve

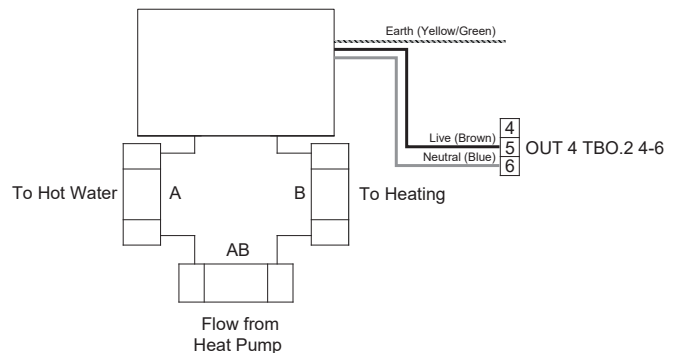
The 3-way diverter valve uses 230-240 Volt electrical supply. The valve head is supplied with 1m factory fitted lead for connecting via FTC box.

Do not grip the valve head while tightening or adjusting plumbing connections. Flow from the heat pump must be connected to AB, with flow to hot water cylinder connecting to A and flow to heating system connecting to B. The valve MUST NOT be fitted on return pipework. Valve head MUST NOT be mounted below horizontal level of pipework.

## Immersion Heater Wiring

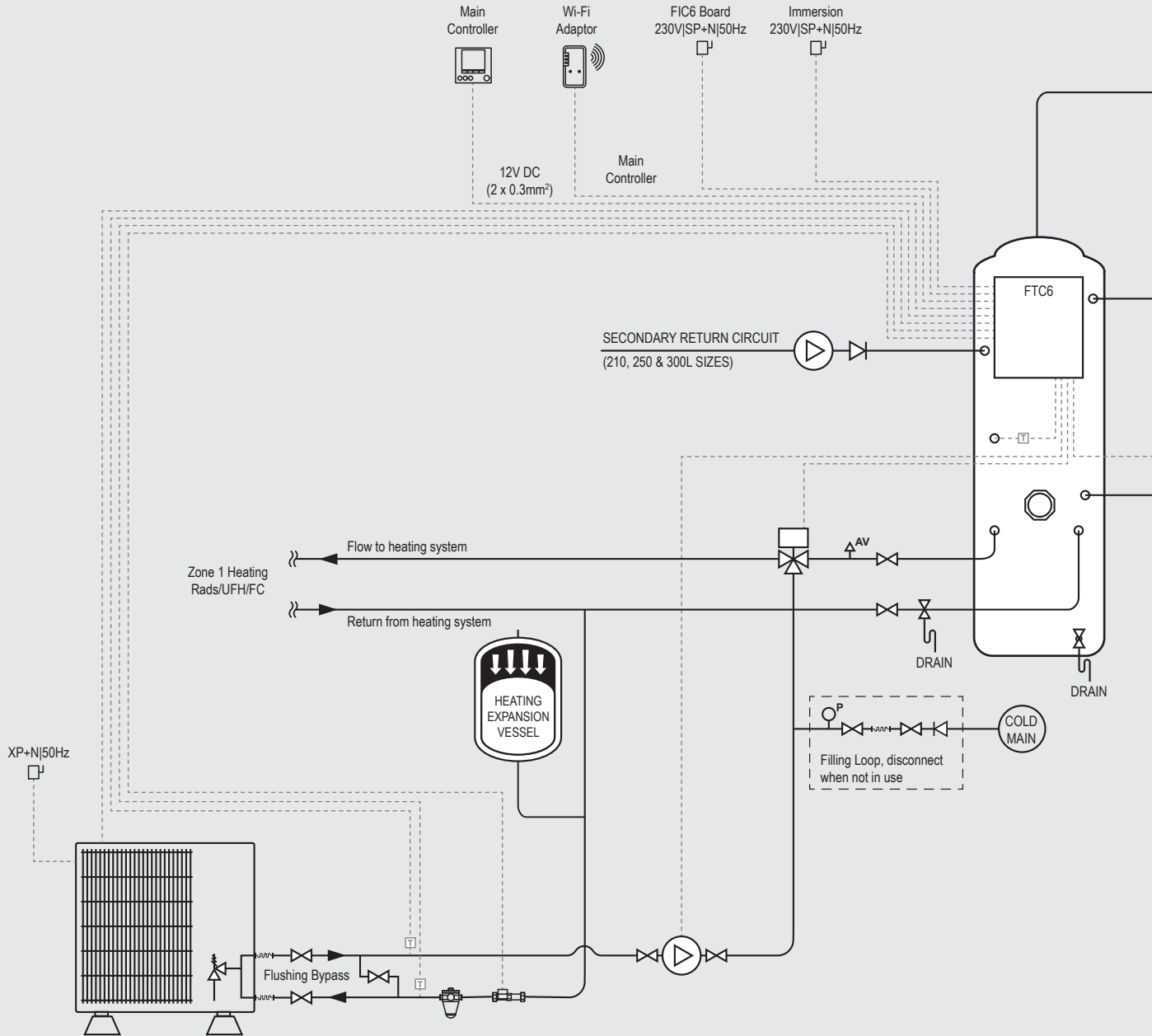


## 3-way Diverter valve

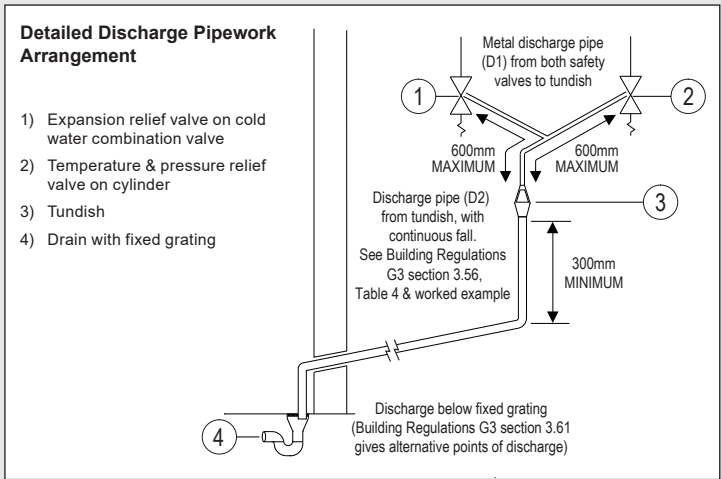
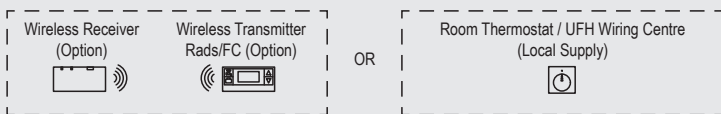
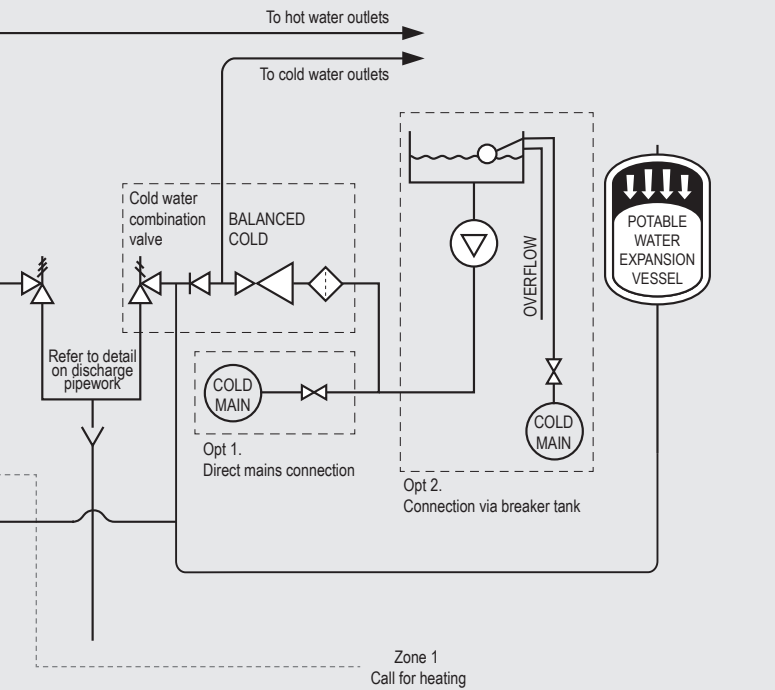


# Installation Instructions - Unvented Cylinders (cont.)

## System Schematic



# Installation Instructions - Unvented Cylinders (cont.)



## Key:

### Items supplied with cylinder

Pressure relief valve	Pressure reducing valve	Check valve	Inline strainer
1 x Cold water combination valve			
Pressure and temperature relief valve	Anti-splash tundish	3kW Titanium immersion heater	Potable water expansion vessel
3-way diverter valve	Main controller	Thermostat (cylinder)	Wi-Fi adaptor
Pressure gauge	Flexihose	Check valve	2x DN15 isolation valve
1 x Filling loop			
1 x Draincock (cylinder)			

### Other items

Full bore isolating valve	Drain cock	Air vent valve	Expansion vessel
Magnetic filter	Flow sensor	Circulation pump	Check valve
Flexihose	Thermostat	Wireless receiver	Wireless transmitter
Room thermostat/UFH wiring centre	Pressure and temperature relief valve	FTC6 Connector block	

# Installation Instructions - Unvented Cylinders (cont.)

## Discharge arrangement

You will need to position the inlet control group so that the discharge from both safety valves can be joined together via a 15mm tee (see diagram on page 13). Connect the tundish and then connect and route the discharge pipe.

Ensure all pipes to and from the tundish are cut square, are free from burrs or damage and that the tundish is fitted vertically.

The discharge pipework must be routed in accordance with Part G3 of schedule 1 of the Building Regulations.

The information that follows is not exhaustive and if you are in doubt you should seek advice.

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

**Note:** Although Building Regulations now permit the D2 pipe from the tundish to be installed in soil stacks within premises, we do not recommend this, as discharge from the temperature and pressure valve may continue for long periods of time. It is the installer's responsibility to ensure the discharge pipework can support the discharge for prolonged periods. If used, follow the guidance given in the G3 Building Regulations (mechanical seal without water trap). As discharge can be in excess of 90°C, discharge into plastic pipework is also not recommended.

The two safety valves will only discharge water under fault conditions. When operating normally water will not be discharged. The tundish should be located in the same space as the unvented hot water storage system and be fitted as close as possible to, and lower than, the safety device, with no more than 600mm of pipe between the valve outlet and the tundish. The tundish should be positioned away from electrical devices.

Any discharge should be visible at the tundish. The tundish should be located such that any discharge is visible. In addition, where discharges from safety devices may not be apparent, extra consideration should be given, e.g. for people with impaired vision or mobility. This could be via the installation of a suitable electronically operated or other safety device to warn when discharge takes place.

The discharge pipe (D2) from the tundish should:

- A Have a vertical section of pipe at least 300mm long, below the tundish before any elbows or bends in the pipework.
- B Be installed with a continuous fall of at least 1 in 200 thereafter.

The discharge pipe (D2) from the tundish should be of metal or other material that has been demonstrated to be capable of withstanding temperatures of the water discharged.

The discharge pipe (D2) should 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 9m long. Therefore, discharge pipes between 9m and 18m equivalent resistance length should be at least two sizes larger than the nominal outlet size of the safety device; between 18 and 27m at least three sizes larger. Bends

must be taken into account in calculating the flow resistance. Refer to the diagram, Table 2 and the worked example.

An alternative approach for sizing discharge pipes would be to follow BS EN 806:2 specifications for design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages.

The discharge pipe (D2) should terminate in a safe place where there is no risk to persons in the vicinity of the discharge. Examples of acceptable discharge arrangements are:

- A To a trapped gully with the end of the pipe below the fixed grating and above the water seal.
- B Downward discharges at a low level; i.e. up to 100mm above external surfaces such as car parks, hard standings, grassed areas etc. are acceptable, providing that – where children play or otherwise could come into contact with discharges – a visible wire cage or similar guard is positioned to prevent contact.
- C Discharges at a high level; e.g. into a metal hopper and metal down pipe with the end of the discharge pipe clearly visible; or onto a roof capable of withstanding high temperature discharges of water and 3m from any plastic guttering systems that would collect such discharges.
- D Device to warn when discharge takes place.

## Discharge worked example

The example below is for G1/2 temperature relief valve with a discharge pipe (D2) having four elbows and a length of 7m from the tundish to the point of discharge.

Maximum resistance allowed for a straight length of 22mm copper discharge pipe (D2) from a G1/2 temperature relief valve is: 9.0m.

Subtract the resistance for four 22mm elbows at 0.8m each = 3.2m.

Therefore the maximum permitted length equates to: 5.8m.

5.8m is less than the actual length of 7m, therefore calculate the next largest size.

Maximum resistance allowed for a straight length of 28mm pipe (D2) from a G1/2 temperature relief valve equates to: 14m.

As the actual length is 7m, a 28mm (D2) copper pipe will be satisfactory.

**Table 2:** Sizing of copper discharge pipe 'D2' for a temperature relief valve with a G1/2 outlet size (as supplied).

Size of discharge pipework	Maximum length of straight pipe (no bends or elbows)	Deduct the figure below from the maximum length for each bend or elbow in the discharge pipe
22mm	Up to 9m	0.8m
28mm	Up to 18m	1.0m
35mm	Up to 27m	1.4m

# Wiring Diagram

Symbol	Name
TB1	Terminal block <Power supply, Outdoor unit>
ECB2	Earth leakage or circuit breaker for immersion heater (Except PAC-IF07/B-E)
MP1	Water circulation pump (Space heating & DHW)
MP2	Water circulation pump 3 (Local supply)
MP3	Water circulation pump 3 (Space heating for Zone2/Local supply)
MP4	Water circulation pump 4 (DHW/Local supply)
3WV1	3-way valve (2-way valve 1/Local supply)
2WV2	2-way valve (For Zone 1/Local supply)
2WV3	2-way valve (For Zone 2/Local supply)
MXV	Mixing valve (Local supply)
HT	Thermostat (fixed temp) for immersion heater (Except PAC-IF07/B-E)
IH	Immersion heater (Except PAC-IF07/B-E)
CH	Control for immersion heater
TH1	Thermistor (Room temp) (Option)
TH2	Thermistor (Ref. liquid temp.) (Included in PAC-IF07/B-E)
THW1	Thermistor (Return water temp.)
THW2	Thermistor (DHW tank upper water temp.)
THW5A	Thermistor (DHW tank lower water temp.) (Included in PAC-IF07/B-E)
THW5B	Thermistor (DHW tank lower water temp.) (Option for PAC-IF07/072B-E)
THW5	Thermistor (Zone1 flow temp.) (Option)
THW7	Thermistor (Zone 2 return temp.) (Option)
THW8	Thermistor (Zone2 flow temp.) (Option)
THW9	Thermistor (Make tank upper temp.) (Option)
THW10	Thermistor (Make tank lower temp.) (Option)
THW11	Thermistor (Boiler flow temp.) (Option)
IN1	Room thermostat 1 (Local supply)
IN2	Flow switch 1 (Local supply)
IN3	Flow switch 2 (Local supply)
NM	Demand control (Local supply)
NO	Outdoor thermostat (Local supply)
NR	Room thermostat 2 (Local supply)
NR7	Flow switch 3 (Local supply)
IN8	Electric energy meter 1 (Local supply)
IN9	Electric energy meter 2 (Local supply)
IN10	Heat meter (Local supply)
IN11	Heat meter (Local supply)
IN12	Smart grid ready input (Local supply)
INAK1	Flow sensor (Option)
FLOW TEMP. CONTROLLER (FTC)	
TBO1-15	Terminal block <Outputs>
TBI-16	Terminal block <Signal inputs, Thermistor>
F2	Fuse (EG TB, 3A/250V)
SW1-6	DIP switch - See table 3
X1-16	Relay
LED1	Power supply (FTC)
LED2	Power supply (Main remote controller)
LED3	Communication (FTC-Outdoor unit)
LED4	Reading or writing data to SD card
CPWPM	Pump speed control signal for MP1
CH108	SD card connector

- Symbols used in wiring diagram are: terminal block. Function with asterisk (\*) may not be available depending on model types.
- Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
- Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for service.
- When connecting a booster heater, the wiring method is different according to the type of built-in thermostat. Please refer to the installation manual for details.

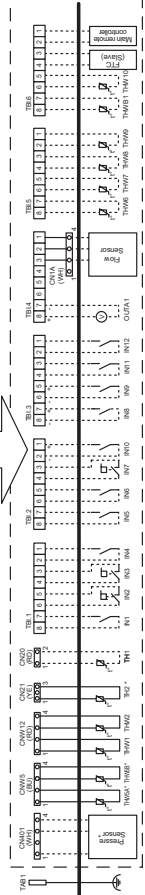
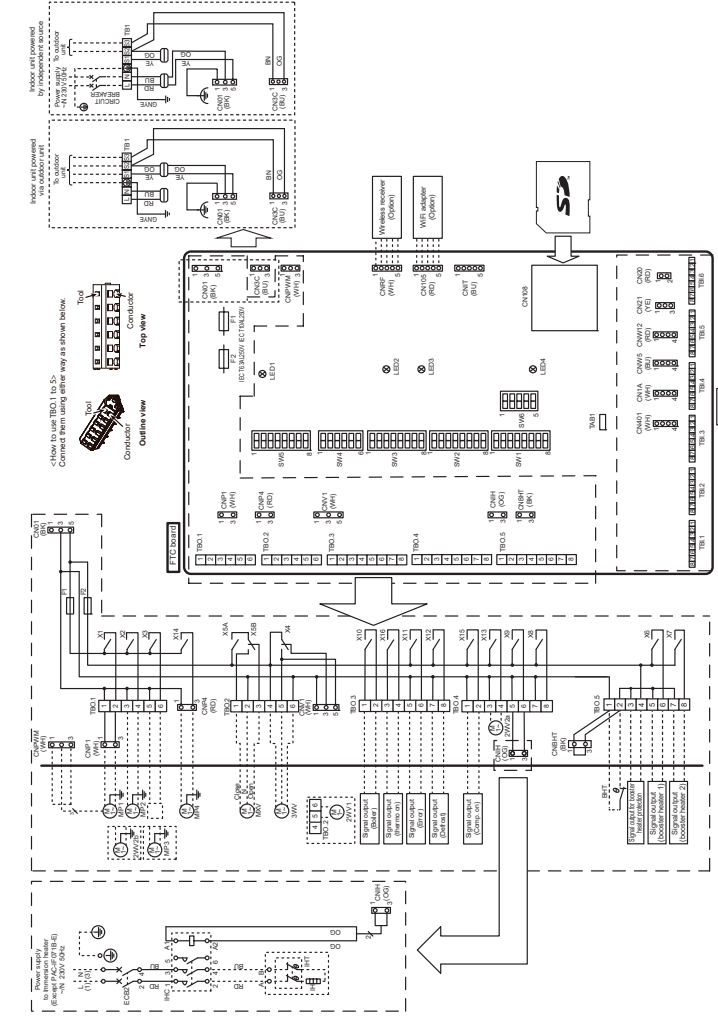


Table 4 Error Codes

Code	Error
L3	Circulation water temperature overheat protection
L4	DHW tank water temperature overheat protection
L5	Indoor unit temperature thermostat (THW1, THW2, THW5B, THW5, THW7, THW8, THW9) failure
L6	Flow sensor failure
L8	Heating operation error protection
L9	Low primary circuit flow rate detected by flow sensor or flow switch (flow switches 1, 2, 3)
LA	Pressure sensor failure
LB	High pressure protection
LC	Boiler circulation water temperature overheat protection
LD	Boiler water temperature thermostat (THWB1) failure
LE	Boiler operation error
LF	Boiler circulation failure
LH	Boiler circulation water freeze protection
LJ	Boiler operation error (type of external plate HEX)
LL	Setting errors of DIP switches on FTC control board
LP	Out of water flow rate range for outdoor heat pump unit
P1	Thermistor (Room temp.) (TH1) failure
P2	Thermistor (Ref. liquid temp.) (TH2) failure
P6	Antenna failure
J0	Communication failure between FTC and wireless receiver
J1-J8	Communication failure between FTC (Master) and FTC wireless remote controller
ED-E5	Communication failure between main remote controller and FTC
EE-EF	Communication failure between FTC and outdoor unit
EE	Outdoor unit receives no signal from indoor unit.
EE	Outdoor unit incorrect connection
U1-P1A	Outdoor unit failure

## FTC WIRING DIAGRAM <PAC-IF07\*B-E>

Item	Terminal block (Connect)	Item	OFF (Option)	ON (Short)
IN1	TB1.17-8	Room thermostat 1 input 1*1	Refer to SW2.1 in <Table 3 DIP Switch Functions>	
IN2	TB1.15-6	Flow switch 1	Refer to SW2.2 in <Table 3 DIP Switch Functions>	
IN3	TB1.13-4	Flow switch 2	Refer to SW2.3 in <Table 3 DIP Switch Functions>	
IN4	TB1.11-2	Demand control	Normal	
IN5	TB1.27-8	Standard opera- Heater operation 3	Boiler operation 3	
IN6	TB1.25-6	Room thermostat 2 input 1*	Refer to SW3.1 in <Table 3 DIP Switch Functions>	
IN7	TB1.23-4	Flow switch 3	Refer to SW3.2 in <Table 3 DIP Switch Functions>	
IN8	TB1.37-8	Electric energy meter 1		
IN9	TB1.35-6	Electric energy meter 2		
IN10	TB1.33-4	Smart grid ready		
IN11	TB1.31-2	Flow sensor		
INAK1	TB1.4.1-3	CN1A/Flow sensor		

- Set the ON/OFF cycle time of the room thermostat for 10 minutes or more.
- If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced. Please consult to select "Boiler" in external input setting screen in the service menu.

Table 2 Outputs

Name	Terminal block (Connect)	Item	ON	OFF
OUT1	TBO.1.1-2, CNP1	Water circulation pump 4 output (Space heating/cooling & DHW)	ON	OFF
OUT2	TBO.1.3-4	Water circulation pump 3 output (Space heating/cooling for Zone1)	ON	OFF
OUT3	TBO.1.5-6	Water circulation pump 3 output (Space heating/cooling for Zone2)*1	ON	OFF
OUT4	TBO.2.1-2	Mixing valve output 1*	Heating	Stop
OUT5	TBO.2.3	Booster heater 1 output	ON	OFF
OUT6	TBO.2.4	Booster heater 2 output	ON	OFF
OUT7	TBO.3.1-2	Boiler output	ON	OFF
OUT8	TBO.3.3-4	Boiler output	ON	OFF
OUT9	TBO.3.5-6	Error output	Normal	Defrost
OUT10	TBO.3.7-8	Defrost output 1*	ON	OFF
OUT11	TBO.3.9-10	Defrost output 2*	ON	OFF
OUT12	TBO.4.1-2	Water circulation pump 4 output (DHW)	ON	OFF
OUT13	TBO.4.3-4	Comp. ON signal	ON	OFF
OUT14	TBO.4.5-6	Thermo ON signal	ON	OFF
OUT15	TBO.5.1-2	Booster heater protection output (OFF/BT Open)	OFF	ON
OUT16	TBO.5.3-4	Booster heater protection output (thermostat normal Stop)	OFF	ON
OUT17	TBO.5.5-6	Booster heater protection output (thermostat normal Stop)	OFF	ON

Do not connect to the terminals that are indicated as "-" in the "Terminal block" field. For 2-zone temperature control.

Table 3 DIP switch functions

DIP switch	Function	OFF	ON	Default settings: Indoor unit (model)
SW1	Boiler	WITHOUT	WITH	Boiler
SW2	Head pump maximum outlet water temperature	55°C	60°C	55°C
SW3	DHW tank	WITHOUT	WITH	DHW tank
SW4	Immersion heater	WITHOUT	WITH	Immersion heater
SW5	Booster heater	WITHOUT	WITH	Booster heater
SW6	Booster heater	WITHOUT	WITH	Booster heater
SW7	Outdoor unit type	Split-type	Package type	Package type
SW8	Wireless remote controller	WITHOUT	WITH	Wireless remote controller
SW9	Room thermostat 1 (Zone operation)	WITHOUT	WITH	Zone operation
SW10	Room thermostat 2 (Zone operation)	WITHOUT	WITH	Zone operation
SW11	Flow switch 1 input (Failure detection at start)	Inactive	Active	Inactive
SW12	Capacity restoration (on at start)	Inactive	Active	Inactive
SW13	Coating mode function	Inactive	Active	Inactive
SW14	Automatic switch to bypass indoor coil (When the outdoor unit stops by error)	Inactive	Active	Inactive
SW15	Mixing tank	WITHOUT	WITH	Mixing tank
SW16	Room temperature	Inactive	Active	Inactive
SW17	Flow sensor	WITHOUT	WITH	Flow sensor

- External output (OUT11) will be available. For safety reasons, this function is not available for certain errors. (In that case, system operation must be stopped and only the water circulation pump keeps running).
- This switch functions only when the FTC unit is connected with a PUHZ-FRP outdoor unit. When another type of outdoor unit is connected, the heating mode function is not available.
- Space heating and DHW can be operated only in indoor unit, like an electric heater.
- If emergency mode is no longer required, return the switch to OFF position.
- Active only when SW4-1 is set to ON.

# Electrical Work

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 guarantee. All wiring should be according to national wiring regulations.

## FTC (Master) powered by independent source

If FTC (Master) and outdoor units have separate power supplies, the following requirements MUST be carried out:

- FTC (Master) unit electrical box connector connections changed.
- Outdoor unit DIP switch settings changed to SW8-3 ON.
- Turn on the outdoor unit before the FTC (Master).
- Power by independent source is not available for particular models of outdoor unit model.

For more details refer to the connecting outdoor unit installation manual.

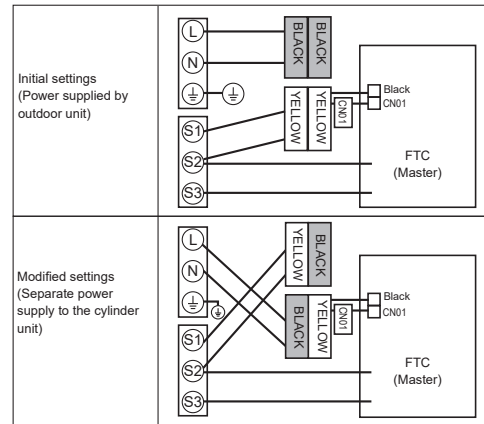
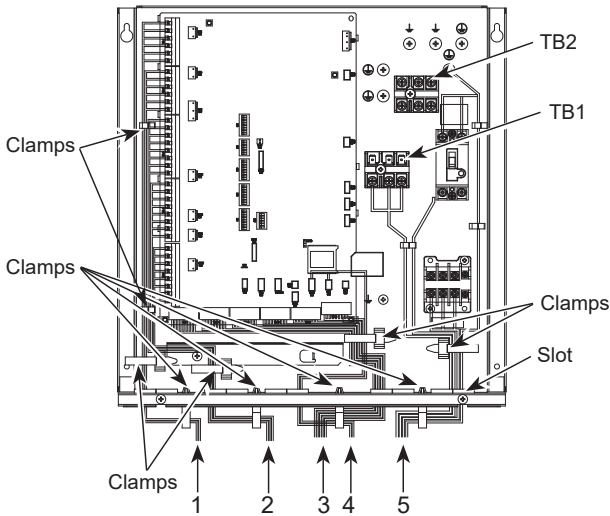


Fig. 19

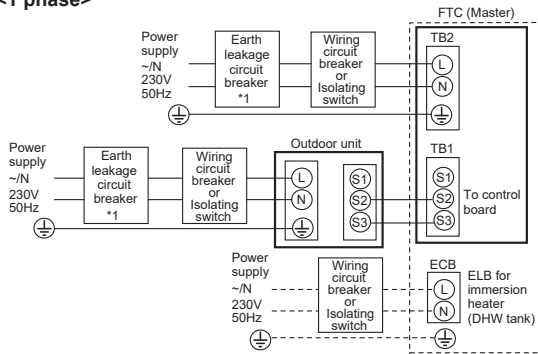


1. High voltage cables (OUTPUT)
2. High voltage cables (OUTPUT)
3. Low voltage cables (INPUT) and wireless receiver's cable
4. Thermistor cables
5. Power cables

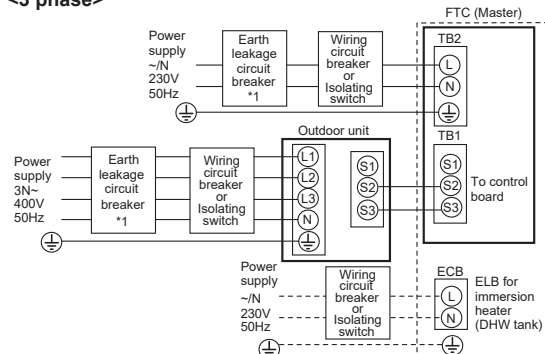
### Wiring for PAC-IF07\*B-E Notes:

1. Do not run the low voltage cables through a slot that the high voltage cables go through.
2. Do not run other cables except low voltage cables through a slot that the wireless receiver's cable goes through.
3. Do not bundle power cables together with other cables.
4. Bundle cables as figure above by using clamps.

### <1 phase>



### <3 phase>



## Electrical connections 1 phase/3 phase

\*1. If the installed earth leakage circuit breaker does not have an over-current protection function, install a breaker with that function along the same power line.

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.

**Note: In accordance with IEE regulations, the circuit breaker/isolating switch located on the outdoor unit should be installed with lockable devices (health and safety).**

FTC (Master) power supply		~N 230 V 50 Hz
FTC (Master) input capacity Main switch (Breaker)		*1 16 A
Wiring No. x size (mm <sup>2</sup> )	FTC (Master) power supply	2 x Min. 1.5
	FTC (Master) power supply earth	1 x Min. 1.5
	FTC (Master) - Outdoor unit	*2 2 x Min. 0.3
	FTC (Master) - Outdoor unit earth	—
Circuit rating	FTC (Master) L - N	*3 230V AC
	FTC (Master) - Outdoor unit S1 - S2	*3 —
	FTC (Master) - Outdoor unit S2 - S3	*3 24V DC

\*2. Max. 120m

\*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. FTC (Master) unit/outdoor unit connecting cords shall not be lighter than polychloroprene sheather flexible cord. (Design 60245 IEC57) FTC (Master) 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 individual heater. Insufficient power supply capacity might cause chattering.



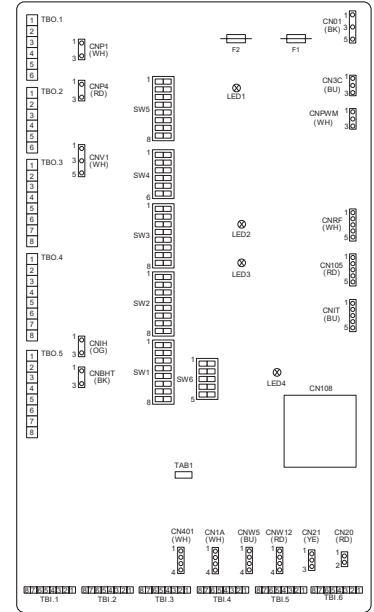
# Electrical Work

## Connecting inputs/outputs

### Signal inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 7-8	—	Room thermostat 1 input *1	Refer to SW2-1	
IN2	TBI.1 5-6	—	Flow switch 1 input	Refer to SW2-2	
IN3	TBI.1 3-4	—	Flow switch 2 input (Zone1)	Refer to SW3-2	
IN4	TBI.1 1-2	—	Demand control input	Normal	Heat source OFF/ Boiler operation *3
IN5	TBI.2 7-8	—	Outdoor thermostat input *2	Standard operation	Heater operation/ Boiler operation *3
IN6	TBI.2 5-6	—	Room thermostat 2 input *1	Refer to SW3-1	
IN7	TBI.2 3-4	—	Flow switch 3 input (Zone2)	Refer to SW3-2	
IN8	TBI.3 7-8	—	Electric energy meter 1	*4	
IN9	TBI.3 5-6	—	Electric energy meter 2		
IN10	TBI.2 1-2	—	Heat meter	*5	
IN11	TBI.3 3-4	—	Smart grid ready input		
INA1	TBI.4 1-3	CN1A	Flow sensor input	*6	

- \*1. Set the ON/OFF cycle time of the room thermostat for 10 minutes or more; otherwise the compressor may be damaged.
- \*2. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
- \*3. To turn on the boiler operation, use the main remote controller to select “Boiler” in “External input setting” screen in the service menu.
- \*4. Connectable electric energy meter and heat meter
- Pulse type Voltage free contact for 12V DC detection by FTC (TBI.2 1 pin, TBI.3 5 and 7 pins have a positive voltage.)
  - Pulse duration Minimum ON time: 40ms  
Minimum OFF time: 100ms
  - Possible unit of pulse 0.1 pulse/kWh 1 pulse/kWh 10 pulse/kWh  
100 pulse/kWh 1000 pulse/kWh
- Those values can be set by the main remote controller. (Refer to the menu tree in “7.2 Main remote controller”.)
- \*5. As for the smart grid ready, refer to “4.9 Smart grid ready”.
- \*6. Connectable flow sensor
- Power supply 5V DC
  - Measuring range 5 to 100 L/min.
- Those values can be set by the main remote controller.  
(Refer to <Auxiliary settings> on this page.)
- Flow signal 0.5V (at minimum flow rate) to 3.5V (at maximum flow rate)



### Wiring specification and local supply parts

Item	Name	Model and specifications
Signal input function	Signal input wire	Use sheathed vinyl coated cord or cable. Max. 30m Wire type: CV, CVS or equivalent Wire size: Stranded wire 0.13 mm <sup>2</sup> to 0.52 mm <sup>2</sup> Solid wire: ø0.4 mm to ø0.8 mm
	Switch	Non-voltage “a” contact signals Remote switch: minimum applicable load 12V DC, 1mA

Note: Stranded wire should be processed with insulation-covered bar terminal (DIN46228-4 standard compatible type).

### <Auxiliary settings>

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

Menu subtitle	Function/ Description	
Economy settings for pump	Water pump stops automatically in certain period of time from when operation is finished.	
Delay	Time before pump switched off*	
Electric heater (Heating)	To select “WITH booster heater (ON)” or “WITHOUT booster heater (OFF)” in Heating mode.	
Delay	The minimum time required for the booster heater to turn ON from after Heating mode has started.	
Electric heater (DHW)	To select “WITH (ON)” or “WITHOUT (OFF)” booster heater or immersion heater individually in DHW mode.	
Delay	The minimum time required for the booster heater or immersion heater to turn ON from after DHW mode has started. (This setting is applied for both booster and immersion heater.)	
Mixing valve control *2	Running	Period from valve fully open (at a hot water mixing ratio of 100%) to valve fully closed (at a cold water mixing ratio of 100%).
	Interval	Interval (min.) to control the Mixing valve.
Flow sensor	Minimum	The minimum flow rate to be detected at Flow sensor.
	Maximum	The maximum flow rate to be detected at Flow sensor.

- \*1. Decreasing “time before pump switched off” may increase the duration of stand-by in Heating/Cooling mode.
- \*2. Set the Running time according to the specification of the actuator of each mixing valve. It is recommended to set the interval to 2 minutes that is a default value. With the interval set longer, it could take longer to warm up a room.

# Electrical Work

## inputs

Name	Terminal block	Connector	Item	OFF (Open)
TH1	—	CN20	Thermistor (Room temp.) (Option) *1	PAC-SE41TS-E
TH2	—	CN21	Thermistor (Ref. liquid temp.) *2	—
THW1	—	CNW12 1-2	Thermistor (Flow water temp.)	—
THW2	—	CNW12 3-4	Thermistor (Return water temp.)	—
THW5A	—	CNW5 1-2	Thermistor (DHW tank upper water temp.)	—
THW5B	—	CNW5 3-4	Thermistor (DHW tank water temp.)	—
THW6	TBI.5 7-8	—	Thermistor (Zone1 flow water temp.) (Option) *1	PAC-TH011-E
THW7	TBI.5 5-6	—	Thermistor (Zone1 return water temp.) (Option) *1	PAC-TH011-E
THW8	TBI.5 3-4	—	Thermistor (Zone2 flow water temp.) (Option) *1	PAC-TH011-E
THW9	TBI.5 1-2	—	Thermistor (Zone2 return water temp.) (Option) *1	PAC-TH011-E
THWB1	TBI.6 7-8	—	Thermistor (boiler flow water temp.) (Option) *1	PAC-TH012HT(L)-E
THW10	TBI.6 5-6	—	Thermistor (Mixing tank water temp.) (Option) *1	PAC-TH012HT(L)-E

Ensure to wire thermistor wirings away from the power line and/or OUT1 to 16 wirings.

