Changes for the Better

MITSUBISHI ELECTRIC

CYLINDER UNIT

January 2013

No. OCH531
REVISED EDITION-A

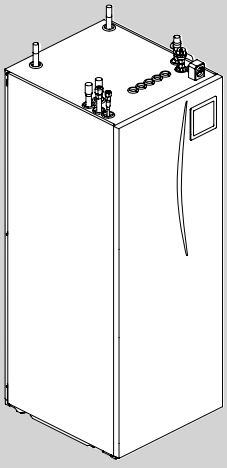
# SERVICE MANUAL R410A

| [Model name] | [Service Ref.] |
|---|---|
| EHST20C-VM6HB | EHST20C-VM6HB.UK |
| EHST20C-YM9HB | EHST20C-YM9HB.UK |
| EHST20C-TM9HB | EHST20C-TM9HB.UK |
| EHST20C-VM2B | EHST20C-VM2B.UK |
| EHST20C-VM6B | EHST20C-VM6B.UK |
| EHST20C-YM9B | EHST20C-YM9B.UK |
| EHST20C-VM6EB | EHST20C-VM6EB.UK |
| EHST20C-YM9EB | EHST20C-YM9EB.UK |
| EHST20C-VM6SB | EHST20C-VM6SB.UK |
| EHPT20X-VM2HB | EHPT20X-VM2HB.UK |
| EHPT20X-VM6HB | EHPT20X-VM6HB.UK |
| EHPT20X-YM9HB | EHPT20X-YM9HB.UK |
| EHPT20X-TM9HB | EHPT20X-TM9HB.UK |
| EHPT20X-VM6B | EHPT20X-VM6B.UK |
| EHPT20X-YM9B | EHPT20X-YM9B.UK |

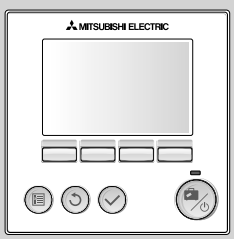
Revision:
- EHST20C-TM9HB.UK, EHST20C-VM2B.UK and EHPT20X-TM9HB.UK have been added in REVISED EDITION-A.
- Some descriptions have been modified.

- Please void OCH531.

Note:
- This manual describes only service data of cylinder unit.
- RoHS compliant products have <G> mark on the spec name plate.



CYLINDER UNIT




MAIN CONTROLLER

## CONTENTS



PARTS CATALOG (OCB531)

# 1 REFERENCE MANUAL

## OUTDOOR UNIT'S SERVICE MANUAL

| Service Ref. | Service Manual No. |
|---|---|
| PUHZ-RP35/50/60/71VHA4 | OCH451 |
| PUHZ-RP35/50/60/71VHA4R4 | |
| PUHZ-RP100/125/140VKA | |
| PUHZ-RP100/125/140YKA | |
| PUHZ-RP100/125YKAR4 | |
| PUHZ-HRP71/100VHA | OCH425 |
| PUHZ-HRP71/100VHA2 | |
| PUHZ-HRP71/100VHA2R1 | |
| PUHZ-HRP100VHA2R2 | |
| PUHZ-HRP100/125YHA | |
| PUHZ-HRP100/125YHA2 | |
| PUHZ-HRP100/125YHA2R1 | |
| PUHZ-W50/85VHA(-BS) | OCH439 |
| PUHZ-W50/85VHAR1(-BS) | |
| PUHZ-W50VHAR2(-BS) | |
| PUHZ-W85VHA2.UK | OCH465 |
| PUHZ-W85VHA2-BS.UK | |
| PUHZ-HW112/140YHA(-BS) | OCH439 |
| PUHZ-HW112/140YHA2(-BS) | |
| PUHZ-HW112/140YHA2R1(-BS) | |
| PUHZ-HW112/140YHA2R3(-BS) | |
| PUHZ-HW140VHA(-BS) | |
| PUHZ-HW140VHA2(-BS) | |
| PUHZ-HW140VHA2R1(-BS) | |
| PUHZ-HW140VHA2R2-BS | |
| PUHZ-HW140VHA2R3(-BS) | |
| PUHZ-SW40/45VHA(-BS) | OCH525 |
| PUHZ-SW75/100/120VHA(-BS) | OCH533 |
| PUHZ-SW100/125YHA(-BS) | |
| PUHZ-SHW80/112VHA | OCH526 |
| PUHZ-SWH112/140YHA | |

# 2 SAFETY PRECAUTION

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

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

**Mitsubishi Electric is not responsible for the failure of locally-supplied and field-supplied parts.**

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

| ⚠ WARNING |
|---|
| **Mechanical** |
| 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. |
| **Electrical** |
| All electrical work should be performed by a qualified technician according to local regulations and the instructions given in this manual. |
| The units must be powered by a dedicated power supply and the correct voltage and circuit breakers must be used. |
| Wiring should be in accordance with national wiring regulations. Connections must be made securely and without tension on the terminals. |
| Earth unit correctly. |
| **General** |
| Keep children and pets away from both the cylinder unit and outdoor unit. |
| 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 done by qualified person. |
| Do not place containers with liquids in on top of the cylinder unit. If they leak or spill onto the cylinder unit damage to the unit and/or fire could occur. |
| Do not place any heavy items on top of the cylinder unit. |
| When installing or relocating, or servicing the cylinder unit, use only the specified refrigerant (R410A) to charge the refrigerant lines. Do not mix it with any other refrigerant and do not allow air to remain in the lines. If air is mixed with the refrigerant, then it can be the cause of abnormal high pressure in the refrigerant line, and may result in an explosion and other hazards.<br>The use of any refrigerant other than that specified for the system will cause mechanical failure or system malfunction or unit breakdown. In the worst case, this could lead to a serious impediment to securing product safety. |
| In heating mode, to avoid the heat emitters being damaged by excessively hot water, set the target flow temperature to a minimum of 2ºC below the maximum allowable temperature of all the heat emitters. For Zone2, set the target flow temperature to a minimum of 5ºC below the maximum allowable flow temperature of all the heat emitters in Zone2 circuit. |

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

## ⚠ WARNING (SPLIT MODELS ONLY)

Do not discharge refrigerant into the atmosphere if refrigerant leaks during installation, ventilate the room.

Use appropriate tools for high pressure refrigerant.

When pumping down refrigerant , stop the compressor before disconnecting the refrigerant pipes.

During installation securely fasten the refrigerant pipes before starting the compressor.

Check that refrigerant gas does not leak after the completion of installation.

Use R410A refrigerant only. Do not allow air to enter the lines. Failure to observe these instructions will cause mechanical failure, system failure or, in the worst case, serious breach of product safety.

## ⚠ CAUTION (SPLIT MODELS ONLY)

<Using R410A refrigerant heat pumps>

Use C1220 copper phosphorus, for copper and copper alloy seamless pipes, to connect the refrigerant pipes. Make sure the insides of the pipes are clean and do not contain any harmful contaminants such as sulfuric compounds, oxidants, debris, or dust. Use pipes with the specified thickness. (Refer to section 4.5. in the installation manual.) Note the following if reusing existing pipes that carried R22 refrigerant.
- Replace the existing flare nuts and flare the flared sections again.
- Do not use thin pipes. (Refer to section 4.5 in the installation manual.)

Store the pipes to be used during installation indoors and keep both ends of the pipes sealed until just before brazing. (Leave elbow joints, etc. in their packaging.) If dust, debris, or moisture enters the refrigerant lines, oil deterioration or compressor breakdown may result.

Use ester oil, ether oil, alkylbenzene oil (small amount) as the refrigeration oil applied to the flared sections. If mineral oil is mixed in the refrigeration oil, oil deterioration may result.

Do not use refrigerant other than R410A refrigerant. If another refrigerant is used, the chlorine will cause the oil to deteriorate.

Use the following tools specifically designed for use with R410A refrigerant. The following tools are necessary to use R410A refrigerant. Contact your nearest dealer for any questions.

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

Be sure to use the correct tools. If dust, debris, or moisture enters the refrigerant lines, refrigeration oil deterioration may result.

Do not use a charging cylinder, a cylindrical measuring container, when charging R410A refrigerant gas. If the refrigerant gas is transferred to a charging cylinder, the composition of the refrigerant will change and system efficiency will be reduced.

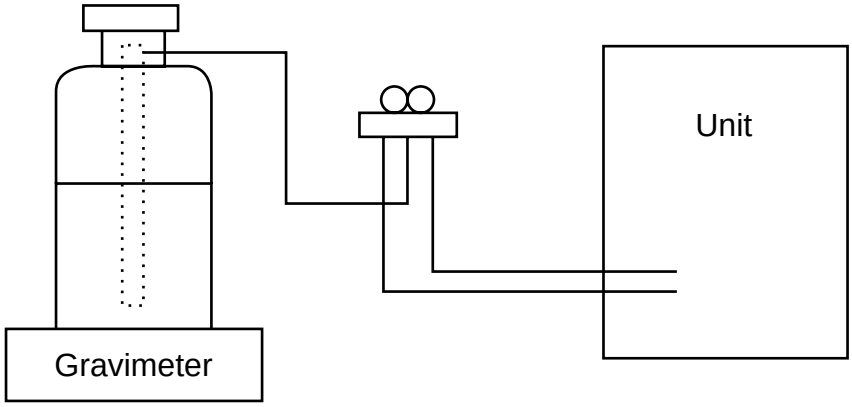
## [1] Cautions for service

**(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) When performing service, install a filter drier simultaneously.**
**Be sure to use a filter drier for new refrigerant.**

## [2] Additional refrigerant charge

**When charging directly from refrigerant cylinder**

· Check that cylinder for R410A on the market is syphon type.
· Charging should be performed with the refrigerant cylinder of syphon stood vertically. (Refrigerant is charged from liquid phase.)




## [3] Service tools

**Use the service tools below as exclusive tools for R410A refrigerant.**

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

| Model name | | | | EHST20C-VM6HB | EHST20C-YM9HB | EHST20C-TM9HB | EHST20C-VM2B | EHST20C-VM6B | EHST20C-YM9B | EHST20C-VM6EB | EHST20C-YM9EB | EHST20C-VM6SB | EHPT20X-VM2HB | EHPT20X-VM6HB | EHPT20X-YM9HB | EHPT20X-TM9HB | EHPT20X-VM6B | EHPT20X-YM9B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nominal domestic hot water volume | | | | 200L | | | | | | | | | | | | | | |
| Overall unit dimensions | | | | 1600 x 595 x 680 mm (Height x Width x Depth) | | | | | | | | | | | | | | |
| Weight (empty) | | | | **128 kg** | **128 kg** | **128 kg** | **125 kg** | **127 kg** | **127 kg** | **122 kg** | **122 kg** | **128 kg** | **113 kg** | **115 kg** | **115 kg** | **115 kg** | **114 kg** | **114 kg** |
| Weight (full) | | | | **343 kg** | **343 kg** | **343 kg** | **340 kg** | **342 kg** | **342 kg** | **337 kg** | **337 kg** | **343 kg** | **326 kg** | **328 kg** | **328 kg** | **328 kg** | **327 kg** | **327 kg** |
| Plate heat exchanger | | | | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | — | — | — | — | — | — |
| Unvented expansion vessel (Primary heating) | | Nominal volume | | 12 L | | | | | | — | — | 12 L | | | | | | |
| | | Charge pressure | | 1 bar | | | | | | — | — | 1 bar | | | | | | |
| Safety device | Water circuit (Primary) | Control thermistor | Heating | 1 - 80°C | | | | | | | | | | | | | | |
| | | Pressure relief valve | | 0.3 MPa (3 bar) | | | | | | | | | | | | | | |
| | | Flow switch | | Min flow 5.5 l/min | | | | | | | | | | | | | | |
| | Booster heater | Manual reset thermostat | | 90°C | | | | | | | | | | | | | | |
| | | Thermal Cut-out (for dry run prevention) | | 121°C | | | | | | | | | | | | | | |
| | DHW tank | Control thermistor | | 40 - 70°C | | | | | | | | | | | | | | |
| | | Temperature and pressure relief valve | | 1.0 MPa (10 bar) | 1.0 MPa (10 bar) | 1.0 MPa (10 bar) | 1.0 MPa (10 bar) | 1.0 MPa (10 bar) | 1.0 MPa (10 bar) | 1.0 MPa (10 bar) | 1.0 MPa (10 bar) | 1.0 MPa (10 bar) | 90°C/ 0.7 MPa (7 bar) | 1.0 MPa (10 bar) | 1.0 MPa (10 bar) | 1.0 MPa (10 bar) | 1.0 MPa (10 bar) | 1.0 MPa (10 bar) |
| Primary circuit circulating Pump | | | | Grundfos UPM2 25 70 - 180 | | | | | | | | | | | | | | |
| Connections | | Water | | 28 mm compression primary circuit/ 22 mm compression DHW circuit/22 mm compression solar thermal (Ancillary heating) circuit | | | | | | | | | | | | | | |
| | | Refrigerant (R410A) | Liquid | 9.52 mm | 9.52 mm | 9.52 mm | 9.52 mm | 9.52 mm | 9.52 mm | 9.52 mm | 9.52 mm | 9.52 mm | — | — | — | — | — | — |
| | | | Gas | 15.88 mm | 15.88 mm | 15.88 mm | 15.88 mm | 15.88 mm | 15.88 mm | 15.88 mm | 15.88 mm | 15.88 mm | | | | | | |
| Target temperature range | | Flow temperature | Heating | 25 - 60°C | | | | | | | | | | | | | | |
| | | | Cooling | — | | | | | | | | | | | | | | |
| | | Room temperature | Heating | 10 - 30°C | | | | | | | | | | | | | | |
| | | | Cooling | — | | | | | | | | | | | | | | |
| Guaranteed operating range | | Ambient *1 | | 0 - 35°C (≦ 80 %RH) | | | | | | | | | | | | | | |
| | | Outdoor temperature | Heating | See outdoor unit spec table. | | | | | | | | | | | | | | |
| | | | Cooling | — | | | | | | | | | | | | | | |
| DHW tank performance *2 | | Time to raise DHW tank temp 15 - 65°C | | 21.75 mins | | | | | | | | | | | | | | |
| | | Time to reheat 70% of DHW tank to 65°C | | 16 mins | | | | | | | | | | | | | | |
| Electrical data | | Control board | Power supply (Phase, voltage, frequency) | ~/N, 230 V, 50 Hz | | | | | | | | | | | | | | |
| | | | Breaker (*when powered from independent source) | 10 A | | | | | | | | | | | | | | |
| | | Booster heater | Power supply (Phase, voltage, frequency) | ~/N, 230 V, 50 Hz | 3~, 400 V, 50 Hz | 3~, 230 V, 50 Hz | ~/N, 230 V, 50 Hz | ~/N, 230 V, 50 Hz | 3~, 400 V, 50 Hz | ~/N, 230 V, 50 Hz | 3~, 400 V, 50 Hz | ~/N, 230 V, 50 Hz | ~/N, 230 V, 50 Hz | ~/N, 230 V, 50 Hz | 3~, 400 V, 50 Hz | 3~, 230 V, 50 Hz | ~/N, 230 V, 50 Hz | 3~, 400 V, 50 Hz |
| | | | Capacity | 2 kW+ 4 kW | 3 kW+ 6 kW | 3 kW+ 6 kW | 2 kW | 2 kW+ 4 kW | 3 kW+ 6 kW | 2 kW+ 4 kW | 3 kW+ 6 kW | 2 kW+ 4 kW | 2 kW | 2 kW+ 4 kW | 3 kW+ 6 kW | 3 kW+ 6 kW | 2 kW+ 4 kW | 3 kW+ 6 kW |
| | | | Current | 26 A | 13 A | 23 A | 9 A | 26 A | 13 A | 26 A | 13 A | 26 A | 9 A | 26 A | 13 A | 23 A | 26 A | 13 A |
| | | | Breaker | 32 A | 16 A | 32 A | 16 A | 32 A | 16 A | 32 A | 16 A | 32 A | 16 A | 32 A | 16 A | 32 A | 32 A | 16 A |
| | | Immersion heater *3 | Power supply (Phase, voltage, frequency) | ~/N, 230 V, 50 Hz | | | — | | | | | | ~/N, 230 V, 50 Hz | | | | — | |
| | | | Capacity | 3 kW | | | — | | | | | | 3 kW | | | | — | |
| | | | Current | 13 A | | | — | | | | | | 13 A | | | | — | |
| | | | Breaker | 16 A | | | — | | | | | | 16 A | | | | — | |
| Solar (ancillary) connection | | | | — | — | — | — | — | — | — | — | ✔ | — | — | — | — | — | — |

<Table 3.1>

**Optional extras**

| | | | |
|---|---|---|---|
| • Wireless Remote Controller | PAR-WT50R-E | • Remote sensor | PAC-SE41TS-E |
| • Wireless Receiver | PAR-WR51R-E | • Joint pipe (15.88 → 12.7) | PAC-SH50RJ-E |
| • Immersion heater (1 Ph 3kW) | PAC-IH03V-E | • Joint pipe (9.52 → 6.35) | PAC-SH30RJ-E |
| • EHPT Accessories for UK | PAC-WK01UK-E | •Thermistor | PAC-TH011-E |
| | | •High temperature thermistor | PAC-TH011HT-E |

*1 The environment must be frost-free.

*2 Tested under BS7206 conditions .

*3 Do not fit immersion heaters without thermal cut-out.