\*1. The maximum length of the thermistor wiring is 30m.

The length of the optional thermistors are 5m. If you need to splice and extend the wirings, following points must be carried out.

- 1) Connect the wirings by soldering.
- 2) Insulate each connecting point against dust and water. Stranded wire should be processed with insulation-covered bar terminal (DIN46228-4 standard compatible type).

\*2. Except PAC-IF072/073B-E

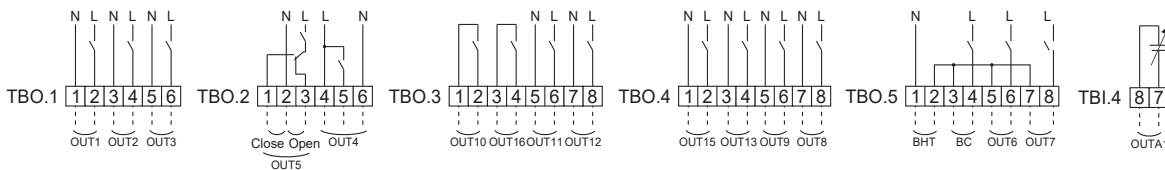
## Onputs

Name	Terminal block	Connector	Item	OFF	ON	Signal/Max. current	Max. total current
OUT1	TBO.1 1-2	CNP1	Water circulation pump 1 output (Space heating/cooling & DHW)	OFF	ON	230V AC 1.0A Max. (Inrush current 40A Max.)	4.0A (a)
OUT2	TBO.1 3-4	—	Water circulation pump 2 output (Space heating/cooling for Zone1)	OFF	ON	230V AC 1.0A Max. (Inrush current 40A Max.)	
OUT3	TBO.1 5-6	—	Water circulation pump 3 output (Space heating/cooling for Zone2) *1 2-way valve 2b output *2	OFF	ON	230V AC 1.0A Max. (Inrush current 40A Max.)	
OUT4	TBO.2 4-6	CNV1	3-way valve (2-way valve 1) output	Heating	DHW	230V AC 0.1A Max.	3.0A (b)
OUT5	TBO.2 1-2 TBO.2 2-3	—	Mixing valve output *1	Stop	Close Open	230V AC 0.1A Max.	
OUT6	TBO.5 5-6	—	Booster heater 1 output	OFF	ON	230V AC 0.5A Max. (Relay)	
OUT7	TBO.5 7-8	—	Booster heater 2 output	OFF	ON	230V AC 0.5A Max. (Relay)	
OUT8	TBO.4 7-8	—	Cooling signal output	OFF	ON	230V AC 0.5A Max.	
OUT9	TBO.4 5-6	CNIH	Immersion heater output	OFF	ON	230V AC 0.5A Max. (Relay)	—
OUT10	TBO.3 1-2	—	Boiler output	OFF	ON	Non-voltage contact 220 - 240V AC (30 V DC) 0.5A or less 10mA 5V DC or more	
OUT11	TBO.3 5-6	—	Error output	Normal	Error	230V AC 0.5A Max.	3.0A (b)
OUT12	TBO.3 7-8	—	Defrost output	Normal	Defrost	230V AC 0.5A Max.	
OUT13	TBO.4 3-4	—	2-way valve 2a output *2	OFF	ON	230V AC 0.1A Max.	
OUT14	—	CNP4	Water circulation pump 4 output (DHW)	OFF	ON	230V AC 1.0A Max.	4.0A (a)
OUT15	TBO.4 1-2	—	Comp. ON signal	OFF	ON	230V AC 0.5A Max.	3.0A (b)
OUT16	TBO.3 3-4	—	Heating/Cooling thermo ON signal	OFF	ON	Non-voltage contact 220 - 240V AC (30V DC) 0.5A or less 10mA 5V DC or more	—
OUTA1	TBI.4 7-8	—	Analog output	—	—	0 - 10V DC 5mA Max.	—
BC	TBO.5 3-4	—	Booster heater protection output	OFF (BHT open)	ON (BHT short)	230V AC 0.5A Max.	—
BHT	TBO.5 1-2	CNBHT	Thermostat for booster heater	Thermostat Normal: short	High temp.: open	—	—

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

\*1 For 2-zone temperature control.

\*2 For 2-zone valve ON/OFF control.



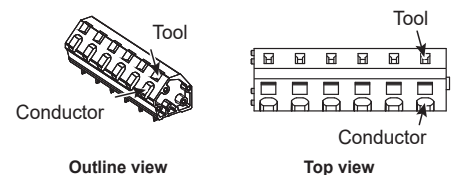
## Wiring specification and local supply parts

Item	Name	Model and Specification
External output function	Outputs wire	Use sheathed vinyl coated cord or cable. Max. 30m Wire type: CV, CVS or equivalent Wire size: Stranded wire 0.25mm <sup>2</sup> to 1.5mm <sup>2</sup> Solid wire: 0.25mm <sup>2</sup> to 1.5mm <sup>2</sup>

### Note:

1. When the FTC is powered via outdoor unit, the maximum grand total current of (a)+(b) is 3.0A.
2. Do not connect multiple water circulation pumps directly to each output (OUT1, OUT2 and OUT3). In such a case, connect them via (a) relay(s).
3. Connect an appropriate surge absorber to OUT10 (TBO.3 1-2) depending on the load at site.
4. Stranded wire should be processed with insulation-covered bar terminal (DIN46228-4 standard compatible type).

### How to use TBO.1 to 5



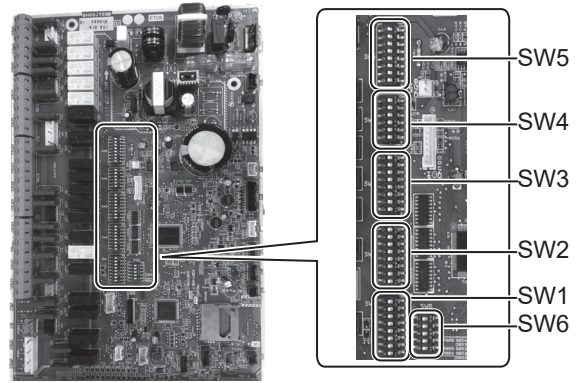
Connect them using either way as shown above.

# System Set Up

## DIP Switch Functions

Located on the FTC printed circuit board are 6 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 the table. Only an authorised installer can change DIP switch settings under one's own responsibility according to the installation condition. Make sure to turn off both indoor unit and outdoor unit power supplies before changing the switch settings.



DIP switch	Function	OFF	ON	Default settings: Indoor unit model	
SW1	SW1-1	Boiler	WITHOUT Boiler	WITH Boiler	OFF
	SW1-2	Heat pump maximum outlet water temperature	55°C	60°C	ON
	SW1-3	DHW tank	WITHOUT DHW tank	WITH DHW tank	ON
	SW1-4	Immersion heater	WITHOUT Immersion heater	WITH Immersion heater	ON
	SW1-5	Booster heater	WITHOUT Booster heater	WITH Booster heater	OFF
	SW1-6	Booster heater function	For heating only	For heating and DHW	OFF
	SW1-7	Outdoor unit type	Split type	Packaged type	ON
	SW1-8	Wireless remote controller	WITHOUT Wireless remote controller	WITH Wireless remote controller	OFF
SW2	SW2-1	Room thermostat1 input (IN1) logic change	Zone1 operation stop at thermostat short	Zone1 operation stop at thermostat open	OFF
	SW2-2	Flow switch1 input (IN2) logic change	Failure detection at short	Failure detection at open	OFF
	SW2-3	Booster heater capacity restriction	Inactive	Active	OFF
	SW2-4	Cooling mode function	Inactive	Active	OFF
	SW2-5	Automatic switch to backup heat source operation (When outdoor unit stops by error)	Inactive	Active *1	OFF
	SW2-6	Mixing tank	WITHOUT Mixing tank	WITH Mixing tank	OFF
	SW2-7	2-zone temperature control	Inactive	Active *4	OFF
	SW2-8	Flow sensor	WITHOUT Flow sensor	WITH Flow sensor	ON
SW3	SW3-1	Room thermostat 2 input (IN6) logic change	Zone2 operation stop at thermostat short	Zone2 operation stop at thermostat open	OFF
	SW3-2	Flow switch 2 and 3 input logic change	Failure detection at short	Failure detection at open	OFF
	SW3-3	—	—	—	OFF
	SW3-4	Electric energy meter	WITHOUT Electric energy meter	WITH Electric energy meter	OFF
	SW3-5	Heating mode function	Inactive	Active	ON
	SW3-6	2-zone valve ON/OFF control	Inactive	Active	OFF
	SW3-7	—	—	—	OFF
	SW3-8	Heat meter	WITHOUT Heat meter	WITH Heat meter	OFF
SW4	SW4-1	Multiple outdoor unit control	Inactive	Active	OFF
	SW4-2	Position of multiple outdoor unit control	Sub	Main	OFF
	SW4-3	—	—	—	OFF
	SW4-4	Indoor unit only operation (during installation work) *2	Inactive	Active	OFF
	SW4-5	Emergency mode (Heater only operation)	Normal	Emergency mode (Heater only operation)	OFF *3
	SW4-6	Emergency mode (Boiler operation)	Normal	Emergency mode (Boiler operation)	OFF *3
SW5	SW5-1	—	—	—	OFF
	SW5-2	Advanced auto adaptation	Inactive	Active	ON
	SW5-3	—	—	—	OFF
	SW5-4	—	—	—	OFF
	SW5-5	—	—	—	OFF
	SW5-6	—	—	—	OFF
	SW5-7	—	—	—	OFF
	SW5-8	—	—	—	OFF
SW6	SW6-1	—	—	—	OFF
	SW6-2	—	—	—	OFF
	SW6-3	Pressure sensor	Inactive	Active	OFF
	SW6-4	Analog output signal (0-10V)	Inactive	Active	OFF
	SW6-5	—	—	—	OFF

**Notes:** \*1. External output (OUT11) will be available. For safety reasons, this function is not available for certain errors. (In that case, system operation must be stopped and only the water circulation pump keeps running.)

\*2. Space heating and DHW can be operated only in indoor unit, like an electric heater. (Refer to "5.7 Indoor unit only operation".)

\*3. If emergency mode is no longer required, return the switch to OFF position.

\*4. Active only when SW3-6 is set to OFF.

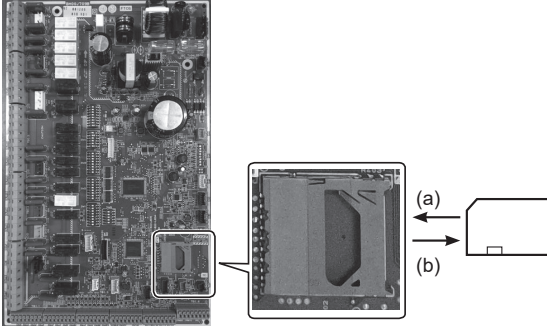
# System Set Up

## Using SD memory card

FTC is equipped with an SD memory card interface.

Using an SD memory card can simplify main remote controller settings and can store operating logs. \*1

store operating logs. \*1



FTC (Main)

(a) For insertion, push on the SD memory card until it clicks into place.

(b) For ejection, push on the SD memory card until it clicks.


**Note: To avoid cutting fingers, do not touch sharp edges of the SD memory card connector (CN108) on the FTC control board.**

Logos
These Logos are the trademark of SD-3C, LLC
Capacities
2 GB to 32 GB *2
SD speed classes
All

\*1 To edit main remote controller settings or to check operating data, an Ecodan service tool (for use with PC) is required.

\*2 A 2 GB SD memory card stores up to 30 days of operation logs.

### <Handling precautions>

- Use an SD memory card that complies with the SD standards. Check that the SD memory card has a logo on it of those shown.
- SD memory cards to the SD standards include SD, SDHC, mini SD, mini SDHC, micro SD, and micro SDHC. The capacities are available up to 32 GB. Choose that with a maximum allowable temperature of 55°C.
- When the SD memory card is a mini SD, mini SDHC, micro SD, or micro SDHC memory card, use an SD memory card converter adapter.
- Before writing to the SD memory card, release the write-protect switch. 
- Before inserting or ejecting an SD memory card, make sure to power off the system. If an SD memory card is inserted or ejected with the system powered on, the stored data could be corrupted or the SD memory card be damaged.  
\*An SD memory card is live for a while after the system is powered off. Before insertion or ejection wait until the LED lamps on the FTC control board are all off.
- The read and write operations have been verified using the following SD memory cards, however these operations are not always guaranteed as the specifications of these SD memory cards could change.

Manufacturer	Model	Tested in
Verbatim	#44015	Mar. 2012
SanDisk	SDSDB-002G-B35	Oct. 2011
Panasonic	RP-SDP04GE1K	Oct. 2011
Arvato	2GB PS8032 TSB 24nm MLC	Jun. 2012
Arvato	2GB PS8035 TSB A19nm MLC	Jul. 2014
SanDisk	SDSDUN-008G-G46	Oct. 2016
Verbatim	#43961	Oct. 2016
Verbatim	#44018	Oct. 2016
VantaTek	VSDHC08	Sep. 2017

Before using a new SD memory card (including the card that comes with the unit), always check that the SD memory card can be safely read and written to by the FTC controller.

### <How to check read and write operations>

- Check for correct wiring of power supply to the system. (Do not power on the system at this point.)
- Insert an SD memory card.
- Power on the system.
- The LED4 lamp lights if the read and write operations are successfully completed. If the LED4 lamp continues blinking or does not light, the SD memory card cannot be read or written to by the FTC controller.

- Make sure to follow the instruction and the requirement of the SD memory card's manufacturer.
- Format the SD memory card if determined unreadable in step (6). This could make it readable.  
Download an SD card formatter from the following site.  
SD Association homepage: <https://www.sdcard.org>
- FTC supports FAT file system but not NTFS file system.
- Mitsubishi Electric is not liable for any damages, in whole or in part, including failure of writing to an SD memory card, and corruption and loss of the saved data, or the like. Back up saved data as necessary.
- Do not touch any electronic parts on the FTC control board when inserting or ejecting an SD memory card, or else the control board could fail.

### Installation - Wi-Fi adapter

The cylinder units are supplied fitted with a Wi-Fi adapter which can be used to easily pair your Ecodan system to the internet to enable remote control, monitoring, maintenance and technical support. The Wi-Fi adapter is pre-wired to the FTC controller and is located at the front of the cylinder.

The installer must locate and mount the Wi-Fi adapter in a suitable location with good Wi-Fi signal strength (i.e. NOT within the FTC controller and not nearby automatic control devices such as automatic doors or fire alarms).

Please refer to the specific installation manual and setup quick reference guide provided. An instructional video is also available via the QR code.

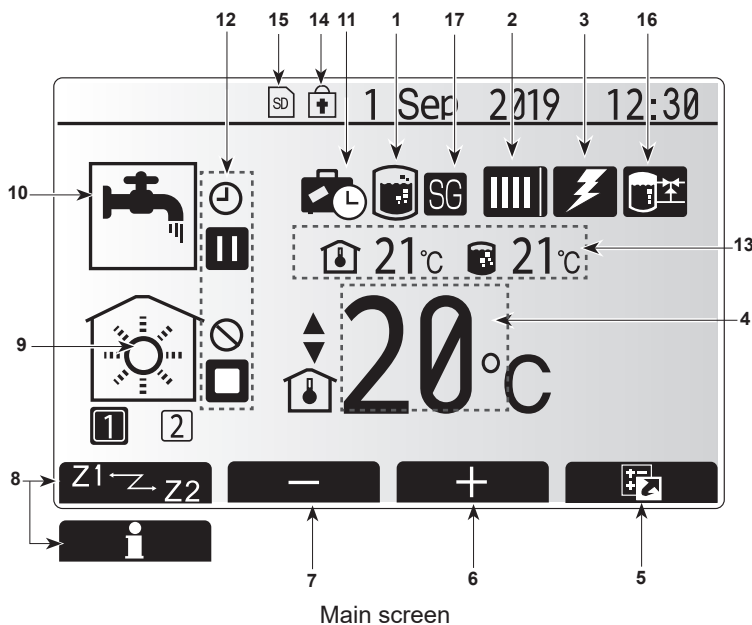
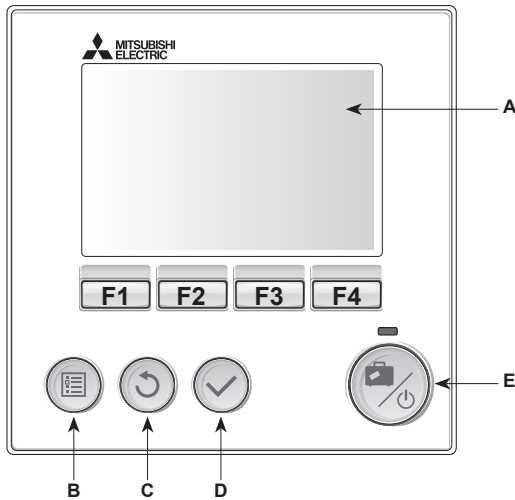
### Scan the QR-Code for MELCloud access points on Ecodan air source heat pumps



# System Set Up

## Main remote controller

To change the settings of your heating/cooling system, please use the main remote controller. The following is a guide to viewing the main settings. Should you require more information please contact your installer or local Mitsubishi Electric dealer.



### <Main remote 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 seconds 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 unit protection functions (e.g. freeze stat. function) will NOT operate. Please beware that without these safety functions enabled the cylinder unit may potentially become exposed to damage.**

### <Main screen icons>

Icon	Description
1 Legionella prevention	When this icon is displayed, 'Legionella prevention mode' is active.
2 Heat pump	<ul style="list-style-type: none"> <li>'Heat pump' is running.</li> <li>Defrosting</li> <li>Emergency heating</li> <li>'Quiet mode' is activated.</li> </ul>
3 Electric heater	When this icon is displayed, the 'Electric heaters' (booster or immersion heater) are in use.
4 Target temperature	<ul style="list-style-type: none"> <li>Target flow temperature</li> <li>Target room temperature</li> <li>Compensation curve</li> </ul>
5 OPTION	Pressing the function button below, this icon will display the option screen.
6 +	Increase set temperature.
7 -	Decrease set temperature.
8 Z1 Z2	<ul style="list-style-type: none"> <li>Pressing the function button below, this icon switches between Zone1 and Zone2.</li> <li>Information: Pressing the function button below, this icon displays the information screen.</li> </ul>
9 Space heating/cooling mode	<ul style="list-style-type: none"> <li>Heating mode Zone1 or Zone2</li> <li>Cooling mode Zone1 or Zone2</li> </ul>
10 DHW mode	Normal or ECO mode
11 Holiday mode	When this icon is displayed, 'Holiday mode' is active.
12	<ul style="list-style-type: none"> <li>Timer</li> <li>Prohibited</li> <li>Server control</li> <li>Stand-by</li> <li>Stand-by (*2)</li> <li>Stop</li> <li>Operating</li> </ul>
13 Current temperature	<ul style="list-style-type: none"> <li>Current room temperature</li> <li>Current water temperature of DHW tank</li> </ul>
14	The Menu button is locked or the switching of the operation modes between DHW and Heating operations are disabled in the Option screen. (*3)
15	<ul style="list-style-type: none"> <li>SD memory card is inserted. Normal operation.</li> <li>SD memory card is inserted. Abnormal operation.</li> </ul>
16 Buffer tank control	When this icon is displayed, 'Buffer tank control' is active.
17 Smart grid ready	When this icon is displayed, 'Smart grid ready' is active.

**\*2 This unit is in Stand-by whilst other indoor unit(s) is in operation by priority.**

**\*3 To lock or unlock the Menu, press the BACK and CONFIRM keys simultaneously for 3 seconds.**

# System Set Up

## Setting the main remote controller

After the power has been connected to the outdoor and cylinder units, the initial system settings can be entered via the main remote controller.

1. Check all breakers and other safety devices are correctly installed and turn on power to the system.
2. When the main remote controller is switched on for the first time, the screen automatically goes to Initial settings menu, Language setting screen and Date/Time setting screen in order.
3. Main remote controller will automatically start up. Wait approximately 6 minutes whilst the control menus load.
4. When the controller is ready, a blank screen with a line running across the top will be displayed.
5. Press button E (Power) to turn on the system. Before turning on the system, perform initial settings as instructed below.

## Initial setting wizard

When the main remote controller is switched on for the first time, the screen automatically goes to Language setting screen, Date/Time setting screen and Main settings menu screen in order. Enter the desired number using the function keys and press CONFIRM.

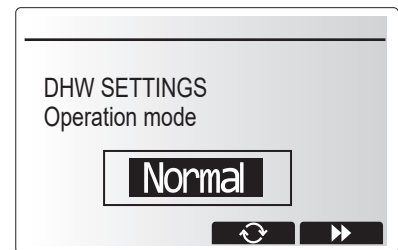
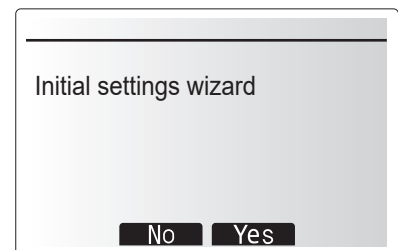
### Note:

<HEATER CAPACITY RESTRICTION>

This setting restricts the booster heater capacity. It is NOT possible to change the setting after starting up. If you do not have any special requirements (such as Building Regulations) in your country, skip this setting (select "No").

- Hot water (DHW/Legionella)
- Heating/Cooling
- Operation (ON/Prohibited/Timer)
- Pump speed
- Heat pump flow rate range
- Mixing valve control
- HEATER CAPACITY RESTRICTION

<sup>1</sup> The screen goes to the next setting screen. Changes have not been saved.



## 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 2 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.

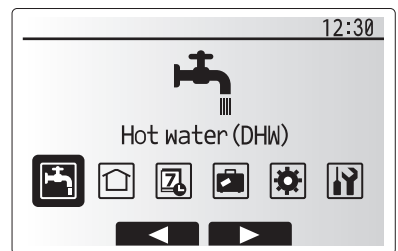
### Installer Level – Long press

If the MENU button is pressed down for 3 seconds, the main settings will be displayed with all functionality available.

The colour of ▼▼ buttons is inverted as per right figure.

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

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



Main menu



## General Operation

- To find the icon that you wish to set, use the F2 and F3 buttons to move between the icons.
- The highlighted icon will appear as a larger version of the centre of the screen.
- Press CONFIRM to select and edit the highlighted mode.
- Follow the <Main Remote Controller Menu Tree> for further setting, using ◀▶ buttons for scrolling or F1 to F4 for selecting.

# System Set Up

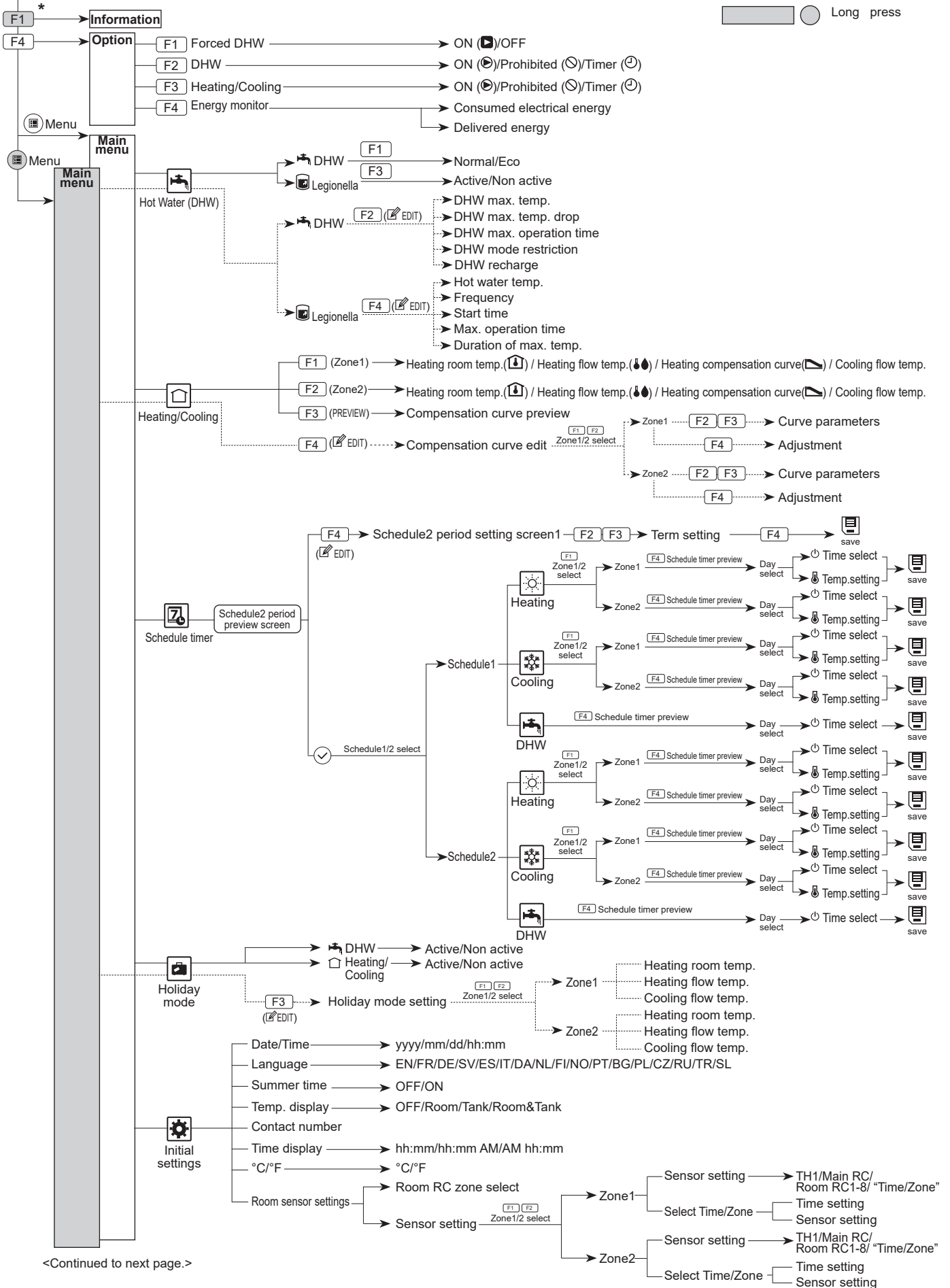
## <Main Remote Controller Menu Tree>

Initial

Main screen \* Short press for 1 Zone system.

Unrestricted access  
 Installer only

Long press

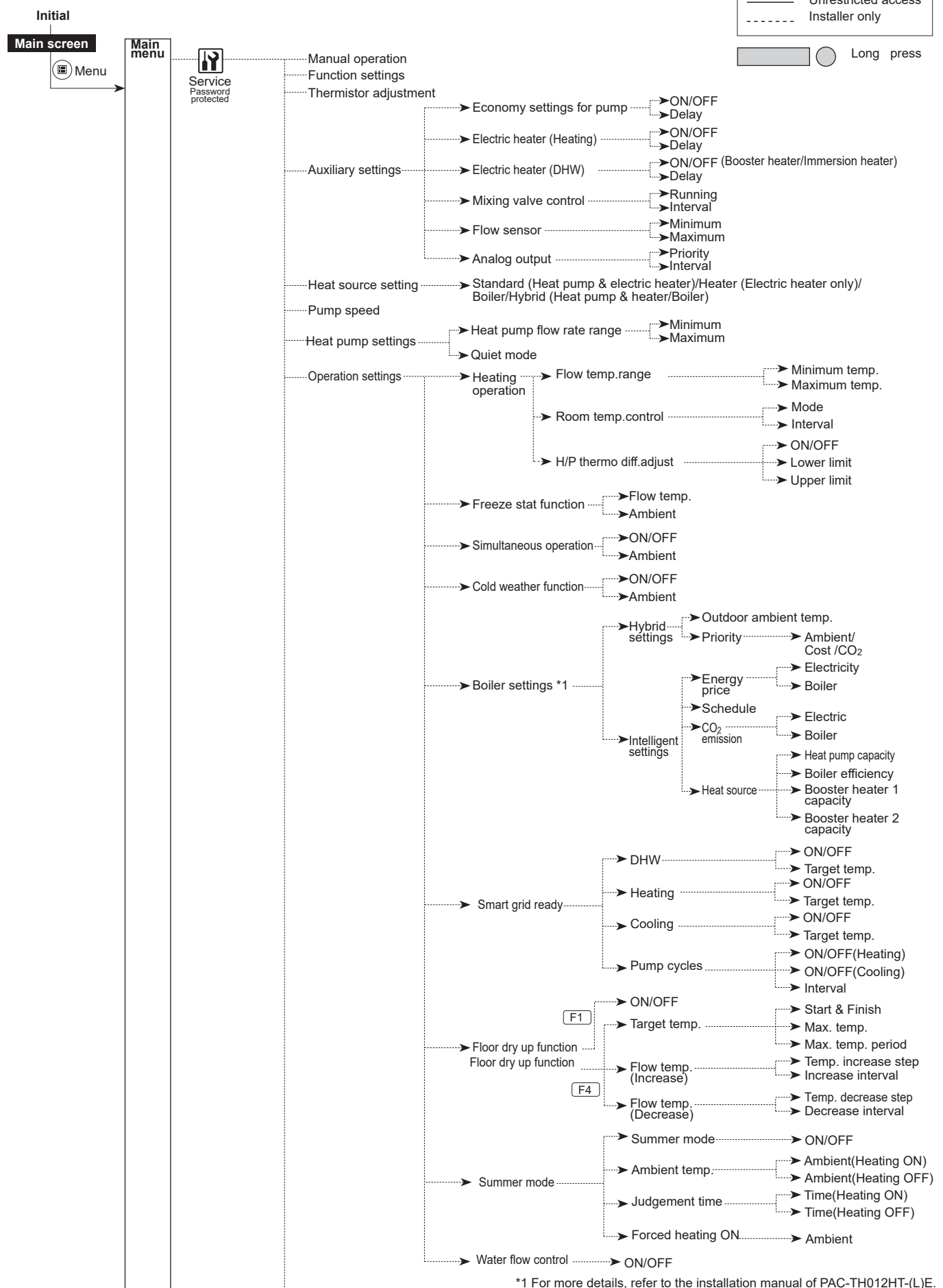


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# System Set Up

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## <Main Controller Menu Tree>



— Unrestricted access  
 - - - - - Installer only

◻ Long press

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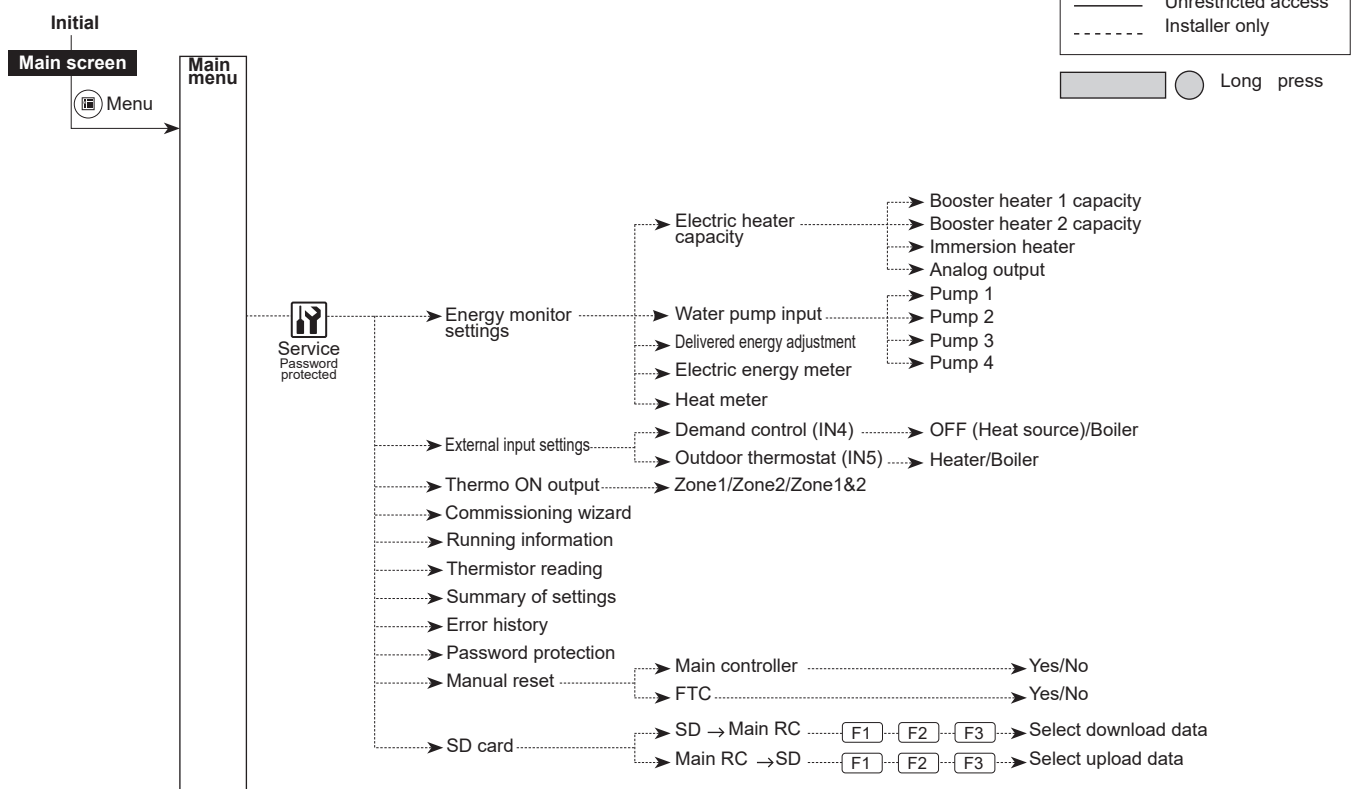
\*1 For more details, refer to the installation manual of PAC-TH012HT-(L)E.



# System Set Up

<Continued from the previous page.>

## <Main Controller Menu Tree>



## Domestic Hot Water (DHW)/Legionella Prevention

The domestic hot water and Legionella prevention menus control the operation of DHW 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 down the MENU button for 3 seconds, then select "hot water".
4. Press F2 key to display the HOT WATER (DHW) SETTING menu.
5. 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.
6. 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. temp. drop	Difference in temperature between DHW max. temp. and the temperature at which DHW mode restarts	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 pre-venting further stored water heating (only when DHW max. operation time has passed)	30 - 120	min.	30

\* When the DHW max. temp. is set over 55°C, the temperature at which DHW mode restarts must be less than 50°C to protect the device.

### <Eco mode>

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

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

### <[DHW recharge]>

Select the amount of DHW tank.

Return to the DHW/Legionella prevention menu.

# System Set Up

## Legionella Prevention Mode settings (LP mode)

1. Use button F3 to choose Legionella mode active YES/NO.
2. To edit the Legionella function, press down the MENU button for 3 seconds and select "hot water", then press F4 key.
3. Use F1 and F2 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.

Please note that LP mode uses the assistance of electric heaters 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**

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.

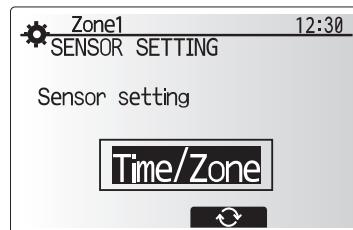
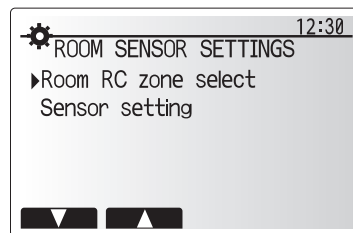
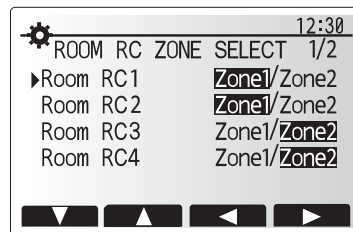
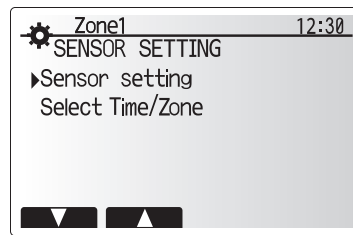
Menu subtitle	Function	Range	Unit	Default value
Hot water temp.	Desired temp. of stored hot water	60–70	°C	65
Frequency	Time between LP mode DHW tank heat up	1–30	day	15
Start time	Time when LP mode will begin	0:00–23:00	-	03:00
Max. operation time	Maximum time allowed for LP mode DHW tank heat	1–5	hour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

## Initial Settings

### <Room sensor settings>

For room sensor settings it is important to choose the correct room sensor depending on the heating mode the system will operate in.

1. From the Initial settings menu select Room Sensor Settings heat ups.
2. When 2-zone temperature control is active and wireless remote controllers are available, from Room RC Zone Select screen select zone no. to assign to each remote controller.
3. From Sensor Setting screen, select a room sensor to be used for monitoring the room temperature from Zone1 and Zone2 separately
4. From Sensor Setting screen, select Time/Zone to make it possible to use different room sensors according to the time schedule set in the Select Time/Zone menu. The room sensors can be switched up to 4 times within 24 hours.



# System Set Up

## Service Menu

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

The factory default password is "0000".

Follow the procedure described in General Operation for the set up operation.

Many functions cannot 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 remote controller will display a reminder message prompting the installer to stop operation before continuing. By selecting "Yes" the unit will cease operation.

### <Manual operation>

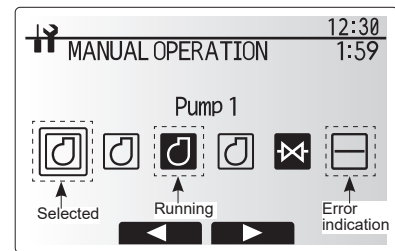
During the filling of the system the water circulation pump and 3-way valve can be manually overridden using manual operation mode.

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 FTC.

#### ► Example

Pressing F3 button will switch manual operation mode ON for the main 3-way valve. When filling of the DHW 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 FTC will resume control of the part.



Manual operation menu screen

Manual operation and heat source setting cannot 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 the last operation.

### <Operation settings>

#### Heating operation

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

Menu subtitle		Function	Range	Unit	Default
Flow temp. range	Minimum temp.	To minimise the loss by frequent ON and OFF in mild outdoor ambient temperature seasons.	20 to 45	°C	30
	Maximum temp.	To set max. possible flow temperature according to the type of heat emitters.	35 to 60	°C	50
Room temp. control	Mode	Setting for Room temp. control At Fast mode, target outlet water temperature is set higher than the one set at normal mode. This reduces the time to reach the target room temperature when the room temperature is relatively low.*	Normal/Fast	—	Normal
	Interval	Selectable according to the heat emitter type and the materials of floor (i.e. radiators, floor heating-thick, -thin concrete, wood, etc.).	10 to 60	min	10
Heat pump thermo diff. adjust	ON/OFF	To minimise the loss by frequent ON and OFF in mild outdoor ambient temperature seasons.	ON/OFF	—	ON
	Lower limit	Prohibits heat pump operation until the flow temperature drops below the target flow temperature plus lower limit value.	-9 to -1	°C	-5
	Upper limit	Allows heat pump operation until the flow temperature rises above the target flow temperature plus upper limit value.	+3 to +5	°C	+5

< Heating operation (Room temp. control table) >

#### Notes:

1. The minimum flow temperature that prohibits heat pump operation is 20°C.
2. The maximum flow temperature that allows heat pump operation equals to the maximum temperature set in the Flow temp. range menu.

\* Fast mode is not efficient and will increase running cost compared to normal mode.

#### Freeze stat function

Menu subtitle	Function/ Description
Freeze stat function *1	An operational function to prevent the water circuit from freezing when outdoor ambient temperature drops.
Flow t.	The target outlet water temperature at water circuit when operating in Freeze stat function. *2
Outdoor ambient temp.	Minimum outdoor ambient temperature which freeze stat function will begin to operate, (3–20°C) or choose **. If asterisk (**) is chosen freeze stat function is deactivated (i.e. primary water freeze risk)".

\*1. When the system is turned off, freeze stat function is not enabled.

\*2. Flow t. is fixed to 20°C and unchangeable.

#### Simultaneous Operation

For periods of very low outdoor ambient temperature this mode can be used. Simultaneous operation allows both DHW and space heating to run together by using the heat pump and/or booster heater to provide space heating whilst only 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.

- Range of outdoor ambient temperature at which simultaneous operation starts is -30 to 10°C (default -15°C).
- System shall automatically return to routine operation. This will happen when the outdoor ambient temperature rises above the selected temperature for this specific mode of operation.

# System Set Up

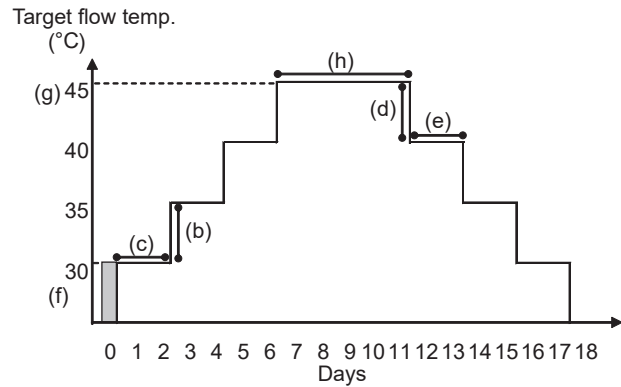
## <Floor dry up function>

The Floor dry up function automatically changes the target hot water temperature in stages to gradually dry concrete when this particular type of underfloor heating system is installed.

Upon completion of the operation the system stops all the operations except the Freeze stat.

For Floor dry up function, the target flow temp. of Zone1 is the same as that of Zone2.

- This function is not available when a PUHZ-FRP outdoor unit is connected.
- Disconnect wiring to external inputs of room thermostat, demand control and outdoor thermostat, or the target flow temperature may not be maintained.



Functions	Symbol	Description	Option/Range	Unit	Default	
Floor dry up function	a	Sets the function to ON and power on the system using the main remote controller and the dry up heating operation will start.	ON/OFF	—	OFF	
Flow temp. (increase)	Flow temp. increase step	b	Sets the increase step of the target flow temperature.	+1 to +10	°C	+5
	Increase interval	c	Sets the period for which the same target flow temperature is maintained.	1 to 7	day	2
Flow temp. (decrease)	Flow temp. decrease step	d	Sets the decrease step of the target flow temperature.	-1 to -10	°C	-5
	Decrease interval	e	Sets the period for which the same target flow temperature is maintained.	1 to 7	day	2
Target temperature	Start & Finish	f	Sets the target flow temperature at the start and the finish of the operation.	20 to 60	°C	30
	Max. target temp.	g	Sets the maximum target flow temperature.	20 to 60	°C	45
	Max. temp. period	h	Sets the period for which the maximum target flow temperature is maintained.	1 to 20	day	5

# System Set Up

## <Energy monitor settings>

In this menu, all parameters required to record the consumed electrical energy and the delivered heat energy which is displayed on the main remote controller can be set. The parameters are: an electric heater capacity, supply power of water pump and heat meter pulse.

### Demand control (IN4)

The selection of "OFF", whilst a signal is being sent to IN4, forcefully stops all the heat source operations and the selection of "Boiler" stops operations of heat pump and electric heater and performs boiler operation.

### Outdoor thermostat (IN5)

The selection of "Heater", whilst a signal is being sent to IN5, performs electric-heater-only operation and the selection of "Boiler" performs boiler operation.

## <Password protection>

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

### 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 seconds
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**.

### <Manual reset>

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



Password input screen

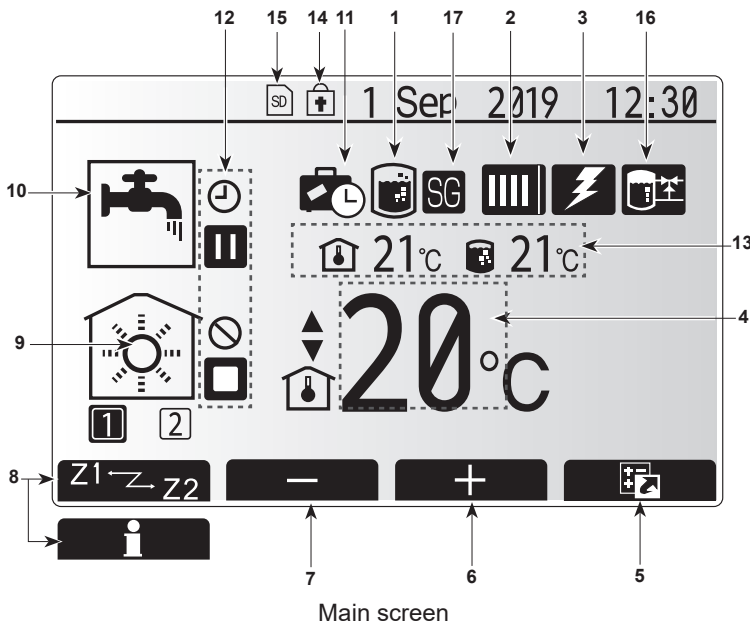
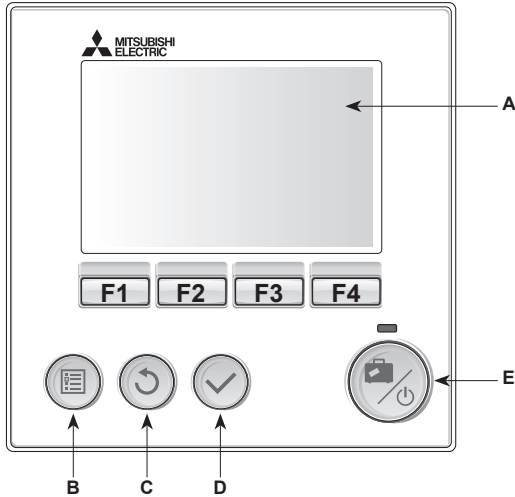


Password verify screen

# Operator and owner info

## Main remote controller

To change the settings of your heating/cooling system please use the main remote controller located on the front panel of the cylinder unit or hydrobox. The following is a guide to viewing the main settings. Should you require more information please contact your installer or local Mitsubishi Electric dealer. Cooling mode is available for ERS series only. However, Cooling mode is not available when the indoor unit is connected to PUHZ-FRP.



### <Main remote 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 seconds 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 unit protection functions (e.g. freeze stat. function) will NOT operate. Please beware that without these safety functions enabled the cylinder unit may potentially become exposed to damage.

### <Main screen icons>

Icon	Description								
1	Legionella prevention When this icon is displayed, 'Legionella prevention mode' is active.								
2	Heat pump <table border="1"> <tr> <td></td> <td>'Heat pump' is running.</td> </tr> <tr> <td></td> <td>Defrosting</td> </tr> <tr> <td></td> <td>Emergency heating</td> </tr> <tr> <td></td> <td>'Quiet mode' is activated.</td> </tr> </table>		'Heat pump' is running.		Defrosting		Emergency heating		'Quiet mode' is activated.
	'Heat pump' is running.								
	Defrosting								
	Emergency heating								
	'Quiet mode' is activated.								
3	Electric heater When this icon is displayed, the 'Electric heaters' (booster or immersion heater) are in use.								
4	Target temperature <table border="1"> <tr> <td></td> <td>Target flow temperature</td> </tr> <tr> <td></td> <td>Target room temperature</td> </tr> <tr> <td></td> <td>Compensation curve</td> </tr> </table>		Target flow temperature		Target room temperature		Compensation curve		
	Target flow temperature								
	Target room temperature								
	Compensation curve								
5	OPTION Pressing the function button below, this icon will display the option screen.								
6	+	Increase set temperature.							
7	-	Decrease set temperature.							
8	Z1 Z2 Pressing the function button below, this icon switches between Zone1 and Zone2. Information Pressing the function button below, this icon displays the information screen.								
9	Space heating/cooling mode <table border="1"> <tr> <td></td> <td>Heating mode Zone1 or Zone2</td> </tr> <tr> <td></td> <td>Cooling mode Zone1 or Zone2</td> </tr> </table>		Heating mode Zone1 or Zone2		Cooling mode Zone1 or Zone2				
	Heating mode Zone1 or Zone2								
	Cooling mode Zone1 or Zone2								
10	DHW mode Normal or ECO mode								
11	Holiday mode When this icon is displayed, 'Holiday mode' activated.								
12		Timer							
		Prohibited							
		Server control							
		Stand-by							
		Stand-by (*2)							
		Stop							
		Operating							
13	Current temperature <table border="1"> <tr> <td></td> <td>Current room temperature</td> </tr> <tr> <td></td> <td>Current water temperature of DHW tank</td> </tr> </table>		Current room temperature		Current water temperature of DHW tank				
	Current room temperature								
	Current water temperature of DHW tank								
14	 The Menu button is locked or the switching of the operation modes between DHW and Heating operations are disabled in the Option screen. (*3)								
15	 SD memory card is inserted. Normal operation.								
	 SD memory card is inserted. Abnormal operation.								
16	Buffer tank control When this icon is displayed, 'Buffer tank control' is active.								
17	Smart grid ready When this icon is displayed, 'Smart grid ready' is active.								

\*2 This unit is in Stand-by whilst other indoor unit(s) is in operation by priority.

\*3 To lock or unlock the Menu, press the BACK and CONFIRM keys simultaneously for 3 seconds.

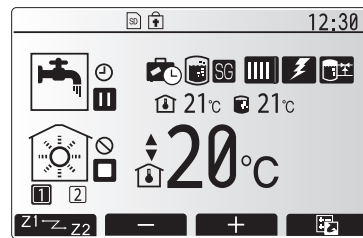
# Operator and owner info

## ■ General Operation

In general operation the screen displayed on the main remote controller will be shown as in the figure on the right.

This screen shows the target temperature, space heating mode, DHW mode (if DHW tank is present in system), any additional heat sources being used, holiday mode, and the date and time.

You should use the function buttons to access more information. When this screen is displayed pressing F1 will display the current status and pressing F4 will take the user to the option menu screen.



Home screen

## Option screen

This screen shows the main operating modes of the system. Use function buttons to switch between Operating (▶), Prohibited (⊘) and Timer (⌚) for DHW and space heating/cooling, or detailed information on energy or capacity.

The option screen allows quick setting of the following;

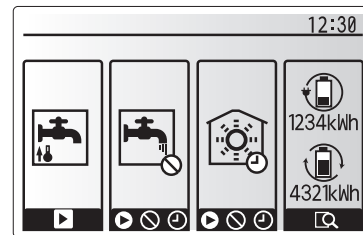
- Forced DHW (if DHW tank present) — to turn ON/OFF press F1
- DHW operating mode (if DHW tank present) — to change mode press F2
- Space heating/cooling operating mode — to change mode press F3
- Energy monitor

Following accumulated energy values are displayed.

⌚ : Consumed electrical energy in total (month-to-date)

🔥 : Delivered heat energy in total (month-to-date)

To monitor the energy values in each operation mode for [month-to-date/ last month/ the month before last/ year-to-date/ last year], press F4 to access to the Energy monitor menu.



Option screen

## Note:

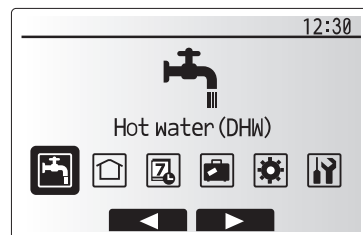
**If a certain accuracy is required for the monitoring, the method to display captured data from external energy meter(s) should be set up. Contact your installer for further details.**

## ■ Main Settings Menu

To access the main settings menu press button B 'MENU'

The following menus will be displayed;

- [DHW]  
(Cylinder unit or hydrobox (or FTC BOX) plus locally supplied DHW tank)
- [Heating/Cooling]
- [Schedule timer]
- [Holiday mode]
- [Initial settings]
- [Service] (Password protected)



Main settings menu screen

## ⚙️ [Initial Settings]

1. From the main settings menu use F2 and F3 buttons to highlight 'Initial settings' icon and select by pressing CONFIRM.
2. Use F1 and F2 buttons to scroll through the menu list. When the required title is highlighted then press CONFIRM to edit.
3. Use the relevant function buttons to edit each initial setting then press CONFIRM to save the setting.

Initial settings that can be edited are

- [Date/Time] \*Be sure to set it to the local standard time.
- [Language]
- [Summer time]
- [Temp. display]
- [Contact number]
- [Time display]
- [°C/°F]
- [Room sensor settings]

To return to the main settings menu press the BACK button.

Icon	Description
	[Hot water (DHW)]
	[Heating/Cooling]
	[Schedule timer]
	[Holiday mode]
	[Initial settings]
	[Service]

# Operator and owner info

## [Room sensor settings]

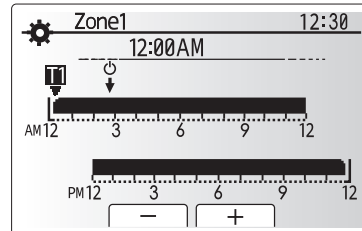
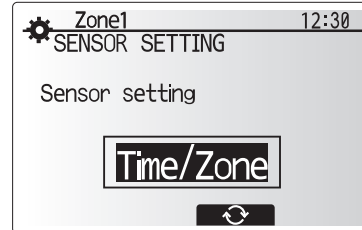
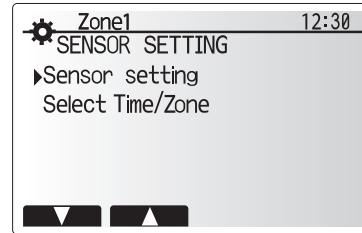
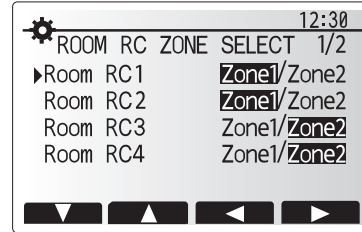
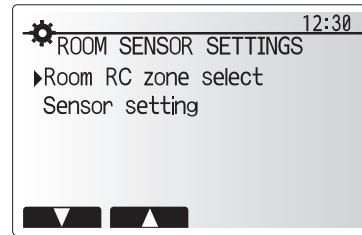
For room sensor settings it is important to choose the correct room sensor depending on the heating mode the system will operate in.

- From the Initial settings menu select Room sensor settings.
- When 2-zone temperature control is active and wireless remote controllers are available, from Room RC zone select screen, select zone No. to assign to each remote controller.
- From Sensor setting screen, select a room sensor to be used for monitoring the room temperature from Zone1 and Zone2 separately.

Control option (Website manual)	Corresponding initial settings room sensor	
	Zone1	Zone2
A	Room RC1-8 (one each for Zone1 and Zone2)	*
B	TH1	*
C	Main remote controller	*
D	*	*

\* Not specified (if a field-supplied room thermostat is used)  
Room RC1-8 (one each for Zone1 and Zone2) (if a wireless remote controller is used as a room thermostat)

- From Sensor setting screen, select Time/Zone to make it possible to use different room sensors according to the time schedule set in the Select Time/Zone menu. The room sensors can be switched up to 4 times within 24 hours.



Time/Zone schedule setting screen

## Domestic Hot Water (DHW)/Legionella Prevention

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

### <Eco mode>

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

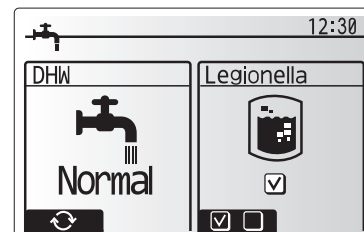
**Note: The actual energy saved in Eco mode will vary according to outdoor ambient temperature.**

Return to the DHW/legionella prevention menu.

### 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 from routinely switching to space heating/cooling and continue to provide DHW tank heating.

Forced DHW operation is activated by pressing button F1 and Back button in the 'Option Screen'. After DHW operation finishes, the system will automatically return to normal operation. To cancel forced DHW operation hold down button F1 in the 'Option Screen'.









# Operator and owner info

## [Heating/Cooling]

The heating/cooling menus deal with space heating/cooling using normally either a radiator, fan-coil, or underfloor heating/cooling system depending on the installation.

There are 3 heating modes

- Heating room temp. (Auto adaptation) 
- Heating flow temp. 
- Heating compensation curve 
- Cooling flow temp. 

### Room temp. (Auto adaptation) mode

The controller uses temperature sensors around the heating system to monitor space 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 temperature of water flowing to the space heating circuit accordingly. By monitoring not only the outdoor ambient, but the room and heating circuit water temperatures, the heating is more consistent and sudden spikes in required heat output are reduced. This results in a lower overall flow temperature being required.

### Flow temp. mode

The temperature of the water flowing to the heating circuit is set by the installer to best suit the space heating/cooling system design, and the user's desired requirements.

### 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 FTC 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.

Your installer will set the parameters of the graph depending on local conditions and type of space heating used in your home. It should not be necessary for you to alter these settings. If however, you find that over a reasonable operating period the space heating is not heating or is overheating your home, please contact your installer so they can check your system for any problems and update these settings if necessary.

## [Holiday mode]

Holiday mode can be used to keep the system running at lower flow temperatures and thus reduced power usage whilst the property is unoccupied. Holiday mode can run either flow temp., room temp., heating, compensation curve heating and DHW all at reduced flow temperatures to save energy if the occupier is absent.

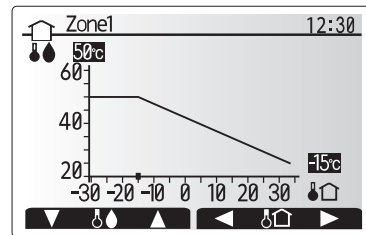
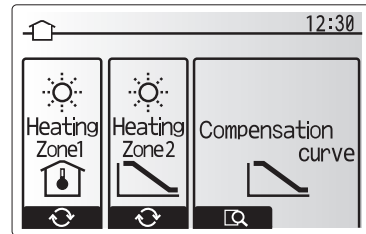
From the main menu screen, press button E should be pressed. Be careful not to hold down button E for too long as this will turn off the controller and system.



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.

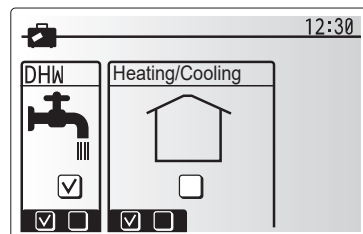
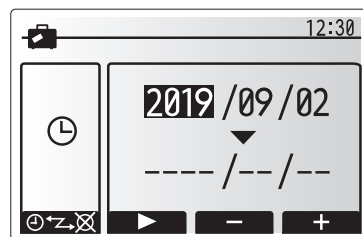
- Press button F1 to activate or deactivate holiday mode.
- Use buttons F2, F3 and F4 to input the date on which you would like holiday mode to activate or deactivate holiday mode for space heating.

### Editing holiday mode

Refer to the menu tree in "Main remote controller" of the Installation Manual. Should you require the Holiday mode settings e.g. the flow temp., room temp. to be altered you should contact your installer.



 : Flow temp.  
 : Outdoor ambient temp.



# Operator and owner info

## [Schedule timer]

Scheduled timer can be set in two ways, for example; one for summer and the other for winter. (Refer to as "Schedule 1" and "Schedule 2" respectively.) Once the term (months) for the Schedule 2 is specified, rest of the term will be specified as Schedule 1. In each Schedule, an operational pattern of modes (Heating/Cooling/DHW) can be set. If no operational pattern is set for Schedule 2, only the pattern for Schedule 1 will be valid. If Schedule 2 is set to full-year (i.e. March to Feb.), only the operational pattern for Schedule 2 will be valid.

The schedule timer is activated or deactivated in the option screen. (See 'General Operation' section)

### <Setting the Schedule period>

1. From the main settings menu use F2 and F3 to highlight the schedule icon then press CONFIRM.
2. The Schedule period preview screen is displayed.
3. To change the Schedule period, press F4. button.
4. The time bar edit screen is displayed.
5. Use F2/F3 button to point at a starting month of the Schedule 2, then press CONFIRM.
6. Use F2/F3 button to point at an ending month of the Schedule 2, then press CONFIRM.
7. Press F4 to save settings.

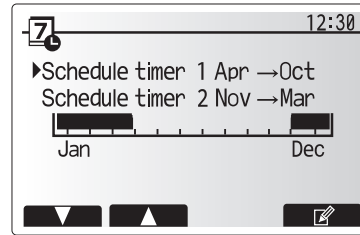
### <Setting the Schedule timer>

1. From the main settings menu use F2 and F3 to highlight the schedule icon then press CONFIRM.
2. From the Schedule 2 period preview screen use F1 and F2 to scroll through the selecting each subtitle in turn by pressing CONFIRM.
3. The schedule timer sub menu will be displayed. The icons show the following modes;
  - [Heating]
  - [Cooling]
  - [DHW]
4. Use F2 and F3 buttons to move between mode icons press CONFIRM to be shown the PREVIEW screen for each mode.

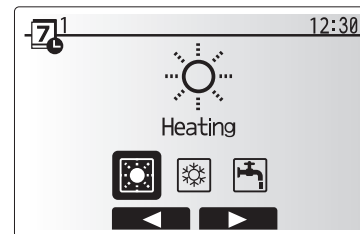
The preview screen allows you to view the current settings. In 2-zone heating/cooling operation, press F1 to switch between Zone1 and Zone2. Days of the week are displayed across the top of the screen. Where day appears underlined the settings are the same for all those days. Hours of the day and night are represented as a bar across the main part of the screen. Where the bar is solid black, space heating/cooling and DHW (whichever is selected) is allowed.

5. In the preview menu screen press F4 button.

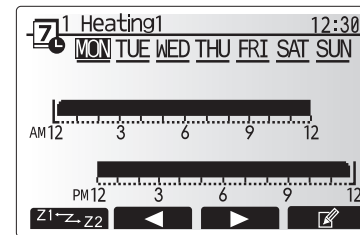
6. First select the days of the week you wish to schedule.
7. Press F2/F3 buttons to move between days and F1 to check or uncheck the box.
8. When you have selected the days press CONFIRM.



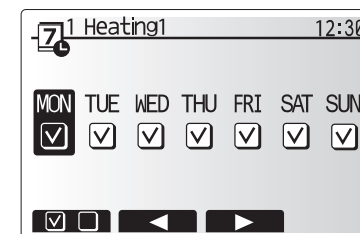
Schedule 2 period preview screen



Schedule 1 mode select screen



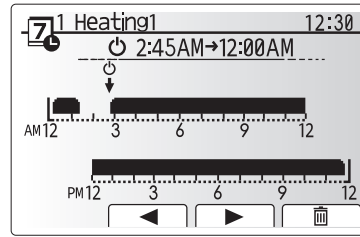
Preview screen



Day of week select screen

# Operator and owner info

9. The time bar edit screen will be displayed.
10. 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.
11. Use F3 button to set the required time of inactivity then press CONFIRM.
12. You can add up to 4 periods of inactivity within a 24 hour interval.



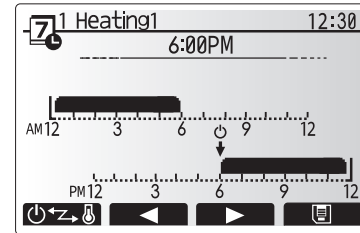
Time of period setting screen 1

13. 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/cooling 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.



Time of period setting screen 2

## [Service] Menu

The service menu is password protected to prevent accidental changes being made to the operation settings, by unauthorised/unqualified persons.

# Operator and owner info

## Troubleshooting

The following table is to be used as a guide to possible problems. It is not exhaustive and all problems should be investigated by the installer or another competent person. Users should not attempt to repair the system themselves.

At no time should the system be operating with the safety devices by-passed or plugged.

Fault symptom	Possible cause	Solution
Cold water at taps (system with DHW tank)	Scheduled control off period	Check schedule settings and change if necessary.
	All hot water from DHW tank Used	Ensure DHW mode is operating and wait for DHW tank to re-heat
	Heat pump or electric heater not working	Contact installer.
Heating system does not get up to set temperature.	Prohibit, schedule or holiday mode selected	Check settings and change as appropriate.
	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.
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 DHW tank 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 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.	Contact installer.
Schedule function inhibits the system from operating but the outdoor unit operates.	Freeze stat. function is active.	Normal operation no action necessary.
Pump runs without reason for short time.	Pump jam prevention mechanism to inhibit the build up of scale.	Normal operation no action necessary.
Mechanical noise heard coming from indoor unit	Heaters switching on/off	Normal operation no action necessary.
	3-way valve changing position between DHW and heating mode.	Normal operation no action necessary.
Noisy pipework	Air trapped in the system	Try bleeding radiators (if present) If the symptoms persist contact installer.
	Loose pipework	Contact installer.
Water discharges from one of the relief valves	The system has overheated or overpressurised	Switch off power to the heat pump and any immersion heaters, then contact the installer.
Small amounts of water drip from one of the relief valves.	Dirt may be preventing a tight seal in the valve	Twist the valve cap in the direction indicted until a click is heard. This will release a small amount of water flushing dirt from the valve. Be very careful the water released will be hot. Should the valve continue to drip contact installer as the rubber seal may be damaged and need replacing.
An error code appears in the main remote controller display.	The indoor or outdoor unit is reporting an abnormal condition	Make a note of the error code number and contact installer.
Heat pump is forced to turn ON and OFF.	Smart grid ready input (IN11 and IN12) is used, and switch-on and off commands are input.	Normal operation no action necessary.

## Power failure

All setting will be saved for 1 week with no power, after 1 week Date/Time ONLY will be saved.

## Important:

Please note that annual servicing is a requirement to maintain the Warranty on your unvented cylinder.

If water is flowing through the tundish, this is an indication of problem with a part of your heating system and action is needed. Call Technical Support (see contact details on back page).

After draining the cylinder, the hot tap must be left fully open until the cylinder has fully cooled. Failure to follow this instruction may result

# Commissioning

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## Sterilisation

Only switch on power to the immersion heaters once sterilisation liquid has been purged and the cylinder filled with water.

## Flushing & filling the cylinder

Check that the pressure in the expansion vessel is 3 bar (45psi), i.e. the same as the setting of the pressure reducing valve. The valve is of the car tyre (Schrader) type. Check all the connections for tightness including any factory made connections such as the immersion heater and the temperature and pressure relief valve. Before filling, open the hot tap furthest away from the unvented cylinder to let air out.

Open the cold main isolation valve and allow the unit to fill. When water flows from the tap allow it to run for a short while to flush through any dirt, swarf or flux residue. Close the tap and open every other hot tap in turn to purge all remaining air.

## Flushing and filling the heating system

Part L of the 2022 Building Regulations requires that all central heating systems are cleaned and dosed with protective inhibitor whenever any major works are carried out to the system. For retrofit installations we recommend you follow best practice, thoroughly flushing the system once prior to fitting new equipment, with a second flush after the equipment is fitted, before the system is commissioned.

When the heating system is filled, it must be dosed with a suitable inhibitor in the correct ratios for the system size to protect against corrosion and limescale. Always consult the inhibitor chemical manufacturer's instructions for safety and correct dosing procedure.

**Important:** always consult the heat pump manufacturer's instructions for any special requirements around flushing and dosing. Failure to adequately flush and dose the system will invalidate the product warranty.

## Unvented heat pump cylinder

Ensure the heating circuit has been fully flushed, carrying out commissioning in line with the heat pump manufacturer's commissioning instructions for the heating and the primary circuit. Primary pipework must be filled, vented and tested in accordance with the heat pump manufacturer's instructions. To ensure all pipework is fully vented, bleed valves may need opening, especially on any raised pipes; inadequate flushing or venting could cause damage to the heat pump or circulation pump. Ensure the lever on the two port & three port valve is set to the filling position and fill the primary circuit, ensuring the appropriate inhibitors are added in the right concentrations. When full, move the lever back.

Record information on the Commissioning Checklist.

## Storage temperature

The minimum hot water setting is 40°C. The maximum hot water setting is 60°C. In hard water areas a maximum of 55°C is recommended.

## Safety checks

During heat-up double check all pipework for leaks, ensuring all connections, including the immersion heaters and any pre-plumbed connections, are watertight. There should be no sign of water coming from either the expansion relief valve or the temperature/pressure relief valve. Now hold both of these safety valves fully open, allowing as much water as possible to flow through the tundish. Check that your discharge pipework is free from debris and is carrying the water away to waste efficiently. It is normal that some water will splash out of the tundish. This should be minimised by ensuring the tundish, D1 and D2 pipes are vertical to allow clean flow. Release the valves and check that they reseal properly. On completion of commissioning, fill in the Benchmark Commissioning Checklist & leave with the homeowner.

## Decommissioning & disposal

Damage to the environment and risks to personal health are avoided by the proper decommissioning and disposal of this product. To decommission your unvented hot water cylinder, isolate the electricity supply to the immersion heater and heat pump before draining the cylinder and safely disconnecting all fixtures and fittings. The cylinder is made from many recyclable materials therefore we strongly encourage recycling of this product at your local authority recycling centre at the end of its working life. For more information on proper disposal, please contact your local council or waste disposal office.

# Servicing

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## General

Servicing should only be carried out by competent installers and only spare parts approved by the manufacturer may be used. Never bypass any of the safety devices and never operate the unit without all of the safety devices being in place and fully operational.

## Draining

Isolate from the electrical supply to prevent the immersion heaters burning out. Turn off the heat pump. Isolate the unit from the cold mains. Attach a hose to the draining tap ensuring that it reaches to a level below the unit (this will ensure an efficient syphon is set up and the maximum amount of water is drained from the unit). First open the hot tap closest to the unit and then open the draining tap.

**WARNING:** Water drained off may be very hot!

**Important:** After draining the cylinder, do not close the hot tap until the cylinder has fully cooled. Failure to follow this instruction may result in damage to the cylinder and will invalidate the warranty.

## Filling the cylinder

Check that the pressure in the expansion vessel is 3 bar (45psi), i.e. the same as the setting of the pressure reducing valve. The valve is of the car tyre (Schrader) type. Check all the connections for tightness including any factory made connections such as the immersion heater and the temperature and pressure relief valve. Before filling, open the hot tap furthest away from the unvented cylinder to let air out.

Open the cold main isolation valve and allow the unit to fill. When water flows from the tap allow it to run for a short while to flush through any dirt, swarf or flux residue. Close the tap and open every other hot tap in turn to purge all remaining air.

## Annual maintenance

The unvented cylinder requires an annual service in order to ensure safe working and optimum performance, and to maintain the warranty. It is essential that the following checks are performed by a competent installer on an annual basis. Commonly this is done at the same time as the annual heat pump service.

1) Twist the cap of the expansion relief valve on the cold water combination valve and allow water to flow for 5 seconds. Release and make sure it reseats correctly. Repeat with the temperature and pressure relief valve. In both cases check that the discharge pipework is carrying the water away adequately. If not, check for blockages etc. and clear.

**WARNING:** The water discharged may be very hot!

- 2) Check that any immersion heaters fitted are working correctly and that they are controlling the water at a temperature between 55°C and 65°C.
- 3) Check the pressure in the expansion vessel is charged to 3 bar (45psi). Turn off the water supply to the unit and open a hot tap first. The air valve on expansion vessel is a Schrader (car tyre) type. Air, nitrogen or CO<sub>2</sub> may be used to charge the expansion vessel.
- 4) Unscrew the head on the cold water combination valve and clean the mesh filter within (some water may escape).