# 4 PART NAMES AND FUNCTIONS

### <EHST20C-*M*HB/*M*B> (Split model system)

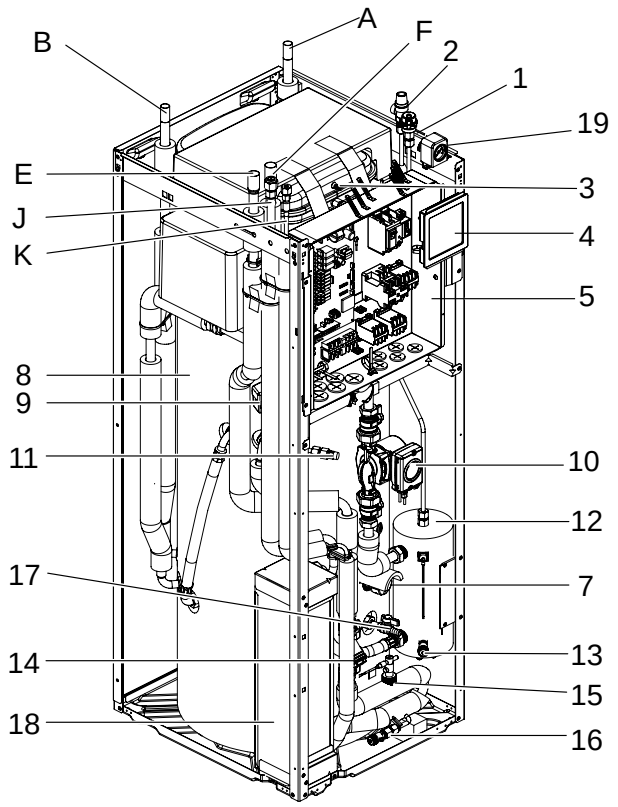



Figure 4-1

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

### <EHST20C-*M*EB>
### (Split model system without expansion vessel )

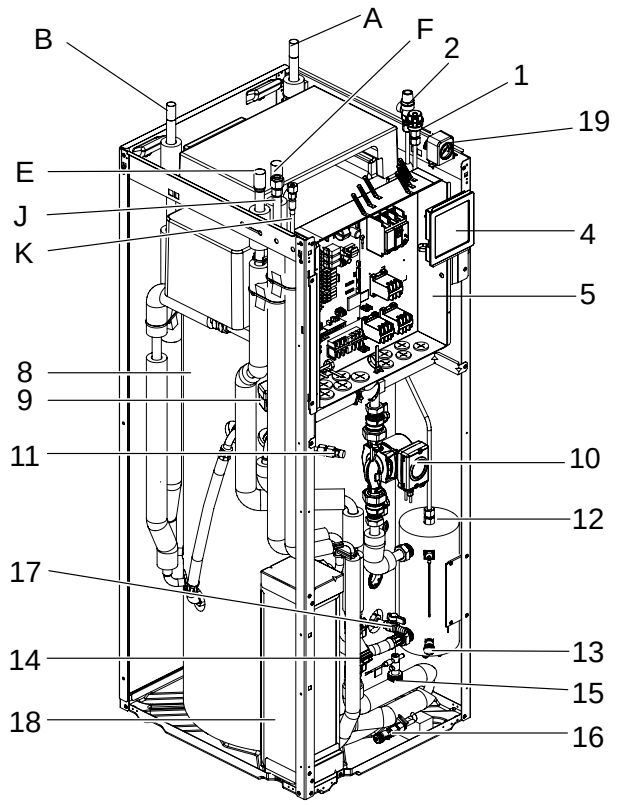



Figure 4-2

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

## <EHST20C-VM6SB> (Solar split model system)

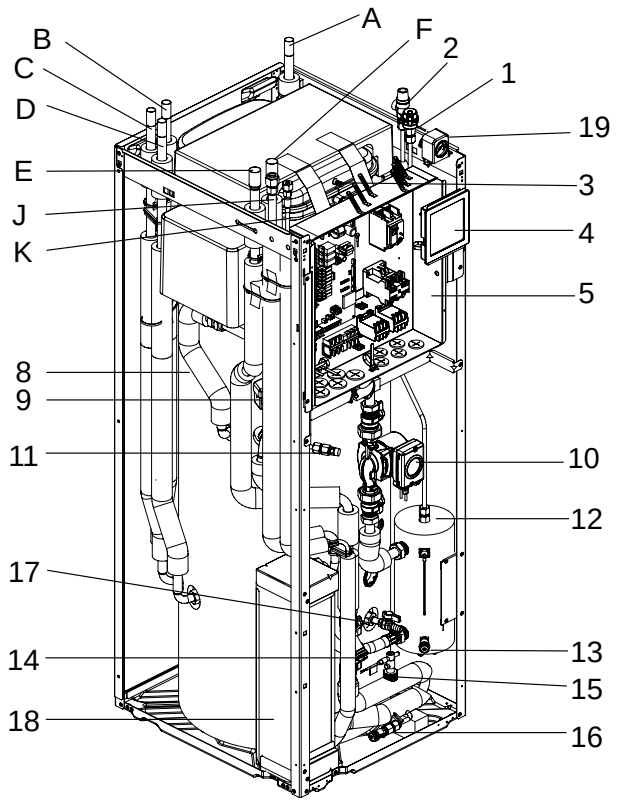



**Figure 4-3**

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

## <EHPT20X-VM2HB> (UK Packaged model system)

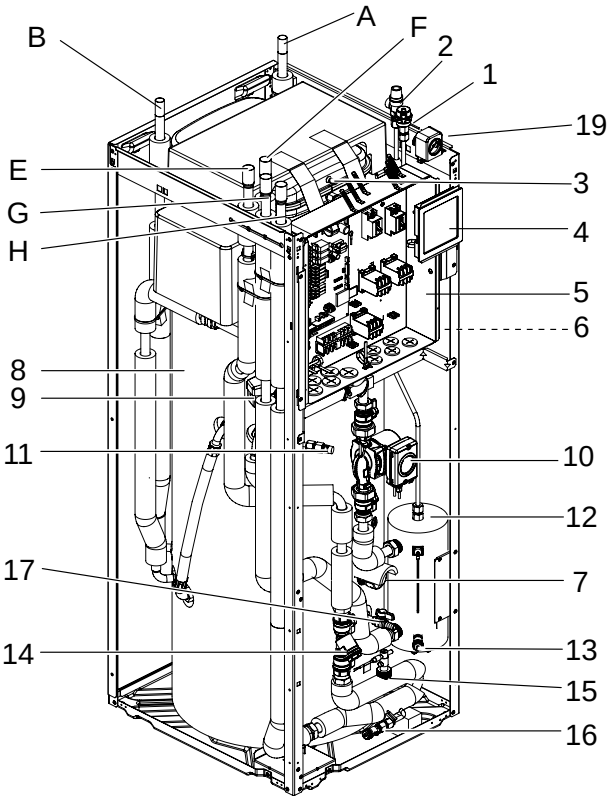



**Figure 4-4**

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

## <EHPT20X-*M*HB/*M*B (except EHPT20X-VM2HB)> (Packaged model system)

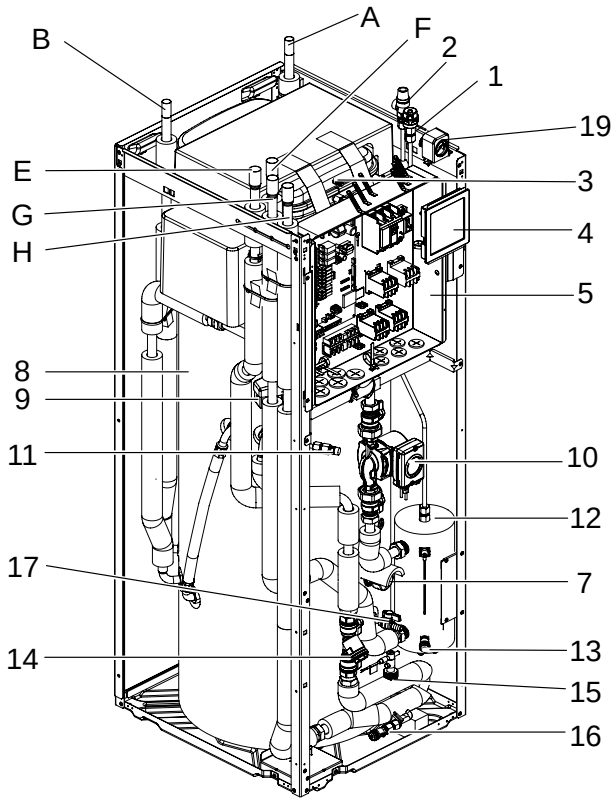


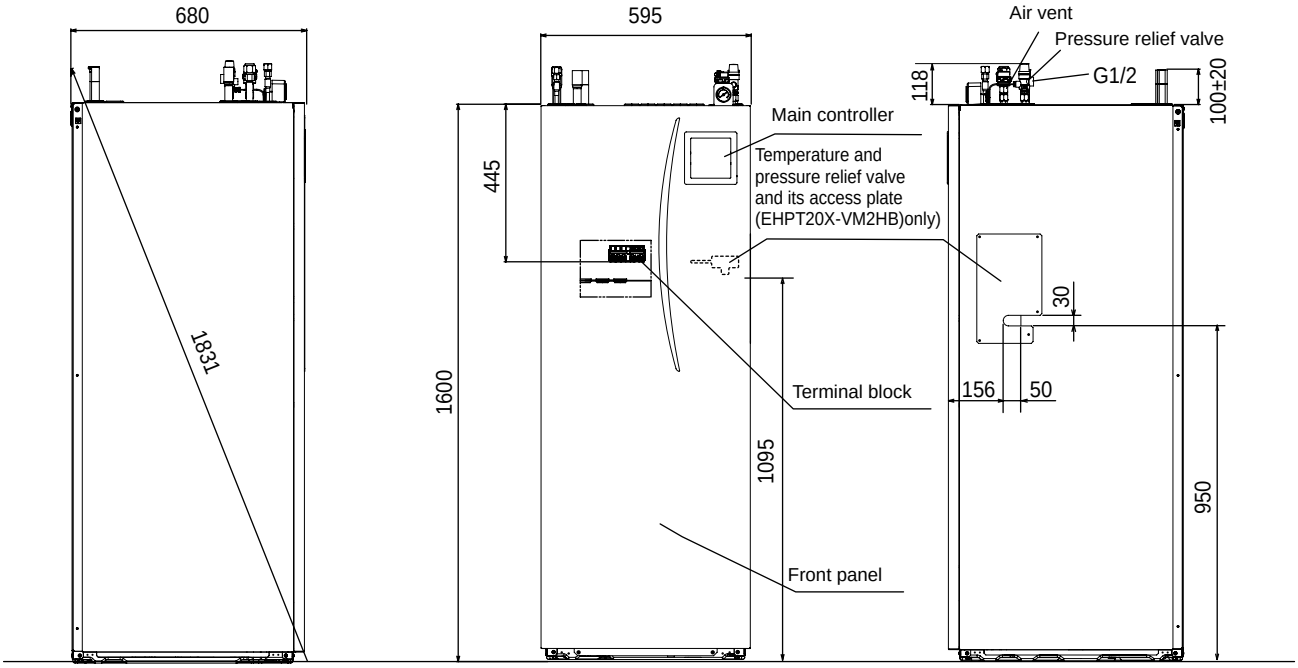

**Figure 4-5**

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

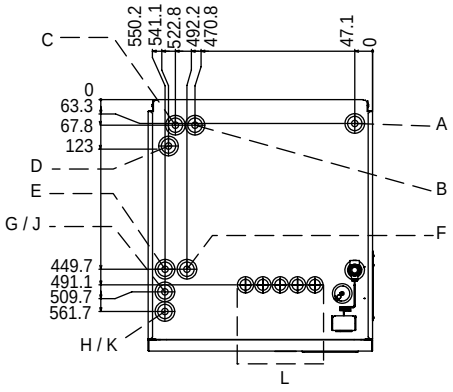
# 5 OUTLINES AND DIMENSIONS

## 5-1. Technical Drawings

<Unit: mm>




<Left side> <Front> <Right side>




<Top>

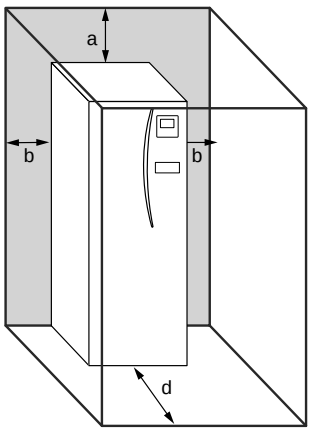
| Letter | Pipe description | Connection size/type |
|---|---|---|
| A | DHW outlet connection | 22 mm/Compression |
| B | Cold water inlet connection | 22 mm/Compression |
| C/D | Solar (ancillary heat source) connections | 22 mm/Compression |
| E | Space heating return connection | 28 mm/Compression |
| F | Space heating flow connection | 28 mm/Compression |
| G | Flow from heat pump connection (No plate heat exchanger) | 28 mm/Compression |
| H | Return to heat pump connection (No plate heat exchanger) | 28 mm/Compression |
| J | Refrigerant (GAS) (With plate heat exchanger) | 15.88 mm/Flare |
| K | Refrigerant (LIQUID) (With plate heat exchanger) | 9.52 mm/Flare |
| L | Electrical cable inlets ①②③④⑤ | —<br>For inlets ① and ②, run low-voltage wires including external input wires and thermistor wires. For inlets ③, ④, and ⑤, run high-voltage wires including power cable, indoor-outdoor cable, and external output wires.<br>*For a wireless receiver (option) cable, use inlet ①. |

## 5-2. Service access diagrams

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

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

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




Service access

# 6 WIRING DIAGRAM

## 6-1. EHST20C-VM6HB

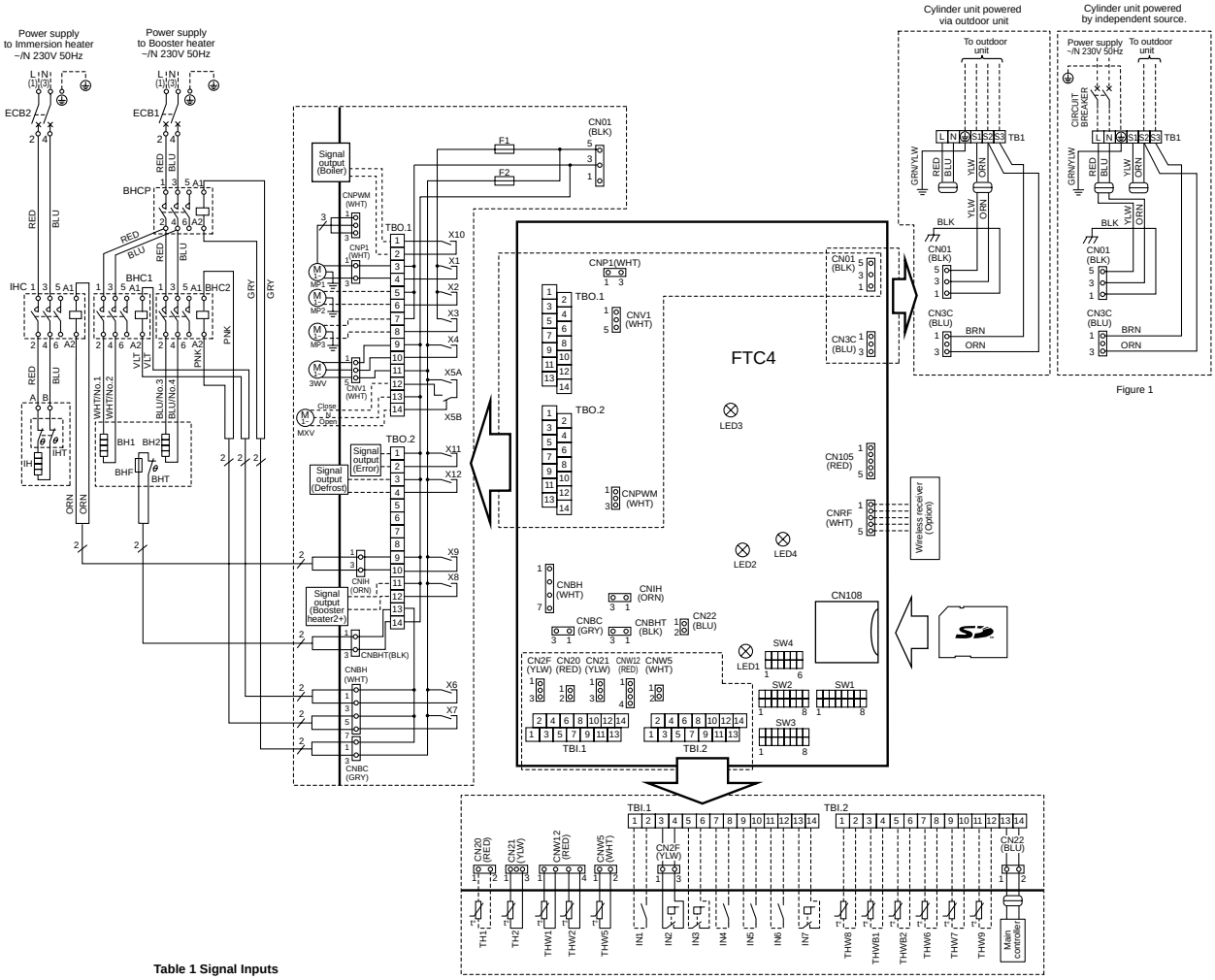



Figure 1

**Table 1 Signal Inputs**

| Name | Terminal block | Connector | Item | OFF (Open) | ON (Short) |
|---|---|---|---|---|---|
| IN1 | TBI.1 1-2 | — | Room thermostat 1 input | Refer to SW2-1 in <6-16 Dip switch setting> | |
| IN2 | TBI.1 3-4 | CN2F | Flow switch 1 input | Refer to SW2-2 in <6-16 Dip switch setting> | |
| IN3 | TBI.1 5-6 | — | Flow switch 2 input (Zone1) | Refer to SW3-2 in <6-16 Dip switch setting> | |
| IN4 | TBI.1 7-8 | — | Demand control input | Normal | Heat source OFF/Boiler operation *2 |
| IN5 | TBI.1 9-10 | — | Outdoor thermostat input *1 | Standard operation | Heater operation/Boiler operation *2 |
| IN6 | TBI.1 11-12 | — | Room thermostat 2 input | Refer to SW3-1 in <6-16 Dip switch setting> | |
| IN7 | TBI.1 13-14 | — | Flow switch 3 input (Zone2) | Refer to SW3-3 in <6-16 Dip switch setting> | |

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
*2. To turn on the boiler operation, use the main controller to select “Boiler” in “External/input setting“ screen in the service menu.