**Your warranty may be void without proof of annual servicing.**

# Annual Maintenance Log Book

Contractor name		Engineer name	
Site name		Site number	
Cylinder unit maintenance record sheet			
Warranty number		Model number	
		Serial number	
No	Mechanical	Frequency	Notes
1	Turn OFF water supply, drain DHW tank, remove mesh from strainer clean and replace in strainer. *1		
2	Keep water supply OFF, open hot water taps and check the primary-side expansion vessel charge pressure. Top up if necessary (1 bar).		
3	Keep water supply OFF and check the potable vessel charge pressure. Top up if necessary (3.5 bar).		
4	Keep water supply OFF. 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	Turn water supply ON, open the pressure relief valve and then the expansion relief valve in turn. Check for unrestricted discharge to the tundish and that the valves reseal correctly. Check there are no blockages in the tundish and associated pipework.		
7	Check and if necessary top up the concentration of anti-freeze/inhibitor (if used in the system).		
8	Top up the primary/heating system using a temporary backflow prevention filling loop and re-pressurise to 1 bar.		
9	Heat system and check pressure does not rise above 3 bar and no water is released from the safety valves.		
10	Release any air from the system.		
11	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 models only [except EHPT20 series]		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 reseal 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 pipework 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 cylinder unit's strainer mesh plus any that are fitted external to the cylinder unit. 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	Check every	Possible failures
Pressure relief valve (3 bar) Air vent (Auto/Manual) Drain cock (Primary/Sanitary circuit) Manometer Inlet control group (ICG)* Mud trap	6 years	Water leakage

\* OPTIONAL PARTS for UK

### Parts which require regular inspection

Parts	Check every	Possible failures
Pressure relief valve (3bar) Temperature and pressure relief valve	1 year (turning the knob manually)	PRV could seize and risk burst of expansion vessel
Immersion heater	2 years	Earth leakage causing circuit breaker to activate (Heater is always OFF)
Water circulation pump (Primary circuit)	20,000 hrs (3 years)	Water circulation pump failure
Magnetic filter	3 years	Flow rate decrease due to clogging
Mud trap	1 year	Flow rate decrease due to clogging

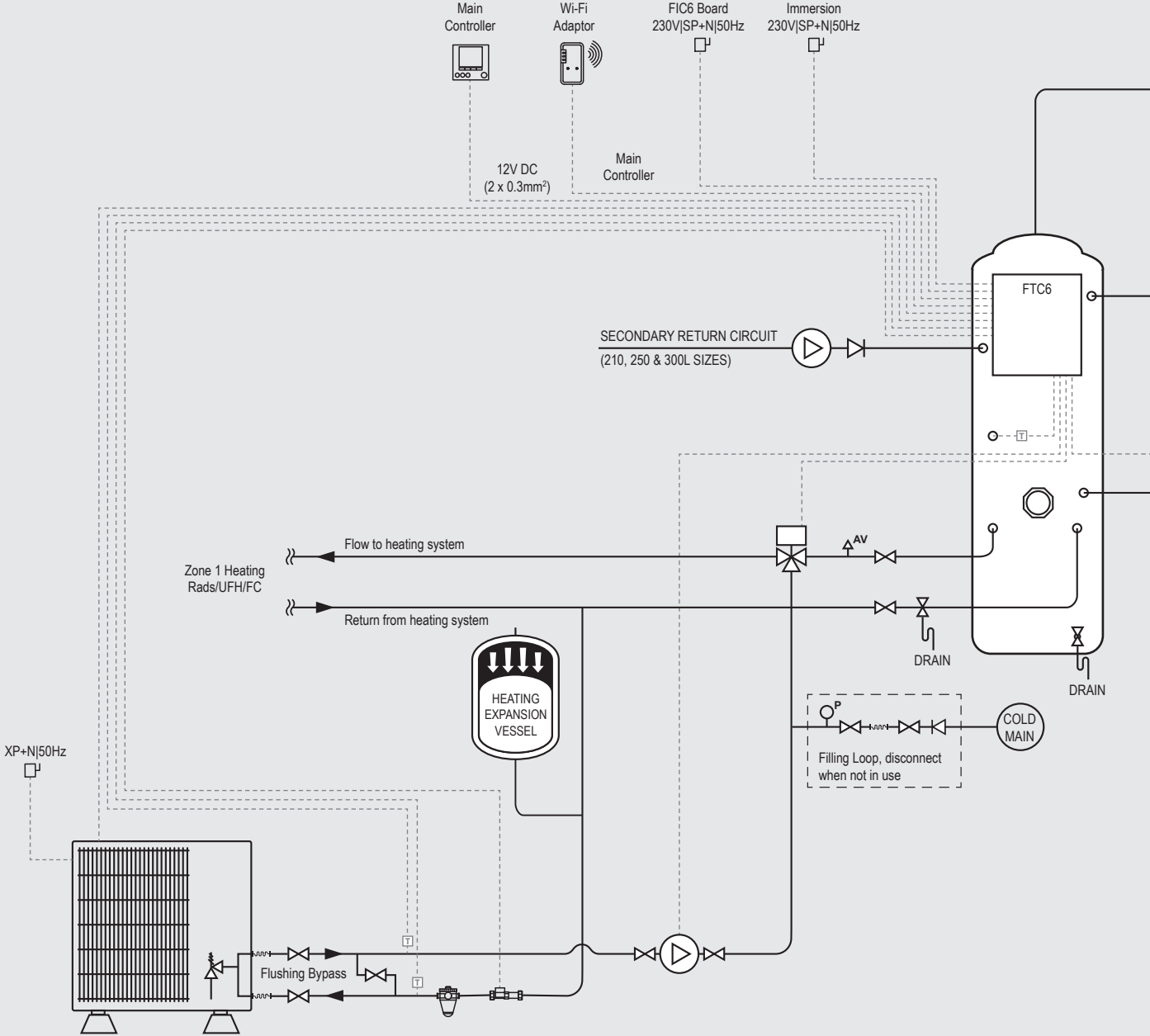
### Parts which must NOT be re-used when servicing

\* O-ring  
 \* Gasket

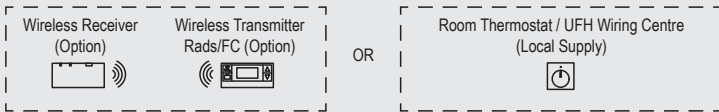
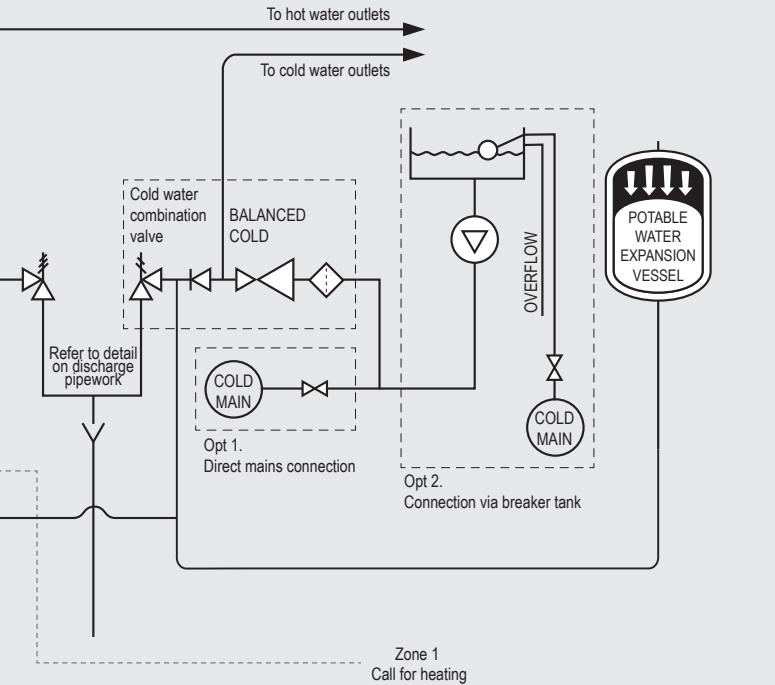
#### Note:

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

System Schematic

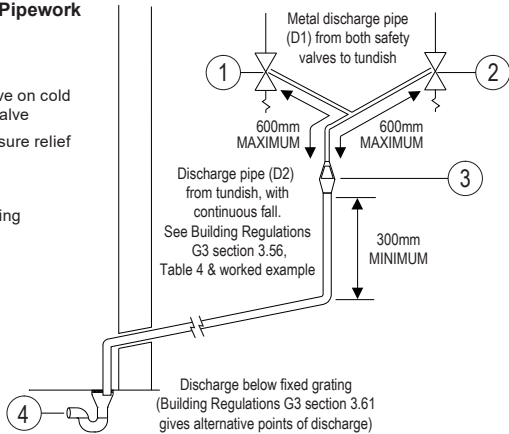






### Detailed Discharge Pipework Arrangement

- 1) Expansion relief valve on cold water combination valve
- 2) Temperature & pressure relief valve on cylinder
- 3) Tundish
- 4) Drain with fixed grating



## Key:

### Items supplied with cylinder

Pressure relief valve	Pressure reducing valve	Check valve	Inline strainer
1 x Cold water combination valve			
Pressure and temperature relief valve	Anti-splash tundish	3kW Titanium immersion heater	Potable water expansion vessel
3-way diverter valve	Main controller	Thermostat (cylinder)	Wi-Fi adaptor
Pressure gauge	Flexihose	Check valve	2x DN15 isolation valve
1 x Filling loop			
1 x Draincock (cylinder)			

### Other items

Full bore isolating valve	Drain cock	Air vent valve	Expansion vessel
Magnetic filter	Flow sensor	Circulation pump	Check valve
Flexihose	Thermostat	Wireless receiver	Wireless transmitter
Room thermostat/UFH wiring centre	Pressure and temperature relief valve	FTC6 Connector block	



# Servicing

## 9-5. Service Menu

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

The factory default password is "0000".

Follow the procedure described in General Operation for the set up operation.

The service menu is navigated using the F1 and F2 buttons to scroll through the functions. The menu is comprised of the following functions:

1. Manual operation
2. Function settings
3. Thermistor adjustment
4. Auxiliary settings
5. Heat source setting
6. Pump speed
7. Heat pump settings
8. Operation settings
9. Energy monitor settings
10. External input settings
11. Thermo ON output
12. Commissioning wizard
13. Running information
14. Thermistor reading
15. Summary of settings
16. Error history
17. Password protection
18. Manual reset
19. SD card

Many functions cannot 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 remote controller will display a reminder message prompting the installer to stop operation before continuing. By selecting "Yes" the unit will cease operation.

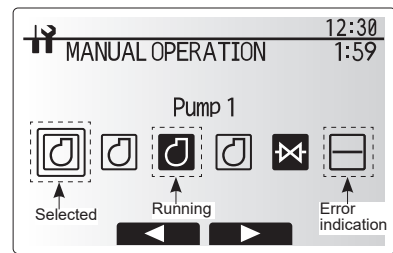
### <Manual operation>

During the filling of the system the water circulation 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 FTC.

#### ► Example

Pressing F3 button will switch manual operation mode ON for the main 3-way valve. When filling of the DHW 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 FTC will resume control of the part.



Manual operation menu screen

Manual operation and heat source setting cannot 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 the last operation.

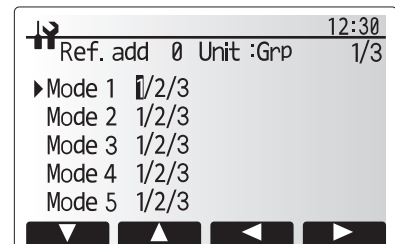
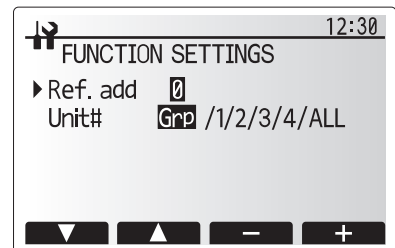
### <Function settings>

Function Setting allows the setting of auto recovery after power failure.

1. From the Service Menu use F1 and F2 to highlight Function Setting.
2. Press CONFIRM.
3. Ensure the Ref address and unit number are displayed to the right.
4. Press CONFIRM.
5. Use F3 and F4 to highlight either 1/2/3 (see below).
6. Press CONFIRM.

Setting	Unit	Mode	Number
Auto recovery after power failure	Grp	Mode 1	1 - Inactive 2 - Active *1 3 - NO FUNCTION

\*1 Approx. 4-minute delay after power is restored.

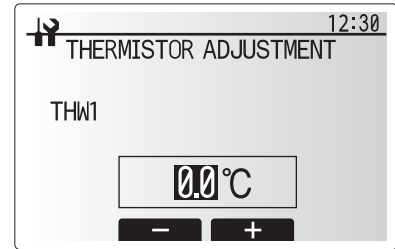


# Servicing

## <Thermistor adjustment>

This function allows adjustments to be made to the thermistor readings from -10 to 10°C in 0.5°C intervals.

- THW1: Thermistor (Flow water temp.)
- THW2: Thermistor (Return water temp.)
- THW5: Thermistor (DHW tank water temp.)
- THW6: Thermistor (Zone1 flow temp.)(Option)
- THW7: Thermistor (Zone1 return temp.)(Option)
- THW8: Thermistor (Zone2 flow temp.)(Option)
- THW9: Thermistor (Zone2 return temp.)(Option)
- THW10: Thermistor (Mixing tank temp.)(Option)
- THWB1: Thermistor (Boiler flow temp.)(Option)



## <Auxiliary settings>

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

Menu subtitle	Function/ Description
Economy settings for pump	Water pump stops automatically in certain period of time from when operation is finished.
Delay	Time before pump switched off *1
Electric heater (Heating)	To select "WITH booster heater (ON)" or "WITHOUT booster heater (OFF)" in Heating mode.
Delay	The minimum time required for the booster heater to turn ON from after Heating mode has started.
Electric heater (DHW)	To select "WITH (ON)" or "WITHOUT (OFF)" booster heater or immersion heater individually in DHW mode.
Delay	The minimum time required for the booster heater or immersion heater to turn ON from after DHW mode has started. (This setting is applied for both booster and immersion heater.)
Mixing valve control *2	Running: Period from valve fully open (at a hot water mixing ratio of 100%) to valve fully closed (at a cold water mixing ratio of 100%)
Interval	Interval (min.) to control the Mixing valve.
Flow sensor *3	Minimum: The minimum flow rate to be detected at Flow sensor.
Maximum	The maximum flow rate to be detected at Flow sensor.

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

\*2 Set the Running time according to the specifications of the actuator of each mixing valve. It is recommended to set the interval to 2 minutes that is a default value. With the interval set longer, it could take longer to warm up a room.

\*3 Do not change the setting since it is set according to the specification of Flow sensor attached to the cylinder unit.

### Economy settings for pump

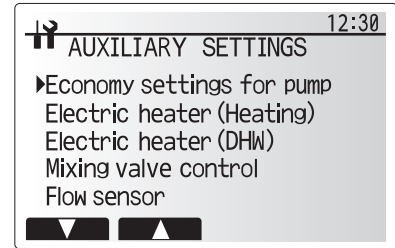
1. From the Auxiliary Settings menu highlight Economy Settings for water circulation pump.
2. Press CONFIRM.
3. The economy settings for water circulation pump screen is displayed.
4. Use button F1 to switch the economy settings ON/OFF.
5. Use buttons F3 and F4 to adjust the time the water circulation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

### Electric heater (Heating)

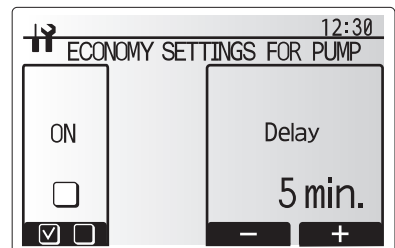
1. From the Auxiliary Settings menu highlight Electric heater (Heating).
2. Press CONFIRM.
3. The Electric heater (Heating) screen is displayed.
4. Press F1 button to switch the function ON/OFF.
5. Use F3 and F4 buttons to adjust the time period of heat pump only operation before the booster heater will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

### Electric heater (DHW)

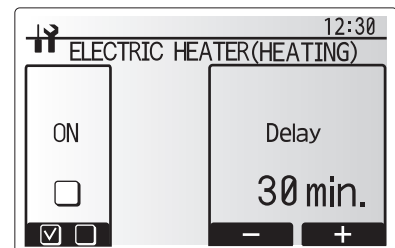
1. From the Auxiliary Settings menu highlight Electric heater (DHW).
2. Press CONFIRM.
3. The Electric heater (DHW) screen is displayed.
4. Press F1 and F2 buttons to switch the function ON/OFF. (F1: booster heater, F2: immersion heater)
5. Use F3 and F4 buttons to adjust the time period of heat pump only operation before the booster heater and the immersion heater (if present) will assist in DHW heating (15 to 30 minutes).



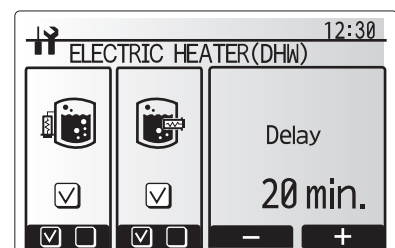
Auxiliary settings menu screen



Economy settings for pump screen



Electric heater (Heating) screen



Electric heater (DHW) screen

# Servicing

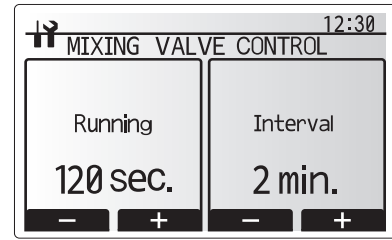
## Mixing valve control

1. From the Auxiliary Settings menu highlight Mixing valve control.
2. Press CONFIRM.
3. The Mixing valve control screen is displayed.
4. Use F1 and F2 buttons to set Running time between 10 to 240 seconds. The Running time equals to a period from full open of the valve (at a hot water mixing ratio of 100%) to full close (at a cold water mixing ratio of 100%).

**Note: Set the Running time according to the specifications of the actuator of each mixing valve.**

1. From the Auxiliary Settings menu highlight Mixing valve control.
2. Press CONFIRM.
3. The Mixing valve control screen is displayed.
4. Press F3 and F4 buttons to set the interval between 2-zone temperature controls of the mixing valve between 1 to 30 minutes.

**Note: It is recommended to set the interval to 2 minutes that is a default value. With the interval set longer, it could take longer to warm up a room.**



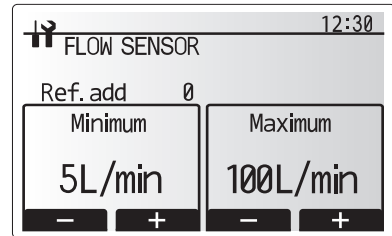
Mixing valve control setting screen

## Flow sensor

1. From the Auxiliary Settings menu highlight Flow sensor.
2. Press CONFIRM.
3. Press F3 or F4 buttons to select a refrigerant address of which you wish to configure or check the settings, and press CONFIRM. \*1
4. The Flow sensor screen is displayed.
5. Use F1 and F2 buttons to set the minimum flow rate of flow sensor between 0 to maximum L/min.
6. Use F3 and F4 buttons to set the maximum flow rate of flow sensor between minimum to 100L/min.

\*1 For multiple outdoor units control system only.

**Note: Do not change the setting since it is set according to the specification of Flow sensor attached to the cylinder unit.**



Flow sensor setting 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.

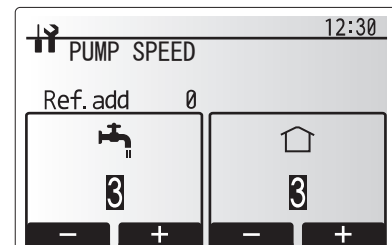


Heat source setting screen

## <Pump speed>

1. From the Service menu, highlight Pump speed.
2. Press CONFIRM.
3. Press F3 and F4 buttons to select a refrigerant address of which you wish to configure or check the settings, and press CONFIRM. \*1
4. The Pump speed screen is displayed.
5. Use F1 and F2 buttons to set the pump speed (1 to 5) of DHW operation.
6. Use F3 and F4 buttons to set the pump speed (1 to 5) of space heating (cooling) operation.

\*1 For multiple outdoor units control system only.



Pump speed setting screen

# Servicing

## <Operation settings>

### Heating operation

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

Menu subtitle	Function	Range	Unit	Default	
Flow temp. range	Minimum temp.	To minimise the loss by frequent ON and OFF in mild outdoor ambient temperature seasons.	20 to 45	°C	30
	Maximum temp.	To set max. possible flow temperature according to the type of heat emitters.	35 to 60	°C	50
Room temp. control	Mode	Setting for Room temp. control At Fast mode, target outlet water temperature is set higher than the one set at normal mode. This reduces the time to reach the target room temperature when the room temperature is relatively low.*	Normal/Fast	—	Normal
	Interval	Selectable according to the heat emitter type and the materials of floor (i.e. radiators, floor heating-thick, -thin concrete, wood, etc.)	10 to 60	min	10
Heat pump thermo diff. adjust	ON/OFF	To minimise the loss by frequent ON and OFF in mild outdoor ambient temperature seasons.	ON/OFF	—	ON
	Lower limit	Prohibits heat pump operation until the flow temperature drops below the target flow temperature plus lower limit value.	-9 to -1	°C	-5
	Upper limit	Allows heat pump operation until the flow temperature rises above the target flow temperature plus upper limit value.	+3 to +5	°C	+5

< Heating operation (Room temp. control table) >

### Notes:

1. The minimum flow temperature that prohibits heat pump operation is 20°C.
2. The maximum flow temperature that allows heat pump operation equals to the maximum temperature set in the Flow temp. range menu.

\* Fast mode is not efficient and will increase running cost compared to normal mode.

### Freeze stat function

Menu subtitle	Function/ Description
Freeze stat function *1	An operational function to prevent the water circuit from freezing when outdoor ambient temperature drops.
Flow t.	The target outlet water temperature at water circuit when operating in Freeze stat function. *2
Outdoor ambient temp.	Minimum outdoor ambient temperature which freeze stat function will begin to operate, (3-20°C) or choose **. If asterisk (**) is chosen freeze stat function is deactivated (i.e. primary water freeze risk)**.

\*1 When the system is turned off, freeze stat function is not enabled. \*2 Flow t. is fixed to 20°C and unchangeable.

### Simultaneous Operation

For periods of very low outdoor ambient temperature this mode can be used. Simultaneous operation allows both DHW and space heating to run together by using the heat pump and/or booster heater to provide space heating whilst only 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.

- Range of outdoor ambient temperature at which simultaneous operation starts is -30 to 10°C (default -15°C).
- System shall automatically return to routine operation. This will happen when the outdoor ambient temperature rises above the selected temperature for this specific mode of operation.

### Cold weather function

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

- Range of outdoor ambient temperature at which cold weather function starts is -30 to -10°C (default -15°C).
- System shall automatically return to routine operation. This will happen when the outdoor ambient temperature rises above the selected temperature for this specific mode of operation.

### Floor dry up function

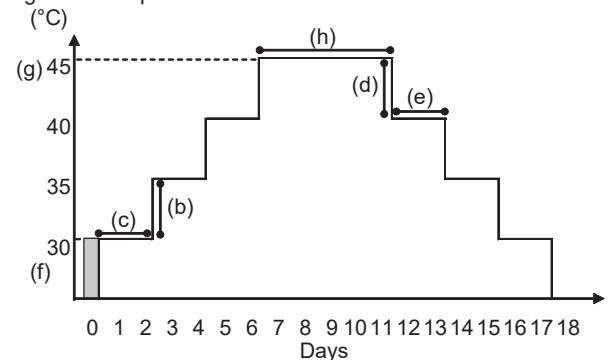
The Floor dry up function automatically changes the target hot water temperature in stages to gradually dry concrete when this particular type of underfloor heating system is installed.

Upon completion of the operation the system stops all the operations except the Freeze stat.

For Floor dry up function, the target flow temp. of Zone1 is the same as that of Zone2.

- This function is not available when a PUAZ-FRP outdoor unit is connected.
- Disconnect wiring to external inputs of room thermostat, demand control and outdoor thermostat, or the target flow temperature may not be maintained.

Target flow temp.



Functions	Symbol	Description	Option/Range	Unit	Default	
Floor dry up function	a	Sets the function to ON and power on the system using the main remote controller and the dry up heating operation will start.	ON/OFF	—	OFF	
Flow temp. (increase)	Flow temp. increase step	b	Sets the increase step of the target flow temperature.	+1 to +10	°C	+5
	Increase interval	c	Sets the period for which the same target flow temperature is maintained.	1 to 7	day	2
Flow temp. (decrease)	Flow temp. decrease step	d	Sets the decrease step of the target flow temperature.	-1 to -10	°C	-5
	Decrease interval	e	Sets the period for which the same target flow temperature is maintained.	1 to 7	day	2
Target temperature	Start & Finish	f	Sets the target flow temperature at the start and the finish of the operation.	20 to 60	°C	30
	Max. target temp.	g	Sets the maximum target flow temperature.	20 to 60	°C	45
	Max. temp. period	h	Sets the period for which the maximum target flow temperature is maintained.	1 to 20	day	5

# Servicing

## <Energy monitor settings>

### 1. General description

End user can monitor accumulated<sup>(\*1)</sup> 'Consumed electrical energy' and 'Delivered heat energy' in each operation mode<sup>(\*\*2)</sup> on the main remote controller.

\*1 Monthly and Year to date

- \*2 - DHW operation
  - Space heating
  - Space cooling

Refer to the menu tree in "Main Settings Menu" for how to check the energy, and "DIP switch functions" for the details on DIP-SW setting.

Either one of the following 2 methods is used for monitoring.

**Note: Method 1 should be used as a guide. If a certain accuracy is required, the 2nd method should be used.**

#### (1) Calculation internally

Electricity consumption is calculated internally based on the energy consumption of outdoor unit, electric heater, water pump(s) and other auxiliaries. Delivered heat is calculated internally by multiplying delta T (Flow and Return temp.) and flow rate measured by the factory fitted sensors. Set the electric heater capacity and water pump(s) input according to indoor model name and specs of additional pump(s) supplied locally (refer to the menu tree in "Main Settings Menu").

When additional pumps supplied locally are connected change setting according to specs of the pumps. When anti-freeze solution is used for primary water circuit, set the delivered energy adjustment if necessary. For further detail of above, refer to "Main remote controller".

#### (2) Actual measurement by external meter (locally supplied)

FTC has external input terminals for 2 'Electric energy meters' and a 'Heat meter'.

If two 'Electric energy meters' are connected, the 2 recorded values will be combined at the FTC and shown on the main remote controller (e.g. Meter 1 for HP power line, Meter 2 for heater power line).

Refer to the [Signal inputs] in section "6. WIRING DIAGRAM" for more information on connectable electric energy meter and heat meter.

#### • Connectable electric energy meter and heat meter

- Pulse meter type            Voltage free contact for 12V DC detection by FTC (TBI.3 1, 3 and 5 pin have a positive voltage)
- Pulse duration              Minimum ON time: 40 ms  
                                      Minimum OFF time: 100 ms
- Possible unit of pulse      0.1 pulse/kWh            1 pulse/kWh            10 pulse/kWh  
                                      100 pulse/kWh          1000 pulse/kWh

Those values can be set by the main remote controller (refer to the menu tree in "9-4. Main Settings Menu").

# Servicing

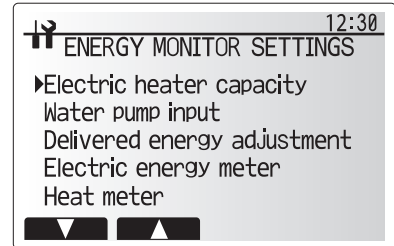
## 2. Settings using the main remote controller

In this menu, all parameters required to record the consumed electrical energy and the delivered heat energy which is displayed on the main remote controller can be set. The parameters are: an electric heater capacity, supply power of water pump and heat meter pulse.

Follow the procedure described in General Operation for the set up operation.

For Pump 1, \*\*\* can be also set besides this setting.

In the case \*\*\* is selected, the system acknowledges "factory fitted pump" is selected.



Energy monitor settings menu screen

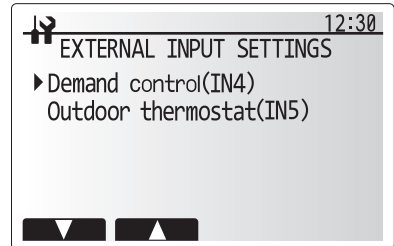
### <External input settings>

#### Demand control (IN4)

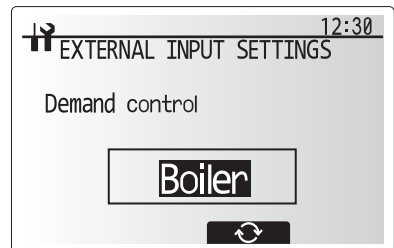
The selection of "OFF", whilst a signal is being sent to IN4, forcefully stops all the heat source operations and the selection of "Boiler" stops operations of heat pump and electric heater and performs boiler operation.

#### Outdoor thermostat (IN5)

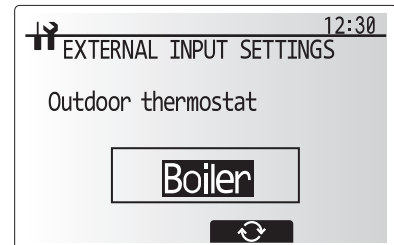
The selection of "Heater", whilst a signal is being sent to IN5, performs only electric heater operation and the selection of "Boiler" performs boiler operation.



External input settings menu screen



Demand control screen



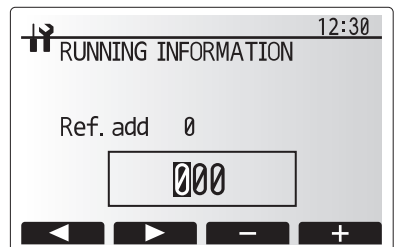
Outdoor thermostat setting screen

### <Running information>

This function shows current temperature and other data of main component parts of both the indoor and outdoor units.

1. From the Service menu highlight Running information.
2. Press CONFIRM.
3. Press F3 and F4 buttons to set the Ref. address. \*1
4. Use the function buttons to enter index code for the component to be viewed.
5. Press CONFIRM.

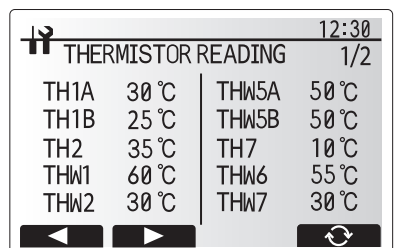
\*1 For multiple outdoor units control system only.



### <Thermistor reading>

This function shows the current readings of thermistors located on the water and refrigerant circuit

Thermistor	Description	Thermistor	Description
TH1A	Zone1 room temperature	TH7	Ambient (outdoor) temperature
TH1B	Zone2 room temperature	THW6	Zone1 flow temperature
TH2	Refrigerant return temperature	THW7	Zone1 return temperature
THW1	Flow water temperature	THW8	Zone2 flow temperature
THW2	Return water temperature	THW9	Zone2 return temperature
THW5A	DHW tank upper water temperature	THW10	Mixing tank temperature
THW5B	DHW tank lower water temperature	THWB1	Boiler flow temperature



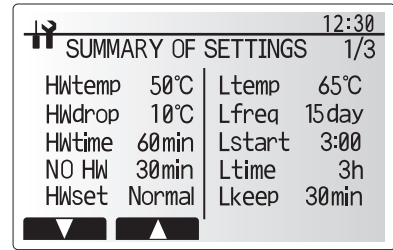


# Servicing

## <Summary of settings>

This function shows the current installer/user entered settings.

Abbreviation	Explanation	Abbreviation	Explanation
<b>HWtemp</b>	DHW max. temperature	<b>Z2 mode</b>	Operation mode
<b>HWdrop</b>	DHW temperature drop		- HER (Heating room temperature)
<b>HWtime</b>	DHW max. operation time		- HE (Heating flow temperature)
<b>NO HW</b>	DHW mode restriction		- HCC (Heating compensation curve)
<b>HWset</b>	DHW operation mode (Normal/Eco)		- COR (—)
<b>Ltemp</b>	Legionella hot water temperature		- CO (Cooling flow temperature)
<b>Lfreq</b>	Legionella operation frequency	<b>Hroom 1</b>	Heating target room temperature
<b>Lstart</b>	Legionella mode start time	<b>Hroom 2</b>	Heating target room temperature
<b>Ltime</b>	Legionella max. operation time	<b>Hflow 1</b>	Heating target flow temperature
<b>Lkeep</b>	Duration of max. (Legionella) hot water temperature	<b>Hflow 2</b>	Heating target flow temperature
<b>Z1 mode</b>	Operation mode	<b>Croom 1</b>	Cooling target room temperature
	- HER (Heating room temperature)	<b>Croom 2</b>	Cooling target room temperature
	- HE (Heating flow temperature)	<b>Cflow 1</b>	Cooling target flow temperature
	- HCC (Heating compensation curve)	<b>Cflow 2</b>	Cooling target flow temperature
	- COR (—)	<b>FSflow</b>	Freeze stat function flow temperature
	- CO (Cooling flow temperature)	<b>FSout</b>	Freeze stat function ambient temperature



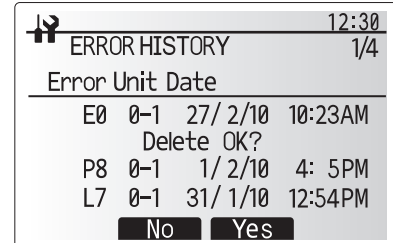
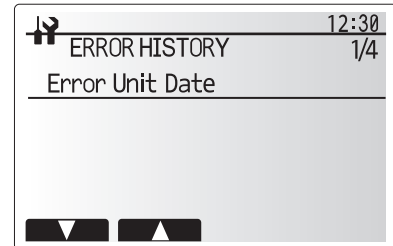
## <Error history>

Error history allows the service engineer to view previous check codes, the unit address and the date on which they occurred. Up to 16 check codes can be stored in the history. The most recent error event is displayed at the top of the list.

1. From the service menu select Error history.
  2. Press CONFIRM.
- Please see "10-4. Self-diagnosis and action" for check code diagnosis and actions.

To delete an Error history item:

1. From Error history screen press F4 button (Rubbish bin icon)
2. Then press F3 button (Yes).



## <Password protection>

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

### 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 seconds
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**.

### <Manual reset>

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



Password input screen



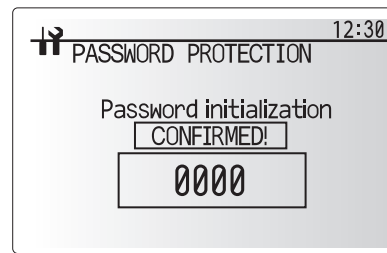
Password verify screen

# Servicing

## 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 seconds.
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**.

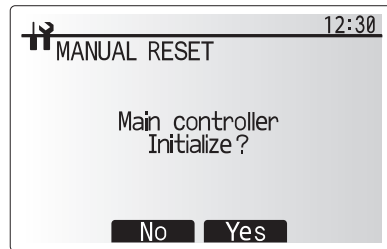
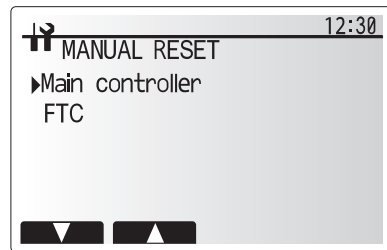


Completion screen

## <Manual reset>

Should you wish to restore the initial 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 FTC or Main remote controller.
5. Press F3 button to confirm manual reset of chosen device.



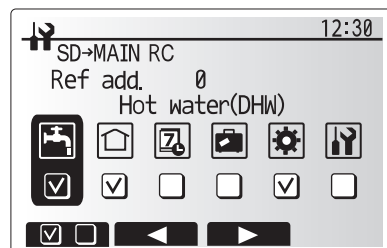
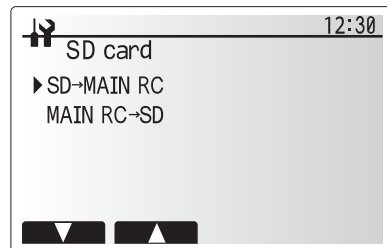
## <SD card>

The use of an SD memory card simplifies the main remote controller settings in the field.

\*Ecoda service tool (for use with PC tool) is necessary for the setting.

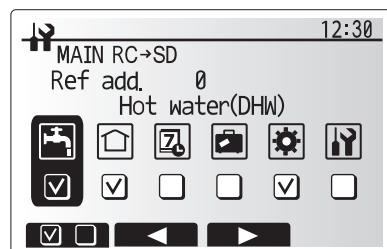
### SD → Main RC

1. From the SD card setting use F1 and F2 buttons to scroll through list until "SD → Main RC" is highlighted.
  2. Press CONFIRM.
  3. Press F3 and F4 buttons to set the Ref. address. \*1
  4. Use F1, F2 and F3 buttons to select a menu to write to the main remote controller.
  5. Press CONFIRM to start downloading.
  6. Wait for a few minutes until "Complete!" appears.
- \*1 For multiple outdoor units control system only.



### Main RC → SD

1. From the SD card setting use F1 and F2 buttons to scroll through list until Main RC → SD is highlighted.
  2. Press CONFIRM.
  3. Press F3 and F4 buttons to set the Ref. address. \*1
  4. Use F1, F2 and F3 buttons to select a menu to write to the SD memory card.
  5. Press CONFIRM to start uploading.
  6. Wait for a few minutes until "Complete!" appears.
- \*1 For multiple outdoor units control system only.



# Servicing

Request code	Request content	Range	Unit
103	Error history 1 (latest)	Displays error history. ("—" is displayed if no history is present)	Code
104	Error history 2 (second to last)	Displays error history. ("—" is displayed if no history is present)	—
105	Error history 3 (third to last)	Displays error history. ("—" is displayed if no history is present)	—
154	Water circulation pump 1 - Accumulated operating time (after reset)	0 to 9999	10 hours
156	Water circulation pump 2 - Accumulated operating time (after reset)	0 to 9999	10 hours
157	Water circulation pump 3 - Accumulated operating time (after reset)	0 to 9999	10 hours
158	Water circulation pump 4 - Accumulated operating time (after reset)	0 to 9999	10 hours
162	Indoor unit - DIP SW1 setting information	Refer to detail contents described hereinafter.	—
163	Indoor unit - DIP SW2 setting information	Refer to detail contents described hereinafter.	—
164	Indoor unit - DIP SW3 setting information	Refer to detail contents described hereinafter.	—
165	Indoor unit - DIP SW4 setting information	Refer to detail contents described hereinafter.	—
166	Indoor unit - DIP SW5 setting information	Refer to detail contents described hereinafter.	—
175	Indoor unit - Output signal information	Refer to detail contents described hereinafter.	—
176	Indoor unit - Input signal information	Refer to detail contents described hereinafter.	—
177	Mixing valve opening step	0 to 10	Step
190	Indoor unit - Software version 1st 4 digits	Refer to Note below.	—
191	Indoor unit - Software version last 4 digits	Refer to Note below.	—
200	Initialisation of Function Setting	—	—
340	Water circulation pump 1 - Accumulated operating time reset	—	—
342	Water circulation pump 2 - Accumulated operating time reset	—	—
343	Water circulation pump 3 - Accumulated operating time reset	—	—
344	Water circulation pump 4 - Accumulated operating time reset	—	—
504	Indoor unit - Zone1 room temp. (TH1A)	-39 to 88	°C
505	Indoor unit - Ref. liquid temp. (TH2)	-39 to 88	°C
506	Indoor unit - Return water temp. (THW2)	-39 to 88	°C
507	Indoor unit - Zone2 room temp. (TH1B)	-39 to 88	°C
508	Indoor unit - DHW tank lower water temp. (THW5B)	-39 to 88	°C
509	Indoor unit - Zone1 flow water temp. (THW6)	-39 to 88	°C
510	Indoor unit - Outside air temp. (TH7)	-39 to 88	°C
511	Indoor unit - Flow water temp. (THW1)	-39 to 88	°C
512	Indoor unit - Zone1 return water temp. (THW7)	-39 to 88	°C
513	Indoor unit - Zone2 flow water temp. (THW8)	-39 to 88	°C
514	Indoor unit - Zone2 return water temp. (THW9)	-39 to 88	°C
515	Indoor unit - Boiler flow water temp. (THWB1)	-40 to 140	°C
534	Indoor unit - DHW tank upper water temp. (THW5A)	-39 to 88	°C
535	Indoor unit - Mixing tank water temp. (THW10)	-40 to 140	°C
540	Flow rate of the primary circuit	0 to 100	L/min
550	Indoor unit - Error postponement history 1 (latest)	Displays postponement code. ("—" is displayed if no postponement code is present)	—
551	Indoor unit - Operation control at time of error	0 Standard, 1 Heater, 2 Boiler	—
552	Indoor unit - Operation mode at time of error	0: OFF, 1: DHW, 2: Heating, 3: Cooling, 4: Legionella prevention, 5: Freeze protection, 6: Operation stop, 7: Defrost	—
553	Indoor unit - Output signal information at time of error	Refer to detail contents described hereinafter.	—
554	Indoor unit - Input signal information at time of error	Refer to detail contents described hereinafter.	—
555	Indoor unit - Zone1 room temp. (TH1A) at time of error	-39 to 88	°C
556	Indoor unit - Zone2 room temp. (TH1B) at time of error	-39 to 88	°C
557	Indoor unit - Ref. liquid temp. (TH2) at time of error	-39 to 88	°C
558	Indoor unit - Flow water temp. (THW1) at time of error	-39 to 88	°C
559	Indoor unit - Return water temp. (THW2) at time of error	-39 to 88	°C
560	Indoor unit - DHW tank water temp. (THW5) at time of error	-39 to 88	°C
561	Indoor unit - Zone1 flow water temp. (THW6) at time of error	-39 to 88	°C
562	Indoor unit - Zone1 return water temp. (THW7) at time of error	-39 to 88	°C
563	Indoor unit - Zone2 flow water temp. (THW8) at time of error	-39 to 88	°C
564	Indoor unit - Zone2 return water temp. (THW9) at time of error	-39 to 88	°C
565	Indoor unit - Boiler flow water temp. (THWB1) at time of error	-40 to 140	°C
567	Indoor unit - Failure (P1/P2/L5/L8/Ld) thermistor	0: Failure thermistor is none, 1: TH1A, 2: TH2, 3: THW1, 4: THW2, 5: THWB1, 6: THW5B, 8: TH1B, A: THW6, B: THW7, C: THW8, D: THW9	—
568	Mixing valve opening step at time of error	0 to 10	Step
569	Operated Flow switch at time of failure (L9)	0: No operated flow switch, 1: Flow switch 1, 2: Flow switch 2, 3: Flow switch 3	—
571	Flow rate at time of error	0 to 100	L/min.

**Note:**

Refer to outdoor unit service manual for request code 0 to 102, 106 to 149.

Request codes 103 to 105 indicate error histories of both indoor and outdoor units.

As only 4 digits can be displayed at one time, the software version number is displayed in two halves.

Enter code 190 to see the first 4 digits and code 191 to see the last 4 digits.

For example software version No. 5.01 A000, when code 190 is entered 0501 is displayed, when code 191 is entered A000 is displayed.

Request code 200 resets all Function Setting to the factory default settings.

# Servicing

## Indoor unit switch setting display (Request code: 162 to 166)

0: OFF 1: ON

SW1, SW2, SW3, SW4, SW5								Display
1	2	3	4	5	6	7	8	
0	0	0	0	0	0	0	0	00 00
1	0	0	0	0	0	0	0	00 01
0	1	0	0	0	0	0	0	00 02
1	1	0	0	0	0	0	0	00 03
0	0	1	0	0	0	0	0	00 04
1	0	1	0	0	0	0	0	00 05
0	1	1	0	0	0	0	0	00 06
1	1	1	0	0	0	0	0	00 07
0	0	0	1	0	0	0	0	00 08
1	0	0	1	0	0	0	0	00 09
0	1	0	1	0	0	0	0	00 0A
1	1	0	1	0	0	0	0	00 0B
0	0	1	1	0	0	0	0	00 0C
1	0	1	1	0	0	0	0	00 0D
0	1	1	1	0	0	0	0	00 0E
1	1	1	1	0	0	0	0	00 0F
0	0	0	0	1	0	0	0	00 10
1	0	0	0	1	0	0	0	00 11
0	1	0	0	1	0	0	0	00 12
1	1	0	0	1	0	0	0	00 13
0	0	1	0	1	0	0	0	00 14
1	0	1	0	1	0	0	0	00 15
0	1	1	0	1	0	0	0	00 16
1	1	1	0	1	0	0	0	00 17
0	0	0	1	1	0	0	0	00 18
1	0	0	1	1	0	0	0	00 19
0	1	0	1	1	0	0	0	00 1A
1	1	0	1	1	0	0	0	00 1B
0	0	1	1	1	0	0	0	00 1C
1	0	1	1	1	0	0	0	00 1D
0	1	1	1	1	0	0	0	00 1E
1	1	1	1	1	0	0	0	00 1F
0	0	0	0	0	1	0	0	00 20
1	0	0	0	0	1	0	0	00 21
0	1	0	0	0	1	0	0	00 22
1	1	0	0	0	1	0	0	00 23
0	0	1	0	0	1	0	0	00 24
1	0	1	0	0	1	0	0	00 25
0	1	1	0	0	1	0	0	00 26
1	1	1	0	0	1	0	0	00 27
0	0	0	1	0	1	0	0	00 28
1	0	0	1	0	1	0	0	00 29
0	1	0	1	0	1	0	0	00 2A
1	1	0	1	0	1	0	0	00 2B
0	0	1	1	0	1	0	0	00 2C
1	0	1	1	0	1	0	0	00 2D
0	1	1	1	0	1	0	0	00 2E
1	1	1	1	0	1	0	0	00 2F
0	0	0	0	1	1	0	0	00 30
1	0	0	0	1	1	0	0	00 31
0	1	0	0	1	1	0	0	00 32
1	1	0	0	1	1	0	0	00 33
0	0	1	0	1	1	0	0	00 34
1	0	1	0	1	1	0	0	00 35
0	1	1	0	1	1	0	0	00 36
1	1	1	0	1	1	0	0	00 37
0	0	0	1	1	1	0	0	00 38
1	0	0	1	1	1	0	0	00 39
0	1	0	1	1	1	0	0	00 3A
1	1	0	1	1	1	0	0	00 3B
0	0	1	1	1	1	0	0	00 3C
1	0	1	1	1	1	0	0	00 3D
0	1	1	1	1	1	0	0	00 3E
1	1	1	1	1	1	0	0	00 3F

0: OFF 1: ON

SW1, SW2, SW3, SW4, SW5								Display
1	2	3	4	5	6	7	8	
0	0	0	0	0	0	1	0	00 40
1	0	0	0	0	0	1	0	00 41
0	1	0	0	0	0	1	0	00 42
1	1	0	0	0	0	1	0	00 43
0	0	1	0	0	0	1	0	00 44
1	0	1	0	0	0	1	0	00 45
0	1	1	0	0	0	1	0	00 46
1	1	1	0	0	0	1	0	00 47
0	0	0	1	0	0	1	0	00 48
1	0	0	1	0	0	1	0	00 49
0	1	0	1	0	0	1	0	00 4A
1	1	0	1	0	0	1	0	00 4B
0	0	1	1	0	0	1	0	00 4C
1	0	1	1	0	0	1	0	00 4D
0	1	1	1	0	0	1	0	00 4E
1	1	1	1	0	0	1	0	00 4F
0	0	0	0	1	0	1	0	00 50
1	0	0	0	1	0	1	0	00 51
0	1	0	0	1	0	1	0	00 52
1	1	0	0	1	0	1	0	00 53
0	0	1	0	1	0	1	0	00 54
1	0	1	0	1	0	1	0	00 55
0	1	1	0	1	0	1	0	00 56
1	1	1	0	1	0	1	0	00 57
0	0	0	1	1	0	1	0	00 58
1	0	0	1	1	0	1	0	00 59
0	1	0	1	1	0	1	0	00 5A
1	1	0	1	1	0	1	0	00 5B
0	0	1	1	1	0	1	0	00 5C
1	0	1	1	1	0	1	0	00 5D
0	1	1	1	1	0	1	0	00 5E
1	1	1	1	1	0	1	0	00 5F
0	0	0	0	0	1	1	0	00 60
1	0	0	0	0	1	1	0	00 61
0	1	0	0	0	1	1	0	00 62
1	1	0	0	0	1	1	0	00 63
0	0	1	0	0	1	1	0	00 64
1	0	1	0	0	1	1	0	00 65
0	1	1	0	0	1	1	0	00 66
1	1	1	0	0	1	1	0	00 67
0	0	0	1	0	1	1	0	00 68
1	0	0	1	0	1	1	0	00 69
0	1	0	1	0	1	1	0	00 6A
1	1	0	1	0	1	1	0	00 6B
0	0	1	1	0	1	1	0	00 6C
1	0	1	1	0	1	1	0	00 6D
0	1	1	1	0	1	1	0	00 6E
1	1	1	1	0	1	1	0	00 6F
0	0	0	0	1	1	1	0	00 70
1	0	0	0	1	1	1	0	00 71
0	1	0	0	1	1	1	0	00 72
1	1	0	0	1	1	1	0	00 73
0	0	1	0	1	1	1	0	00 74
1	0	1	0	1	1	1	0	00 75
0	1	1	0	1	1	1	0	00 76
1	1	1	0	1	1	1	0	00 77
0	0	0	1	1	1	1	0	00 78
1	0	0	1	1	1	1	0	00 79
0	1	0	1	1	1	1	0	00 7A
1	1	0	1	1	1	1	0	00 7B
0	0	1	1	1	1	1	0	00 7C
1	0	1	1	1	1	1	0	00 7D
0	1	1	1	1	1	1	0	00 7E
1	1	1	1	1	1	1	0	00 7F

# Servicing

## Indoor unit switch setting display (Request code: 162 to 166)

0: OFF 1: ON

SW1, SW2, SW3, SW4, SW5								Display
1	2	3	4	5	6	7	8	
0	0	0	0	0	0	0	1	00 80
1	0	0	0	0	0	0	1	00 81
0	1	0	0	0	0	0	1	00 82
1	1	0	0	0	0	0	1	00 83
0	0	1	0	0	0	0	1	00 84
1	0	1	0	0	0	0	1	00 85
0	1	1	0	0	0	0	1	00 86
1	1	1	0	0	0	0	1	00 87
0	0	0	1	0	0	0	1	00 88
1	0	0	1	0	0	0	1	00 89
0	1	0	1	0	0	0	1	00 8A
1	1	0	1	0	0	0	1	00 8B
0	0	1	1	0	0	0	1	00 8C
1	0	1	1	0	0	0	1	00 8D
0	1	1	1	0	0	0	1	00 8E
1	1	1	1	0	0	0	1	00 8F
0	0	0	0	1	0	0	1	00 90
1	0	0	0	1	0	0	1	00 91
0	1	0	0	1	0	0	1	00 92
1	1	0	0	1	0	0	1	00 93
0	0	1	0	1	0	0	1	00 94
1	0	1	0	1	0	0	1	00 95
0	1	1	0	1	0	0	1	00 96
1	1	1	0	1	0	0	1	00 97
0	0	0	1	1	0	0	1	00 98
1	0	0	1	1	0	0	1	00 99
0	1	0	1	1	0	0	1	00 9A
1	1	0	1	1	0	0	1	00 9B
0	0	1	1	1	0	0	1	00 9C
1	0	1	1	1	0	0	1	00 9D
0	1	1	1	1	0	0	1	00 9E
1	1	1	1	1	0	0	1	00 9F
0	0	0	0	0	1	0	1	00 A0
1	0	0	0	0	1	0	1	00 A1
0	1	0	0	0	1	0	1	00 A2
1	1	0	0	0	1	0	1	00 A3
0	0	1	0	0	1	0	1	00 A4
1	0	1	0	0	1	0	1	00 A5
0	1	1	0	0	1	0	1	00 A6
1	1	1	0	0	1	0	1	00 A7
0	0	0	1	0	1	0	1	00 A8
1	0	0	1	0	1	0	1	00 A9
0	1	0	1	0	1	0	1	00 AA
1	1	0	1	0	1	0	1	00 AB
0	0	1	1	0	1	0	1	00 AC
1	0	1	1	0	1	0	1	00 AD
0	1	1	1	0	1	0	1	00 AE
1	1	1	1	0	1	0	1	00 AF
0	0	0	0	1	1	0	1	00 B0
1	0	0	0	1	1	0	1	00 B1
0	1	0	0	1	1	0	1	00 B2
1	1	0	0	1	1	0	1	00 B3
0	0	1	0	1	1	0	1	00 B4
1	0	1	0	1	1	0	1	00 B5
0	1	1	0	1	1	0	1	00 B6
1	1	1	0	1	1	0	1	00 B7
0	0	0	1	1	1	0	1	00 B8
1	0	0	1	1	1	0	1	00 B9
0	1	0	1	1	1	0	1	00 BA
1	1	0	1	1	1	0	1	00 BB
0	0	1	1	1	1	0	1	00 BC
1	0	1	1	1	1	0	1	00 BD
0	1	1	1	1	1	0	1	00 BE
1	1	1	1	1	1	0	1	00 BF

0: OFF 1: ON

SW1, SW2, SW3, SW4, SW5								Display
1	2	3	4	5	6	7	8	
0	0	0	0	0	0	1	1	00 C0
1	0	0	0	0	0	1	1	00 C1
0	1	0	0	0	0	1	1	00 C2
1	1	0	0	0	0	1	1	00 C3
0	0	1	0	0	0	1	1	00 C4
1	0	1	0	0	0	1	1	00 C5
0	1	1	0	0	0	1	1	00 C6
1	1	1	0	0	0	1	1	00 C7
0	0	0	1	0	0	1	1	00 C8
1	0	0	1	0	0	1	1	00 C9
0	1	0	1	0	0	1	1	00 CA
1	1	0	1	0	0	1	1	00 CB
0	0	1	1	0	0	1	1	00 CC
1	0	1	1	0	0	1	1	00 CD
0	1	1	1	0	0	1	1	00 CE
1	1	1	1	0	0	1	1	00 CF
0	0	0	0	1	0	1	1	00 D0
1	0	0	0	1	0	1	1	00 D1
0	1	0	0	1	0	1	1	00 D2
1	1	0	0	1	0	1	1	00 D3
0	0	1	0	1	0	1	1	00 D4
1	0	1	0	1	0	1	1	00 D5
0	1	1	0	1	0	1	1	00 D6
1	1	1	0	1	0	1	1	00 D7
0	0	0	1	1	0	1	1	00 D8
1	0	0	1	1	0	1	1	00 D9
0	1	0	1	1	0	1	1	00 DA
1	1	0	1	1	0	1	1	00 DB
0	0	1	1	1	0	1	1	00 DC
1	0	1	1	1	0	1	1	00 DD
0	1	1	1	1	0	1	1	00 DE
1	1	1	1	1	0	1	1	00 DF
0	0	0	0	0	1	1	1	00 E0
1	0	0	0	0	1	1	1	00 E1
0	1	0	0	0	1	1	1	00 E2
1	1	0	0	0	1	1	1	00 E3
0	0	1	0	0	1	1	1	00 E4
1	0	1	0	0	1	1	1	00 E5
0	1	1	0	0	1	1	1	00 E6
1	1	1	0	0	1	1	1	00 E7
0	0	0	1	0	1	1	1	00 E8
1	0	0	1	0	1	1	1	00 E9
0	1	0	1	0	1	1	1	00 EA
1	1	0	1	0	1	1	1	00 EB
0	0	1	1	0	1	1	1	00 EC
1	0	1	1	0	1	1	1	00 ED
0	1	1	1	0	1	1	1	00 EE
1	1	1	1	0	1	1	1	00 EF
0	0	0	0	1	1	1	1	00 F0
1	0	0	0	1	1	1	1	00 F1
0	1	0	0	1	1	1	1	00 F2
1	1	0	0	1	1	1	1	00 F3
0	0	1	0	1	1	1	1	00 F4
1	0	1	0	1	1	1	1	00 F5
0	1	1	0	1	1	1	1	00 F6
1	1	1	0	1	1	1	1	00 F7
0	0	0	1	1	1	1	1	00 F8
1	0	0	1	1	1	1	1	00 F9
0	1	0	1	1	1	1	1	00 FA
1	1	0	1	1	1	1	1	00 FB
0	0	1	1	1	1	1	1	00 FC
1	0	1	1	1	1	1	1	00 FD
0	1	1	1	1	1	1	1	00 FE
1	1	1	1	1	1	1	1	00 FF

# Servicing

## Output signal display (Request code: 175/553)

Please refer to Table 2 on relevant wiring diagram whilst using the following.

0: OFF 1: ON

OUT								Display
1	2	3	4	5A	5B	6	7	
0	0	0	0	0	0	0	0	xx 00
1	0	0	0	0	0	0	0	xx 01
0	1	0	0	0	0	0	0	xx 02
1	1	0	0	0	0	0	0	xx 03
0	0	1	0	0	0	0	0	xx 04
1	0	1	0	0	0	0	0	xx 05
0	1	1	0	0	0	0	0	xx 06
1	1	1	0	0	0	0	0	xx 07
0	0	0	1	0	0	0	0	xx 08
1	0	0	1	0	0	0	0	xx 09
0	1	0	1	0	0	0	0	xx 0A
1	1	0	1	0	0	0	0	xx 0B
0	0	1	1	0	0	0	0	xx 0C
1	0	1	1	0	0	0	0	xx 0D
0	1	1	1	0	0	0	0	xx 0E
1	1	1	1	0	0	0	0	xx 0F
0	0	0	0	1	0	0	0	xx 10
1	0	0	0	1	0	0	0	xx 11
0	1	0	0	1	0	0	0	xx 12
1	1	0	0	1	0	0	0	xx 13
0	0	1	0	1	0	0	0	xx 14
1	0	1	0	1	0	0	0	xx 15
0	1	1	0	1	0	0	0	xx 16
1	1	1	0	1	0	0	0	xx 17
0	0	0	1	1	0	0	0	xx 18
1	0	0	1	1	0	0	0	xx 19
0	1	0	1	1	0	0	0	xx 1A
1	1	0	1	1	0	0	0	xx 1B
0	0	1	1	1	0	0	0	xx 1C
1	0	1	1	1	0	0	0	xx 1D
0	1	1	1	1	0	0	0	xx 1E
1	1	1	1	1	0	0	0	xx 1F
0	0	0	0	0	1	0	0	xx 20
1	0	0	0	0	1	0	0	xx 21
0	1	0	0	0	1	0	0	xx 22
1	1	0	0	0	1	0	0	xx 23
0	0	1	0	0	1	0	0	xx 24
1	0	1	0	0	1	0	0	xx 25
0	1	1	0	0	1	0	0	xx 26
1	1	1	0	0	1	0	0	xx 27
0	0	0	1	0	1	0	0	xx 28
1	0	0	1	0	1	0	0	xx 29
0	1	0	1	0	1	0	0	xx 2A
1	1	0	1	0	1	0	0	xx 2B
0	0	1	1	0	1	0	0	xx 2C
1	0	1	1	0	1	0	0	xx 2D
0	1	1	1	0	1	0	0	xx 2E
1	1	1	1	0	1	0	0	xx 2F
0	0	0	0	1	1	0	0	xx 30
1	0	0	0	1	1	0	0	xx 31
0	1	0	0	1	1	0	0	xx 32
1	1	0	0	1	1	0	0	xx 33
0	0	1	0	1	1	0	0	xx 34
1	0	1	0	1	1	0	0	xx 35
0	1	1	0	1	1	0	0	xx 36
1	1	1	0	1	1	0	0	xx 37
0	0	0	1	1	1	0	0	xx 38
1	0	0	1	1	1	0	0	xx 39
0	1	0	1	1	1	0	0	xx 3A
1	1	0	1	1	1	0	0	xx 3B
0	0	1	1	1	1	0	0	xx 3C
1	0	1	1	1	1	0	0	xx 3D
0	1	1	1	1	1	0	0	xx 3E
1	1	1	1	1	1	0	0	xx 3F

0: OFF 1: ON

OUT								Display
1	2	3	4	5A	5B	6	7	
0	0	0	0	0	0	1	0	xx 40
1	0	0	0	0	0	1	0	xx 41
0	1	0	0	0	0	1	0	xx 42
1	1	0	0	0	0	1	0	xx 43
0	0	1	0	0	0	1	0	xx 44
1	0	1	0	0	0	1	0	xx 45
0	1	1	0	0	0	1	0	xx 46
1	1	1	0	0	0	1	0	xx 47
0	0	0	1	0	0	1	0	xx 48
1	0	0	1	0	0	1	0	xx 49
0	1	0	1	0	0	1	0	xx 4A
1	1	0	1	0	0	1	0	xx 4B
0	0	1	1	0	0	1	0	xx 4C
1	0	1	1	0	0	1	0	xx 4D
0	1	1	1	0	0	1	0	xx 4E
1	1	1	1	0	0	1	0	xx 4F
0	0	0	0	1	0	1	0	xx 50
1	0	0	0	1	0	1	0	xx 51
0	1	0	0	1	0	1	0	xx 52
1	1	0	0	1	0	1	0	xx 53
0	0	1	0	1	0	1	0	xx 54
1	0	1	0	1	0	1	0	xx 55
0	1	1	0	1	0	1	0	xx 56
1	1	1	0	1	0	1	0	xx 57
0	0	0	1	1	0	1	0	xx 58
1	0	0	1	1	0	1	0	xx 59
0	1	0	1	1	0	1	0	xx 5A
1	1	0	1	1	0	1	0	xx 5B
0	0	1	1	1	0	1	0	xx 5C
1	0	1	1	1	0	1	0	xx 5D
0	1	1	1	1	0	1	0	xx 5E
1	1	1	1	1	0	1	0	xx 5F
0	0	0	0	0	1	1	0	xx 60
1	0	0	0	0	1	1	0	xx 61
0	1	0	0	0	1	1	0	xx 62
1	1	0	0	0	1	1	0	xx 63
0	0	1	0	0	1	1	0	xx 64
1	0	1	0	0	1	1	0	xx 65
0	1	1	0	0	1	1	0	xx 66
1	1	1	0	0	1	1	0	xx 67
0	0	0	1	0	1	1	0	xx 68
1	0	0	1	0	1	1	0	xx 69
0	1	0	1	0	1	1	0	xx 6A
1	1	0	1	0	1	1	0	xx 6B
0	0	1	1	0	1	1	0	xx 6C
1	0	1	1	0	1	1	0	xx 6D
0	1	1	1	0	1	1	0	xx 6E
1	1	1	1	0	1	1	0	xx 6F
0	0	0	0	1	1	1	0	xx 70
1	0	0	0	1	1	1	0	xx 71
0	1	0	0	1	1	1	0	xx 72
1	1	0	0	1	1	1	0	xx 73
0	0	1	0	1	1	1	0	xx 74
1	0	1	0	1	1	1	0	xx 75
0	1	1	0	1	1	1	0	xx 76
1	1	1	0	1	1	1	0	xx 77
0	0	0	1	1	1	1	0	xx 78
1	0	0	1	1	1	1	0	xx 79
0	1	0	1	1	1	1	0	xx 7A
1	1	0	1	1	1	1	0	xx 7B
0	0	1	1	1	1	1	0	xx 7C
1	0	1	1	1	1	1	0	xx 7D
0	1	1	1	1	1	1	0	xx 7E
1	1	1	1	1	1	1	0	xx 7F

# Servicing

## Output signal display (Request code: 175/553)

Please refer to Table 2 on relevant wiring diagram whilst using the following.

0: OFF 1: ON

OUT								Display
1	2	3	4	5A	5B	6	7	
0	0	0	0	0	0	0	1	xx 80
1	0	0	0	0	0	0	1	xx 81
0	1	0	0	0	0	0	1	xx 82
1	1	0	0	0	0	0	1	xx 83
0	0	1	0	0	0	0	1	xx 84
1	0	1	0	0	0	0	1	xx 85
0	1	1	0	0	0	0	1	xx 86
1	1	1	0	0	0	0	1	xx 87
0	0	0	1	0	0	0	1	xx 88
1	0	0	1	0	0	0	1	xx 89
0	1	0	1	0	0	0	1	xx 8A
1	1	0	1	0	0	0	1	xx 8B
0	0	1	1	0	0	0	1	xx 8C
1	0	1	1	0	0	0	1	xx 8D
0	1	1	1	0	0	0	1	xx 8E
1	1	1	1	0	0	0	1	xx 8F
0	0	0	0	1	0	0	1	xx 90
1	0	0	0	1	0	0	1	xx 91
0	1	0	0	1	0	0	1	xx 92
1	1	0	0	1	0	0	1	xx 93
0	0	1	0	1	0	0	1	xx 94
1	0	1	0	1	0	0	1	xx 95
0	1	1	0	1	0	0	1	xx 96
1	1	1	0	1	0	0	1	xx 97
0	0	0	1	1	0	0	1	xx 98
1	0	0	1	1	0	0	1	xx 99
0	1	0	1	1	0	0	1	xx 9A
1	1	0	1	1	0	0	1	xx 9B
0	0	1	1	1	0	0	1	xx 9C
1	0	1	1	1	0	0	1	xx 9D
0	1	1	1	1	0	0	1	xx 9E
1	1	1	1	1	0	0	1	xx 9F
0	0	0	0	0	1	0	1	xx A0
1	0	0	0	0	1	0	1	xx A1
0	1	0	0	0	1	0	1	xx A2
1	1	0	0	0	1	0	1	xx A3
0	0	1	0	0	1	0	1	xx A4
1	0	1	0	0	1	0	1	xx A5
0	1	1	0	0	1	0	1	xx A6
1	1	1	0	0	1	0	1	xx A7
0	0	0	1	0	1	0	1	xx A8
1	0	0	1	0	1	0	1	xx A9
0	1	0	1	0	1	0	1	xx AA
1	1	0	1	0	1	0	1	xx AB
0	0	1	1	0	1	0	1	xx AC
1	0	1	1	0	1	0	1	xx AD
0	1	1	1	0	1	0	1	xx AE
1	1	1	1	0	1	0	1	xx AF
0	0	0	0	1	1	0	1	xx B0
1	0	0	0	1	1	0	1	xx B1
0	1	0	0	1	1	0	1	xx B2
1	1	0	0	1	1	0	1	xx B3
0	0	1	0	1	1	0	1	xx B4
1	0	1	0	1	1	0	1	xx B5
0	1	1	0	1	1	0	1	xx B6
1	1	1	0	1	1	0	1	xx B7
0	0	0	1	1	1	0	1	xx B8
1	0	0	1	1	1	0	1	xx B9
0	1	0	1	1	1	0	1	xx BA
1	1	0	1	1	1	0	1	xx BB
0	0	1	1	1	1	0	1	xx BC
1	0	1	1	1	1	0	1	xx BD
0	1	1	1	1	1	0	1	xx BE
1	1	1	1	1	1	0	1	xx BF

0: OFF 1: ON

OUT								Display
1	2	3	4	5A	5B	6	7	
0	0	0	0	0	0	1	1	xx C0
1	0	0	0	0	0	1	1	xx C1
0	1	0	0	0	0	1	1	xx C2
1	1	0	0	0	0	1	1	xx C3
0	0	1	0	0	0	1	1	xx C4
1	0	1	0	0	0	1	1	xx C5
0	1	1	0	0	0	1	1	xx C6
1	1	1	0	0	0	1	1	xx C7
0	0	0	1	0	0	1	1	xx C8
1	0	0	1	0	0	1	1	xx C9
0	1	0	1	0	0	1	1	xx CA
1	1	0	1	0	0	1	1	xx CB
0	0	1	1	0	0	1	1	xx CC
1	0	1	1	0	0	1	1	xx CD
0	1	1	1	0	0	1	1	xx CE
1	1	1	1	0	0	1	1	xx CF
0	0	0	0	1	0	1	1	xx D0
1	0	0	0	1	0	1	1	xx D1
0	1	0	0	1	0	1	1	xx D2
1	1	0	0	1	0	1	1	xx D3
0	0	1	0	1	0	1	1	xx D4
1	0	1	0	1	0	1	1	xx D5
0	1	1	0	1	0	1	1	xx D6
1	1	1	0	1	0	1	1	xx D7
0	0	0	1	1	0	1	1	xx D8
1	0	0	1	1	0	1	1	xx D9
0	1	0	1	1	0	1	1	xx DA
1	1	0	1	1	0	1	1	xx DB
0	0	1	1	1	0	1	1	xx DC
1	0	1	1	1	0	1	1	xx DD
0	1	1	1	1	0	1	1	xx DE
1	1	1	1	1	0	1	1	xx DF
0	0	0	0	0	1	1	1	xx E0
1	0	0	0	0	1	1	1	xx E1
0	1	0	0	0	1	1	1	xx E2
1	1	0	0	0	1	1	1	xx E3
0	0	1	0	0	1	1	1	xx E4
1	0	1	0	0	1	1	1	xx E5
0	1	1	0	0	1	1	1	xx E6
1	1	1	0	0	1	1	1	xx E7
0	0	0	1	0	1	1	1	xx E8
1	0	0	1	0	1	1	1	xx E9
0	1	0	1	0	1	1	1	xx EA
1	1	0	1	0	1	1	1	xx EB
0	0	1	1	0	1	1	1	xx EC
1	0	1	1	0	1	1	1	xx ED
0	1	1	1	0	1	1	1	xx EE
1	1	1	1	0	1	1	1	xx EF
0	0	0	0	1	1	1	1	xx F0
1	0	0	0	1	1	1	1	xx F1
0	1	0	0	1	1	1	1	xx F2
1	1	0	0	1	1	1	1	xx F3
0	0	1	0	1	1	1	1	xx F4
1	0	1	0	1	1	1	1	xx F5
0	1	1	0	1	1	1	1	xx F6
1	1	1	0	1	1	1	1	xx F7
0	0	0	1	1	1	1	1	xx F8
1	0	0	1	1	1	1	1	xx F9
0	1	0	1	1	1	1	1	xx FA
1	1	0	1	1	1	1	1	xx FB
0	0	1	1	1	1	1	1	xx FC
1	0	1	1	1	1	1	1	xx FD
0	1	1	1	1	1	1	1	xx FE
1	1	1	1	1	1	1	1	xx FF

# Servicing

## Output signal display (Request code: 175/553)

Please refer to Table 2 on relevant wiring diagram whilst using the following.

0: OFF 1: ON

OUT								Display
8*	9	10	11	12	13	14	15	
0	0	0	0	0	0	0	0	00 xx
1	0	0	0	0	0	0	0	01 xx
0	1	0	0	0	0	0	0	02 xx
1	1	0	0	0	0	0	0	03 xx
0	0	1	0	0	0	0	0	04 xx
1	0	1	0	0	0	0	0	05 xx
0	1	1	0	0	0	0	0	06 xx
1	1	1	0	0	0	0	0	07 xx
0	0	0	1	0	0	0	0	08 xx
1	0	0	1	0	0	0	0	09 xx
0	1	0	1	0	0	0	0	0A xx
1	1	0	1	0	0	0	0	0B xx
0	0	1	1	0	0	0	0	0C xx
1	0	1	1	0	0	0	0	0D xx
0	1	1	1	0	0	0	0	0E xx
1	1	1	1	0	0	0	0	0F xx
0	0	0	0	1	0	0	0	10 xx
1	0	0	0	1	0	0	0	11 xx
0	1	0	0	1	0	0	0	12 xx
1	1	0	0	1	0	0	0	13 xx
0	0	1	0	1	0	0	0	14 xx
1	0	1	0	1	0	0	0	15 xx
0	1	1	0	1	0	0	0	16 xx
1	1	1	0	1	0	0	0	17 xx
0	0	0	1	1	0	0	0	18 xx
1	0	0	1	1	0	0	0	19 xx
0	1	0	1	1	0	0	0	1A xx
1	1	0	1	1	0	0	0	1B xx
0	0	1	1	1	0	0	0	1C xx
1	0	1	1	1	0	0	0	1D xx
0	1	1	1	1	0	0	0	1E xx
1	1	1	1	1	0	0	0	1F xx
0	0	0	0	0	1	0	0	20 xx
1	0	0	0	0	1	0	0	21 xx
0	1	0	0	0	1	0	0	22 xx
1	1	0	0	0	1	0	0	23 xx
0	0	1	0	0	1	0	0	24 xx
1	0	1	0	0	1	0	0	25 xx
0	1	1	0	0	1	0	0	26 xx
1	1	1	0	0	1	0	0	27 xx
0	0	0	1	0	1	0	0	28 xx
1	0	0	1	0	1	0	0	29 xx
0	1	0	1	0	1	0	0	2A xx
1	1	0	1	0	1	0	0	2B xx
0	0	1	1	0	1	0	0	2C xx
1	0	1	1	0	1	0	0	2D xx
0	1	1	1	0	1	0	0	2E xx
1	1	1	1	0	1	0	0	2F xx
0	0	0	0	1	1	0	0	30 xx
1	0	0	0	1	1	0	0	31 xx
0	1	0	0	1	1	0	0	32 xx
1	1	0	0	1	1	0	0	33 xx
0	0	1	0	1	1	0	0	34 xx
1	0	1	0	1	1	0	0	35 xx
0	1	1	0	1	1	0	0	36 xx
1	1	1	0	1	1	0	0	37 xx
0	0	0	1	1	1	0	0	38 xx
1	0	0	1	1	1	0	0	39 xx
0	1	0	1	1	1	0	0	3A xx
1	1	0	1	1	1	0	0	3B xx
0	0	1	1	1	1	0	0	3C xx
1	0	1	1	1	1	0	0	3D xx
0	1	1	1	1	1	0	0	3E xx
1	1	1	1	1	1	0	0	3F xx

\* Displayed only when the request code is 553.