**Table 2 Outputs**

| Name | Terminal block | Connector | Item | OFF | ON |
|---|---|---|---|---|---|
| OUT1 | TBO.1 3-4 | CNP1 | Water circulation pump 1 output (Space heating & DHW) | OFF | ON |
| OUT2 | TBO.1 5-6 | — | Water circulation pump 2 output (Space heating for Zone1) | OFF | ON |
| OUT3 | TBO.1 7-8 | — | Water circulation pump 3 output (Space heating for Zone2) | OFF | ON |
| OUT4 | TBO.1 9-11 | CNV1 | 3-way valve output | Heating | DHW |
| OUT5 | TBO.1 12-13 | — | Mixing valve output | Stop | Close |
| | TBO.1 13-14 | | | Stop | Open |
| OUT6 | — | CNBH 1-3 | Booster heater 1 output | OFF | ON |
| OUT7 | — | CNBH 5-7 | Booster heater 2 output | OFF | ON |
| OUT8 | TBO.2 11-12 | — | Booster heater 2+ output | OFF | ON |
| OUT9 | TBO.2 9-10 | CNIH | Immersion heater output | OFF | ON |
| OUT10 | TBO.1 1-2 | — | Boiler output | OFF | ON |
| OUT11 | TBO.2 1-2 | — | Error output | Normal | Error |
| OUT12 | TBO.2 3-4 | — | Defrost output | Normal | Defrost |

| Symbol | Name |
|---|---|
| TB1 | Terminal block <Power supply, Outdoor unit> |
| ECB1 | Earth leakage circuit breaker for booster heater |
| ECB2 | Earth leakage circuit breaker for immersion heater |
| MP1 | Water circulation pump1(Space heating & DHW) |
| MP2 | Water circulation pump2 (Space heating for Zone1)(Field supply) |
| MP3 | Water circulation pump3 (Space heating for Zone2)(Field supply) |
| 3WV | 3-way valve |
| MXV | Mixing valve (Field supply) |
| BHT | Thermostat for booster heater |
| BHF | Thermal fuse for booster heater |
| BH1 | Booster heater 1 |
| BH2 | Booster heater 2 |
| BHC1 | Contactor for booster heater 1 |
| BHC2 | Contactor for booster heater 2 |
| BHCP | Contactor for booster heater protection |
| IHT | Thermostat (fixed temp.) for immersion heater |
| IH | Immersion heater |
| IHC | Contactor for immersion heater |

| Symbol | Name |
|---|---|
| TH1 | Thermistor (Room temp.)(Option) |
| TH2 | Thermistor (Ref. liquid temp.) |
| 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) |
| THWB1 | Thermistor (Boiler flow temp.)(Option) |
| THWB2 | Thermistor (Boiler return temp.)(Option) |
| IN1 | Room thermostat 1 (Field supply) |
| IN2 | Flow switch 1 |
| IN3 | Flow switch 2 (Field supply) |
| IN4 | Demand control (Field supply) |
| IN5 | Outdoor thermostat (Field supply) |
| IN6 | Room thermostat 2 (Field supply) |
| IN7 | Flow switch 3 (Field supply) |

| FLOW TEMP. CONTROLLER (FTC4) | |
|---|---|
| TBO.1~2 | Terminal block <Outputs> |
| TBI.1~2 | Terminal block <Signal Inputs, Thermistor> |
| F1~F2 | Fuse (T6.3AL250V) |
| SW1~4 | Dip switch *See <6-16 Dip switch setting>. |
| X1~X12 | Relay |
| LED1 | Power supply (FTC4) |
| LED2 | Power supply (Main controller) |
| LED3 | Communication (FTC4-Outdoor unit) |
| LED4 | Reading or writing data to SD card |
| CNPWM | Pump speed control signal for MP1 |
| CN108 | SD card connector |

1. Symbols used in wiring diagram are,
   : connector, : terminal block.
2. Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings,
3. Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
4. This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

## 6-2. EHST20C-YM9HB

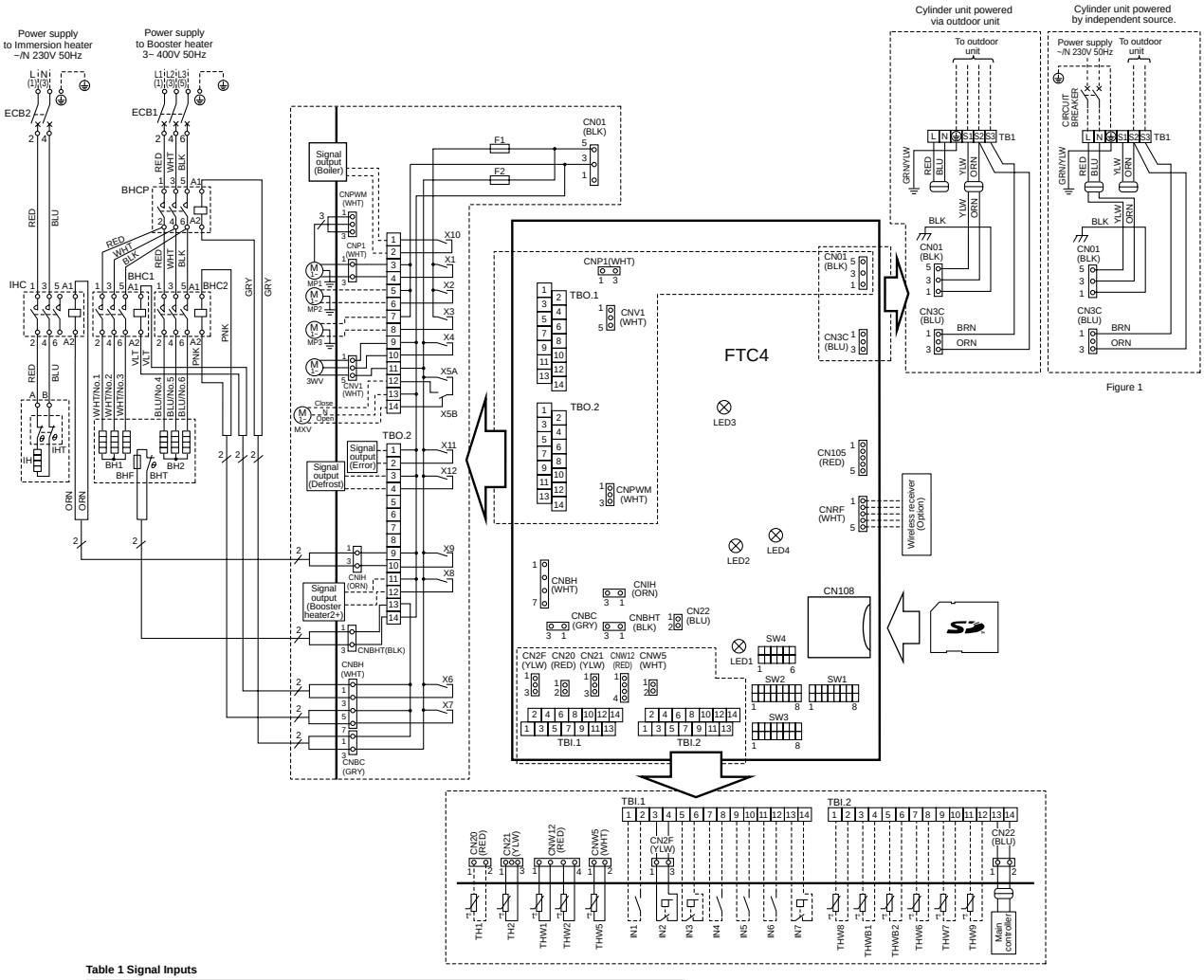



Figure 1

**Table 1 Signal Inputs**

| Name | Terminal block | Connector | Item | OFF (Open) | ON (Short) |
|---|---|---|---|---|---|
| IN1 | TBI.1 1-2 | — | Room thermostat 1 input | Refer to SW2-1 in <6-16 Dip switch setting> | |
| IN2 | TBI.1 3-4 | CN2F | Flow switch 1 input | Refer to SW2-2 in <6-16 Dip switch setting> | |
| IN3 | TBI.1 5-6 | — | Flow switch 2 input (Zone1) | Refer to SW3-2 in <6-16 Dip switch setting> | |
| IN4 | TBI.1 7-8 | — | Demand control input | Normal | Heat source OFF/Boiler operation *2 |
| IN5 | TBI.1 9-10 | — | Outdoor thermostat input *1 | Standard operation | Heater operation/Boiler operation *2 |
| IN6 | TBI.1 11-12 | — | Room thermostat 2 input | Refer to SW3-1 in <6-16 Dip switch setting> | |
| IN7 | TBI.1 13-14 | — | Flow switch 3 input (Zone2) | Refer to SW3-3 in <6-16 Dip switch setting> | |

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
*2. To turn on the boiler operation, use the main controller to select “Boiler” in “External/input setting“ screen in the service menu.

**Table 2 Outputs**

| Name | Terminal block | Connector | Item | OFF | ON |
|---|---|---|---|---|---|
| OUT1 | TBO.1 3-4 | CNP1 | Water circulation pump 1 output (Space heating & DHW) | OFF | ON |
| OUT2 | TBO.1 5-6 | — | Water circulation pump 2 output (Space heating for Zone1) | OFF | ON |
| OUT3 | TBO.1 7-8 | — | Water circulation pump 3 output (Space heating for Zone2) | OFF | ON |
| OUT4 | TBO.1 9-11 | CNV1 | 3-way valve output | Heating | DHW |
| OUT5 | TBO.1 12-13 | — | Mixing valve output | Stop | Close |
| | TBO.1 13-14 | | | Stop | Open |
| OUT6 | — | CNBH 1-3 | Booster heater 1 output | OFF | ON |
| OUT7 | — | CNBH 5-7 | Booster heater 2 output | OFF | ON |
| OUT8 | TBO.2 11-12 | — | Booster heater 2+ output | OFF | ON |
| OUT9 | TBO.2 9-10 | CNIH | Immersion heater output | OFF | ON |
| OUT10 | TBO.1 1-2 | — | Boiler output | OFF | ON |
| OUT11 | TBO.2 1-2 | — | Error output | Normal | Error |
| OUT12 | TBO.2 3-4 | — | Defrost output | Normal | Defrost |

| Symbol | Name |
|---|---|
| TB1 | Terminal block <Power supply, Outdoor unit> |
| ECB1 | Earth leakage circuit breaker for booster heater |
| ECB2 | Earth leakage circuit breaker for immersion heater |
| MP1 | Water circulation pump1(Space heating & DHW) |
| MP2 | Water circulation pump2 (Space heating for Zone1)(Field supply) |
| MP3 | Water circulation pump3 (Space heating for Zone2)(Field supply) |
| 3WV | 3-way valve |
| MXV | Mixing valve (Field supply) |
| BHT | Thermostat for booster heater |
| BHF | Thermal fuse for booster heater |
| BH1 | Booster heater 1 |
| BH2 | Booster heater 2 |
| BHC1 | Contactor for booster heater 1 |
| BHC2 | Contactor for booster heater 2 |
| BHCP | Contactor for booster heater protection |
| IHT | Thermostat (fixed temp.) for immersion heater |
| IH | Immersion heater |
| IHC | Contactor for immersion heater |

| Symbol | Name |
|---|---|
| TH1 | Thermistor (Room temp.)(Option) |
| TH2 | Thermistor (Ref. liquid temp.) |
| 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) |
| THWB1 | Thermistor (Boiler flow temp.)(Option) |
| THWB2 | Thermistor (Boiler return temp.)(Option) |
| IN1 | Room thermostat 1 (Field supply) |
| IN2 | Flow switch 1 |
| IN3 | Flow switch 2 (Field supply) |
| IN4 | Demand control (Field supply) |
| IN5 | Outdoor thermostat (Field supply) |
| IN6 | Room thermostat 2 (Field supply) |
| IN7 | Flow switch 3 (Field supply) |

| FLOW TEMP. CONTROLLER (FTC4) | |
|---|---|
| TBO.1~2 | Terminal block <Outputs> |
| TBI.1~2 | Terminal block <Signal Inputs, Thermistor> |
| F1~F2 | Fuse (T6.3AL250V) |
| SW1~4 | Dip switch *See <6-16 Dip switch setting> |
| X1~X12 | Relay |
| LED1 | Power supply (FTC4) |
| LED2 | Power supply (Main controller) |
| LED3 | Communication (FTC4-Outdoor unit) |
| LED4 | Reading or writing data to SD card |
| CNPWM | Pump speed control signal for MP1 |
| CN108 | SD card connector |

1. Symbols used in wiring diagram are,
   ⊡⊡ : connector, □□□ : terminal block.
2. Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings,
3. Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
4. This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

## 6-3. EHST20C-TM9HB

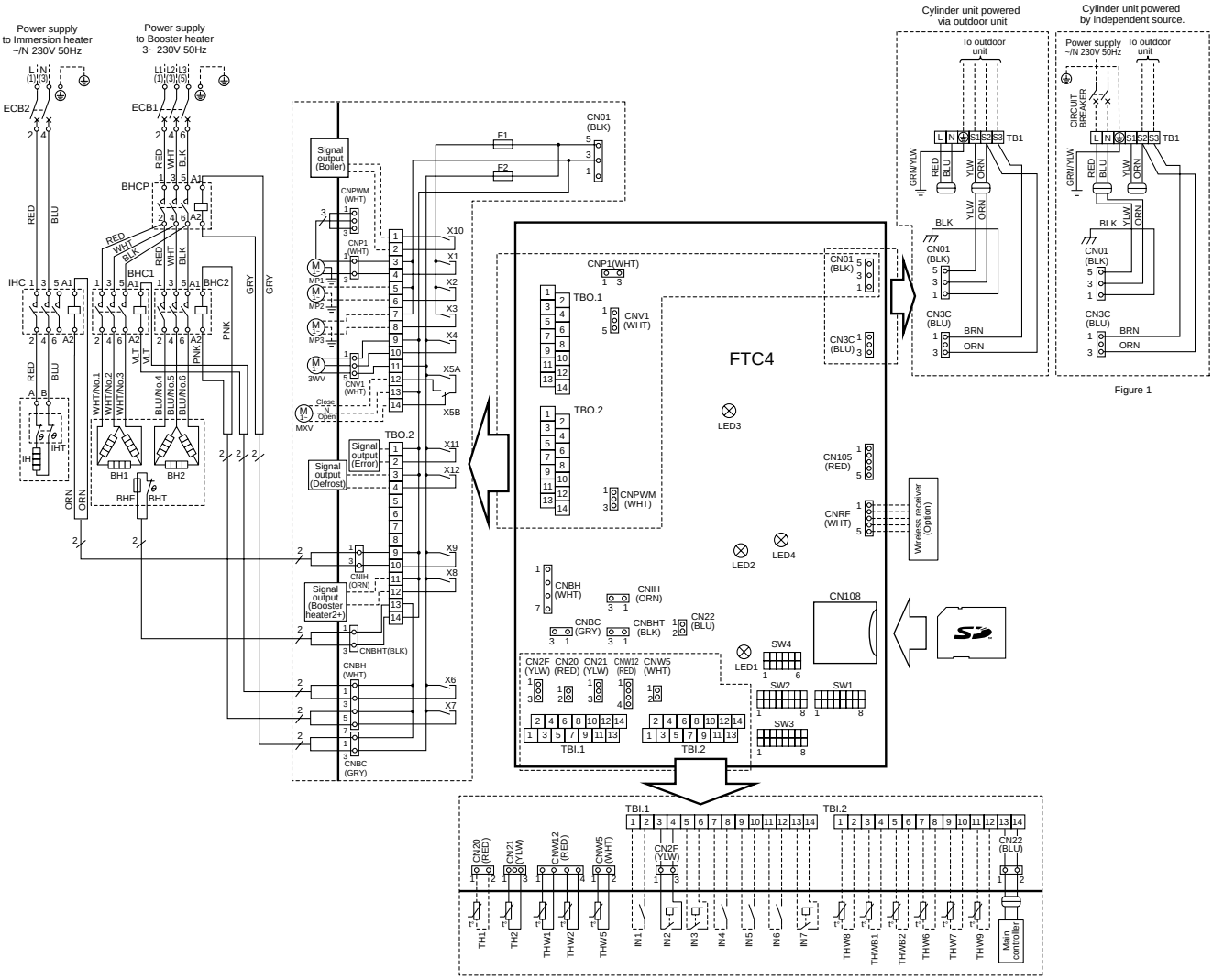



Figure 1

**Table 1 Signal Inputs**

| Name | Terminal block | Connector | Item | OFF (Open) | ON (Short) |
|---|---|---|---|---|---|
| IN1 | TBI.1 1-2 | — | Room thermostat 1 input | Refer to SW2-1 in <6-16 Dip switch setting> | |
| IN2 | TBI.1 3-4 | CN2F | Flow switch 1 input | Refer to SW2-2 in <6-16 Dip switch setting> | |
| IN3 | TBI.1 5-6 | — | Flow switch 2 input (Zone1) | Refer to SW3-2 in <6-16 Dip switch setting> | |
| IN4 | TBI.1 7-8 | — | Demand control input | Normal | Heat source OFF/Boiler operation *2 |
| IN5 | TBI.1 9-10 | — | Outdoor thermostat input *1 | Standard operation | Heater operation/Boiler operation *2 |
| IN6 | TBI.1 11-12 | — | Room thermostat 2 input | Refer to SW3-1 in <6-16 Dip switch setting> | |
| IN7 | TBI.1 13-14 | — | Flow switch 3 input (Zone2) | Refer to SW3-3 in <6-16 Dip switch setting> | |

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
*2. To turn on the boiler operation, use the main controller to select “Boiler” in “External/input setting“ screen in the service menu.