0: OFF 1: ON

OUT								Display
8	9	10	11	12	13	14	15	
0	0	0	0	0	0	1	0	40 xx
1	0	0	0	0	0	1	0	41 xx
0	1	0	0	0	0	1	0	42 xx
1	1	0	0	0	0	1	0	43 xx
0	0	1	0	0	0	1	0	44 xx
1	0	1	0	0	0	1	0	45 xx
0	1	1	0	0	0	1	0	46 xx
1	1	1	0	0	0	1	0	47 xx
0	0	0	1	0	0	1	0	48 xx
1	0	0	1	0	0	1	0	49 xx
0	1	0	1	0	0	1	0	4A xx
1	1	0	1	0	0	1	0	4B xx
0	0	1	1	0	0	1	0	4C xx
1	0	1	1	0	0	1	0	4D xx
0	1	1	1	0	0	1	0	4E xx
1	1	1	1	0	0	1	0	4F xx
0	0	0	0	1	0	1	0	50 xx
1	0	0	0	1	0	1	0	51 xx
0	1	0	0	1	0	1	0	52 xx
1	1	0	0	1	0	1	0	53 xx
0	0	1	0	1	0	1	0	54 xx
1	0	1	0	1	0	1	0	55 xx
0	1	1	0	1	0	1	0	56 xx
1	1	1	0	1	0	1	0	57 xx
0	0	0	1	1	0	1	0	58 xx
1	0	0	1	1	0	1	0	59 xx
0	1	0	1	1	0	1	0	5A xx
1	1	0	1	1	0	1	0	5B xx
0	0	1	1	1	0	1	0	5C xx
1	0	1	1	1	0	1	0	5D xx
0	1	1	1	1	0	1	0	5E xx
1	1	1	1	1	0	1	0	5F xx
0	0	0	0	0	1	1	0	60 xx
1	0	0	0	0	1	1	0	61 xx
0	1	0	0	0	1	1	0	62 xx
1	1	0	0	0	1	1	0	63 xx
0	0	1	0	0	1	1	0	64 xx
1	0	1	0	0	1	1	0	65 xx
0	1	1	0	0	1	1	0	66 xx
1	1	1	0	0	1	1	0	67 xx
0	0	0	1	0	1	1	0	68 xx
1	0	0	1	0	1	1	0	69 xx
0	1	0	1	0	1	1	0	6A xx
1	1	0	1	0	1	1	0	6B xx
0	0	1	1	0	1	1	0	6C xx
1	0	1	1	0	1	1	0	6D xx
0	1	1	1	0	1	1	0	6E xx
1	1	1	1	0	1	1	0	6F xx
0	0	0	0	1	1	1	0	70 xx
1	0	0	0	1	1	1	0	71 xx
0	1	0	0	1	1	1	0	72 xx
1	1	0	0	1	1	1	0	73 xx
0	0	1	0	1	1	1	0	74 xx
1	0	1	0	1	1	1	0	75 xx
0	1	1	0	1	1	1	0	76 xx
1	1	1	0	1	1	1	0	77 xx
0	0	0	1	1	1	1	0	78 xx
1	0	0	1	1	1	1	0	79 xx
0	1	0	1	1	1	1	0	7A xx
1	1	0	1	1	1	1	0	7B xx
0	0	1	1	1	1	1	0	7C xx
1	0	1	1	1	1	1	0	7D xx
0	1	1	1	1	1	1	0	7E xx
1	1	1	1	1	1	1	0	7F xx

## Mixing valve state

OUT		Mixing valve state
5A	5B	
0	0	Stop
0	1	Stop
1	0	Open
1	1	Close



# Servicing

## Input signal display (Request code: 176/554)

Please refer to Table 1 on relevant wiring diagram whilst using the following.

0: OFF (open)      1: ON (short)

IN								Display
1	2	3	4	5	6	7	8	
0	0	0	0	0	0	0	0	00 00
1	0	0	0	0	0	0	0	00 01
0	1	0	0	0	0	0	0	00 02
1	1	0	0	0	0	0	0	00 03
0	0	1	0	0	0	0	0	00 04
1	0	1	0	0	0	0	0	00 05
0	1	1	0	0	0	0	0	00 06
1	1	1	0	0	0	0	0	00 07
0	0	0	1	0	0	0	0	00 08
1	0	0	1	0	0	0	0	00 09
0	1	0	1	0	0	0	0	00 0A
1	1	0	1	0	0	0	0	00 0B
0	0	1	1	0	0	0	0	00 0C
1	0	1	1	0	0	0	0	00 0D
0	1	1	1	0	0	0	0	00 0E
1	1	1	1	0	0	0	0	00 0F
0	0	0	0	1	0	0	0	00 10
1	0	0	0	1	0	0	0	00 11
0	1	0	0	1	0	0	0	00 12
1	1	0	0	1	0	0	0	00 13
0	0	1	0	1	0	0	0	00 14
1	0	1	0	1	0	0	0	00 15
0	1	1	0	1	0	0	0	00 16
1	1	1	0	1	0	0	0	00 17
0	0	0	1	1	0	0	0	00 18
1	0	0	1	1	0	0	0	00 19
0	1	0	1	1	0	0	0	00 1A
1	1	0	1	1	0	0	0	00 1B
0	0	1	1	1	0	0	0	00 1C
1	0	1	1	1	0	0	0	00 1D
0	1	1	1	1	0	0	0	00 1E
1	1	1	1	1	0	0	0	00 1F
0	0	0	0	0	1	0	0	00 20
1	0	0	0	0	1	0	0	00 21
0	1	0	0	0	1	0	0	00 22
1	1	0	0	0	1	0	0	00 23
0	0	1	0	0	1	0	0	00 24
1	0	1	0	0	1	0	0	00 25
0	1	1	0	0	1	0	0	00 26
1	1	1	0	0	1	0	0	00 27
0	0	0	1	0	1	0	0	00 28
1	0	0	1	0	1	0	0	00 29
0	1	0	1	0	1	0	0	00 2A
1	1	0	1	0	1	0	0	00 2B
0	0	1	1	0	1	0	0	00 2C
1	0	1	1	0	1	0	0	00 2D
0	1	1	1	0	1	0	0	00 2E
1	1	1	1	0	1	0	0	00 2F
0	0	0	0	1	1	0	0	00 30
1	0	0	0	1	1	0	0	00 31
0	1	0	0	1	1	0	0	00 32
1	1	0	0	1	1	0	0	00 33
0	0	1	0	1	1	0	0	00 34
1	0	1	0	1	1	0	0	00 35
0	1	1	0	1	1	0	0	00 36
1	1	1	0	1	1	0	0	00 37
0	0	0	1	1	1	0	0	00 38
1	0	0	1	1	1	0	0	00 39
0	1	0	1	1	1	0	0	00 3A
1	1	0	1	1	1	0	0	00 3B
0	0	1	1	1	1	0	0	00 3C
1	0	1	1	1	1	0	0	00 3D
0	1	1	1	1	1	0	0	00 3E
1	1	1	1	1	1	0	0	00 3F

0: OFF (open)      1: ON (short)

IN								Display
1	2	3	4	5	6	7	8	
0	0	0	0	0	0	1	0	00 40
1	0	0	0	0	0	1	0	00 41
0	1	0	0	0	0	1	0	00 42
1	1	0	0	0	0	1	0	00 43
0	0	1	0	0	0	1	0	00 44
1	0	1	0	0	0	1	0	00 45
0	1	1	0	0	0	1	0	00 46
1	1	1	0	0	0	1	0	00 47
0	0	0	1	0	0	1	0	00 48
1	0	0	1	0	0	1	0	00 49
0	1	0	1	0	0	1	0	00 4A
1	1	0	1	0	0	1	0	00 4B
0	0	1	1	0	0	1	0	00 4C
1	0	1	1	0	0	1	0	00 4D
0	1	1	1	0	0	1	0	00 4E
1	1	1	1	0	0	1	0	00 4F
0	0	0	0	1	0	1	0	00 50
1	0	0	0	1	0	1	0	00 51
0	1	0	0	1	0	1	0	00 52
1	1	0	0	1	0	1	0	00 53
0	0	1	0	1	0	1	0	00 54
1	0	1	0	1	0	1	0	00 55
0	1	1	0	1	0	1	0	00 56
1	1	1	0	1	0	1	0	00 57
0	0	0	1	1	0	1	0	00 58
1	0	0	1	1	0	1	0	00 59
0	1	0	1	1	0	1	0	00 5A
1	1	0	1	1	0	1	0	00 5B
0	0	1	1	1	0	1	0	00 5C
1	0	1	1	1	0	1	0	00 5D
0	1	1	1	1	0	1	0	00 5E
1	1	1	1	1	0	1	0	00 5F
0	0	0	0	0	1	1	0	00 60
1	0	0	0	0	1	1	0	00 61
0	1	0	0	0	1	1	0	00 62
1	1	0	0	0	1	1	0	00 63
0	0	1	0	0	1	1	0	00 64
1	0	1	0	0	1	1	0	00 65
0	1	1	0	0	1	1	0	00 66
1	1	1	0	0	1	1	0	00 67
0	0	0	1	0	1	1	0	00 68
1	0	0	1	0	1	1	0	00 69
0	1	0	1	0	1	1	0	00 6A
1	1	0	1	0	1	1	0	00 6B
0	0	1	1	0	1	1	0	00 6C
1	0	1	1	0	1	1	0	00 6D
0	1	1	1	0	1	1	0	00 6E
1	1	1	1	0	1	1	0	00 6F
0	0	0	0	1	1	1	0	00 70
1	0	0	0	1	1	1	0	00 71
0	1	0	0	1	1	1	0	00 72
1	1	0	0	1	1	1	0	00 73
0	0	1	0	1	1	1	0	00 74
1	0	1	0	1	1	1	0	00 75
0	1	1	0	1	1	1	0	00 76
1	1	1	0	1	1	1	0	00 77
0	0	0	1	1	1	1	0	00 78
1	0	0	1	1	1	1	0	00 79
0	1	0	1	1	1	1	0	00 7A
1	1	0	1	1	1	1	0	00 7B
0	0	1	1	1	1	1	0	00 7C
1	0	1	1	1	1	1	0	00 7D
0	1	1	1	1	1	1	0	00 7E
1	1	1	1	1	1	1	0	00 7F

# Servicing

## ■ Indoor unit only operation

In indoor unit only operation, an operation without connecting outdoor unit is possible. When in Indoor unit only operation, the main control has control functions.

### <Heater>

Heating for DHW and space heating is provided by the heater.

#### • Activating indoor unit only operation mode

To activate indoor unit only operation see the following:

1. Switch OFF the breaker for the outdoor unit (or both breakers if cylinder powered independently).
2. Change DIP switch SW4-4 and SW4-5 to ON.
3. Switch ON the breaker(s).
4. Indoor unit only operation is now activated.

#### • Deactivating indoor unit only operation mode

To deactivate indoor unit only operation see the following:

1. Switch OFF the breaker for the outdoor unit (or both breakers if cylinder powered independently).
2. Change DIP switch SW4-4 and SW4-5 to OFF.
3. Switch ON the breaker(s).
4. Indoor unit only operation is now deactivated.

### <Boiler>

Heating for space heating is provided by the boiler.

#### • Activating indoor unit only operation mode

To activate indoor unit only operation see the following:

1. Switch OFF the breaker for the outdoor unit (or both breakers if cylinder powered independently).
2. Change DIP switch SW4-4 and SW4-6 to ON.
3. Switch ON the breaker(s).
4. Indoor unit only operation is now activated.

#### • Deactivating indoor unit only operation mode

To deactivate indoor unit only operation see the following:

1. Switch OFF the breaker for the outdoor unit (or both breakers if cylinder powered independently).
2. Change DIP switch SW4-4 and SW4-6 to OFF.
3. Switch ON the breaker(s).
4. Indoor unit only operation is now deactivated.

## ■ Emergency operation

In emergency operation, an operation without connecting outdoor unit and main remote controller is possible.

When in Emergency operation, the main control has NO control functions.

Space heating flow temp. is restarted 40°C and DHW tank temp. is restricted 50°C. \*1

### <Heater>

Heating for DHW and space heating is provided by the heater.

#### • Activating emergency operation mode

To activate emergency operation see the following:

1. Switch OFF the breaker for the outdoor unit (or both breakers if cylinder powered independently).
2. Change DIP switch SW4-5 to ON.
3. Switch ON the breaker(s).
4. Emergency operation is now activated.

#### • Deactivating emergency operation mode

To deactivate emergency operation see the following:

1. Switch OFF the breaker for the outdoor unit (or both breakers if cylinder powered independently).
2. Change DIP switch SW4-5 to OFF.
3. Switch ON the breaker(s).
4. Emergency operation is now deactivated.

### <Boiler>

Heating for space heating is provided by the boiler.

#### • Activating emergency operation mode

To activate emergency operation see the following:

1. Switch OFF the breaker for the outdoor unit (or both breakers if cylinder powered independently).
2. Change DIP switch SW4-6 to ON.
3. Switch ON the breaker(s).
4. Emergency operation is now activated.

#### • Deactivating emergency operation mode

To deactivate emergency operation see the following:

1. Switch OFF the breaker for the outdoor unit (or both breakers if cylinder powered independently).
2. Change DIP switch SW4-6 to OFF.
3. Switch ON the breaker(s).
4. Emergency operation is now deactivated.

### ⚠ WARNING

Do not attempt to change the DIP switches whilst the breaker(s) are ON as this could result in electric shock.

	Indoor unit only operation
Indoor unit	Necessary
Heat pump	Not necessary
Main remote controller	Necessary
DIP switch setting	Electric heater SW4-4 ON, SW4-5 ON
	Boiler SW4-4 ON, SW4-6 ON
Setting range for flow temp.	20 to 60°C Selectable
Setting range for tank temp.	40 to 60°C Selectable

	Emergency operation
Indoor unit	Necessary
Heat pump	Not necessary
Main remote controller	Not necessary
DIP switch setting	Electric heater SW4-5 ON
	Boiler SW4-6 ON
Setting range for flow temp.	Fixed at 40°C
Setting range for tank temp.	Fixed at 50°C *1

\*1 Default setting is 50°C. Once system has started running, emergency operation runs at the latest set temp.

# Troubleshooting

## Important

- Any required parts should be purchased from Mitsubishi Electric parts.
- Disconnect the electrical supply before removing any electrical equipment covers.
- NEVER bypass any thermal controls or operate system without the necessary safety valves.

- Water contained in the cylinder may be very hot, especially following a thermal control failure. Caution must be taken when drawing water from the unit.

Issue	Possible Cause	Solution
Water escaping from the case	Compression fitting on hot draw-off not sealing	Check/remake joint with sealing paste
	Leaking cylinder	Isolate supply and contact us
Cold water at hot taps	Heat pump not working	Check heat source - consult heat pump manufacturer's instructions
	Motorised valve fault	Check plumbing / wiring to motorised valve
	Cut-out in dual stat has operated	Reset and investigate cause
	Immersion heater not switched on or cut-out has triggered	Check / reset
	Circulating pump fault	Check pump & consult manufacturer's instructions
Water discharges from expansion relief valve	If continual - pressure reducing valve (part of cold water combination valve) may not be operating correctly	Check outlet pressure from cold water combination valve is 3 bar
	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 3 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 & pressure relief valve	Unit has overheated - thermal controls have failed (Note: water will be very hot.)	Switch off power to heat pump, boiler 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
	Cold mains off	Check and open stopcock
No hot water flow	Strainer blocked in pressure reducing valve	Isolate water supply and clean
	Cold water combination valve may be fitted incorrectly	Check and refit as required
Noise during hot water draw-off - typically worse in the morning	Loose pipework	Install extra clips
	Water hammer	Fit a shock arrestor
Hot or warm water from cold tap	If tap runs cold after a minute or so the pipe is picking up heat from heating pipework	Insulate / re-route

The fault finding table (above) will enable operational faults to be identified and their possible causes rectified. Any work carried out on this unvented water heater and its associated controls MUST be carried out by a competent installer for unvented water heating systems. In case of doubt contact Technical Support (see contact details on back page).

## <Summary of self-diagnosis based on Check codes and Service Procedures>

Present and past Check codes are logged, and they can be displayed on the main remote controller or control board of the outdoor unit. Please refer to the table below and subsequent explanations to diagnose and remedy typical problems that may occur in the field.

Unit Condition	Check code	Action
Reoccurring problem	Displayed	Use table "10-4. Self-diagnosis and action" to identify fault and correct.
	Not Displayed	Use table "10-5. Troubleshooting by inferior phenomena" to identify fault and correct.
Non reoccurring problem	Logged	1. Check temporary causes of defects such as the operation of safety devices on the refrigerant/water circuit including compressor, poor wiring, electrical noise etc. Re-check the symptom and the installation environment, refrigerant amount (Split systems only), weather conditions at time of fault etc. 2. Reset Check code logs, service the unit and restart system.
	Not Logged	1. Recheck the abnormal symptom. 2. Identify cause of problem and take corrective action according to Table "10-5. Troubleshooting by inferior phenomena". 3. If no obvious problem can be found, continue to operate the unit.

### Note:

Electrical components should only be replaced as a final option. Please follow instructions in "Self-diagnosis and action" and "Troubleshooting by inferior phenomena" fully before resorting to replacing parts.

## Test Run

Before a test run

- After installation of outdoor unit, pipework and electrical wiring, recheck that there is no water leakage, loosened connections or miswiring.
- Measure impedance between the ground and the power supply terminal block (L,N) on the outdoor and indoor units with suitable (500V) ohmmeter. Resistance should be  $\geq 1.0M\Omega$ .
- Read the Installation and Operation Manuals fully, especially the safety requirements, before carrying out any test runs.

## Malfunction diagnosis method by main remote controller

If during start up or operation a malfunction occurs, the Check code screen may be displayed on the main remote controller.

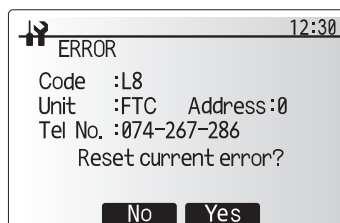
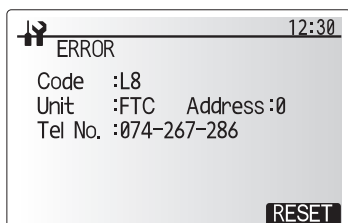
The Check code screen shows the following; code, unit, ref. address and telephone number of installer (only if previously entered by the installer).

Please note: In the case of some malfunctions a Check code is not generated - please refer to table "10-5. Troubleshooting by inferior phenomena" for more details.

To reset:

1. To reset the main remote controller press F4 button (Reset).

2. Then press F3 (Yes) to confirm.



# Troubleshooting

## 10-4. Self-diagnosis and action

Check if DIP SW is set correctly. (Refer to "6-9. DIP switch functions".)

Check code	Title and display conditions	Possible Cause	Diagnosis and action
L3	<p><b>Circulation water temperature overheat protection</b> &lt;DHW/Heating/Cooling/LP/FS/OS&gt; Check code displayed when THW1 detects a temp. <math>\geq 80^{\circ}\text{C}</math> for 10 consecutive seconds or THW2 detects a temp. <math>\geq 80^{\circ}\text{C}</math> for 10 consecutive seconds.</p> <p>DHW: Domestic hot water mode Heating: Heating mode Cooling: Cooling mode LP: Legionella prevention mode FS: Freeze stat OS: Operation stop TH1A/B: Room temp. thermistor TH2: Liquid refrigerant temp. thermistor THW1: Flow water temp. thermistor THW2: Return water temp. thermistor THW5B: DHW tank lower water temp. thermistor THW6: Zone1 flow water temperature thermistor THW7: Zone1 return water temperature thermistor THW8: Zone2 flow water temperature thermistor THW9: Zone2 return water temperature thermistor THWB1: Boiler flow water temperature thermistor</p>	<ol style="list-style-type: none"> <li>Insufficient system head</li> <li>Reduced flow in primary water circuit Due to 1 or more of the following; Faulty pump, insufficient air purge, blocked strainer, leak in water circuit.</li> <li>Valve operation fault</li> <li>2-way valve (local supply) actuator fault</li> <li>3-way valve actuator fault</li> <li>Booster heater relay (BHC1, BHC2, BHCP) operating fault</li> <li>Power supply voltage increase</li> <li>THW1 or THW5 has become detached from its holder.</li> <li>THW1 or THW2 fault</li> <li>FTC board failure</li> </ol>	<ol style="list-style-type: none"> <li>Refer to table in "10-6. Checking Component Parts' Function" to determine if system pump meets requirements. If more head required either add a pump of the same size or replace existing pump with capacity model. See "11. DISASSEMBLY PROCEDURE" for how to replace pump.</li> <li>Check circulation pump (See "10-6. Checking Component Parts' Function" for how to check). Open purge valve to remove trapped air. Check the strainer for blockages. Check the primary water circuit for leaks. Check that the flow amount is within the recommended range.</li> <li>Check valves on primary water circuit are installed level.</li> <li>Electrically test to determine fault</li> <li>1) Electrically test to determine fault. 2) Operate 3-way valve manually using the main remote controller. (Refer to &lt;Manual operation&gt; in "9-5. Service menu".) 3) Replace 3-way valve coil. 4) Replace 3-way valve. (Refer to Procedure 6 in "11. DISASSEMBLY PROCEDURE."</li> <li>Electrically test the relays (BHC1, BHC2, BHCP) to determine fault. See "10-6. Checking Component Parts' Function" for how to check.</li> <li>Check the supply voltage.</li> <li>Visually inspect location and reattach as necessary.</li> <li>Check resistance of thermistor against table in "10-6. Checking Component Parts' Function". Compare FTC detected temperature to hand held detector.</li> <li>Replace board.</li> </ol>
L4	<p><b>Tank water temperature overheat protection</b> &lt;DHW/Heating/Cooling/LP/FS/OS&gt; Check code display when THW5B detects a temp. <math>\geq 75^{\circ}\text{C}</math> for 10 consecutive seconds.</p>	<ol style="list-style-type: none"> <li>3-way valve actuator fault</li> <li>Immersion heater relay (IHC) operating fault</li> <li>THW5B fault</li> <li>FTC board failure</li> </ol>	<ol style="list-style-type: none"> <li>1) Electrically test to determine fault. 2) Operate 3-way valve manually using the main remote controller. (Refer to &lt;Manual operation&gt; in "9-5. Service menu".) 3) Replace 3-way valve coil. 4) Replace 3-way valve. (Refer to Procedure 6 in "11. DISASSEMBLY PROCEDURE."</li> <li>Check immersion heater relay (IHC).</li> <li>Check resistance of thermistor against table in "10-6. Checking Component Parts' Function". Compare FTC detected temperature to hand held detector.</li> <li>Replace board.</li> </ol>

# Troubleshooting

Check code	Title and display conditions	Possible Cause	Diagnosis and action																																																			
P1/P2/L5/LD	<p><b>Indoor unit temperature thermistor failure</b>            Note: The thermistors subject to failure can be checked in "Request code: 567" in "Running information."</p> <p>&lt;DHW/Heating/Cooling/LP/FS/OS&gt;            Check code displayed when thermistor is at open or short (see table).</p> <p><u>Exceptions</u>            Check code will not be displayed for TH2; During defrost and for 10 minutes after defrost operation.</p>	<ol style="list-style-type: none"> <li>Connector/terminal wire has become detached or loose wiring.</li> <li>Thermistor fault</li> <li>FTC board failure</li> <li>The thermistor on the wireless remote controller or the main remote controller may be defective (when Room temp. is chosen for the Heating operation and when Main remote controller or Room RC 1-8 is chosen for the Room Sensor setting in the Initial setting).</li> <li>Incorrect setting of the DIP switch(es)</li> </ol>	<ol style="list-style-type: none"> <li>Visually check the terminals and connections and reattach as appropriate.</li> <li>Check resistance of thermistor against table in "10-6. Checking Component Parts' Function". Compare FTC detected temperature to hand held detector.</li> <li>Replace board.</li> <li>Replace wireless remote controller or main remote controller.</li> <li>Check the DIP switch setting(s).</li> </ol>																																																			
		<table border="1"> <thead> <tr> <th rowspan="2">Check code</th> <th colspan="2">Thermistor</th> <th rowspan="2">Open detection</th> <th rowspan="2">Short detection</th> </tr> <tr> <th>Symbol</th> <th>Name</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>TH1A/TH1B</td> <td>Room temperature thermistor</td> <td>-39°C or below</td> <td>88.5°C or above</td> </tr> <tr> <td>P2</td> <td>TH2</td> <td>Liquid temperature thermistor</td> <td>-39°C or below</td> <td>88.5°C or above</td> </tr> <tr> <td rowspan="7">L5</td> <td>THW1</td> <td>Flow water temperature thermistor</td> <td>-39°C or below</td> <td>88.5°C or above</td> </tr> <tr> <td>THW2</td> <td>Return water temperature thermistor</td> <td>-39°C or below</td> <td>88.5°C or above</td> </tr> <tr> <td>THW5B</td> <td>DHW tank water temperature thermistor</td> <td>-39°C or below</td> <td>88.5°C or above</td> </tr> <tr> <td>THW6</td> <td>Zone1 flow water temperature thermistor</td> <td>-39°C or below</td> <td>88.5°C or above</td> </tr> <tr> <td>THW7</td> <td>Zone1 return water temperature thermistor</td> <td>-39°C or below</td> <td>88.5°C or above</td> </tr> <tr> <td>THW8</td> <td>Zone2 flow water temperature thermistor</td> <td>-39°C or below</td> <td>88.5°C or above</td> </tr> <tr> <td>THW9</td> <td>Zone2 return water temperature thermistor</td> <td>-39°C or below</td> <td>88.5°C or above</td> </tr> <tr> <td>LD</td> <td>THWB1</td> <td>Boiler flow water temperature thermistor</td> <td>-40°C or below</td> <td>140°C or above</td> </tr> </tbody> </table>		Check code	Thermistor		Open detection	Short detection	Symbol	Name	P1	TH1A/TH1B	Room temperature thermistor	-39°C or below	88.5°C or above	P2	TH2	Liquid temperature thermistor	-39°C or below	88.5°C or above	L5	THW1	Flow water temperature thermistor	-39°C or below	88.5°C or above	THW2	Return water temperature thermistor	-39°C or below	88.5°C or above	THW5B	DHW tank water temperature thermistor	-39°C or below	88.5°C or above	THW6	Zone1 flow water temperature thermistor	-39°C or below	88.5°C or above	THW7	Zone1 return water temperature thermistor	-39°C or below	88.5°C or above	THW8	Zone2 flow water temperature thermistor	-39°C or below	88.5°C or above	THW9	Zone2 return water temperature thermistor	-39°C or below	88.5°C or above	LD	THWB1	Boiler flow water temperature thermistor	-40°C or below	140°C or above
Check code	Thermistor		Open detection		Short detection																																																	
	Symbol	Name																																																				
P1	TH1A/TH1B	Room temperature thermistor	-39°C or below	88.5°C or above																																																		
P2	TH2	Liquid temperature thermistor	-39°C or below	88.5°C or above																																																		
L5	THW1	Flow water temperature thermistor	-39°C or below	88.5°C or above																																																		
	THW2	Return water temperature thermistor	-39°C or below	88.5°C or above																																																		
	THW5B	DHW tank water temperature thermistor	-39°C or below	88.5°C or above																																																		
	THW6	Zone1 flow water temperature thermistor	-39°C or below	88.5°C or above																																																		
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LD	THWB1	Boiler flow water temperature thermistor	-40°C or below	140°C or above																																																		
L6	<p><b>Circulation water freeze protection</b>            &lt;DHW/Heating/Cooling/LP/FS/OS&gt;            Check code displayed when THW1 detects a temp. ≤ 1°C for 10 consecutive seconds or THW2 detects a temp. ≤ 3°C for 10 consecutive seconds.</p> <p><u>Exception</u>            Check code will not be displayed if:            FS function is disabled,            For 10 minutes after water circulation pump1 is switched on.</p>	<ol style="list-style-type: none"> <li>Insufficient system head</li> <li>Reduced flow in primary water circuit Due to 1 or more of the following;            Faulty pump, insufficient air purge, blocked strainer, leak in water circuit</li> <li>Valve operation fault</li> <li>2-way valve (local supply) actuator fault</li> <li>3-way valve actuator fault</li> <li>THW1 has become detached from its holder.</li> <li>THW1 or THW2 fault</li> <li>FTC board failure</li> </ol>	<ol style="list-style-type: none"> <li>Refer to table in "10-6. Checking Component Parts' Function" to determine if system pump meets requirements.            If more head required either add a pump of the same size or replace existing pump with capacity model.            See "11. DISASSEMBLY PROCEDURE" for how to replace pump.</li> <li>Check circulation pump (See "10-6. Checking Component Parts' Function" for how to check).            Open purge valve to remove trapped air.            Check the strainer for blockages.            Check the primary water circuit for leaks.            Check that the flow amount is within the recommended range.</li> <li>Check valves on primary water circuit are installed level.</li> <li>Electrically test to determine fault.</li> <li>1) Electrically test to determine fault.            2) Operate 3-way valve manually using the main remote controller. (Refer to &lt;Manual operation&gt; in "9-5. Service menu".)            3) Replace 3-way valve coil.            4) Replace 3-way valve. (Refer to Procedure 6 in "11. DISASSEMBLY PROCEDURE".)</li> <li>Visually inspect location and reattach as necessary.</li> <li>Check resistance of thermistor against table in "10-6. Checking Component Parts' Function".            Compare FTC detected temperature to hand held detector.</li> <li>Replace board.</li> </ol>																																																			

# Troubleshooting

Check code	Title and display conditions	Possible Cause	Diagnosis and action
L8	<b>Heating operation error</b> Note: "3" is displayed in "Request code: 567" in "Running information". <Heating/FS> If a), b) and c) occur, L8 is displayed; a) No change on THW1 and THW5B (under 1°C for 20 minutes from unit starts operation) b) No change on THW1 (under 1°C for 10 minutes from booster heater starts operation) c) THW1-THW2 < -5°C (for 10 minutes continuously)	1. THW1 has become detached from its holder.  2. Booster heater fault  3. THW1 or THW2 or THW5B fault  4. FTC board failure	1. Visually inspect location and reattach as necessary.  2. Electrically test to determine fault. See "10-6. Checking Component Parts' Function" for how to check.  3. Check resistance of thermistor against table in "10-6. Checking Component Parts' Function". Compare FTC detected temperature to hand held detector.  4. Replace board.
	<b>Heating operation error</b> Note: "A" is displayed in "Request code: 567" in "Running information".	1. THW6 has become detached from its holder.  2. THW6 or THW7 fault  3. FTC board failure	1. Visually inspect location and reattach as necessary.  2. Check resistance of thermistor against table in "10-6. Checking Component Parts' Function". Compare FTC detected temperature to hand held detector.  3. Replace board.
	<b>Heating operation error</b> Note: "C" is displayed in "Request code: 567" in "Running information".	1. THW8 has become detached from its holder.  2. THW8 or THW9 fault  3. FTC board failure	1. Visually inspect location and reattach as necessary.  2. Check resistance of thermistor against table in "10-6. Checking Component Parts' Function". Compare FTC detected temperature to hand held detector.  3. Replace board.
L9	<b>Low primary circuit (Heat source side) flow rate detected by flow sensor</b> Note: "1" is displayed in "Request code: 569" in "Running information". <DHW/Heating/LP/FS> Check code displayed when flow sensor detects low flow rate for 10 seconds.  <u>Exception</u> For 1 minute after water circulation pump1 is switched on.	1. Insufficient system head  2. Reduced flow in primary water circuit Due to 1 or more of the following; Faulty pump, insufficient air purge, blocked strainer, leak in water circuit.  3. Valve operation fault  4. 2-way valve (local supply) actuator fault 5. Connector/terminal wire has become detached or loose wiring. 6. Flow sensor fault  7. Incorrect setting of the SW2-2 8. FTC board failure	1. Refer to table in "10-6. Checking Component Parts' Function" to determine if system pump meets requirements. If more head required either add a pump of the same size or replace existing pump with capacity model. See "11. DISASSEMBLY PROCEDURE" for how to replace pump.  2. Check circulation pump (See "10-6. Checking Component Parts' Function" for how to check). Open purge valve to remove trapped air. Check the strainer for blockages. Check the primary water circuit for leaks. Check that the flow amount is within the recommended range.  3. Check valves on primary water circuit are installed level.  4. Electrically test to determine fault.  5. Visually check the CN1A connector and IN2 terminal and reattach if necessary.  6. Electrically test to determine fault. See "10-6. Checking Component Parts' Function" for how to check.  7. Check the SW2-2 setting.  8. Replace board.
	<b>Low primary circuit (Zone1 side) flow rate detected by flow switch</b> Note: "2" is displayed in "Request code: 569" in "Running information".	1. Insufficient system head  2. Reduced flow in primary water circuit Due to 1 or more of the following; Faulty pump, insufficient air purge, blocked strainer, leak in water circuit.  3. Terminal wire has become detached or loose wiring. 4. Flow switch fault 5. Incorrect setting of the SW3-2 6. FTC board failure	1. If more head required either add a pump of the same size or replace existing pump .  2. Check circulation pump (See "10-6. Checking Component Parts' Function" for how to check). Open purge valve to remove trapped air. Check the strainer for blockages. Check the primary water circuit for leaks. Check that the flow amount is within the recommended range.  3. Visually check the IN3 terminal and reattach if necessary.  4. Electrically test to determine fault  5. Check the SW3-2 setting.  6. Replace board.

# Troubleshooting

Check code	Title and display conditions	Possible Cause	Diagnosis and action
L9	<b>Low primary circuit (Zone2 side) flow rate detected by flow switch</b> Note: "3" is displayed in "Request code: 569" in "Running information".	<ol style="list-style-type: none"> <li>Insufficient system head</li> <li>Reduced flow in primary water circuit Due to 1 or more of the following; Faulty pump, insufficient air purge, blocked strainer, leak in water circuit</li> <li>Terminal wire has become detached or loose wiring.</li> <li>Flow switch fault</li> <li>Incorrect setting of the SW3-3</li> <li>FTC board failure</li> </ol>	<ol style="list-style-type: none"> <li>If more head required either add a pump of the same size or replace existing pump.</li> <li>Check circulation pump (See "10-6. Checking Component Parts' Function" for how to check). Open purge valve to remove trapped air. Check the strainer for blockages. Check the primary water circuit for leaks. Check that the flow amount is within the recommended range.</li> <li>Visually check the IN7 terminal and reattach if necessary.</li> <li>Electrically test to determine fault.</li> <li>Check the SW3-3 setting.</li> <li>Replace board.</li> </ol>
LA	Pressure sensor failure	<ol style="list-style-type: none"> <li>Connector/terminal wire has become detached or loose wiring.</li> <li>Pressure sensor fault</li> <li>FTC board failure</li> </ol>	<ol style="list-style-type: none"> <li>Check pressure sensor cable for damage or loose connections.</li> <li>Electrically test to determine fault. See "10-6. Checking Component Parts' Function" for how to check.</li> <li>Replace board.</li> </ol>
LB	High pressure protection	<ol style="list-style-type: none"> <li>Flow rate of the heating circuit may be reduced.</li> <li>Plate heat exchanger may be clogged.</li> <li>Outdoor unit failure.</li> </ol>	<ol style="list-style-type: none"> <li>Check water circuit.</li> <li>Check the plate heat exchanger.</li> <li>Check refrigerant volume, valve, LEV coil and pipe crushing of outdoor unit.</li> </ol>
LC	Boiler circulation water temperature overheat protection <DHW/Heating/LP/FS/OS> Check code displayed when THWB1 detects a temp. $\geq 80^{\circ}\text{C}$ for 10 consecutive seconds or THWB2 detects a temp. $\geq 80^{\circ}\text{C}$ for 10 consecutive seconds	<ol style="list-style-type: none"> <li>The set temperature for Boiler is too high.</li> <li>Flow rate of the heating circuit from the boiler may be reduced.</li> </ol>	<ol style="list-style-type: none"> <li>Check if the set temperature for Boiler for heating exceeds the restriction. (See the manual for the thermistors "PAC-TH011HT-E")</li> <li>Check for <ul style="list-style-type: none"> <li>water leakage</li> <li>strainer blockage</li> <li>water circulation pump function.</li> </ul> </li> </ol>
LD	Boiler temperature thermistor (THWB1, THWB2) failure	Refer to check codes (P1/P2/L5/LD).	
LE	Boiler operation error <Heating> Boiler is running and THW6 detects a temperature $< 30^{\circ}\text{C}$ for consecutive 60 minutes.	<ol style="list-style-type: none"> <li>THW6 has become detached from its holder.</li> <li>Incorrect wiring between FTC (OUT10) and the boiler.</li> <li>Boiler fuel has run out or the system is OFF.</li> <li>Boiler failure</li> <li>FTC board failure</li> </ol>	<ol style="list-style-type: none"> <li>Visually inspect location and reattach as necessary.</li> <li>See the manual of the thermistors "PAC-TH011HT-E".</li> <li>Check the status of the boiler.</li> <li>Check the status of the boiler.</li> <li>Replace board.</li> </ol>
LF	Flow sensor failure	Disconnection or loose connection of flow sensor	Check flow sensor cable for damage or loose connections.
LH	Boiler circulation water freeze protection	Flow rate of the heating circuit from the boiler may be reduced.	Check for <ul style="list-style-type: none"> <li>water leakage</li> <li>strainer blockage</li> <li>water circulation pump function.</li> </ul>
LJ	DHW operation error (type of external plate HEX)	<ol style="list-style-type: none"> <li>DHW tank water temp. thermistor (THW5B) has become detached from its holder.</li> <li>Flow rate of the sanitary circuit may be reduced.</li> </ol>	<ol style="list-style-type: none"> <li>Check for disconnection of DHW tank water temp. thermistor (THW5B).</li> <li>Check for water circulation pump function.</li> </ol>
LL	Setting errors of DIP switches on FTC control board	Incorrect setting of DIP switches <ol style="list-style-type: none"> <li>Boiler operation</li> <li>2-zone temperature control</li> </ol>	<ol style="list-style-type: none"> <li>For boiler operation, check that DIP SW1-1 is set to ON (With Boiler) and DIP SW2-6 is set to ON (With Mixing Tank).</li> <li>For 2-zone temperature control, check DIP SW2-7 is set to ON (2-zone) and DIP SW2-6 is set to ON (With Mixing Tank).</li> </ol>
P1	Indoor unit temperature thermistor (TH1) failure	Refer to check codes (P1/P2/L5/LD).	
P2	Indoor unit temperature thermistor (TH2) failure	Refer to check codes (P1/P2/L5/LD).	
P6	Anti-freeze protection of plate heat exchanger <Cooling> The check code displayed when Ref. liquid temp. (TH2) stays at $-5^{\circ}\text{C}$ or lower for 10 seconds after compressor operates for 6 minutes.	<Cooling> <ol style="list-style-type: none"> <li>Reduced water flow <ul style="list-style-type: none"> <li>Clogged filter</li> <li>Leakage of water</li> </ul> </li> <li>Low temperature <ul style="list-style-type: none"> <li>Low load</li> <li>Inlet water is too cold.</li> </ul> </li> <li>Defective water pump</li> <li>Defective outdoor fan control.</li> <li>Overcharge of refrigerant</li> <li>Defective refrigerant circuit (clogs)</li> <li>Malfunction of linear expansion valve</li> </ol>	<ol style="list-style-type: none"> <li>Check water piping.</li> <li>Check water pump.</li> <li>Check outdoor fan motor.</li> <li>Check operating condition of refrigerant circuit.</li> <li>Check linear expansion valve.</li> </ol>

# Troubleshooting

Check code	Title and display conditions	Possible Cause	Diagnosis and action
P6	<Defrosting> THW2 detects a temperature ≤15°C and TH2 detects a temperature ≤-16°C for consecutive 10 seconds.	<Defrosting> 1. Reduced water flow • Clogged filter • Leakage of water 2. Low temperature • Low load • Inlet water is cold. 3. Defective water pump 4. Leakage or shortage of refrigerant 5. Malfunction of linear expansion valve	1., 2. 3. Check water piping. 3. Check water pump. 4. Correct to proper amount of refrigerant. 5. Check linear expansion valve.
E0/E4	<b>Main remote controller communication failure (Reception error)</b> Check code E0 is displayed if main remote controller does not receive any signal from the indoor unit for ref. address "0" for 3 minutes. Check code E4 is displayed if indoor unit does not receive any data from the main remote controller for 3 minutes or indoor unit does not receive any signal from the main remote controller for 2 minutes.	1. Contact failure with transmission cable 2. Wiring procedure not observed. (Cable length/cable diameter/number of indoor units/number of main remote controllers) 3. Fault on the indoor unit FTC board section controlling Ref. address "0" 4. Fault with the main remote controller circuit board 5. Electrical noise causes interference with transmission/reception of data for main remote controller.	1. Check connection cable for damage or loose connections at the FTC and main remote controller terminals. 2. Check main remote controller and FTC common wiring max cable length 500 m. Only use 2-core cable. Only connect 1 main remote controller to 1 FTC indoor unit board. 3. to 5. If the problem is not solved by the above measures then: Turn the power to the indoor unit OFF and then ON. Power to both the indoor unit and outdoor units should be switched OFF then ON. (This may require switching 1 or 2 breakers depending if the unit is powered independently from the outdoor unit). If the E4 code is still displayed the FTC and/or the main remote controller circuit board should be replaced.
E3/E5	<b>Main remote controller communication failure (Transmission error)</b> Check code E3 is displayed if the main remote controller cannot find an empty transmission path and thus fails to transmit for 6 seconds or the data received by the main remote controller is different to what was sent (by the main remote controller) 30 consecutive times. Check code E5 is displayed if the FTC cannot find an empty transmission path for 3 minutes and thus cannot transmit or the data sent by the FTC is different to what was expected 30 consecutive times.	1. 2 or more main remote controllers have been connected to the FTC. 2. Fault with main remote controller transmission/receiving circuit board 3. Fault with the main remote controller circuit board 4. Electrical noise causes interference with transmission/reception of data for main remote controller.	1. Only connect 1 main remote controller to 1 FTC indoor unit board. 2. to 4. Turn the power to the indoor unit OFF and then ON. Power to both the indoor unit and outdoor units should be switched OFF then ON. (This may require switching 1 or 2 breakers depending if the unit is powered independently from the outdoor unit). If the E3/E5 code is still displayed the FTC and/or the main remote controller circuit board should be replaced.
E6	<b>Indoor/outdoor communication failure (Reception error)</b> Check code E6 is displayed if after the power is switched ON to the indoor unit, the FTC board does not receive any signal or the signal received is not complete for 6 minutes, or after a period of operation the FTC board does not receive any signal or the signal received is not complete for 3 minutes.	1. Contact failure/short circuit/miswiring 2. Fault with outdoor unit transmission/receiving circuit board 3. Fault with FTC transmission/receiving circuit board 4. Electrical noise causes interference with FTC-Outdoor unit transmission cable.	* Check the LED display on the outdoor unit circuit board. (Connect the A-control service tool, PAC-SK52ST to test.) Refer to the outdoor unit service manual for explanation of EA-EC codes. 1. Check the connections on the indoor and outdoor units have not become loose and that the connecting cable is not damaged. 2. to 4. Turn the power to the indoor unit OFF and then ON. Power to both the indoor unit and outdoor units should be switched OFF then ON. (This may require switching 1 or 2 breakers depending if the unit is powered independently from the outdoor unit). If the E6 code is still displayed the FTC and/or the outdoor unit circuit board should be replaced.
E7	<b>Indoor/outdoor communication failure (Transmission error)</b> Check code E7 is displayed if despite the FTC board sending signal "0", signal "1" is received 30 consecutive times.	1. Fault with FTC transmission/receiving circuit board 2. Electrical noise causes interference with power supply. 3. Electrical noise causes interference with FTC-outdoor unit transmission cable.	1. to 3. Turn the power to the indoor unit OFF and then ON. Power to both the indoor unit and outdoor units should be switched OFF then ON. (This may require switching 1 or 2 breakers depending if the unit is powered independently from the outdoor unit). If the E7 code is still displayed the FTC circuit board should be replaced.



# Troubleshooting

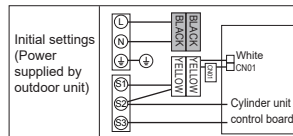
Check code	Title and display conditions	Possible Cause	Diagnosis and action
E1/E2	<p><b>Main remote controller control board failure</b> Check code E1 displayed if main remote controller cannot access it is non volatile (non power dependent) memory. Check code E2 is displayed when there is a fault with the main remote controller's internal clock.</p>	1. Fault with the main remote controller circuit board	1. Replace main remote controller circuit board.
J0	<p><b>Indoor unit/wireless receiver communication failure</b> Check code J0 is displayed when the FTC cannot receive data from the wireless receiver for 1 minute.</p>	<ol style="list-style-type: none"> <li>1. Connection fault with wireless receiver-FTC connection</li> <li>2. Fault with FTC receiving circuit board</li> <li>3. Fault with wireless receiver's transmission circuit board</li> <li>4. Electrical noise causes interference with wireless receiver communication cable.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the connections to the wireless receiver and FTC have not become loose and that the connecting cable is not damaged.</li> <li>2. to 4. Turn the power to the indoor unit OFF and then ON. Power to both the indoor unit and outdoor units should be switched OFF then ON. (This may require switching 1 or 2 breakers depending if the unit is powered independently from the outdoor unit). If the J0 code is still displayed the FTC and/or the wireless receiver circuit board should be replaced.</li> </ol>
J1 to J8	<p><b>Wireless remote controller/wireless receiver communication failure (Reception error)</b> Check code displayed if wireless receiver receives no/incomplete data from the wireless remote controller for 15 consecutive minutes.</p> <p>The digit after the J refers to the address of the wireless remote controller that has the error. E.g. Check code "J3" refers to a communication fault between the wireless receiver and wireless remote control with address 3.</p>	<ol style="list-style-type: none"> <li>1. Battery on wireless remote control may be flat.</li> <li>2. The wireless remote controller is out of range of the wireless receiver.</li> <li>3. Fault with wireless remote controller transmission circuit board</li> <li>4. Fault with wireless receiver's reception circuit board</li> </ol>	<ol style="list-style-type: none"> <li>1. Check and replace the battery if necessary the wireless remote controller battery.</li> <li>2. to 4. Reposition the wireless remote control closer to the receiver and perform a communication test. For procedure refer to wireless remote controller installation manual. If "OK" is displayed then the cause of the J1 to J8 error was the controller was out of range of the receiver. The wireless remote controller should be installed within range of the receiver. If "Err" is displayed replace wireless remote controller with a new controller and perform the pairing procedure. If after this procedure the "Err" code is still displayed the fault is with the receiver unit (attached to the indoor unit). The receiver unit should be replaced with a new part and the original remote control can be reconnected. If "OK" is displayed then the fault is with the remote control and this should be replaced.</li> </ol>
EE	Combination error between FTC and outdoor unit	R410A outdoor unit is combined incorrectly.	Check combination of FTC and outdoor unit.
U*, F*, A*	Outdoor unit failure	Outdoor unit failure	Refer to outdoor unit service manual.

Note: To cancel check codes, please switch system off (press button F4 (RESET) on main remote controller).

# Troubleshooting

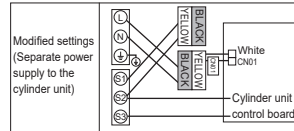
## 10-5. Troubleshooting by inferior phenomena

No.	Fault symptom	Possible cause	Explanation - Solution
1	Main remote controller display is blank.	<ol style="list-style-type: none"> <li>There is no power supply to main remote controller.</li> <li>Power is supplied to main remote controller, however, the display on the main remote controller does not appear.</li> </ol>	<ol style="list-style-type: none"> <li>Check LED2 on FTC. (See "6. WIRING DIAGRAM".)               <ol style="list-style-type: none"> <li>When LED2 is lit. Check for damage or contact failure of the main remote controller wiring.</li> <li>When LED2 is blinking. Refer to No. 5 below.</li> <li>When LED2 is not lit. Refer to No. 4 below.</li> </ol> </li> <li>Check the following:               <ul style="list-style-type: none"> <li>Disconnection between the main remote controller cable and the FTC control board</li> <li>Failure of the main remote controller if "Please Wait" is not displayed.</li> <li>Refer to No. 2 below if "Please Wait" is displayed.</li> </ul> </li> </ol>
2	"Please Wait" remains displayed on the main remote controller.	<ol style="list-style-type: none"> <li>"Please Wait" is displayed for up to 6 minutes.</li> <li>Communication failure between the main remote controller and FTC</li> <li>Communication failure between FTC and outdoor unit</li> </ol>	<ol style="list-style-type: none"> <li>Normal operation</li> <li>Main remote controller start up checks/procedure.</li> <li> <ol style="list-style-type: none"> <li>If "0%" or "50 to 99%" is displayed below "Please Wait" there is a communication error between the main remote controller and the FTC control board.               <ul style="list-style-type: none"> <li>Check wiring connections on the main remote controller.</li> <li>Replace the main remote controller or the FTC control board.</li> </ul> </li> <li>If "1 to 49%" is displayed there is a communication error between the outdoor unit's and FTC's control boards.               <ul style="list-style-type: none"> <li>Check the wiring connections on the outdoor unit control board and the FTC control board. (Ensure S1 and S2 are not cross-wired and S3 is securely wired with no damage. (See "7. FIELD WIRING".))</li> <li>Replace the outdoor unit's and/or the FTC's control boards.</li> </ul> </li> </ol> </li> </ol>
3	The main screen appears with a press of the "ON" button, but disappears in a second.	The main remote controller operations do not work for a while after the settings are changed in the service menu. This is because the system takes time to apply the changes.	<p>Normal operation</p> <p>The indoor unit is applying updated settings made in the service menu. Normal operation will start shortly.</p>
4	LED2 on FTC is off. (See "6. WIRING DIAGRAM".)	<p>When LED1 on FTC is also off. (See "6. WIRING DIAGRAM".) &lt;FTC powered via outdoor unit.&gt;</p> <ol style="list-style-type: none"> <li>The outdoor unit is not supplied at the rated voltage.</li> <li>Defective outdoor controller circuit board</li> <li>FTC is not supplied with 220 to 240 VAC.</li> <li>FTC failure</li> <li>Faulty connector wiring</li> </ol>	<ol style="list-style-type: none"> <li>Check the voltage across the terminals L and N or L3 and N on the outdoor power board. (See "7. FIELD WIRING".)               <ul style="list-style-type: none"> <li>When the voltage is not 220 to 240 VAC, check wiring of the outdoor unit and of the breaker.</li> <li>When the voltage is at 220 to 240 VAC, go to "2." below.</li> </ul> </li> <li>Check the voltage across the outdoor unit terminals S1 and S2. (See "7. FIELD WIRING".)               <ul style="list-style-type: none"> <li>When the voltage is not 220 to 240 VAC, check the fuse on the outdoor control board and check for faulty wiring.</li> <li>When the voltage is 220 to 240 VAC, go to "3." below.</li> </ul> </li> <li>Check the voltage across the indoor unit terminals S1 and S2. (See "7. FIELD WIRING".)               <ul style="list-style-type: none"> <li>When the voltage is not 220 to 240 VAC, check FTC-outdoor unit wiring for faults.</li> <li>When the voltage is 220 to 240 VAC, go to "4." below.</li> </ul> </li> <li>Check the FTC control board.               <ul style="list-style-type: none"> <li>Check the fuse on FTC control board.</li> <li>Check for faulty wiring.</li> <li>If no problem found with the wiring, the FTC control board is faulty.</li> </ul> </li> <li>Check the connector wiring.               <ul style="list-style-type: none"> <li>When the connectors are wired incorrectly, re-wire the connectors referring to below. (See "7. FIELD WIRING".)</li> </ul> </li> </ol>



# Troubleshooting

No.	Fault symptom	Possible cause	Explanation - Solution
4	LED2 on FTC is off. (See "6. WIRING DIAGRAM".)	<FTC powered on independent source>	<ol style="list-style-type: none"> <li>1. Check the voltage across the L and N terminals on the indoor power supply terminal block. (See "7. FIELD WIRING".) <ul style="list-style-type: none"> <li>• When the voltage is not 220 to 240 VAC, check for faulty wiring to power supply.</li> <li>• When the voltage is 220 to 240 VAC, go to 2. below.</li> </ul> </li> <li>2. Check for faulty wiring between the connectors. <ul style="list-style-type: none"> <li>• When the connectors are wired incorrectly re-wire them correctly referring to below. (See "7. FIELD WIRING" and a wiring diagram on the control and electrical box cover.)</li> </ul> </li> <li>3. Check the FTC control board. <ul style="list-style-type: none"> <li>• Check the fuse on FTC control board.</li> <li>• Check for faulty wiring.</li> <li>• If no problem found with the wiring, the FTC control board is faulty.</li> </ul> </li> </ol>
		<ol style="list-style-type: none"> <li>1. FTC is not supplied with 220 to 240 VAC.</li> <li>2. There are problems in the method of connecting the connectors.</li> <li>3. FTC failure</li> </ol>	
		<p>When LED1 on FTC is lit.</p> <p>Incorrect setting of refrigerant address for outdoor unit (None of the refrigerant address is set to "0".)</p>	
5	LED2 on FTC is blinking. (See "6. WIRING DIAGRAM".)	When LED1 is also blinking on FTC . Faulty wiring between FTC and outdoor unit	Check for faulty wiring between FTC and outdoor unit.
		<p>When LED1 on FTC is lit.</p> <ol style="list-style-type: none"> <li>1. Faulty wiring in main remote controller Multiple indoor units have been wired to a single outdoor unit.</li> <li>2. Short-circuited wiring in main remote controller</li> <li>3. Main remote controller failure</li> </ol>	<ol style="list-style-type: none"> <li>1. Check for faulty wiring in main remote controller. The number of indoor units that can be wired to a single outdoor unit is one. Additional indoor units must be wired individually to a single outdoor unit.</li> <li>2,3. Remove main remote controller wires and check LED2 on FTC. (See "6. WIRING DIAGRAM".) <ul style="list-style-type: none"> <li>• If LED2 is blinking check for short circuits in the main remote controller wiring.</li> <li>• If LED2 is lit, wire the main remote controller again and: <ul style="list-style-type: none"> <li>- if LED2 is blinking, the main remote controller is faulty;</li> <li>- if LED2 is lit, faulty wiring of the main remote controller has been corrected.</li> </ul> </li> </ul> </li> </ol>
6	LED4 on FTC is off. (See "6. WIRING DIAGRAM".)	<ol style="list-style-type: none"> <li>1. SD memory card is NOT inserted into the memory card slot with correct orientation.</li> <li>2. Not an SD standards compliant memory card.</li> </ol>	<ol style="list-style-type: none"> <li>1. Correctly insert SD memory card in place until a click is heard.</li> <li>2. Use an SD standards compliant memory card. (Refer to installation manual, "5.8 Using SD memory card".)</li> </ol>
	LED4 on FTC is blinking. (See "6. WIRING DIAGRAM".)	<ol style="list-style-type: none"> <li>1. Full of data</li> <li>2. Write-protected</li> <li>3. NOT formatted</li> <li>4. Formatted in NTFS file system</li> </ol>	<ol style="list-style-type: none"> <li>1. Move or delete data, or replace SD memory card with a new one.</li> <li>2. Release the write-protect switch.</li> <li>3. Refer to installation manual, "5.8 Using SD memory card".</li> <li>4. FTC is Not compatible with NTFS file system. Use an SD memory card formatted in FAT file system.</li> </ol>
7	No water at hot tap.	<ol style="list-style-type: none"> <li>1. Cold main off</li> <li>2. Strainer (local supply) blocked.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check and open stop cock.</li> <li>2. Isolate water supply and clean strainer.</li> </ol>
8	Cold water at tap.	<ol style="list-style-type: none"> <li>1. Hot water run out.</li> <li>2. Prohibit, schedule timer or holiday mode selected or demand control input (IN4) or smart grid ready (switch-off command).</li> <li>3. Heat pump not working.</li> <li>4. Booster heater cut-out tripped.</li> <li>5. The earth leakage circuit breaker for booster heater breaker (ECB1) tripped.</li> <li>6. The booster heater thermal cut-out has tripped and cannot be reset using the manual reset button.</li> <li>7. Immersion heater cut-out tripped.</li> <li>8. Immersion heater breaker (ECB2) tripped.</li> <li>9. 3-way valve fault</li> </ol>	<ol style="list-style-type: none"> <li>1. Ensure DHW mode is operating and wait for DHW tank to re-heat.</li> <li>2. Check settings and change as appropriate.</li> <li>3. Check heat pump – consult outdoor unit service manual.</li> <li>4. Check booster heater thermostat and press reset button if safe. Reset button is located on the side of booster heater, covered with white rubber cap. See "4. PART NAMES AND FUNCTIONS" to find out its position.</li> <li>5. Check the cause and reset if safe.</li> <li>6. Check resistance across the thermal cut-out, if open then the connection is broken and the booster heater will have to be replaced. Contact your Mitsubishi Electric dealer.</li> <li>7. 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.</li> <li>8. Check the cause and reset if safe.</li> <li>9. Check plumbing/wiring to 3-way valve. <ol style="list-style-type: none"> <li>(i) Manually override 3-way valve using the main remote controller. (Refer to &lt;Manual operation&gt; in "9-5. Service menu") If the valve does not still function, go to (ii) below.</li> <li>(ii) Replace 3-way valve coil. If the valve does not still function, go to (iii) below.</li> <li>(iii) Replace 3-way valve. (Refer to "11. DISASSEMBLY PROCEDURE".)</li> </ol> </li> </ol>



# Troubleshooting

No.	Fault symptom	Possible cause	Explanation - Solution
9	Water heating takes longer.	<ol style="list-style-type: none"> <li>Heat pump not working.</li> <li>Booster heater cut-out tripped.</li> <li>Booster heater breaker (ECB1) tripped.</li> <li>The booster heater thermal cut-out has tripped and cannot be reset using the manual reset button.</li> <li>Immersion heater cut-out has been triggered.</li> <li>Immersion heater breaker (ECB2) tripped.</li> <li>Flow rate of the sanitary circuit may be reduced.</li> </ol>	<ol style="list-style-type: none"> <li>Check heat pump – consult outdoor unit service manual.</li> <li>Check booster heater thermostat and press reset button if safe. Reset button is located on the side of booster heater, covered with white rubber cap. See "4. PART NAMES AND FUNCTIONS" to find out its position.</li> <li>Check the cause and reset if safe.</li> <li>Check resistance across the thermal cut-out, if open then connection is broken and the booster heater will have to be replaced. Contact your Mitsubishi Electric dealer.</li> <li>Check immersion heater thermostat and press reset button located on immersion heater boss, if safe. If the heater kept running with no water inside, this may have resulted in failure, so replace it with a new one.</li> <li>Check the cause and reset if safe.</li> <li>Check the following items <ul style="list-style-type: none"> <li>Check for trapped air in water pump (sanitary circuit).</li> <li>Check if the speed of water pump (sanitary circuit) is set to 2.</li> <li>Check water pump (sanitary circuit) for malfunction. (Refer to "10-6. Checking Component Parts' Function".)</li> <li>Replace plate heat exchanger (water - water) or scale trap, if there are a blockage which blocks the sanitary circuit.</li> </ul> </li> </ol>
10	Temperature of DHW tank water dropped.	<p>When DHW operation is not running, the DHW tank emits heat and the water temperature decreases to a certain level. If water in the DHW tank is reheated frequently because of a significant drop in water temperature, check for the following.</p> <ol style="list-style-type: none"> <li>Water leakage in the pipes that connect to the DHW tank</li> <li>Insulation material coming loose or off.</li> <li>3-way valve failure</li> <li>Water pump (sanitary circuit) speed setting failure</li> </ol>	<ol style="list-style-type: none"> <li>Take the following measures. <ul style="list-style-type: none"> <li>Retighten the nuts holding the pipes onto the DHW tank.</li> <li>Replace seal materials.</li> <li>Replace the pipes.</li> </ul> </li> <li>Fix insulation.</li> <li>Check plumbing/wiring to 3-way valve. <ol style="list-style-type: none"> <li>Manually override 3-way valve using the main remote controller. (Refer to &lt;Manual operation&gt; in "9-5. Service menu".) If the valve does not still function, go to (ii) below.</li> <li>Replace 3-way valve motor. If the valve does not still function, go to (iii) below.</li> <li>Replace 3-way valve. (Refer to "11. DISASSEMBLY PROCEDURE".)</li> </ol> </li> <li>Water pump (sanitary circuit) MUST be set to speed 2. When it set to speed 1, hot water would be mixed with cold water due to circulation.</li> </ol>
11	Hot or warm water from cold tap.	Heat of hot water pipe is transferred to cold water pipe.	Insulate/re-route pipework.
12	Water leakage	<ol style="list-style-type: none"> <li>Poorly sealed connections of water circuit components</li> <li>Water circuit components reaching the end of life</li> </ol>	<ol style="list-style-type: none"> <li>Tighten connections as required.</li> <li>Refer to PARTS CATALOG for expected part lifetimes and replace them as necessary.</li> </ol>
13	Heating system does not reach the set temperature.	<ol style="list-style-type: none"> <li>Prohibit, schedule timer or holiday mode selected or demand control input (IN4) or smart grid ready (switch-off command).</li> <li>Check settings and change as appropriate.</li> <li>The temperature sensor is located in a room that has a different temperature relative to that of the rest of the house.</li> <li>Heat pump not working.</li> <li>Booster heater cut-out tripped.</li> <li>Booster heater breaker (ECB1) tripped.</li> <li>The booster heater thermal cut-out tripped and cannot be reset using the manual reset button.</li> <li>Incorrectly sized heat emitter</li> <li>3-way valve failure</li> <li>Battery problem (wireless control only)</li> <li>If a mixing tank is installed, the flow rate between the mixing tank and the cylinder unit is less than that between the mixing tank and the local system.</li> </ol>	<ol style="list-style-type: none"> <li>Check settings and change as appropriate.</li> <li>Check the battery power and replace if flat.</li> <li>Relocate the temperature sensor to a more suitable room.</li> <li>Check heat pump – consult outdoor unit service manual.</li> <li>Check booster heater thermostat and press reset button if safe. Reset button is located on the side of booster heater, covered with white rubber cap. (See "4. PART NAMES AND FUNCTIONS" for position.)</li> <li>Check the cause of the trip and reset if safe.</li> <li>Check resistance across the thermal cut-out, if open then the connection is broken and the booster heater will have to be replaced. Contact your Mitsubishi Electric dealer.</li> <li>Check the heat emitter surface area is adequate. Increase size if necessary.</li> <li>Check plumbing/wiring to 3-way valve. <ol style="list-style-type: none"> <li>Manually override 3-way valve using the main remote controller. (Refer to &lt;Manual operation&gt; in "9-5. Service menu".) If the 3-way valve does not function, go to (ii) below.</li> <li>Replace 3-way valve motor. If the 3-way valve coil is replaced but the 3-way valve does not function go to (iii) below.</li> <li>Replace 3-way valve. (Refer to "11. DISASSEMBLY PROCEDURE".)</li> </ol> </li> <li>Check the battery power and replace if flat.</li> <li>Increase the flow rate between the mixing tank and the cylinder unit decrease that between the mixing tank and the local system.</li> </ol>

# Troubleshooting

No.	Fault symptom	Possible cause	Explanation - Solution
14	Heating system does not reach the set lower temperature.	Heating system operates depending on the heating load to prevent low-load heating system from the frequent switching (ON/OFF) of the compressor.	Normal operation, no action necessary.
15	In 2-zone temperature control, Zone1 or Zone2 does not reach the set temperature.	<ol style="list-style-type: none"> <li>When Zone1 and Zone2 are both in heating mode, the hot water temperature in Zone2 does not exceed that in Zone1.</li> <li>Faulty wiring of motorized mixing valve</li> <li>Faulty installation of motorized mixing valve</li> <li>Incorrect setting of Running time</li> <li>Motorized mixing valve failure</li> <li>Pump2(Zone1 pump) or Pump3(Zone2 pump) failure</li> <li>Vales on heating system are closed</li> </ol>	<ol style="list-style-type: none"> <li>Normal action no action necessary.</li> <li>Refer to installation manual, "5.3 Wiring for 2-zone temperature control".</li> <li>Check for correct installation. (Refer to the manual included with each motorized mixing valve.)</li> <li>Check for correct setting of Running time.</li> <li>Inspect the mixing valve. (Refer to the manual included with each motorized mixing valve.)</li> <li>Inspect the pumps</li> <li>Check the valves</li> </ol>
16	When a PUHZ-FRP outdoor unit is connected, DHW or Heating operation cannot run.	The outdoor unit is set to have operation of the indoor unit of air conditioner take precedence over that of the cylinder unit, and in the main remote controller settings "Electric heater (Heating)" or "Electric heater (DHW)" is turned off.	Turn ON Electric heater (Heating) or Electric heater (DHW) using the main remote controller.
17	When a PUHZ-FRP outdoor unit is connected and is in heat recovery operation, the set temperature is not reached.	When the outdoor unit is set to have cooling operation of the indoor unit of air conditioner take precedence over that of the cylinder unit, the outdoor unit controls the frequency of the compressor according to the load of air conditioner. The DHW and heating run according to that frequency.	Normal operation no action necessary. If Air-to-Water system is given priority in operation, comp Hz can be regulated depending on the load of DHW or Heating. For more details, refer to the PUHZ-FRP installation manual.
18	After DHW operation room temperature rises slightly.	At the end of the DHW mode operation the 3-way valve diverts hot water away from the DHW circuit 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 varies according to the type of the system and of the pipe run between the plate heat exchanger and the cylinder unit.	Normal operation no action necessary.
19	The room temperature rises during DHW operation.	3-way valve failure	<p>Check the 3-way valve.</p> <p>(i) Manually override 3-way valve using the main remote controller. (Refer to &lt;Manual operation&gt; in "9-5. Service menu".) If the 3-way valve does not function, go to (ii) below.</p> <p>(ii) Replace 3-way valve coil. If the 3-way valve coil is replaced but the 3-way valve does not function go to (iii) below.</p> <p>(iii) Replace 3-way valve. (Refer to "11. DISASSEMBLY PROCEDURE".)</p>
20	Water discharges from pressure relief valve. (Primary circuit)	<ol style="list-style-type: none"> <li>If continual – pressure relief valve could bite foreign objects and the valve seat may be damaged.</li> <li>If intermittent – expansion vessel charge may have reduced/bladder perished.</li> </ol>	<ol style="list-style-type: none"> <li>Turn the handle on the pressure relief valve several turns. If leakage persists, replace the pressure relief valve with a new one.</li> <li>Check pressure in expansion vessel. Recharge to 1 bar if necessary. If bladder perished replace expansion vessel with a new one.</li> </ol>
21	Water discharges from pressure relief valve. (Sanitary circuit)	<ol style="list-style-type: none"> <li>If continual – field supplied pressure reducing valve not working.</li> <li>If continual – pressure relief valve could bite foreign objects and the valve seat may be damaged.</li> <li>If intermittent – expansion vessel charge may have reduced/bladder perished.</li> <li>DHW tank may have subjected to backflow.</li> </ol>	<ol style="list-style-type: none"> <li>Check function of pressure reducing valve and replace if necessary.</li> <li>Turn the handle on the pressure relief valve several turns. If leakage persists, replace the pressure relief valve with a new one.</li> <li>Check gas-side pressure in expansion vessel. Recharge to correct precharge pressure if necessary. If bladder perished replace expansion vessel with a new one with appropriate pre-charge.</li> <li>Check the pressure in DHW tank. If pressure in DHW tank is similar to that in the incoming mains, cold water supply that merges with incoming mains water supply could flow back to DHW tank. Investigate source of back-feed and rectify error in pipework/fitting configuration. Adjust pressure in cold supply.</li> </ol>
22	Water discharges from temperature and pressure relief valve (EHPT20X-MHEDW only) (Sanitary circuit)	<ol style="list-style-type: none"> <li>If continual – field supplied pressure reducing valve not working.</li> <li>If continual – temperature and pressure relief valve could bite foreign objects and the valve seat may be damaged.</li> <li>If intermittent – expansion vessel charge may have reduced/bladder perished.</li> <li>DHW tank may have subjected to backflow.</li> <li>Unit has overheated – thermal controls have failed.</li> </ol>	<ol style="list-style-type: none"> <li>Check function of pressure reducing valve and replace if necessary.</li> <li>Turn the handle on the temperature and pressure relief valve several turns. If leakage persists, replace the temperature and pressure relief valve with a new one.</li> <li>Check gas-side pressure in expansion vessel. Recharge to correct precharge pressure if necessary. If bladder perished replace expansion vessel with a new one with appropriate pre-charge.</li> <li>Check pressure in DHW tank. If pressure in DHW tank is similar to that in the incoming mains, cold water supply that merges with incoming mains water supply could flow back to DHW tank. Investigate source of back-feed and rectify error in pipework/fitting configuration. Adjust pressure in cold supply.</li> <li>Switch off power to the heat pump and immersion heaters. Leave water running. Wait until discharge stops. Isolate water supply and replace if faulty.</li> </ol>

# Troubleshooting

No.	Fault symptom	Possible cause	Explanation - Solution						
23	Water discharges from expansion relief valve - part of Inlet Control Group (EHPT20X-MHEDW only) (sanitary circuit)	<ol style="list-style-type: none"> <li>1. If continual – field supplied pressure reducing valve not working.</li> <li>2. If continual – expansion relief valve may be damaged.</li> <li>3. If intermittent – expansion vessel charge may have reduced/bladder perished.</li> <li>4. DHW tank may have subjected to backflow.</li> <li>5. Unit has overheated – thermal controls have failed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check function of pressure reducing valve and replace if necessary.</li> <li>2. Turn the handle on the expansion relief valve to check for foreign objects inside. If the problem is not still solved, replace the expansion relief valve with a new one.</li> <li>3. Check gas-side pressure in expansion vessel. Recharge to correct precharge pressure if necessary. If bladder perished replace expansion vessel with a new one with appropriate precharge.</li> <li>4. Check pressure in DHW tank. If pressure in DHW tank is similar to that in the incoming mains, cold water supply that merges with incoming mains water supply could flow back to DHW tank. Investigate source of back-feed and rectify error in pipework/fitting configuration. Adjust pressure in cold supply.</li> <li>5. Switch off power to the heat pump and immersion heaters. Leave water running. Wait until discharge stops. Isolate water supply and replace if faulty.</li> </ol>						
24	Noisy water circulation pump	Air in water circulation pump	Use manual and automatic air vents to remove air from system. Top up water if necessary to achieve 1 bar on primary circuit.						
25	Noise during hot water draw off typically worse in the morning.	<ol style="list-style-type: none"> <li>1. Loose airing cupboard pipework</li> <li>2. Heaters switching on/off</li> </ol>	<ol style="list-style-type: none"> <li>1. Install extra pipe fastening clips.</li> <li>2. Normal operation no action necessary.</li> </ol>						
26	Mechanical noise heard coming from the cylinder unit.	<ol style="list-style-type: none"> <li>1. Heaters switching on/off</li> <li>2. 3-way valve changing position between DHW and heating mode</li> </ol>	Normal operation no action necessary.						
27	Water circulation pump runs for a short time unexpectedly.	Water circulation pump jam prevention mechanism (routine) to inhibit the build-up of scale	Normal operation no action necessary.						
28	Milky/Cloudy water (Sanitary circuit)	Oxygenated water	Water from any pressurised system will release oxygen bubbles when water is running. The bubbles will settle out.						
29	Heating mode has been on standby for a long time (does not start operation smoothly.)	The time of "Delay" set in "Economy settings for pump" is too short. (Go to "Service menu" → "Auxiliary settings" → "Economy settings for pump").	Increase the time of "Delay" in "Economy settings for pump".						
30	The cylinder unit that was running in the heating mode before power failure is running in the DHW mode after power recovery.	The cylinder unit is designed to run in an operation mode with a higher priority (i.e. DHW mode in this case) at power recovery.	<ul style="list-style-type: none"> <li>• Normal operation</li> <li>• After the DHW max. operation time has elapsed or the DHW max. temperature has been reached, the DHW mode switches to the other mode (ex. Heating mode).</li> </ul>						
31	Cooling mode is NOT available.	DIP SW2-4 is OFF.	Turn DIP SW2-4 to ON. (Refer to "6-9. DIP switch functions".)						
32	The cooling system does not cool down to the set temperature.	<ol style="list-style-type: none"> <li>1. When the water in the circulation circuit is unduly hot, Cooling mode starts with a delay for the protection of the outdoor unit.</li> <li>2. When the outdoor ambient temperature is lower than the preset temperature that activates the freeze stat function, Cooling mode does not start running.</li> </ol>	<ol style="list-style-type: none"> <li>1. Normal operation</li> <li>2. To run Cooling mode overriding the freeze stat function, adjust the preset temperature that activates the freeze stat function. (Refer to "&lt;Freeze stat function&gt;" on Page 27.)</li> </ol>						
33	The electric heaters are activated shortly after DHW or LP mode starts running after Cooling mode.	The setting time period of Heat-pump-only operation is short.	Adjust the setting time period of Heat-pump only operation. (Refer to "<Electric heater (DHW)>" on Page 44.)						
34	During DHW or LP mode following the cooling mode, error L6 (circulation water freeze protection error ) occurs and the system stops all the operations.	The unit runs in Cooling mode when the outdoor ambient temperature is lower than 10°C (outside of the guaranteed operating range). (When defrosting operation is running at such a low outdoor ambient temperature after Cooling mode is switched to DHW or LP mode, the water temperature in the cooling circuit drops too low, which could result in L6 error to stop all the operations.	<p>Do not run Cooling operation when the outdoor ambient temperature is lower than 10°C.</p> <p>To automatically stop or recover only Cooling operation and keep other operations running, the freeze stat function can be used. Set the preset temperature that activates the freeze stat function to adjust the outdoor ambient temperature as follows. (Refer to "&lt;Freeze stat function&gt;" on Page 27.)</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Outdoor ambient temperature</th> <th>Cooling operation</th> </tr> </thead> <tbody> <tr> <td>3°C higher than the preset temperature</td> <td>Stop</td> </tr> <tr> <td>5°C higher than the preset temperature</td> <td>Recover</td> </tr> </tbody> </table>	Outdoor ambient temperature	Cooling operation	3°C higher than the preset temperature	Stop	5°C higher than the preset temperature	Recover
Outdoor ambient temperature	Cooling operation								
3°C higher than the preset temperature	Stop								
5°C higher than the preset temperature	Recover								

# Troubleshooting

No.	Fault symptom	Possible cause	Explanation - Solution																
35	<p>The energy monitor value seems not correct.</p> <p>Note: There could be some discrepancies between the actual and the calculated values. If you seek for accuracy, please make sure to connect power meter(s) and heat meter to FTC board. Both should be locally supplied.</p>	<ol style="list-style-type: none"> <li>Incorrect setting of the energy monitor</li> <li>Non-connectable type of external meter (local supply) is connected.</li> <li>External meter (local supply) failure</li> <li>FTC board failure</li> </ol>	<ol style="list-style-type: none"> <li>Check the setting by following the procedure below. (1) Check if the DIP switch is set as the table below.  <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Consumed electric energy</th> <th colspan="2">Delivered heat energy</th> </tr> <tr> <th>SW3-4</th> <th>Electric energy meter (Local supply)</th> <th>SW3-8</th> <th>Heat meter (Local supply)</th> </tr> </thead> <tbody> <tr> <td>OFF</td> <td>Without</td> <td>OFF</td> <td>Without</td> </tr> <tr> <td>ON</td> <td>With</td> <td>ON</td> <td>With</td> </tr> </tbody> </table>                       (2) In the case external electric energy meter and/or heat meter is not used, check if the setting for electric heater and water pump(s) input is correct by referring to &lt;Energy monitor setting&gt; in "9-5. Service menu".                      (3) In the case external electric energy meter and/or heat meter is used, check if the unit of output pulse on external meter matches with the one set at the main remote controller by referring to &lt;Energy monitor setting&gt; in "9-5. Service menu".                 </li> <li>Check if the external meter (local supply) is connectable type by referring to &lt;Energy monitor setting&gt; in "9-5. Service menu".</li> <li>Check if signal is sent to IN8 to IN10 properly. (Refer to section 6. WIRING DIAGRAM) Replace the external heat meter if defective.</li> <li>Check the FTC control board.                     <ul style="list-style-type: none"> <li>Check for faulty wiring.</li> <li>If no problem found with the wiring, the FTC control board is faulty. Replace the board.</li> </ul> </li> </ol>	Consumed electric energy		Delivered heat energy		SW3-4	Electric energy meter (Local supply)	SW3-8	Heat meter (Local supply)	OFF	Without	OFF	Without	ON	With	ON	With
Consumed electric energy		Delivered heat energy																	
SW3-4	Electric energy meter (Local supply)	SW3-8	Heat meter (Local supply)																
OFF	Without	OFF	Without																
ON	With	ON	With																
36	Heat pump is forced to turn ON and OFF.	Smart grid ready input (IN11 and IN12) is used, and switch-on and off commands are input.	Normal operation no action necessary.																