**Table 2 Outputs**

| Name | Terminal block | Connector | Item | OFF | ON |
|---|---|---|---|---|---|
| OUT1 | TBO.1 3-4 | CNP1 | Water circulation pump 1 output (Space heating & DHW) | OFF | ON |
| OUT2 | TBO.1 5-6 | — | Water circulation pump 2 output (Space heating for Zone1) | OFF | ON |
| OUT3 | TBO.1 7-8 | — | Water circulation pump 3 output (Space heating for Zone2) | OFF | ON |
| OUT4 | TBO.1 9-11 | CNV1 | 3-way valve output | Heating | DHW |
| OUT5 | TBO.1 12-13 | — | Mixing valve output | Stop | Close |
| | TBO.1 13-14 | | | Stop | Open |
| OUT6 | — | CNBH 1-3 | Booster heater 1 output | OFF | ON |
| OUT7 | — | CNBH 5-7 | Booster heater 2 output | OFF | ON |
| OUT8 | TBO.2 11-12 | — | Booster heater 2+ output | OFF | ON |
| OUT9 | TBO.2 9-10 | CNIH | Immersion heater output | OFF | ON |
| OUT10 | TBO.1 1-2 | — | Boiler output | OFF | ON |
| OUT11 | TBO.2 1-2 | — | Error output | Normal | Error |
| OUT12 | TBO.2 3-4 | — | Defrost output | Normal | Defrost |

| Symbol | Name |
|---|---|
| TB1 | Terminal block <Power supply, Outdoor unit> |
| ECB1 | Earth leakage circuit breaker for booster heater |
| ECB2 | Earth leakage circuit breaker for immersion heater |
| MP1 | Water circulation pump1(Space heating & DHW) |
| MP2 | Water circulation pump2 (Space heating for Zone1)(Field supply) |
| MP3 | Water circulation pump3 (Space heating for Zone2)(Field supply) |
| 3WV | 3-way valve |
| MXV | Mixing valve (Field supply) |
| BHT | Thermostat for booster heater |
| BHF | Thermal fuse for booster heater |
| BH1 | Booster heater 1 |
| BH2 | Booster heater 2 |
| BHC1 | Contactor for booster heater 1 |
| BHC2 | Contactor for booster heater 2 |
| BHCP | Contactor for booster heater protection |
| IHT | Thermostat (fixed temp.) for immersion heater |
| IH | Immersion heater |
| IHC | Contactor for immersion heater |

| Symbol | Name |
|---|---|
| TH1 | Thermistor (Room temp.)(Option) |
| TH2 | Thermistor (Ref. liquid temp.) |
| 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) |
| THWB1 | Thermistor (Boiler flow temp.)(Option) |
| THWB2 | Thermistor (Boiler return temp.)(Option) |
| IN1 | Room thermostat 1 (Field supply) |
| IN2 | Flow switch 1 |
| IN3 | Flow switch 2 (Field supply) |
| IN4 | Demand control (Field supply) |
| IN5 | Outdoor thermostat (Field supply) |
| IN6 | Room thermostat 2 (Field supply) |
| IN7 | Flow switch 3 (Field supply) |

| FLOW TEMP. CONTROLLER (FTC4) | |
|---|---|
| TBO.1~2 | Terminal block <Outputs> |
| TBI.1~2 | Terminal block <Signal Inputs, Thermistor> |
| F1~F2 | Fuse (T6.3AL250V) |
| SW1~4 | Dip switch *See <6-16 Dip switch setting> |
| X1~X12 | Relay |
| LED1 | Power supply (FTC4) |
| LED2 | Power supply (Main controller) |
| LED3 | Communication (FTC4-Outdoor unit) |
| LED4 | Reading or writing data to SD card |
| CNPWM | Pump speed control signal for MP1 |
| CN108 | SD card connector |

1. Symbols used in wiring diagram are,
   ⊙⊙ : connector, □□□ : terminal block.
2. Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings,
3. Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
4. This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

## 6-4. EHST20C-VM2B

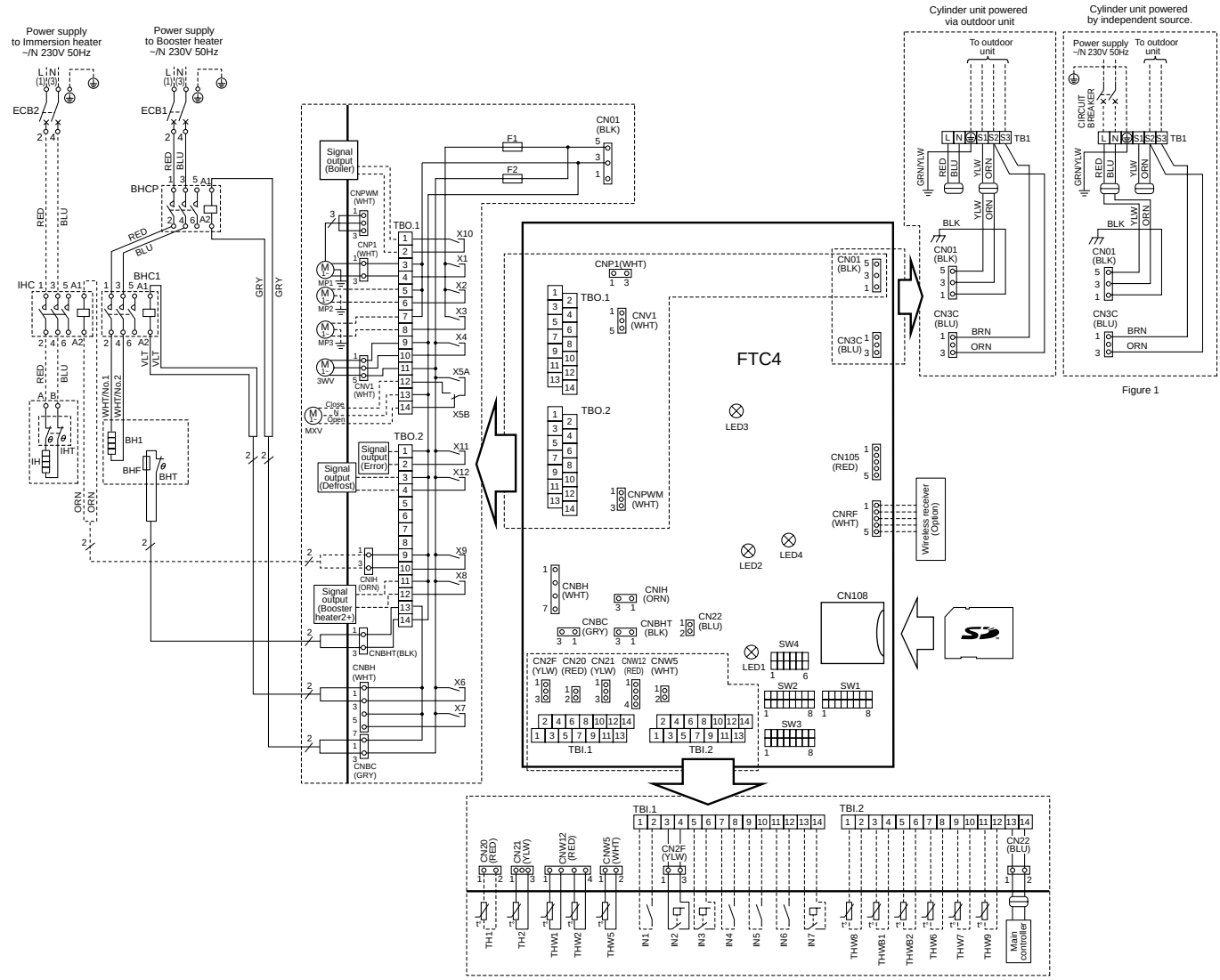



Figure 1

**Table 1 Signal Inputs**

| Name | Terminal block | Connector | Item | OFF (Open) | ON (Short) |
|---|---|---|---|---|---|
| IN1 | TBI.1 1-2 | — | Room thermostat 1 input | Refer to SW2-1 in <6-16 Dip switch setting> | |
| IN2 | TBI.1 3-4 | CN2F | Flow switch 1 input | Refer to SW2-2 in <6-16 Dip switch setting> | |
| IN3 | TBI.1 5-6 | — | Flow switch 2 input (Zone1) | Refer to SW3-2 in <6-16 Dip switch setting> | |
| IN4 | TBI.1 7-8 | — | Demand control input | Normal | Heat source OFF/Boiler operation *2 |
| IN5 | TBI.1 9-10 | — | Outdoor thermostat input *1 | Standard operation | Heater operation/Boiler operation *2 |
| IN6 | TBI.1 11-12 | — | Room thermostat 2 input | Refer to SW3-1 in <6-16 Dip switch setting> | |
| IN7 | TBI.1 13-14 | — | Flow switch 3 input (Zone2) | Refer to SW3-3 in <6-16 Dip switch setting> | |

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
*2. To turn on the boiler operation, use the main controller to select “Boiler” in “External/input setting“ screen in the service menu.

**Table 2 Outputs**

| Name | Terminal block | Connector | Item | OFF | ON |
|---|---|---|---|---|---|
| OUT1 | TBO.1 3-4 | CNP1 | Water circulation pump 1 output (Space heating & DHW) | OFF | ON |
| OUT2 | TBO.1 5-6 | — | Water circulation pump 2 output (Space heating for Zone1) | OFF | ON |
| OUT3 | TBO.1 7-8 | — | Water circulation pump 3 output (Space heating for Zone2) | OFF | ON |
| OUT4 | TBO.1 9-11 | CNV1 | 3-way valve output | Heating | DHW |
| OUT5 | TBO.1 12-13 | — | Mixing valve output | Stop | Close |
| | TBO.1 13-14 | | | Stop | Open |
| OUT6 | — | CNBH 1-3 | Booster heater 1 output | OFF | ON |
| OUT7 | — | CNBH 5-7 | Booster heater 2 output | OFF | ON |
| OUT8 | TBO.2 11-12 | — | Booster heater 2+ output | OFF | ON |
| OUT9 | TBO.2 9-10 | CNIH | Immersion heater output | OFF | ON |
| OUT10 | TBO.1 1-2 | — | Boiler output | OFF | ON |
| OUT11 | TBO.2 1-2 | — | Error output | Normal | Error |
| OUT12 | TBO.2 3-4 | — | Defrost output | Normal | Defrost |

| Symbol | Name |
|---|---|
| TB1 | Terminal block <Power supply, Outdoor unit> |
| ECB1 | Earth leakage circuit breaker for booster heater |
| ECB2 | Earth leakage circuit breaker for immersion heater (Option) |
| MP1 | Water circulation pump1(Space heating & DHW) |
| MP2 | Water circulation pump2 (Space heating for Zone1)(Field supply) |
| MP3 | Water circulation pump3 (Space heating for Zone2)(Field supply) |
| 3WV | 3-way valve |
| MXV | Mixing valve (Field supply) |
| BHT | Thermostat for booster heater |
| BHF | Thermal fuse for booster heater |
| BH1 | Booster heater 1 |
| BHC1 | Contactor for booster heater 1 |
| BHCP | Contactor for booster heater protection |
| IHT | Thermostat (fixed temp.) for immersion heater (Option) |
| IH | Immersion heater (Option) |
| IHC | Contactor for immersion heater (Option) |

| Symbol | Name |
|---|---|
| TH1 | Thermistor (Room temp.)(Option) |
| TH2 | Thermistor (Ref. liquid temp.) |
| 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) |
| THWB1 | Thermistor (Boiler flow temp.)(Option) |
| THWB2 | Thermistor (Boiler return temp.)(Option) |
| IN1 | Room thermostat 1 (Field supply) |
| IN2 | Flow switch 1 |
| IN3 | Flow switch 2 (Field supply) |
| IN4 | Demand control (Field supply) |
| IN5 | Outdoor thermostat (Field supply) |
| IN6 | Room thermostat 2 (Field supply) |
| IN7 | Flow switch 3 (Field supply) |

| FLOW TEMP. CONTROLLER (FTC4) | |
|---|---|
| TBO.1~2 | Terminal block <Outputs> |
| TBI.1~2 | Terminal block <Signal Inputs, Thermistor> |
| F1~F2 | Fuse (T6.3AL250V) |
| SW1~4 | Dip switch *See <6-16 Dip switch setting> |
| X1~X12 | Relay |
| LED1 | Power supply (FTC4) |
| LED2 | Power supply (Main controller) |
| LED3 | Communication (FTC4-Outdoor unit) |
| LED4 | Reading or writing data to SD card |
| CNPWM | Pump speed control signal for MP1 |
| CN108 | SD card connector |

1. Symbols used in wiring diagram are,
   ○○ : connector, □□□ : terminal block.
2. Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings,
3. Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
4. This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal.
   When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

## 6-5. EHST20C-VM6B

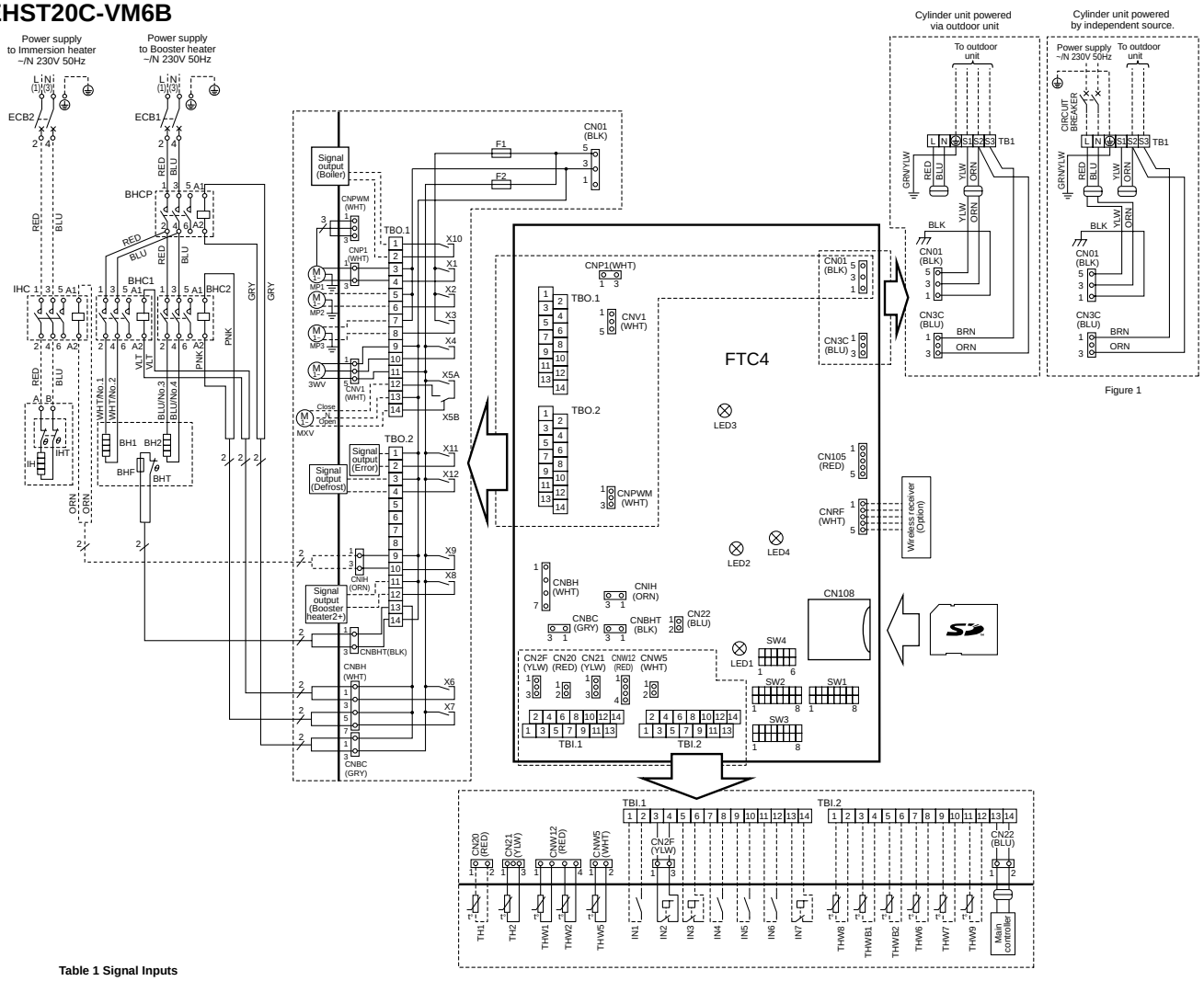



Figure 1

**Table 1 Signal Inputs**

| Name | Terminal block | Connector | Item | OFF (Open) | ON (Short) |
|---|---|---|---|---|---|
| IN1 | TBI.1 1-2 | — | Room thermostat 1 input | Refer to SW2-1 in <6-16 Dip switch setting> | |
| IN2 | TBI.1 3-4 | CN2F | Flow switch 1 input | Refer to SW2-2 in <6-16 Dip switch setting> | |
| IN3 | TBI.1 5-6 | — | Flow switch 2 input (Zone1) | Refer to SW3-2 in <6-16 Dip switch setting> | |
| IN4 | TBI.1 7-8 | — | Demand control input | Normal | Heat source OFF/Boiler operation *2 |
| IN5 | TBI.1 9-10 | — | Outdoor thermostat input *1 | Standard operation | Heater operation/Boiler operation *2 |
| IN6 | TBI.1 11-12 | — | Room thermostat 2 input | Refer to SW3-1 in <6-16 Dip switch setting> | |
| IN7 | TBI.1 13-14 | — | Flow switch 3 input (Zone2) | Refer to SW3-3 in <6-16 Dip switch setting> | |

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
*2. To turn on the boiler operation, use the main controller to select “Boiler” in “External/input setting“ screen in the service menu.

**Table 2 Outputs**

| Name | Terminal block | Connector | Item | OFF | ON |
|---|---|---|---|---|---|
| OUT1 | TBO.1 3-4 | CNP1 | Water circulation pump 1 output (Space heating & DHW) | OFF | ON |
| OUT2 | TBO.1 5-6 | — | Water circulation pump 2 output (Space heating for Zone1) | OFF | ON |
| OUT3 | TBO.1 7-8 | — | Water circulation pump 3 output (Space heating for Zone2) | OFF | ON |
| OUT4 | TBO.1 9-11 | CNV1 | 3-way valve output | Heating | DHW |
| OUT5 | TBO.1 12-13 | — | Mixing valve output | Stop | Close |
| | TBO.1 13-14 | | | Stop | Open |
| OUT6 | — | CNBH 1-3 | Booster heater 1 output | OFF | ON |
| OUT7 | — | CNBH 5-7 | Booster heater 2 output | OFF | ON |
| OUT8 | TBO.2 11-12 | — | Booster heater 2+ output | OFF | ON |
| OUT9 | TBO.2 9-10 | CNIH | Immersion heater output | OFF | ON |
| OUT10 | TBO.1 1-2 | — | Boiler output | OFF | ON |
| OUT11 | TBO.2 1-2 | — | Error output | Normal | Error |
| OUT12 | TBO.2 3-4 | — | Defrost output | Normal | Defrost |

| Symbol | Name |
|---|---|
| TB1 | Terminal block <Power supply, Outdoor unit> |
| ECB1 | Earth leakage circuit breaker for booster heater |
| ECB2 | Earth leakage circuit breaker for immersion heater (Option) |
| MP1 | Water circulation pump1(Space heating & DHW) |
| MP2 | Water circulation pump2 (Space heating for Zone1)(Field supply) |
| MP3 | Water circulation pump3 (Space heating for Zone2)(Field supply) |
| 3WV | 3-way valve |
| MXV | Mixing valve (Field supply) |
| BHT | Thermostat for booster heater |
| BHF | Thermal fuse for booster heater |
| BH1 | Booster heater 1 |
| BH2 | Booster heater 2 |
| BHC1 | Contactor for booster heater 1 |
| BHC2 | Contactor for booster heater 2 |
| BHCP | Contactor for booster heater protection |
| IHT | Thermostat (fixed temp.) for immersion heater (Option) |
| IH | Immersion heater (Option) |
| IHC | Contactor for immersion heater (Option) |

| Symbol | Name |
|---|---|
| TH1 | Thermistor (Room temp.)(Option) |
| TH2 | Thermistor (Ref. liquid temp.) |
| 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) |
| THWB1 | Thermistor (Boiler flow temp.)(Option) |
| THWB2 | Thermistor (Boiler return temp.)(Option) |
| IN1 | Room thermostat 1 (Field supply) |
| IN2 | Flow switch 1 |
| IN3 | Flow switch 2 (Field supply) |
| IN4 | Demand control (Field supply) |
| IN5 | Outdoor thermostat (Field supply) |
| IN6 | Room thermostat 2 (Field supply) |
| IN7 | Flow switch 3 (Field supply) |

| FLOW TEMP. CONTROLLER (FTC4) | |
|---|---|
| TBO.1~2 | Terminal block <Outputs> |
| TBI.1~2 | Terminal block <Signal Inputs, Thermistor> |
| F1~F2 | Fuse (T6.3AL250V) |
| SW1~4 | Dip switch *See <6-16 Dip switch setting> |
| X1~X12 | Relay |
| LED1 | Power supply (FTC4) |
| LED2 | Power supply (Main controller) |
| LED3 | Communication (FTC4-Outdoor unit) |
| LED4 | Reading or writing data to SD card |
| CNPWM | Pump speed control signal for MP1 |
| CN108 | SD card connector |

1. Symbols used in wiring diagram are,
   ⊙⊙ : connector, ⊡⊡⊡ : terminal block.
2. Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings,
3. Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
4. This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

## 6-6. EHST20C-YM9B

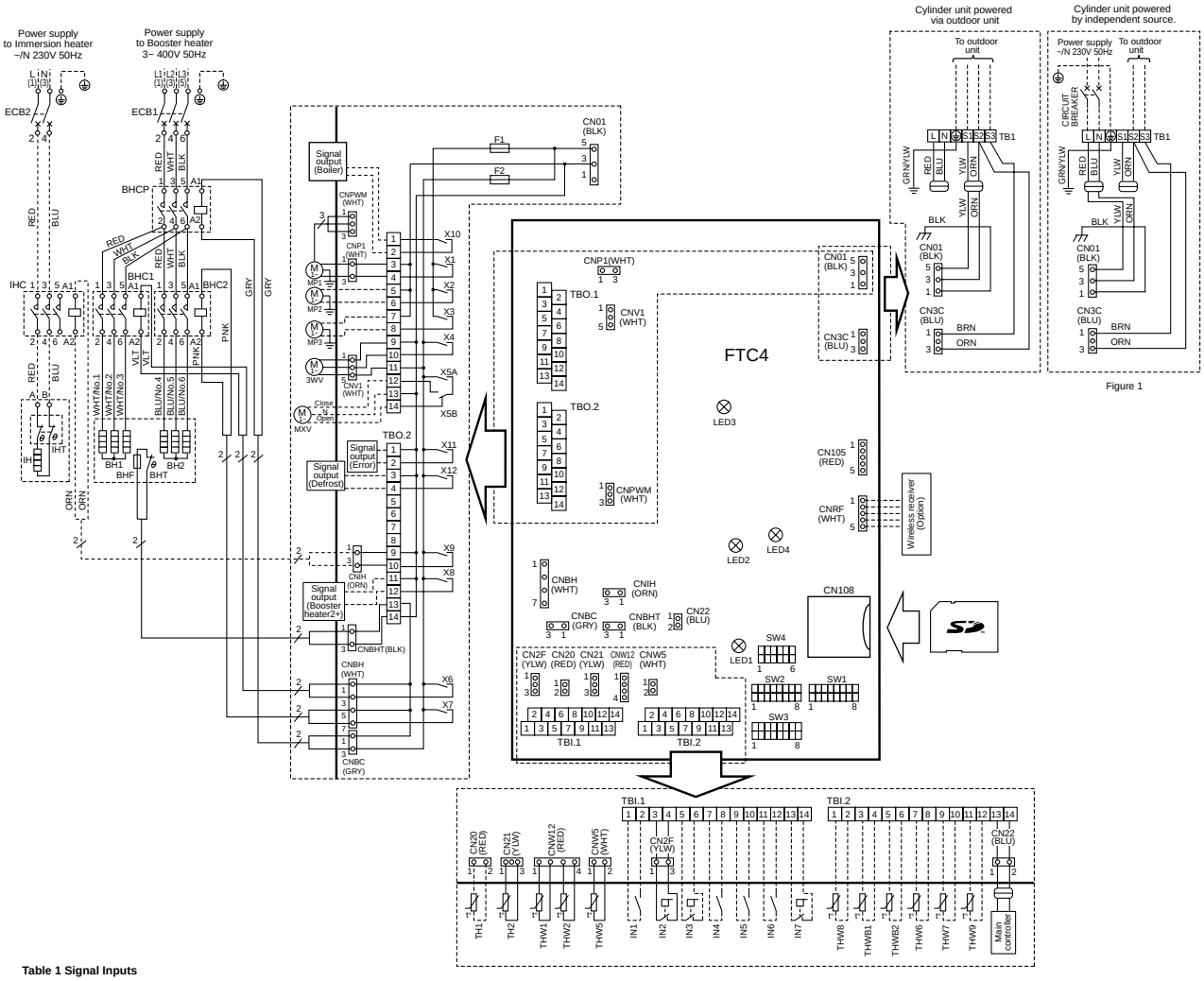



Figure 1

**Table 1 Signal Inputs**

| Name | Terminal block | Connector | Item | OFF (Open) | ON (Short) |
|---|---|---|---|---|---|
| IN1 | TBI.1 1-2 | — | Room thermostat 1 input | Refer to SW2-1 in <6-16 Dip switch setting> | |
| IN2 | TBI.1 3-4 | CN2F | Flow switch 1 input | Refer to SW2-2 in <6-16 Dip switch setting> | |
| IN3 | TBI.1 5-6 | — | Flow switch 2 input (Zone1) | Refer to SW3-2 in <6-16 Dip switch setting> | |
| IN4 | TBI.1 7-8 | — | Demand control input | Normal | Heat source OFF/Boiler operation *2 |
| IN5 | TBI.1 9-10 | — | Outdoor thermostat input *1 | Standard operation | Heater operation/Boiler operation *2 |
| IN6 | TBI.1 11-12 | — | Room thermostat 2 input | Refer to SW3-1 in <6-16 Dip switch setting> | |
| IN7 | TBI.1 13-14 | — | Flow switch 3 input (Zone2) | Refer to SW3-3 in <6-16 Dip switch setting> | |

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
*2. To turn on the boiler operation, use the main controller to select “Boiler” in “External/input setting“ screen in the service menu.

**Table 2 Outputs**

| Name | Terminal block | Connector | Item | OFF | ON |
|---|---|---|---|---|---|
| OUT1 | TBO.1 3-4 | CNP1 | Water circulation pump 1 output (Space heating & DHW) | OFF | ON |
| OUT2 | TBO.1 5-6 | — | Water circulation pump 2 output (Space heating for Zone1) | OFF | ON |
| OUT3 | TBO.1 7-8 | — | Water circulation pump 3 output (Space heating for Zone2) | OFF | ON |
| OUT4 | TBO.1 9-11 | CNV1 | 3-way valve output | Heating | DHW |
| OUT5 | TBO.1 12-13 | — | Mixing valve output | Stop | Close |
| | TBO.1 13-14 | | | Stop | Open |
| OUT6 | — | CNBH 1-3 | Booster heater 1 output | OFF | ON |
| OUT7 | — | CNBH 5-7 | Booster heater 2 output | OFF | ON |
| OUT8 | TBO.2 11-12 | — | Booster heater 2+ output | OFF | ON |
| OUT9 | TBO.2 9-10 | CNIH | Immersion heater output | OFF | ON |
| OUT10 | TBO.1 1-2 | — | Boiler output | OFF | ON |
| OUT11 | TBO.2 1-2 | — | Error output | Normal | Error |
| OUT12 | TBO.2 3-4 | — | Defrost output | Normal | Defrost |

| Symbol | Name |
|---|---|
| TB1 | Terminal block <Power supply, Outdoor unit> |
| ECB1 | Earth leakage circuit breaker for booster heater |
| ECB2 | Earth leakage circuit breaker for immersion heater (Option) |
| MP1 | Water circulation pump1(Space heating & DHW) |
| MP2 | Water circulation pump2 (Space heating for Zone1)(Field supply) |
| MP3 | Water circulation pump3 (Space heating for Zone2)(Field supply) |
| 3WV | 3-way valve |
| MXV | Mixing valve (Field supply) |
| BHT | Thermostat for booster heater |
| BHF | Thermal fuse for booster heater |
| BH1 | Booster heater 1 |
| BH2 | Booster heater 2 |
| BHC1 | Contactor for booster heater 1 |
| BHC2 | Contactor for booster heater 2 |
| BHCP | Contactor for booster heater protection |
| IHT | Thermostat (fixed temp.) for immersion heater (Option) |
| IH | Immersion heater (Option) |
| IHC | Contactor for immersion heater (Option) |

| Symbol | Name |
|---|---|
| TH1 | Thermistor (Room temp.)(Option) |
| TH2 | Thermistor (Ref. liquid temp.) |
| 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) |
| THWB1 | Thermistor (Boiler flow temp.)(Option) |
| THWB2 | Thermistor (Boiler return temp.)(Option) |
| IN1 | Room thermostat 1 (Field supply) |
| IN2 | Flow switch 1 |
| IN3 | Flow switch 2 (Field supply) |
| IN4 | Demand control (Field supply) |
| IN5 | Outdoor thermostat (Field supply) |
| IN6 | Room thermostat 2 (Field supply) |
| IN7 | Flow switch 3 (Field supply) |

| FLOW TEMP. CONTROLLER (FTC4) | |
|---|---|
| TBO.1~2 | Terminal block <Outputs> |
| TBI.1~2 | Terminal block <Signal Inputs, Thermistor> |
| F1~F2 | Fuse (T6.3AL250V) |
| SW1~4 | Dip switch *See <6-16 Dip switch setting> |
| X1~X12 | Relay |
| LED1 | Power supply (FTC4) |
| LED2 | Power supply (Main controller) |
| LED3 | Communication (FTC4-Outdoor unit) |
| LED4 | Reading or writing data to SD card |
| CNPWM | Pump speed control signal for MP1 |
| CN108 | SD card connector |

1. Symbols used in wiring diagram are,
   ⊡⊡ : connector, ⊡⊡⊡ : terminal block.
2. Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
3. Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
4. This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

## 6-7. EHST20C-VM6EB

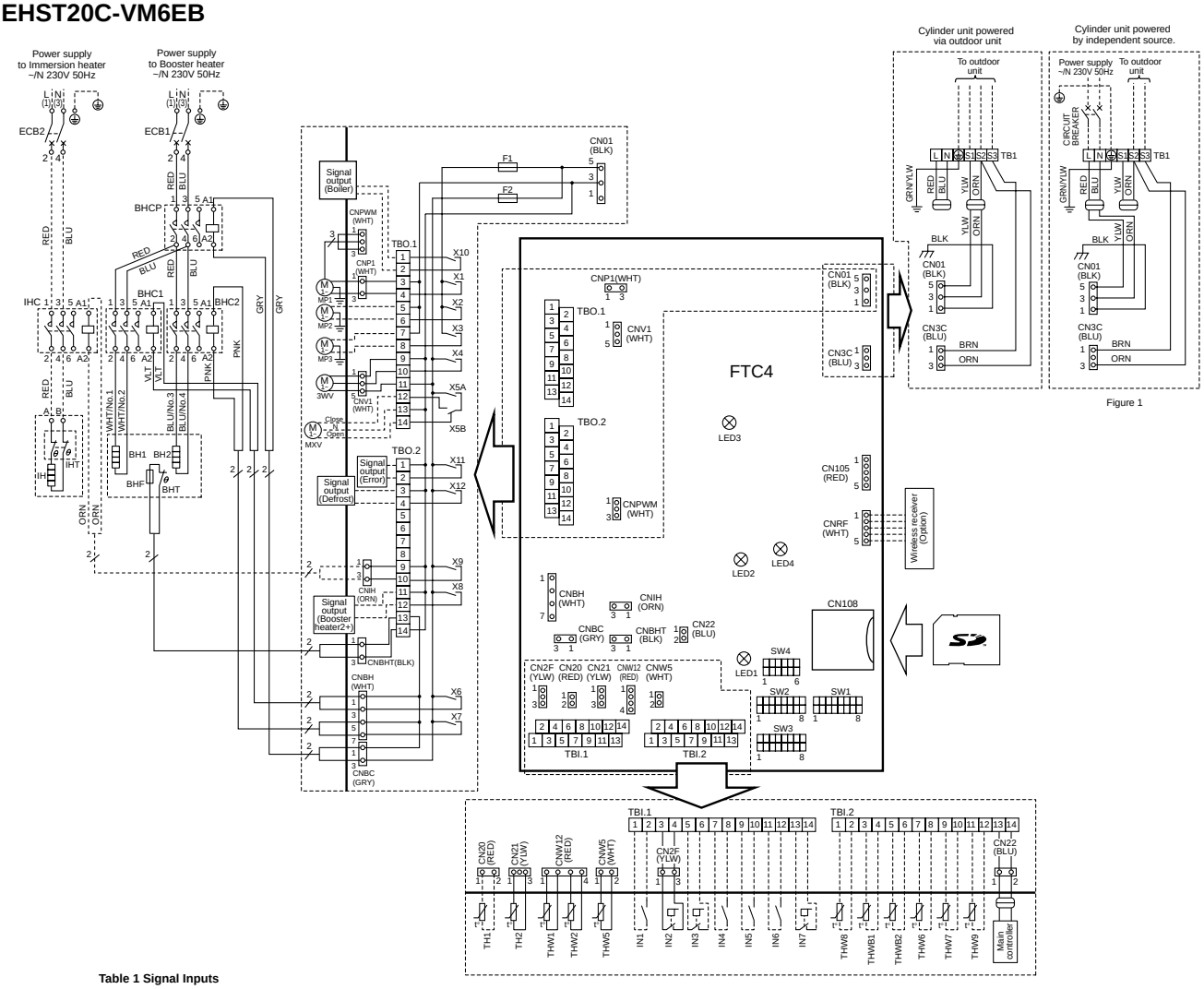



**Table 1 Signal Inputs**

| Name | Terminal block | Connector | Item | OFF (Open) | ON (Short) |
|---|---|---|---|---|---|
| IN1 | TBI.1 1-2 | — | Room thermostat 1 input | Refer to SW2-1 in <6-16 Dip switch setting> | |
| IN2 | TBI.1 3-4 | CN2F | Flow switch 1 input | Refer to SW2-2 in <6-16 Dip switch setting> | |
| IN3 | TBI.1 5-6 | — | Flow switch 2 input (Zone1) | Refer to SW3-2 in <6-16 Dip switch setting> | |
| IN4 | TBI.1 7-8 | — | Demand control input | Normal | Heat source OFF/Boiler operation *2 |
| IN5 | TBI.1 9-10 | — | Outdoor thermostat input *1 | Standard operation | Heater operation/Boiler operation *2 |
| IN6 | TBI.1 11-12 | — | Room thermostat 2 input | Refer to SW3-1 in <6-16 Dip switch setting> | |
| IN7 | TBI.1 13-14 | — | Flow switch 3 input (Zone2) | Refer to SW3-3 in <6-16 Dip switch setting> | |

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
*2. To turn on the boiler operation, use the main controller to select “Boiler” in “External/input setting“ screen in the service menu.

**Table 2 Outputs**

| Name | Terminal block | Connector | Item | OFF | ON |
|---|---|---|---|---|---|
| OUT1 | TBO.1 3-4 | CNP1 | Water circulation pump 1 output (Space heating & DHW) | OFF | ON |
| OUT2 | TBO.1 5-6 | — | Water circulation pump 2 output (Space heating for Zone1) | OFF | ON |
| OUT3 | TBO.1 7-8 | — | Water circulation pump 3 output (Space heating for Zone2) | OFF | ON |
| OUT4 | TBO.1 9-11 | CNV1 | 3-way valve output | Heating | DHW |
| OUT5 | TBO.1 12-13 | — | Mixing valve output | Stop | Close |
| | TBO.1 13-14 | | | Stop | Open |
| OUT6 | — | CNBH 1-3 | Booster heater 1 output | OFF | ON |
| OUT7 | — | CNBH 5-7 | Booster heater 2 output | OFF | ON |
| OUT8 | TBO.2 11-12 | — | Booster heater 2+ output | OFF | ON |
| OUT9 | TBO.2 9-10 | CNIH | Immersion heater output | OFF | ON |
| OUT10 | TBO.1 1-2 | — | Boiler output | OFF | ON |
| OUT11 | TBO.2 1-2 | — | Error output | Normal | Error |
| OUT12 | TBO.2 3-4 | — | Defrost output | Normal | Defrost |

| Symbol | Name |
|---|---|
| TB1 | Terminal block <Power supply, Outdoor unit> |
| ECB1 | Earth leakage circuit breaker for booster heater |
| ECB2 | Earth leakage circuit breaker for immersion heater (Option) |
| MP1 | Water circulation pump1(Space heating & DHW) |
| MP2 | Water circulation pump2 (Space heating for Zone1)(Field supply) |
| MP3 | Water circulation pump3 (Space heating for Zone2)(Field supply) |
| 3WV | 3-way valve |
| MXV | Mixing valve (Field supply) |
| BHT | Thermostat for booster heater |
| BHF | Thermal fuse for booster heater |
| BH1 | Booster heater 1 |
| BH2 | Booster heater 2 |
| BHC1 | Contactor for booster heater 1 |
| BHC2 | Contactor for booster heater 2 |
| BHCP | Contactor for booster heater protection |
| IHT | Thermostat (fixed temp.) for immersion heater (Option) |
| IH | Immersion heater (Option) |
| IHC | Contactor for immersion heater (Option) |

| Symbol | Name |
|---|---|
| TH1 | Thermistor (Room temp.)(Option) |
| TH2 | Thermistor (Ref. liquid temp.) |
| 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) |
| THWB1 | Thermistor (Boiler flow temp.)(Option) |
| THWB2 | Thermistor (Boiler return temp.)(Option) |
| IN1 | Room thermostat 1 (Field supply) |
| IN2 | Flow switch 1 |
| IN3 | Flow switch 2 (Field supply) |
| IN4 | Demand control (Field supply) |
| IN5 | Outdoor thermostat (Field supply) |
| IN6 | Room thermostat 2 (Field supply) |
| IN7 | Flow switch 3 (Field supply) |

| FLOW TEMP. CONTROLLER (FTC4) | |
|---|---|
| TBO.1~2 | Terminal block <Outputs> |
| TBI.1~2 | Terminal block <Signal Inputs, Thermistor> |
| F1~F2 | Fuse (T6.3AL250V) |
| SW1~4 | Dip switch *See <6-16 Dip switch setting> |
| X1~X12 | Relay |
| LED1 | Power supply (FTC4) |
| LED2 | Power supply (Main controller) |
| LED3 | Communication (FTC4-Outdoor unit) |
| LED4 | Reading or writing data to SD card |
| CNPWM | Pump speed control signal for MP1 |
| CN108 | SD card connector |