## Annual Maintenance

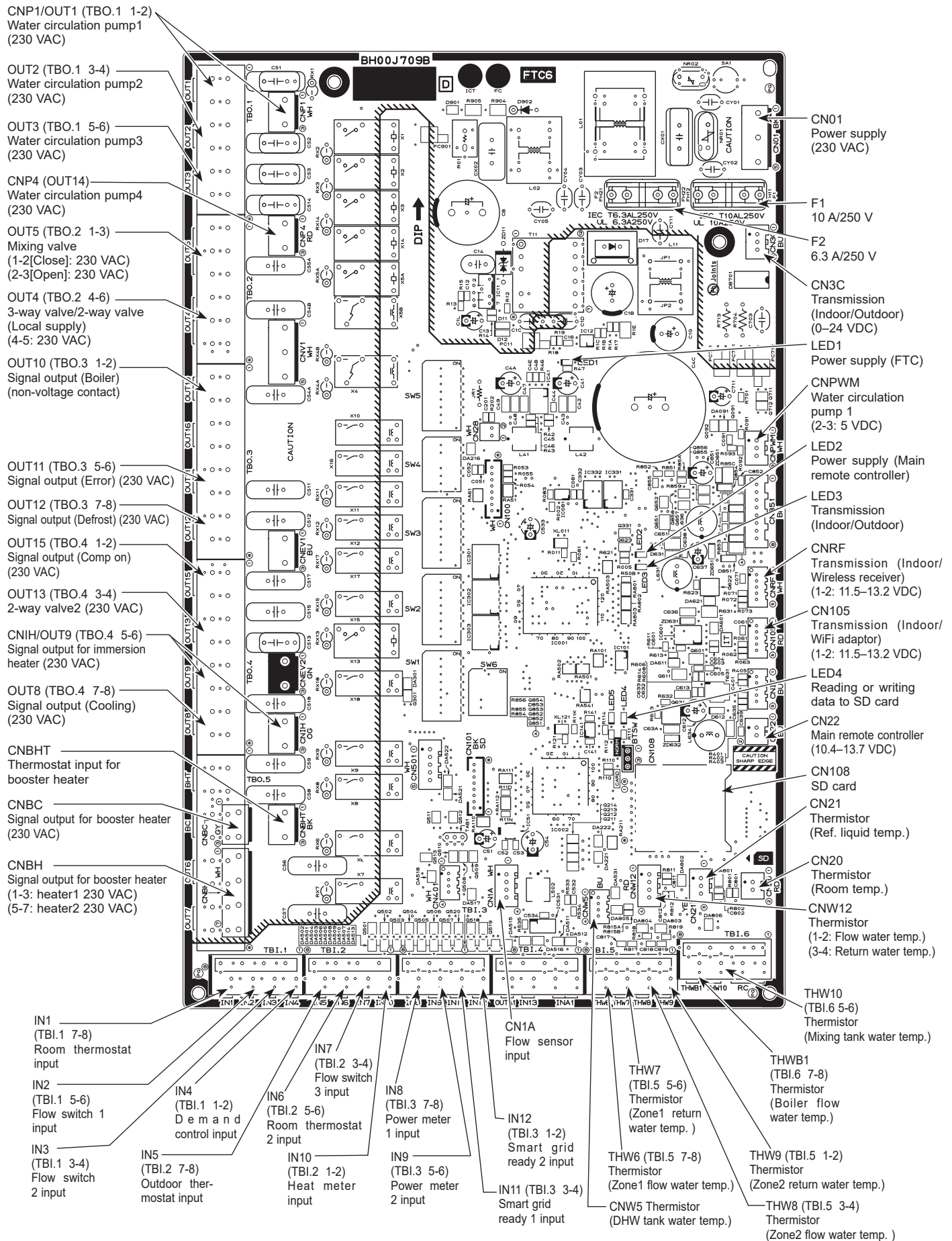
It is essential that the cylinder unit is serviced at least once a year by a qualified individual. Any spare parts required should be purchased from Mitsubishi Electric. NEVER bypass safety devices or operate the unit without them being fully operational.

### <Annual maintenance points>

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

# Test point diagram

## FTC (Controller board)





# Disassembly / Decommissioning Procedure

## Assessment

Before carrying out any disassembly or decommissioning activities, assess the area and task to ensure you have the correct equipment, adequate ventilation and can work safely. Consider issues such as manual handling requirements, condition of the equipment and the area, so that you can mitigate any hazards and allow the safe removal of the cylinder and associated parts.

## Isolate Electrics

Isolate the power supply to the outdoor heat pump unit, the immersion heater and the FTC control box in line with the current electrical regulation. Isolating and locking off at the main consumer unit as required.

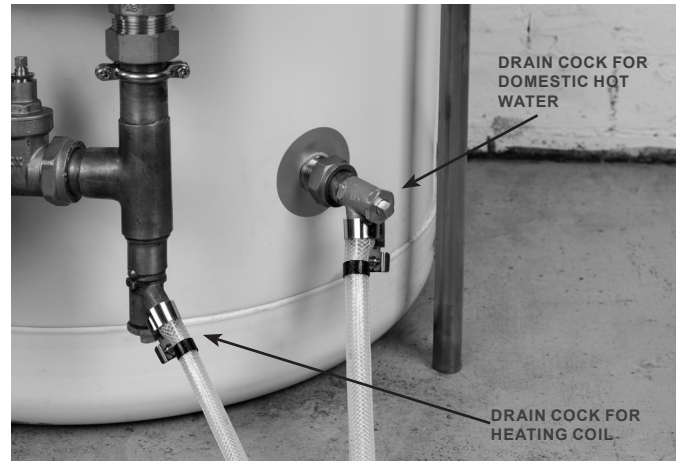
Check the power is dead before proceeding to disconnect the power cable from the fuse spurs for the immersion heater and the FTC control box.



## Drain DHW and Heating

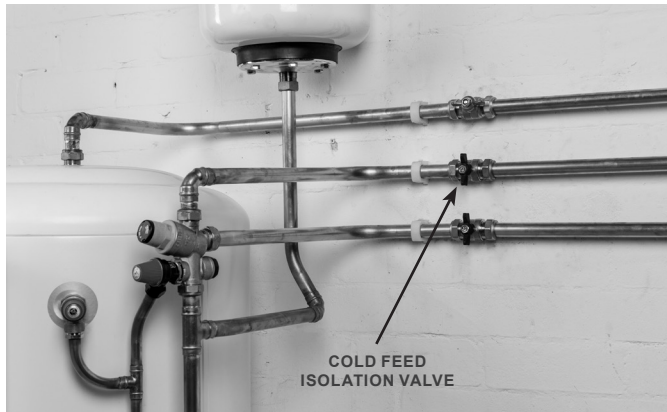
To drain down the domestic hot water, connect a hose to the drain cock at the bottom of the cylinder and secure it with a jubilee clip. Run the hose to a drain point lower than the cylinder and open the drain valve, then open the highest hot tap in the property, allowing the cylinder to drain fully.

To drain the coil in the cylinder, locate the drain cock for the relevant section of the heating system, connect a hose and secure it with a jubilee clip. Run the hose to a safe discharge point lower than the cylinder and open the drain valve, then open the air vent valve for that section of the heating system and allow the system to drain.



## Isolate Water

Isolate the cold feed to the cylinder by closing the isolation valve before the cylinder. Isolate the cylinder from the flow and return of the heating system.



# Disassembly / Decommissioning Procedure

## Recover Electrics

It is important to recover all electrical components separately, as these are covered by WEE regulations and need to be segregated so they can be recycled or disposed of safely.

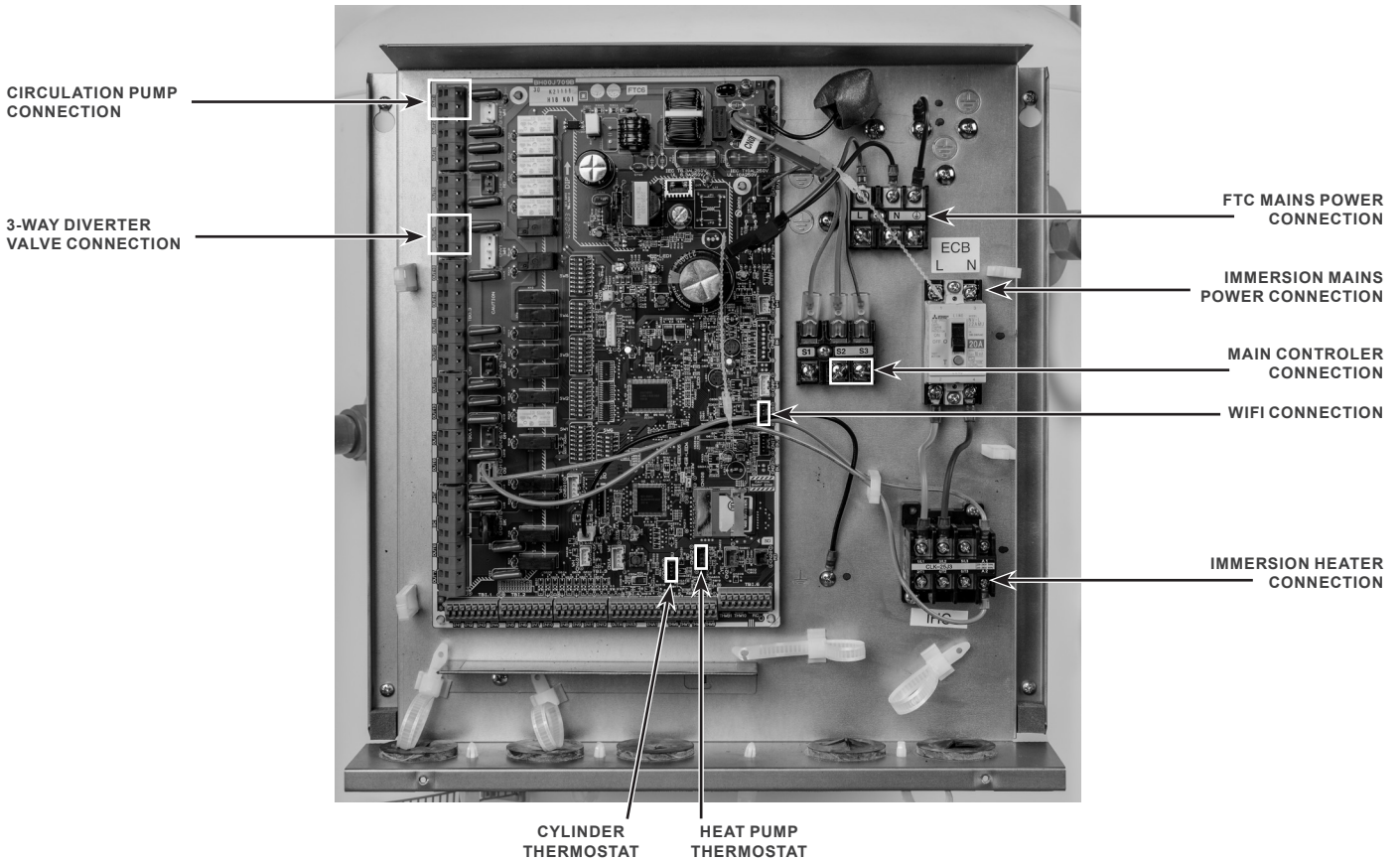
Open the cover to the FTC control box by unscrewing the two fastening screws on the front cover of the control box.

The cover will then lift up and forward to provide access to the PCB, where you can disconnect all the wires, including the ones for the immersion heater, the 3-way diverter valve, the circulating pump, the thermostats, and the main control box.

The FTC box can then be fully removed by removing the 4 fastening bolts in the corners of the back panel. Take care to support the weight of the FTC controller to avoid it falling and damaging the cylinder or the controller.



FTC FASTENING SCREWS



To remove the immersion heater, unscrew the heater using a 86mm box immersion spanner.

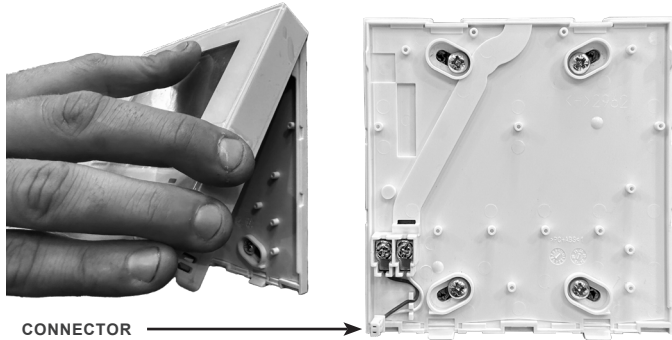


Remove the 3-way diverter valve by loosening the 28mm compression nuts, using the correct size spanners, and turning the nuts anticlockwise until they disconnect from the valve's body, allowing you to slide the valve off the pipework.



# Disassembly / Decommissioning Procedure

To remove the main controller, remove the cover to the wall-mounted main controller, taking care not to damage any of the plastic clips around the edge of the controller or the connector wire located on the inside, the bottom left corner. Disconnect the connector wire running between the back mounting plate and the front of the main controller. Disconnect and remove the Main remote controller.



## Recover Plumbing items

Following the removal of the electrical components, it's safe to dismantle the remaining plumbing components supplied with the cylinder. Disconnect and remove the drain hose if still in place; remove the drain cock by loosening the 22mm compression fitting until the drain cock can be removed.

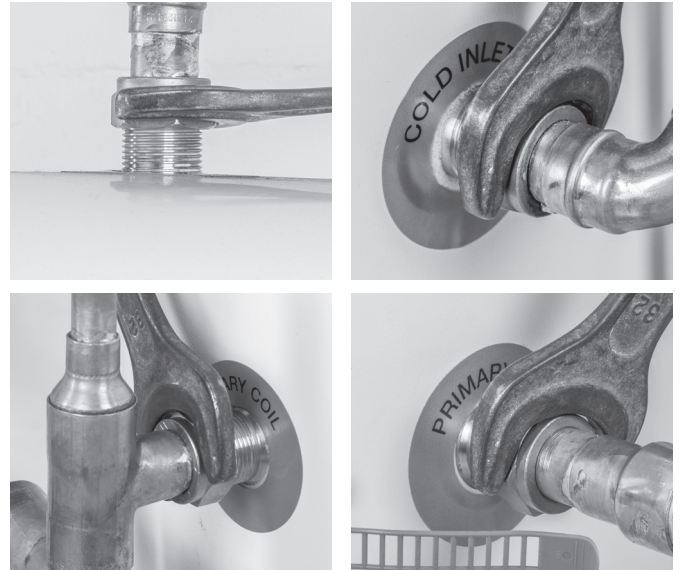


Disconnect and remove the T&P valve at the top of the cylinder by loosening the 15mm compression fitting and sliding off the 15mm copper pipe. Then unscrew the T&P valve from the cylinder by turning it anticlockwise until it comes free of the cylinder.



Disconnect all of the cylinder bosses from the pipework by loosening the 22mm compression nuts using the correct size spanners by turning the nuts anticlockwise until they

disconnect from the cylinder boss, to free the pipework from the cylinder. Depending on the installation, it may be necessary to cut away some of the pipework to allow the cylinder to be removed from its position.



Other components you should recover are the cold water combination valve and the potable water expansion vessel.

To recover the valve, loosen and remove the compression nuts to slide this off the pipework. To recover the expansion vessel, do this by loosening the compression nut to slide off the pipework and then loosening the bolts that are securing this to the wall. Take care to support the weight of the vessel to avoid it falling and causing damage.



## Cap off and leave safe

Any pipework not removed should be capped off to prevent debris from contaminating the remaining system and allow for the refilling of system parts if required.



## Recycling and disposal

All items, including the cylinder and any electrical components, must be disposed of correctly by handing them to a designated recycling centre for domestic waste electrical equipment. Contact your local council or waste disposal office for your nearest collection point or to arrange a collection.

# Service & Maintenance

## Engineers Forms

Should settings be changed from default, please enter and record 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

Main remote controller screen		Parameters	Default setting	Field setting	Notes	
<b>Main</b>	Zone1 heating room temp.	10°C to 30°C	20°C			
	Zone2 heating room temp. *1	10°C to 30°C	20°C			
	Zone1 heating flow temp.	20°C to 60°C	45°C			
	Zone2 heating flow temp. *2	20°C to 60°C	35°C			
	Zone1 cooling flow temp. *3	5°C to 25°C	15°C			
	Zone2 cooling flow temp. *3	5°C to 25°C	20°C			
	Zone1 heating compensation curve	-9°C to +9°C	0°C			
	Zone2 heating compensation curve *2	-9°C to +9°C	0°C			
<b>Option</b>	Holiday mode	Active/Non active/Set time	---			
	Forced DHW operation	On/Off	---			
	DHW	On/Off/Timer	On			
	Heating/Cooling *3	On/Off/Timer	On			
<b>Setting</b>	DHW	Energy monitor	Consumed electrical energy/Delivered energy	---		
		Operation mode	Normal/Eco *4	Normal		
		DHW max. temp.	40°C to 60°C *5	50°C		
		DHW temp. drop	5°C to 30°C	10°C		
		DHW max. operation time	30 to 120 min	60 min		
		DHW mode restriction	30 to 120 min	30 min		
		DHW recharge	Large/Standard	Standard		
	Legionella prevention	Active	Yes/No	Yes		
		Hot water temp.	60°C to 70°C *5	65°C		
		Frequency	1 to 30 days	15 days		
		Start time	00.00 to 23.00	03.00		
		Max. operation time	1 to 5 hours	3 hours		
		Duration of maximum temp.	1 to 120 min	30 min		
	Heating/Cooling *3	Zone1 operation mode	Heating room temp./ Heating flow temp./ Heating compensation curve/ Cooling flow temp.	Room temp.		
		Zone2 operation mode *2	Heating room temp./ Heating flow temp./ Heating compensation curve/ Cooling flow temp.	Compensation curve		
	Compensation curve	Hi flow temp. set point	Zone1 outdoor ambient temp.	-30°C to +33°C *6	-15°C	
			Zone1 flow temp.	20°C to 60°C	50°C	
			Zone2 outdoor ambient temp. *2	-30°C to +33°C *6	-15°C	
		Lo flow temp. set point	Zone2 flow temp. *2	20°C to 60°C	40°C	
			Zone1 outdoor ambient temp.	-28°C to +35°C *7	35°C	
			Zone1 flow temp.	20°C to 60°C	25°C	
		Adjust	Zone2 outdoor ambient temp. *2	-28°C to +35°C *7	35°C	
			Zone2 flow temp. *2	20°C to 60°C	25°C	
			Zone1 outdoor ambient temp.	-29°C to +34°C *8	---	
	Holiday	Zone1 flow temp.	20°C to 60°C	---		
		Zone2 outdoor ambient temp. *2	-29°C to +34°C *8	---		
		Zone2 flow temp. *2	20°C to 60°C	---		
		DHW	Active/Non active	Non active		
Heating/Cooling *3		Active/Non active	Active			
Zone1 heating room temp.		10°C to 30°C	15°C			
Zone2 heating room temp. *1		10°C to 30°C	15°C			
Zone1 heating flow temp.		20°C to 60°C	35°C			
Zone2 heating flow temp. *2		20°C to 60°C	25°C			
Zone1 cooling flow temp. *3		5°C to 25°C	25°C			
Initial settings	Zone2 cooling flow temp. *3	5°C to 25°C	25°C			
	Language	EN/FR/DE/SV/ES/IT/DA/NL/FI/NO/PT/BG/PL/CZ/RU/TR/SL	EN			
	°C/°F	°C/°F	°C			
	Summer time	On/Off	Off			
	Temp. display	Room/DHW tank/Room&DHW tank /Off	Off			
	Time display	hh:mm/hh:mm AM/AM hh:mm	hh:mm			
	Room sensor settings for Zone1	TH1/Main RC/Room RC1 to 8/"Time/Zone"	TH1			
	Room sensor settings for Zone2 *2	TH1/Main RC/Room RC1 to 8/"Time/Zone"	TH1			
Service menu	Room RC zone select *2	Zone1/Zone2	Zone1			
	Thermistor adjustment	THW1	-10°C to +10°C	0°C		
		THW2	-10°C to +10°C	0°C		
		THW5A	-10°C to +10°C	0°C		
		THW5B	-10°C to +10°C	0°C		
		THW6	-10°C to +10°C	0°C		
		THW7	-10°C to +10°C	0°C		
		THW8	-10°C to +10°C	0°C		
		THW9	-10°C to +10°C	0°C		
		THW10	-10°C to +10°C	0°C		
		THWB1	-10°C to +10°C	0°C		
		Auxiliary settings	Economy settings for pump.	On/Off *9	On	
	Delay (3 to 60 min)			10 min		
	Electric heater (Heating)		Space heating: On (used)/Off (not used)	On		
	Electric heater (DHW)		Electric heater delay timer (5 to 180 min)	30 min		
	Booster heater		DHW: On (used)/Off (not used)	On		
	Immersion heater		DHW: On (used)/Off (not used)	On		
	Electric heater delay timer (15 to 30 min)			15 min		
	Mixing valve control		Running (10 to 240 sec)	120 sec		
	Interval (1 to 30 min)			2 min		
Flow sensor *10	Minimum (0 to 100L/min)		5 L/min			
	Maximum (0 to 100L/min)		100 L/min			
	Interval (1 to 30 min)		5 min			
Analog output	Priority (Normal/High)		Normal			

# Service & Maintenance

Commissioning/Field settings record sheet (continued from the previous page)

Main remote controller screen				Parameters	Default setting	Field setting	Notes				
Setting	Service menu	Pump speed	DHW	Pump speed (1 to 5)	5						
			Heating/Cooling	Pump speed (1 to 5)	5						
		Heat source setting			Standard/Heater/Boiler/Hybrid *11	Standard					
			Heat pump setting	Heat pump flow rate range		Minimum(0 to 100L/min.)	5 L/min				
				Maximum(0 to 100L/min.)	100 L/min						
		Quiet mode		Day (Mon to Sun)	—						
				Time	0:00 - 23:45						
		Operation settings	Heating operation	Flow temp.range *12	Minimum.temp.(20 to 45°C)	30°C					
					Maximum.temp.(35 to 60°C)	50°C					
				Room temp.control *13	Mode (Normal/Fast)	Normal					
					Interval (10 to 60min)	10min					
				Heat pump thermo diff.adjust	On/Off *9	On					
					Lower limit (-9 to -1°C)	-5°C					
						Upper limit (+3 to +5°C)	5°C				
				Freeze stat function *14		Outdoor ambient temp. (3 to 20°C) / **	5°C				
			Simultaneous operation (DHW/Heating)		On/Off *9	Off					
					Outdoor ambient temp. (-30 to +10°C) *6	-15°C					
			Cold weather function		On/Off *9	Off					
					Outdoor ambient temp. (-30 to -10°C) *6	-15°C					
			Boiler operation		Hybrid settings		Outdoor ambient temp. (-30 to +10°C) *6	-15°C			
							Priority mode (Ambient/Cost/CO <sub>2</sub> ) *15	Ambient			
							Outdoor ambient temp. rise (+1 to +5 °C)	+3 °C			
					Intelligent settings		Energy price *16	Electricity (0.001 to 999 */kWh)	0.5 */kWh		
								Boiler (0.001 to 999 */kWh)	0.5 */kWh		
							CO <sub>2</sub> emission	Electricity (0.001 to 999 kg -CO <sub>2</sub> /kWh)	0.5 kg -CO <sub>2</sub> /kWh		
								Boiler (0.001 to 999 kg -CO <sub>2</sub> /kWh)	0.5 kg -CO <sub>2</sub> /kWh		
					Heat source		Heat pump capacity (1 to 40 kW)		11.2 kW		
							Boiler efficiency (25 to 150%)		80%		
							Booster heater 1 capacity (0 to 30 kW)		2 kW		
			Booster heater 2 capacity (0 to 30 kW)				4 kW				
			Smart grid ready		DHW		On/Off	Off			
							Target temp (+1 to +20°C) / -- (Non active)	--			
					Heating		On/Off		Off		
							Target temp.	Switch-on recommendation(20 to 60°C)	50°C		
									Switch-on command(20 to 60°C)	55°C	
		Cooling			On/Off		Off				
					Target temp.	Switch-on recommendation(5 to 25°C)	15°C				
							Switch-on command(5 to 25°C)	10°C			
		Pump cycles		Heating (On/Off)		On					
				Cooling (On/Off)		On					
				Interval(10 to 120 min)		10 min					
		Floor dry up function		On/Off *9		Off					
				Target temp.		Start&Finish (20 to 60°C)	30°C				
						Max. temp. (20 to 60°C)		45°C			
						Max. temp. period (1 to 20 days)		5 days			
				Flow temp. (Increase)		Temp. increase step (+1 to +10°C)		+5°C			
						Increase interval (1 to 7 days)		2 days			
		Flow temp. (Decrease)		Temp. decrease step (-1 to -10°C)		-5°C					
				Decrease interval (1 to 7 days)		2 days					
		Summer mode		On/Off		Off					
				Outdoor ambient temp.		Heating ON (4 to 19°C)	10°C				
						Heating OFF (5 to 20°C)		15°C			
				Judgement time		Heating ON (1 to 48 hours)	6 hours				
						Heating OFF (1 to 48 hours)		6 hours			
		Forced heating ON (-30 to 10°C)				5 °C					
		Water flow control		On/Off		Off					

(Continued to next page.)

# Service & Maintenance

## Commissioning/Field settings record sheet (continued from the previous page)

Main remote controller screen				Parameters	Default setting	Field setting	Notes	
Service menu	Energy monitor settings	Electric heater capacity	Booster heater 1 capacity	0 to 30 kW	2 kW			
			Booster heater 2 capacity	0 to 30 kW	4 kW			
			Immersion heater capacity	0 to 30 kW	0 kW			
			Analog output	0 to 30 kW	0 kW			
		Delivered energy adjustment			-50 to +50%	0%		
		Water pump input	Pump 1	0 to 200 W or ***(factory fitted pump)		***		
			Pump 2	0 to 200 W		0 W		
			Pump 3	0 to 200 W		0 W		
			Pump 4	0 to 200 W		72 W		
		Electric energy meter *17		0.1/1/10/100/1000 pulse/kWh		1000 pulse/kWh		
	Heat meter *17		0.1/1/10/100/1000 pulse/kWh		1000 pulse/kWh			
	External input settings	Demand control (IN4)		Heat source OFF/Boiler operation		Boiler operation		
		Outdoor thermostat (IN5)		Heater operation/Boiler operation		Boiler operation		
		Thermo ON output		Zone1/Zone2/Zone1&2		Zone1&2		

\*1 The settings related to Zone2 can be switched only when 2-zone temperature control or 2-Zone valve ON/OFF control is active.

\*2 The settings related to Zone2 can be switched only when 2 zone temperature control is enabled (when DIP SW2-6 and SW2-7 are ON).

\*3 Cooling mode settings are available for ER model only.

\*4 When the cylinder unit is connected with a PUMY-P outdoor unit, the mode is fixed to "Normal".

\*5 For the model without both booster and immersion heater, it may not reach the set temperature depending on the outside ambient temperature.

\*6 The lower limit is -15°C depending on the connected outdoor unit.

\*7 The lower limit is -13°C depending on the connected outdoor unit.

\*8 The lower limit is -14°C depending on the connected outdoor unit.

\*9 On: the function is active; Off: the function is inactive.

\*10 Do not change the setting since it is set according to the specification of flow sensor attached to the cylinder unit.

\*11 When DIP SW1-1 is set to OFF "WITHOUT Boiler" or SW2-6 is set to OFF "WITHOUT Mixing tank", neither Boiler nor Hybrid can be selected.

\*12 Valid only when operating in Heating room temperature.

\*13 When DIP SW5-2 is set to OFF, the function is active.

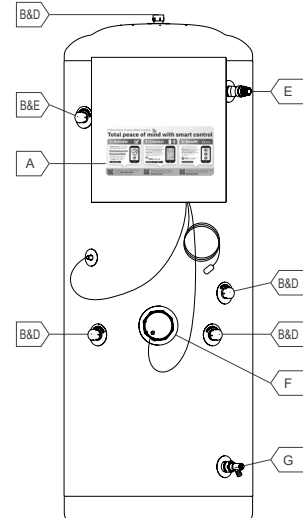












\*14 If asterisk (\*\*) is chosen freeze stat function is deactivated. (i.e. primary water freeze risk)

\*15 When the cylinder unit is connected with a PUMY-P outdoor unit, the mode is fixed to "Ambient".

\*16 \*\*\* of "\*/kWh" represents currency unit (e.g. € or £ or the like)

\*17 The default setting is 1 pulse/kWh depending on the connected indoor unit.

# Parts List

<p>Please order the correct replacement parts; fitting non-approved parts may affect your Warranty.</p> <p>When fitting, ensure the 'O' ring is positioned correctly on the head of the immersion heater and lubricate before fitting. Fit it by hand until almost home then tighten gently, as the 'O' rings will seal easily. Electrical supply - refer to page 11.</p> <p>Do not energise the immersion heater until the cylinder is full of water.</p>		 <p>MEU-UK SAP Code: <b>682003</b> DHW Expansion Vessel 19 litre (250L Cylinder &amp; Under)</p>
		 <p>MEU-UK SAP Code: <b>607364</b> DHW Expansion Vessel 24 litre (300L Cylinder)</p>
		<p><b>F</b></p>  <p>MEU-UK SAP Code: <b>682007</b> Immersion Heater</p>
<p><b>A</b></p>  <p>MEU-UK SAP Code: <b>681966</b> FTC Label</p>	 <p>MEU-UK SAP Code: <b>681967</b> Cold water combination valve</p>	<p><b>G</b></p>  <p>MEU-UK SAP Code: <b>682011</b> Drain Valve</p>
<p><b>B</b></p>  <p>MEU-UK SAP Code: <b>681969</b> Nut Pack (5 of each)</p>	<p><b>D</b></p>  <p>MEU-UK SAP Code: <b>681970</b> Olive Pack (5 of each)</p>	 <p>MEU-UK SAP Code: <b>607391</b> 3-Way Diverter Valve 28mm</p>
<p><b>C</b></p>  <p>MEU-UK SAP Code: <b>681971</b> Tundish (anti-splash)</p>	<p><b>E</b></p>  <p>MEU-UK SAP Code: <b>682005</b> Temp./Pressure Relief Valve</p>	<p><b>H</b></p>  <p>MEU-UK SAP Code: <b>682014</b> FTC Bracket</p>

## LOCAL APPLICATION FACTORS

Additional Requirements for using R32 Refrigerant

1. Important Notice (Fire safety)

R32 is flammable refrigerant (classified as A2L - lower flammability), and the fire safety warranty for the whole system (including outdoor unit) must be done by your side.

Conformity of regulations (e.g. IEC 60335) and laws must be confirmed on the system by your side.

2. Pressure relief valve

PUZ-(H)WM(50/60/85/112/140)(V-Y)(H-A)A outdoor units contain a 0.3 (3.0) MPa (bar) pressure relief valve.

Do not attach an additional pressure relief valve to the heating (cooling) circuit on EHPT(18-21-25-30)X-UKH(L)DWB.

## TECHNICAL SUPPORT

Residential Heating & Ventilation Telephone: 01707 278666

MELSmart Customer Services & Support: 0161 866 6089

Option 1 - Homeowner Helpline

Option 2 - Commercial

Option 3 - Residential Heating Tech Support

Email: [livingenvironmentalsystems@meuk.mee.com](mailto:livingenvironmentalsystems@meuk.mee.com)

Website: [les.mitsubishielectric.co.uk](http://les.mitsubishielectric.co.uk)

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