1. Symbols used in wiring diagram are, ⊙⊙ : connector, □□□ : terminal block.
2. Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings,
3. Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
4. This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

## 6-8. EHST20C-YM9EB

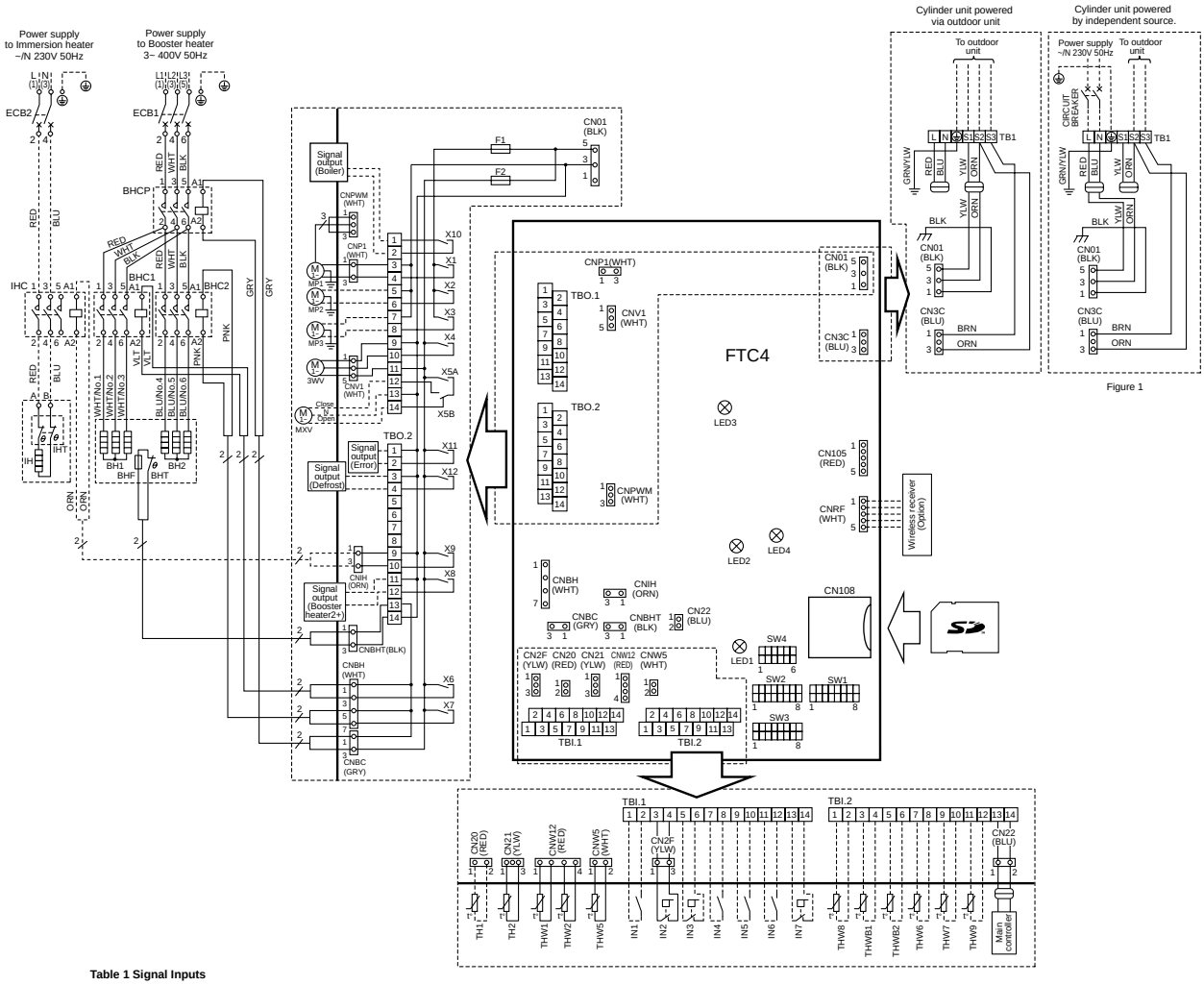



Figure 1

**Table 1 Signal Inputs**

| Name | Terminal block | Connector | Item | OFF (Open) | ON (Short) |
|---|---|---|---|---|---|
| IN1 | TBI.1 1-2 | — | Room thermostat 1 input | Refer to SW2-1 in <6-16 Dip switch setting> | |
| IN2 | TBI.1 3-4 | CN2F | Flow switch 1 input | Refer to SW2-2 in <6-16 Dip switch setting> | |
| IN3 | TBI.1 5-6 | — | Flow switch 2 input (Zone1) | Refer to SW3-2 in <6-16 Dip switch setting> | |
| IN4 | TBI.1 7-8 | — | Demand control input | Normal | Heat source OFF/Boiler operation *2 |
| IN5 | TBI.1 9-10 | — | Outdoor thermostat input *1 | Standard operation | Heater operation/Boiler operation *2 |
| IN6 | TBI.1 11-12 | — | Room thermostat 2 input | Refer to SW3-1 in <6-16 Dip switch setting> | |
| IN7 | TBI.1 13-14 | — | Flow switch 3 input (Zone2) | Refer to SW3-3 in <6-16 Dip switch setting> | |

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
*2. To turn on the boiler operation, use the main controller to select “Boiler” in “External/input setting“ screen in the service menu.

**Table 2 Outputs**

| Name | Terminal block | Connector | Item | OFF | ON |
|---|---|---|---|---|---|
| OUT1 | TBO.1 3-4 | CNP1 | Water circulation pump 1 output (Space heating & DHW) | OFF | ON |
| OUT2 | TBO.1 5-6 | — | Water circulation pump 2 output (Space heating for Zone1) | OFF | ON |
| OUT3 | TBO.1 7-8 | — | Water circulation pump 3 output (Space heating for Zone2) | OFF | ON |
| OUT4 | TBO.1 9-11 | CNV1 | 3-way valve output | Heating | DHW |
| OUT5 | TBO.1 12-13 | — | Mixing valve output | Stop | Close |
| | TBO.1 13-14 | | | Stop | Open |
| OUT6 | — | CNBH 1-3 | Booster heater 1 output | OFF | ON |
| OUT7 | — | CNBH 5-7 | Booster heater 2 output | OFF | ON |
| OUT8 | TBO.2 11-12 | — | Booster heater 2+ output | OFF | ON |
| OUT9 | TBO.2 9-10 | CNIH | Immersion heater output | OFF | ON |
| OUT10 | TBO.1 1-2 | — | Boiler output | OFF | ON |
| OUT11 | TBO.2 1-2 | — | Error output | Normal | Error |
| OUT12 | TBO.2 3-4 | — | Defrost output | Normal | Defrost |

| Symbol | Name |
|---|---|
| TB1 | Terminal block <Power supply, Outdoor unit> |
| ECB1 | Earth leakage circuit breaker for booster heater |
| ECB2 | Earth leakage circuit breaker for immersion heater (Option) |
| MP1 | Water circulation pump1(Space heating & DHW) |
| MP2 | Water circulation pump2 (Space heating for Zone1)(Field supply) |
| MP3 | Water circulation pump3 (Space heating for Zone2)(Field supply) |
| 3WV | 3-way valve |
| MXV | Mixing valve (Field supply) |
| BHT | Thermostat for booster heater |
| BHF | Thermal fuse for booster heater |
| BH1 | Booster heater 1 |
| BH2 | Booster heater 2 |
| BHC1 | Contactor for booster heater 1 |
| BHC2 | Contactor for booster heater 2 |
| BHCP | Contactor for booster heater protection |
| IHT | Thermostat (fixed temp.) for immersion heater (Option) |
| IH | Immersion heater (Option) |
| IHC | Contactor for immersion heater (Option) |

| Symbol | Name |
|---|---|
| TH1 | Thermistor (Room temp.)(Option) |
| TH2 | Thermistor (Ref. liquid temp.) |
| 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) |
| THWB1 | Thermistor (Boiler flow temp.)(Option) |
| THWB2 | Thermistor (Boiler return temp.)(Option) |
| IN1 | Room thermostat 1 (Field supply) |
| IN2 | Flow switch 1 |
| IN3 | Flow switch 2 (Field supply) |
| IN4 | Demand control (Field supply) |
| IN5 | Outdoor thermostat (Field supply) |
| IN6 | Room thermostat 2 (Field supply) |
| IN7 | Flow switch 3 (Field supply) |

| FLOW TEMP. CONTROLLER (FTC4) | |
|---|---|
| TBO.1~2 | Terminal block <Outputs> |
| TBI.1~2 | Terminal block <Signal Inputs, Thermistor> |
| F1~F2 | Fuse (T6.3AL250V) |
| SW1~4 | Dip switch *See <6-16 Dip switch setting> |
| X1~X12 | Relay |
| LED1 | Power supply (FTC4) |
| LED2 | Power supply (Main controller) |
| LED3 | Communication (FTC4-Outdoor unit) |
| LED4 | Reading or writing data to SD card |
| CNPWM | Pump speed control signal for MP1 |
| CN108 | SD card connector |

1. Symbols used in wiring diagram are, ⊡⊡ : connector, ☐☐☐ : terminal block.
2. Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings,
3. Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
4. This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

## 6-9. EHST20C-VM6SB

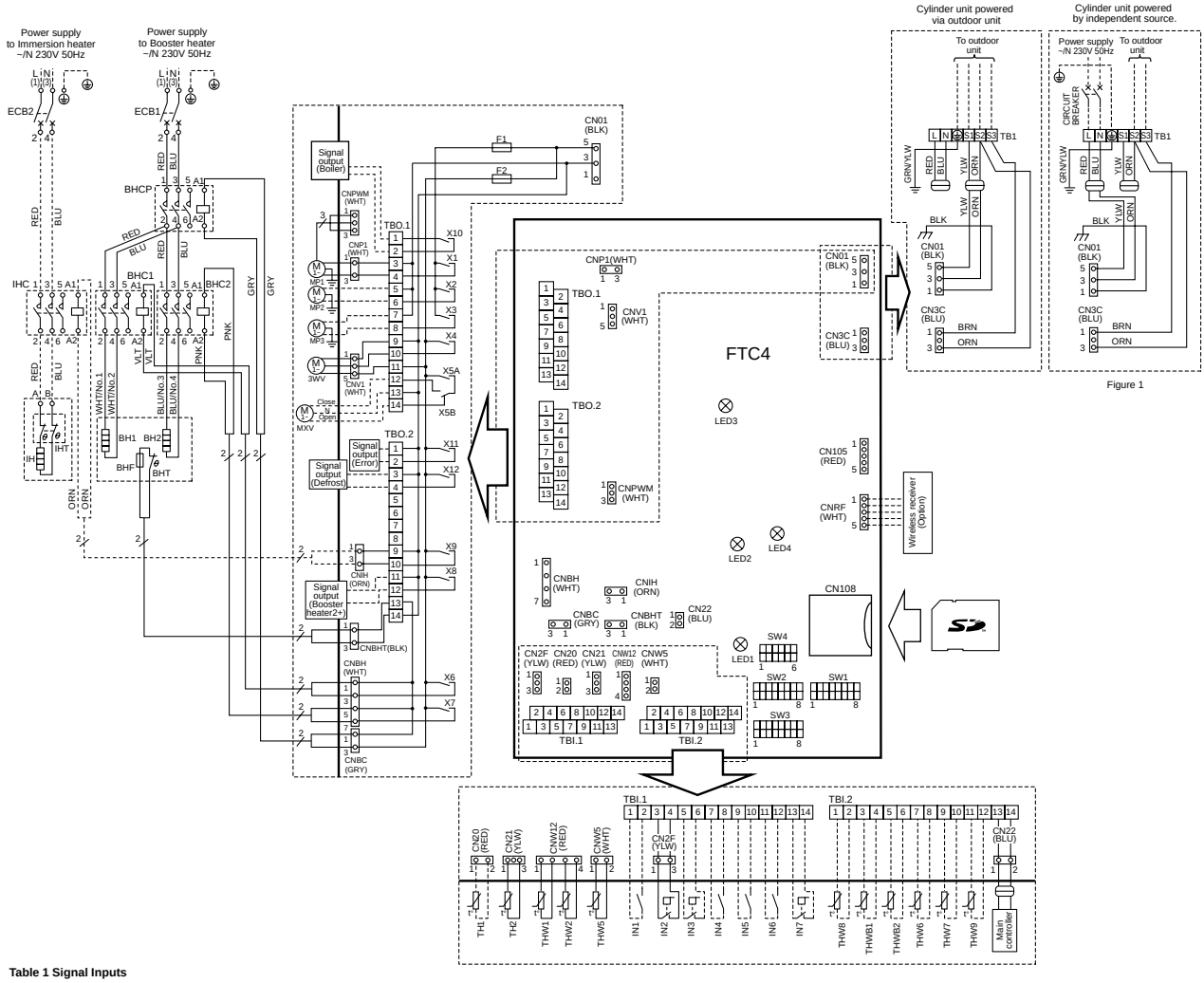



Figure 1

**Table 1 Signal Inputs**

| Name | Terminal block | Connector | Item | OFF (Open) | ON (Short) |
|---|---|---|---|---|---|
| IN1 | TBI.1 1-2 | — | Room thermostat 1 input | Refer to SW2-1 in <6-16 Dip switch setting> | |
| IN2 | TBI.1 3-4 | CN2F | Flow switch 1 input | Refer to SW2-2 in <6-16 Dip switch setting> | |
| IN3 | TBI.1 5-6 | — | Flow switch 2 input (Zone1) | Refer to SW3-2 in <6-16 Dip switch setting> | |
| IN4 | TBI.1 7-8 | — | Demand control input | Normal | Heat source OFF/Boiler operation *2 |
| IN5 | TBI.1 9-10 | — | Outdoor thermostat input *1 | Standard operation | Heater operation/Boiler operation *2 |
| IN6 | TBI.1 11-12 | — | Room thermostat 2 input | Refer to SW3-1 in <6-16 Dip switch setting> | |
| IN7 | TBI.1 13-14 | — | Flow switch 3 input (Zone2) | Refer to SW3-3 in <6-16 Dip switch setting> | |

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
*2. To turn on the boiler operation, use the main controller to select “Boiler” in “External/input setting“ screen in the service menu.

**Table 2 Outputs**

| Name | Terminal block | Connector | Item | OFF | ON |
|---|---|---|---|---|---|
| OUT1 | TBO.1 3-4 | CNP1 | Water circulation pump 1 output (Space heating & DHW) | OFF | ON |
| OUT2 | TBO.1 5-6 | — | Water circulation pump 2 output (Space heating for Zone1) | OFF | ON |
| OUT3 | TBO.1 7-8 | — | Water circulation pump 3 output (Space heating for Zone2) | OFF | ON |
| OUT4 | TBO.1 9-11 | CNV1 | 3-way valve output | Heating | DHW |
| OUT5 | TBO.1 12-13 | — | Mixing valve output | Stop | Close |
| | TBO.1 13-14 | | | Stop | Open |
| OUT6 | — | CNBH 1-3 | Booster heater 1 output | OFF | ON |
| OUT7 | — | CNBH 5-7 | Booster heater 2 output | OFF | ON |
| OUT8 | TBO.2 11-12 | — | Booster heater 2+ output | OFF | ON |
| OUT9 | TBO.2 9-10 | CNIH | Immersion heater output | OFF | ON |
| OUT10 | TBO.1 1-2 | — | Boiler output | OFF | ON |
| OUT11 | TBO.2 1-2 | — | Error output | Normal | Error |
| OUT12 | TBO.2 3-4 | — | Defrost output | Normal | Defrost |

| Symbol | Name |
|---|---|
| TB1 | Terminal block <Power supply, Outdoor unit> |
| ECB1 | Earth leakage circuit breaker for booster heater |
| ECB2 | Earth leakage circuit breaker for immersion heater (Option) |
| MP1 | Water circulation pump1(Space heating & DHW) |
| MP2 | Water circulation pump2 (Space heating for Zone1)(Field supply) |
| MP3 | Water circulation pump3 (Space heating for Zone2)(Field supply) |
| 3WV | 3-way valve |
| MXV | Mixing valve (Field supply) |
| BHT | Thermostat for booster heater |
| BHF | Thermal fuse for booster heater |
| BH1 | Booster heater 1 |
| BH2 | Booster heater 2 |
| BHC1 | Contactor for booster heater 1 |
| BHC2 | Contactor for booster heater 2 |
| BHCP | Contactor for booster heater protection |
| IHT | Thermostat (fixed temp.) for immersion heater (Option) |
| IH | Immersion heater (Option) |
| IHC | Contactor for immersion heater (Option) |

| Symbol | Name |
|---|---|
| TH1 | Thermistor (Room temp.)(Option) |
| TH2 | Thermistor (Ref. liquid temp.) |
| 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) |
| THWB1 | Thermistor (Boiler flow temp.)(Option) |
| THWB2 | Thermistor (Boiler return temp.)(Option) |
| IN1 | Room thermostat 1 (Field supply) |
| IN2 | Flow switch 1 |
| IN3 | Flow switch 2 (Field supply) |
| IN4 | Demand control (Field supply) |
| IN5 | Outdoor thermostat (Field supply) |
| IN6 | Room thermostat 2 (Field supply) |
| IN7 | Flow switch 3 (Field supply) |

| FLOW TEMP. CONTROLLER (FTC4) | |
|---|---|
| TBO.1~2 | Terminal block <Outputs> |
| TBI.1~2 | Terminal block <Signal Inputs, Thermistor> |
| F1~F2 | Fuse (T6.3AL250V) |
| SW1~4 | Dip switch *See <6-16 Dip switch setting> |
| X1~X12 | Relay |
| LED1 | Power supply (FTC4) |
| LED2 | Power supply (Main controller) |
| LED3 | Communication (FTC4-Outdoor unit) |
| LED4 | Reading or writing data to SD card |
| CNPWM | Pump speed control signal for MP1 |
| CN108 | SD card connector |

1. Symbols used in wiring diagram are, ⊙⊙ : connector, □□□ : terminal block.
2. Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings.
3. Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
4. This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

## 6-10. EHPT20X-VM2HB

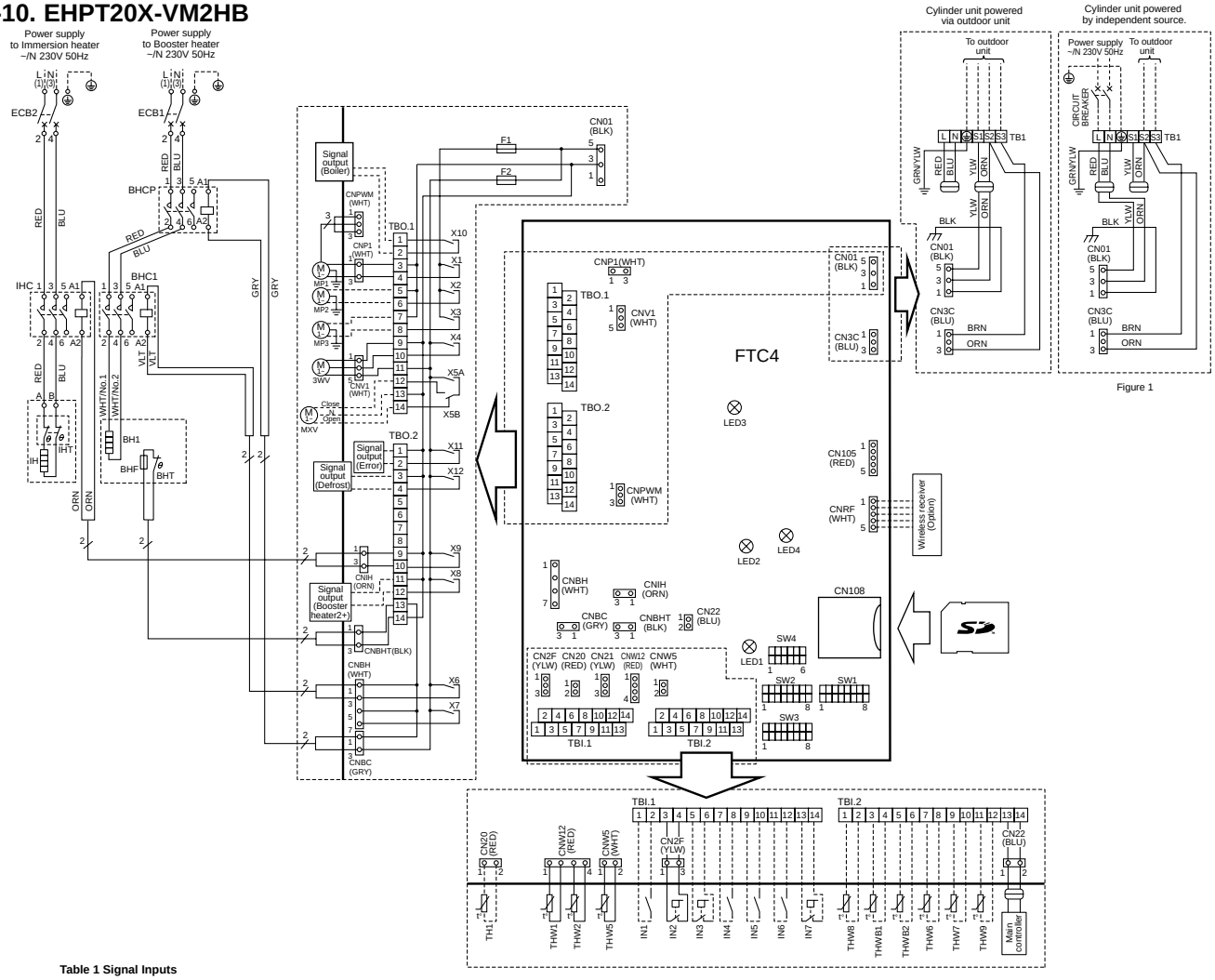



**Table 1 Signal Inputs**

| Name | Terminal block | Connector | Item | OFF (Open) | ON (Short) |
|---|---|---|---|---|---|
| IN1 | TBI.1 1-2 | — | Room thermostat 1 input | Refer to SW2-1 in <6-16 Dip switch setting> | |
| IN2 | TBI.1 3-4 | CN2F | Flow switch 1 input | Refer to SW2-2 in <6-16 Dip switch setting> | |
| IN3 | TBI.1 5-6 | — | Flow switch 2 input (Zone1) | Refer to SW3-2 in <6-16 Dip switch setting> | |
| IN4 | TBI.1 7-8 | — | Demand control input | Normal | Heat source OFF/Boiler operation *2 |
| IN5 | TBI.1 9-10 | — | Outdoor thermostat input *1 | Standard operation | Heater operation/Boiler operation *2 |
| IN6 | TBI.1 11-12 | — | Room thermostat 2 input | Refer to SW3-1 in <6-16 Dip switch setting> | |
| IN7 | TBI.1 13-14 | — | Flow switch 3 input (Zone2) | Refer to SW3-3 in <6-16 Dip switch setting> | |

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
*2. To turn on the boiler operation, use the main controller to select “Boiler” in “External/input setting“ screen in the service menu.

**Table 2 Outputs**

| Name | Terminal block | Connector | Item | OFF | ON |
|---|---|---|---|---|---|
| OUT1 | TBO.1 3-4 | CNP1 | Water circulation pump 1 output (Space heating & DHW) | OFF | ON |
| OUT2 | TBO.1 5-6 | — | Water circulation pump 2 output (Space heating for Zone1) | OFF | ON |
| OUT3 | TBO.1 7-8 | — | Water circulation pump 3 output (Space heating for Zone2) | OFF | ON |
| OUT4 | TBO.1 9-11 | CNV1 | 3-way valve output | Heating | DHW |
| OUT5 | TBO.1 12-13 | — | Mixing valve output | Stop | Close |
| | TBO.1 13-14 | | | Stop | Open |
| OUT6 | — | CNBH 1-3 | Booster heater 1 output | OFF | ON |
| OUT7 | — | CNBH 5-7 | Booster heater 2 output | OFF | ON |
| OUT8 | TBO.2 11-12 | — | Booster heater 2+ output | OFF | ON |
| OUT9 | TBO.2 9-10 | CNIH | Immersion heater output | OFF | ON |
| OUT10 | TBO.1 1-2 | — | Boiler output | OFF | ON |
| OUT11 | TBO.2 1-2 | — | Error output | Normal | Error |
| OUT12 | TBO.2 3-4 | — | Defrost output | Normal | Defrost |

| Symbol | Name |
|---|---|
| TB1 | Terminal block <Power supply, Outdoor unit> |
| ECB1 | Earth leakage circuit breaker for booster heater |
| ECB2 | Earth leakage circuit breaker for immersion heater |
| MP1 | Water circulation pump1(Space heating & DHW) |
| MP2 | Water circulation pump2 (Space heating for Zone1)(Field supply) |
| MP3 | Water circulation pump3 (Space heating for Zone2)(Field supply) |
| 3WV | 3-way valve |
| MXV | Mixing valve (Field supply) |
| BHT | Thermostat for booster heater |
| BHF | Thermal fuse for booster heater |
| BH1 | Booster heater 1 |
| BHC1 | Contactor for booster heater 1 |
| BHCP | Contactor for booster heater protection |
| IHT | Thermostat (fixed temp.) for immersion heater |
| IH | Immersion heater |
| IHC | Contactor for immersion heater |

| Symbol | Name |
|---|---|
| TH1 | Thermistor (Room temp.)(Option) |
| THW1 | Thermistor (Flow water temp.) |
| THW2 | Thermistor (Return water temp.) |
| THW5 | Thermistor (DHW tank water temp.) |
| THW6 | Thermistor (Zone 1 flow temp.)(Option) |
| THW7 | Thermistor (Zone 1 return temp.)(Option) |
| THW8 | Thermistor (Zone 2 flow temp.)(Option) |
| THW9 | Thermistor (Zone 2 return temp.)(Option) |
| THWB1 | Thermistor (Boiler flow temp.)(Option) |
| THWB2 | Thermistor (Boiler return temp.)(Option) |
| IN1 | Room thermostat 1 (Field supply) |
| IN2 | Flow switch 1 |
| IN3 | Flow switch 2 (Field supply) |
| IN4 | Demand control (Field supply) |
| IN5 | Outdoor thermostat (Field supply) |
| IN6 | Room thermostat 2 (Field supply) |
| IN7 | Flow switch 3 (Field supply) |

| FLOW TEMP. CONTROLLER (FTC4) | |
|---|---|
| TBO.1~2 | Terminal block <Outputs> |
| TBI.1~2 | Terminal block <Signal inputs, Thermistor> |
| F1~F2 | Fuse (T6.3AL250V) |
| SW1~4 | Dip switch *See <6-16 Dip switch setting> |
| X1~X12 | Relay |
| LED1 | Power supply (FTC4) |
| LED2 | Power supply (Main controller) |
| LED3 | Communication (FTC4-Outdoor unit) |
| LED4 | Reading or writing data to SD card |
| CNPWM | Pump speed control signal for MP1 |
| CN108 | SD card connector |

1. Symbols used in wiring diagram are,
   ⊙⊙ : connector, □□□ : terminal block.
2. Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings,
3. Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
4. This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

## 6-11. EHPT20X-VM6HB

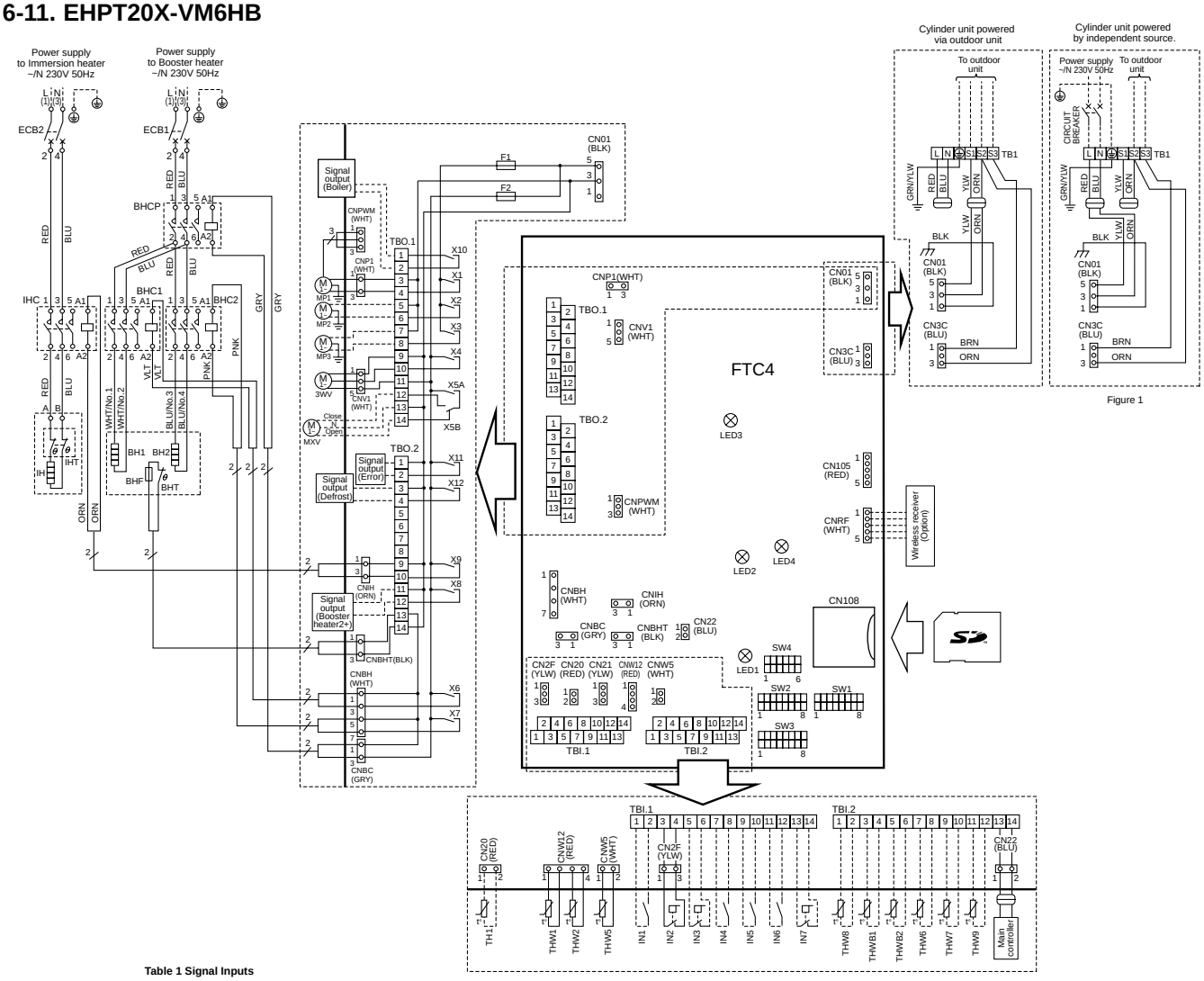



Figure 1

**Table 1 Signal Inputs**

| Name | Terminal block | Connector | Item | OFF (Open) | ON (Short) |
|---|---|---|---|---|---|
| IN1 | TBI.1 1-2 | — | Room thermostat 1 input | Refer to SW2-1 in <6-16 Dip switch setting> | |
| IN2 | TBI.1 3-4 | CN2F | Flow switch 1 input | Refer to SW2-2 in <6-16 Dip switch setting> | |
| IN3 | TBI.1 5-6 | — | Flow switch 2 input (Zone1) | Refer to SW3-2 in <6-16 Dip switch setting> | |
| IN4 | TBI.1 7-8 | — | Demand control input | Normal | Heat source OFF/Boiler operation *2 |
| IN5 | TBI.1 9-10 | — | Outdoor thermostat input *1 | Standard operation | Heater operation/Boiler operation *2 |
| IN6 | TBI.1 11-12 | — | Room thermostat 2 input | Refer to SW3-1 in <6-16 Dip switch setting> | |
| IN7 | TBI.1 13-14 | — | Flow switch 3 input (Zone2) | Refer to SW3-3 in <6-16 Dip switch setting> | |

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
*2. To turn on the boiler operation, use the main controller to select “Boiler” in “External/input setting“ screen in the service menu.

**Table 2 Outputs**

| Name | Terminal block | Connector | Item | OFF | ON |
|---|---|---|---|---|---|
| OUT1 | TBO.1 3-4 | CNP1 | Water circulation pump 1 output (Space heating & DHW) | OFF | ON |
| OUT2 | TBO.1 5-6 | — | Water circulation pump 2 output (Space heating for Zone1) | OFF | ON |
| OUT3 | TBO.1 7-8 | — | Water circulation pump 3 output (Space heating for Zone2) | OFF | ON |
| OUT4 | TBO.1 9-11 | CNV1 | 3-way valve output | Heating | DHW |
| OUT5 | TBO.1 12-13 | — | Mixing valve output | Stop | Close |
| | TBO.1 13-14 | | | Stop | Open |
| OUT6 | — | CNBH 1-3 | Booster heater 1 output | OFF | ON |
| OUT7 | — | CNBH 5-7 | Booster heater 2 output | OFF | ON |
| OUT8 | TBO.2 11-12 | — | Booster heater 2+ output | OFF | ON |
| OUT9 | TBO.2 9-10 | CNIH | Immersion heater output | OFF | ON |
| OUT10 | TBO.1 1-2 | — | Boiler output | OFF | ON |
| OUT11 | TBO.2 1-2 | — | Error output | Normal | Error |
| OUT12 | TBO.2 3-4 | — | Defrost output | Normal | Defrost |

| Symbol | Name |
|---|---|
| TB1 | Terminal block <Power supply, Outdoor unit> |
| ECB1 | Earth leakage circuit breaker for booster heater |
| ECB2 | Earth leakage circuit breaker for immersion heater |
| MP1 | Water circulation pump1(Space heating & DHW) |
| MP2 | Water circulation pump2 (Space heating for Zone1)(Field supply) |
| MP3 | Water circulation pump3 (Space heating for Zone2)(Field supply) |
| 3WV | 3-way valve |
| MXV | Mixing valve (Field supply) |
| BHT | Thermostat for booster heater |
| BHF | Thermal fuse for booster heater |
| BH1 | Booster heater 1 |
| BH2 | Booster heater 2 |
| BHC1 | Contactor for booster heater 1 |
| BHC2 | Contactor for booster heater 2 |
| BHCP | Contactor for booster heater protection |
| IHT | Thermostat (fixed temp.) for immersion heater |
| IH | Immersion heater |
| IHC | Contactor for immersion heater |

| Symbol | Name |
|---|---|
| TH1 | Thermistor (Room temp.)(Option) |
| THW1 | Thermistor (Flow water temp.) |
| THW2 | Thermistor (Return water temp.) |
| THW5 | Thermistor (DHW tank water temp.) |
| THW6 | Thermistor (Zone 1 flow temp.)(Option) |
| THW7 | Thermistor (Zone 1 return temp.)(Option) |
| THW8 | Thermistor (Zone 2 flow temp.)(Option) |
| THW9 | Thermistor (Zone 2 return temp.)(Option) |
| THWB1 | Thermistor (Boiler flow temp.)(Option) |
| THWB2 | Thermistor (Boiler return temp.)(Option) |
| IN1 | Room thermostat 1 (Field supply) |
| IN2 | Flow switch 1 |
| IN3 | Flow switch 2 (Field supply) |
| IN4 | Demand control (Field supply) |
| IN5 | Outdoor thermostat (Field supply) |
| IN6 | Room thermostat 2 (Field supply) |
| IN7 | Flow switch 3 (Field supply) |

| FLOW TEMP. CONTROLLER (FTC4) | |
|---|---|
| TBO.1~2 | Terminal block <Outputs> |
| TBI.1~2 | Terminal block <Signal inputs, Thermistor> |
| F1~F2 | Fuse (T6.3AL250V) |
| SW1~4 | Dip switch *See <6-16 Dip switch setting> |
| X1~X12 | Relay |
| LED1 | Power supply (FTC4) |
| LED2 | Power supply (Main controller) |
| LED3 | Communication (FTC4-Outdoor unit) |
| LED4 | Reading or writing data to SD card |
| CNPWM | Pump speed control signal for MP1 |
| CN108 | SD card connector |

1. Symbols used in wiring diagram are, ⊙⊙ : connector, □□□ : terminal block.
2. Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings,
3. Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
4. This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

## 6-12. EHPT20X-YM9HB

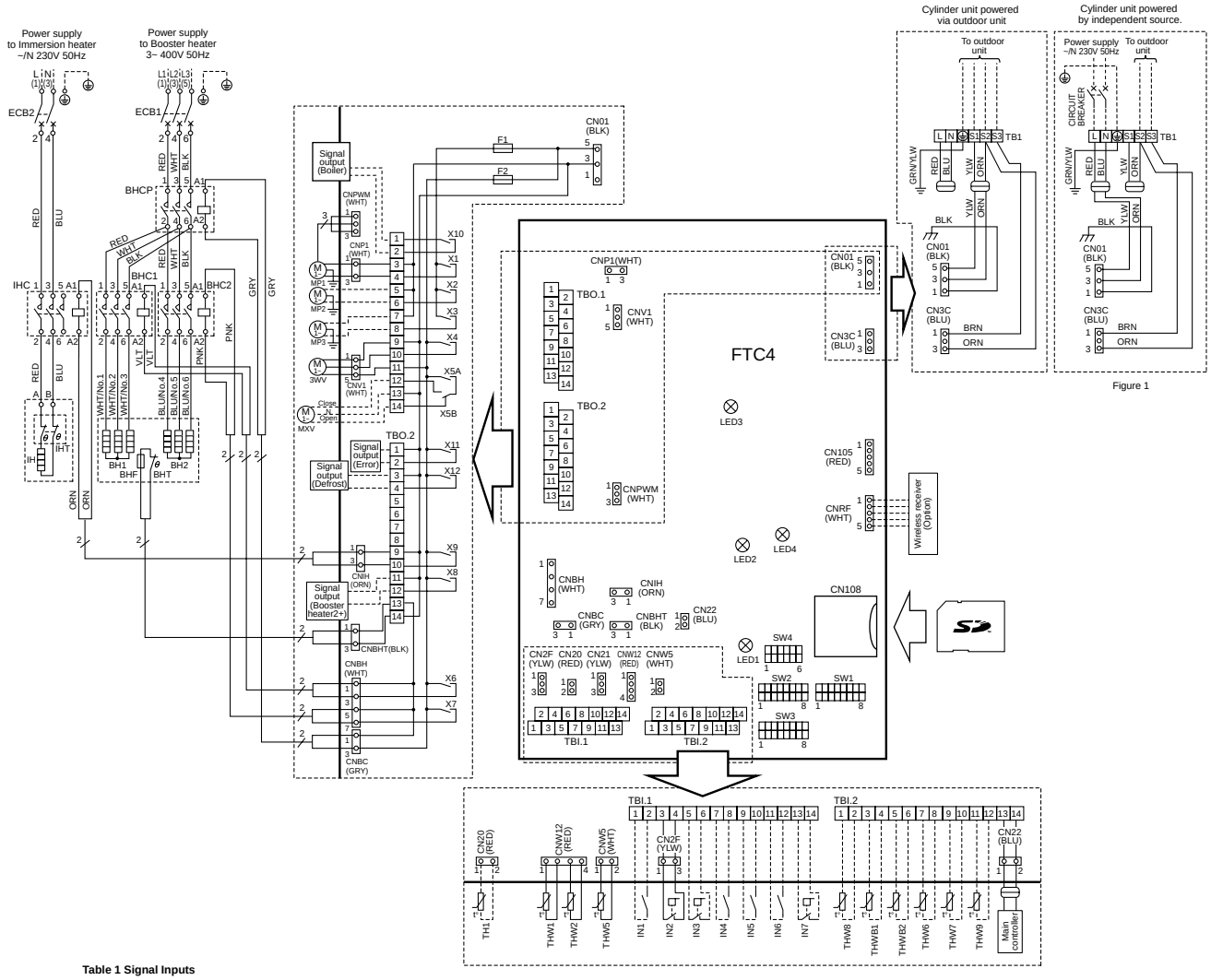



Figure 1

**Table 1 Signal Inputs**

| Name | Terminal block | Connector | Item | OFF (Open) | ON (Short) |
|---|---|---|---|---|---|
| IN1 | TBI.1 1-2 | — | Room thermostat 1 input | Refer to SW2-1 in <6-16 Dip switch setting> | |
| IN2 | TBI.1 3-4 | CN2F | Flow switch 1 input | Refer to SW2-2 in <6-16 Dip switch setting> | |
| IN3 | TBI.1 5-6 | — | Flow switch 2 input (Zone1) | Refer to SW3-2 in <6-16 Dip switch setting> | |
| IN4 | TBI.1 7-8 | — | Demand control input | Normal | Heat source OFF/Boiler operation *2 |
| IN5 | TBI.1 9-10 | — | Outdoor thermostat input *1 | Standard operation | Heater operation/Boiler operation *2 |
| IN6 | TBI.1 11-12 | — | Room thermostat 2 input | Refer to SW3-1 in <6-16 Dip switch setting> | |
| IN7 | TBI.1 13-14 | — | Flow switch 3 input (Zone2) | Refer to SW3-3 in <6-16 Dip switch setting> | |

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
*2. To turn on the boiler operation, use the main controller to select “Boiler” in “External/input setting“ screen in the service menu.

**Table 2 Outputs**

| Name | Terminal block | Connector | Item | OFF | ON |
|---|---|---|---|---|---|
| OUT1 | TBO.1 3-4 | CNP1 | Water circulation pump 1 output (Space heating & DHW) | OFF | ON |
| OUT2 | TBO.1 5-6 | — | Water circulation pump 2 output (Space heating for Zone1) | OFF | ON |
| OUT3 | TBO.1 7-8 | — | Water circulation pump 3 output (Space heating for Zone2) | OFF | ON |
| OUT4 | TBO.1 9-11 | CNV1 | 3-way valve output | Heating | DHW |
| OUT5 | TBO.1 12-13 | — | Mixing valve output | Stop | Close |
| | TBO.1 13-14 | | | Stop | Open |
| OUT6 | — | CNBH 1-3 | Booster heater 1 output | OFF | ON |
| OUT7 | — | CNBH 5-7 | Booster heater 2 output | OFF | ON |
| OUT8 | TBO.2 11-12 | — | Booster heater 2+ output | OFF | ON |
| OUT9 | TBO.2 9-10 | CNIH | Immersion heater output | OFF | ON |
| OUT10 | TBO.1 1-2 | — | Boiler output | OFF | ON |
| OUT11 | TBO.2 1-2 | — | Error output | Normal | Error |
| OUT12 | TBO.2 3-4 | — | Defrost output | Normal | Defrost |

| Symbol | Name |
|---|---|
| TB1 | Terminal block <Power supply, Outdoor unit> |
| ECB1 | Earth leakage circuit breaker for booster heater |
| ECB2 | Earth leakage circuit breaker for immersion heater |
| MP1 | Water circulation pump1(Space heating & DHW) |
| MP2 | Water circulation pump2 (Space heating for Zone1)(Field supply) |
| MP3 | Water circulation pump3 (Space heating for Zone2)(Field supply) |
| 3WV | 3-way valve |
| MXV | Mixing valve (Field supply) |
| BHT | Thermostat for booster heater |
| BHF | Thermal fuse for booster heater |
| BH1 | Booster heater 1 |
| BH2 | Booster heater 2 |
| BHC1 | Contactor for booster heater 1 |
| BHC2 | Contactor for booster heater 2 |
| BHCP | Contactor for booster heater protection |
| IHT | Thermostat (fixed temp.) for immersion heater |
| IH | Immersion heater |
| IHC | Contactor for immersion heater |

| Symbol | Name |
|---|---|
| TH1 | Thermistor (Room temp.)(Option) |
| THW1 | Thermistor (Flow water temp.) |
| THW2 | Thermistor (Return water temp.) |
| THW5 | Thermistor (DHW tank water temp.) |
| THW6 | Thermistor (Zone 1 flow temp.)(Option) |
| THW7 | Thermistor (Zone 1 return temp.)(Option) |
| THW8 | Thermistor (Zone 2 flow temp.)(Option) |
| THW9 | Thermistor (Zone 2 return temp.)(Option) |
| THWB1 | Thermistor (Boiler flow temp.)(Option) |
| THWB2 | Thermistor (Boiler return temp.)(Option) |
| IN1 | Room thermostat 1 (Field supply) |
| IN2 | Flow switch 1 |
| IN3 | Flow switch 2 (Field supply) |
| IN4 | Demand control (Field supply) |
| IN5 | Outdoor thermostat (Field supply) |
| IN6 | Room thermostat 2 (Field supply) |
| IN7 | Flow switch 3 (Field supply) |

| FLOW TEMP. CONTROLLER (FTC4) | |
|---|---|
| TBO.1~2 | Terminal block <Outputs> |
| TBI.1~2 | Terminal block <Signal inputs, Thermistor> |
| F1~F2 | Fuse (T6.3AL250V) |
| SW1~4 | Dip switch *See <6-16 Dip switch setting> |
| X1~X12 | Relay |
| LED1 | Power supply (FTC4) |
| LED2 | Power supply (Main controller) |
| LED3 | Communication (FTC4-Outdoor unit) |
| LED4 | Reading or writing data to SD card |
| CNPWM | Pump speed control signal for MP1 |
| CN108 | SD card connector |

1. Symbols used in wiring diagram are,
   ⊙⊙ : connector, □□□ : terminal block.
2. Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings,
3. Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
4. This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

## 6-13. EHPT20X-TM9HB

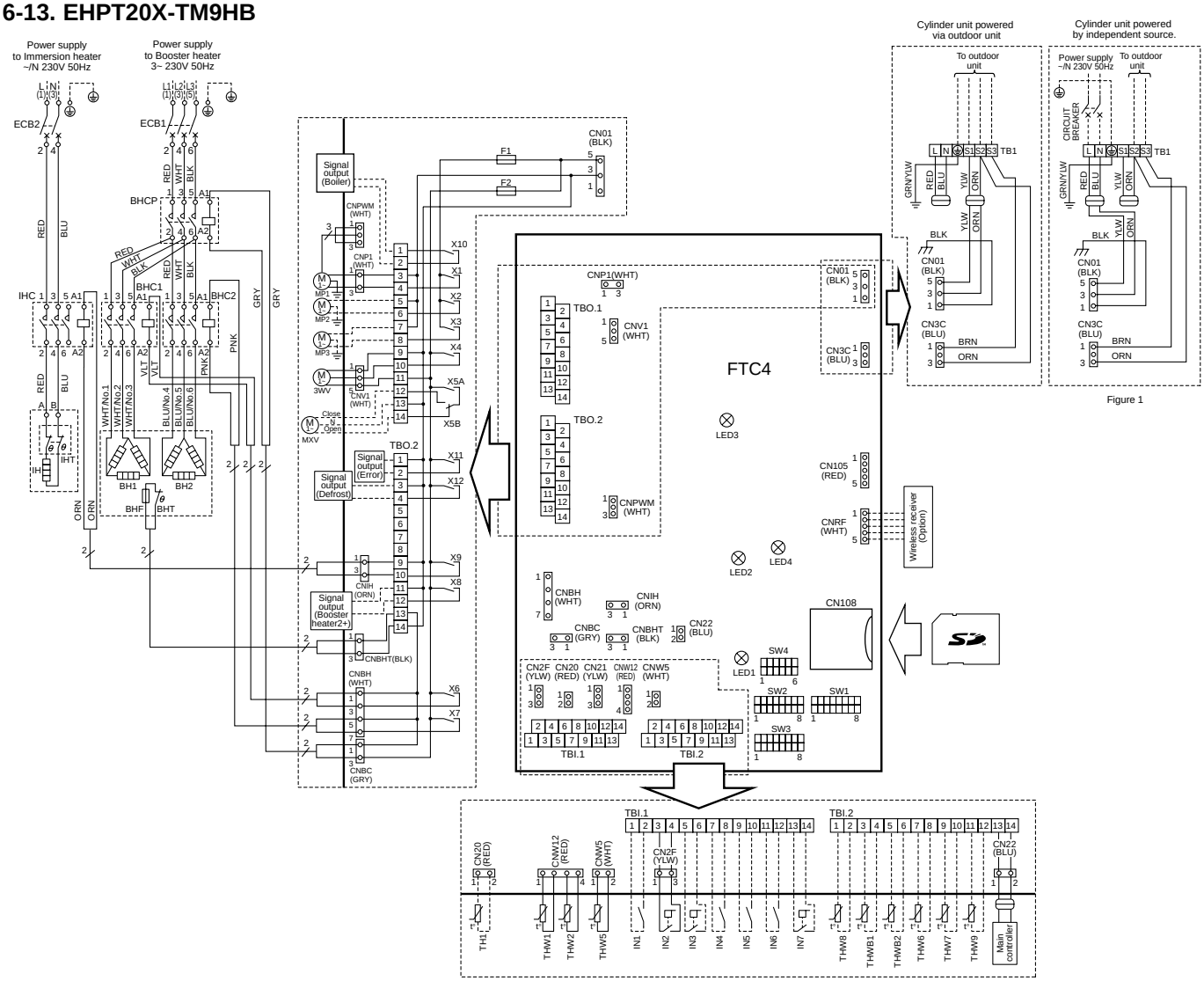



Figure 1

**Table 1 Signal Inputs**

| Name | Terminal block | Connector | Item | OFF (Open) | ON (Short) |
|---|---|---|---|---|---|
| IN1 | TBI.1 1-2 | — | Room thermostat 1 input | Refer to SW2-1 in <6-16 Dip switch setting> | |
| IN2 | TBI.1 3-4 | CN2F | Flow switch 1 input | Refer to SW2-2 in <6-16 Dip switch setting> | |
| IN3 | TBI.1 5-6 | — | Flow switch 2 input (Zone1) | Refer to SW3-2 in <6-16 Dip switch setting> | |
| IN4 | TBI.1 7-8 | — | Demand control input | Normal | Heat source OFF/Boiler operation *2 |
| IN5 | TBI.1 9-10 | — | Outdoor thermostat input *1 | Standard operation | Heater operation/Boiler operation *2 |
| IN6 | TBI.1 11-12 | — | Room thermostat 2 input | Refer to SW3-1 in <6-16 Dip switch setting> | |
| IN7 | TBI.1 13-14 | — | Flow switch 3 input (Zone2) | Refer to SW3-3 in <6-16 Dip switch setting> | |

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
*2. To turn on the boiler operation, use the main controller to select “Boiler” in “External/input setting“ screen in the service menu.

**Table 2 Outputs**

| Name | Terminal block | Connector | Item | OFF | ON |
|---|---|---|---|---|---|
| OUT1 | TBO.1 3-4 | CNP1 | Water circulation pump 1 output (Space heating & DHW) | OFF | ON |
| OUT2 | TBO.1 5-6 | — | Water circulation pump 2 output (Space heating for Zone1) | OFF | ON |
| OUT3 | TBO.1 7-8 | — | Water circulation pump 3 output (Space heating for Zone2) | OFF | ON |
| OUT4 | TBO.1 9-11 | CNV1 | 3-way valve output | Heating | DHW |
| OUT5 | TBO.1 12-13 | — | Mixing valve output | Stop | Close |
| | TBO.1 13-14 | | | Stop | Open |
| OUT6 | — | CNBH 1-3 | Booster heater 1 output | OFF | ON |
| OUT7 | — | CNBH 5-7 | Booster heater 2 output | OFF | ON |
| OUT8 | TBO.2 11-12 | — | Booster heater 2+ output | OFF | ON |
| OUT9 | TBO.2 9-10 | CNIH | Immersion heater output | OFF | ON |
| OUT10 | TBO.1 1-2 | — | Boiler output | OFF | ON |
| OUT11 | TBO.2 1-2 | — | Error output | Normal | Error |
| OUT12 | TBO.2 3-4 | — | Defrost output | Normal | Defrost |

| Symbol | Name |
|---|---|
| TB1 | Terminal block <Power supply, Outdoor unit> |
| ECB1 | Earth leakage circuit breaker for booster heater |
| ECB2 | Earth leakage circuit breaker for immersion heater |
| MP1 | Water circulation pump1(Space heating & DHW) |
| MP2 | Water circulation pump2 (Space heating for Zone1)(Field supply) |
| MP3 | Water circulation pump3 (Space heating for Zone2)(Field supply) |
| 3WV | 3-way valve |
| MXV | Mixing valve (Field supply) |
| BHT | Thermostat for booster heater |
| BHF | Thermal fuse for booster heater |
| BH1 | Booster heater 1 |
| BH2 | Booster heater 2 |
| BHC1 | Contactor for booster heater 1 |
| BHC2 | Contactor for booster heater 2 |
| BHCP | Contactor for booster heater protection |
| IHT | Thermostat (fixed temp.) for immersion heater |
| IH | Immersion heater |
| IHC | Contactor for immersion heater |

| Symbol | Name |
|---|---|
| TH1 | Thermistor (Room temp.)(Option) |
| THW1 | Thermistor (Flow water temp.) |
| THW2 | Thermistor (Return water temp.) |
| THW5 | Thermistor (DHW tank water temp.) |
| THW6 | Thermistor (Zone 1 flow temp.)(Option) |
| THW7 | Thermistor (Zone 1 return temp.)(Option) |
| THW8 | Thermistor (Zone 2 flow temp.)(Option) |
| THW9 | Thermistor (Zone 2 return temp.)(Option) |
| THWB1 | Thermistor (Boiler flow temp.)(Option) |
| THWB2 | Thermistor (Boiler return temp.)(Option) |
| IN1 | Room thermostat 1 (Field supply) |
| IN2 | Flow switch 1 |
| IN3 | Flow switch 2 (Field supply) |
| IN4 | Demand control (Field supply) |
| IN5 | Outdoor thermostat (Field supply) |
| IN6 | Room thermostat 2 (Field supply) |
| IN7 | Flow switch 3 (Field supply) |

| FLOW TEMP. CONTROLLER (FTC4) | |
|---|---|
| TBO.1~2 | Terminal block <Outputs> |
| TBI.1~2 | Terminal block <Signal inputs, Thermistor> |
| F1~F2 | Fuse (T6.3AL250V) |
| SW1~4 | Dip switch *See <6-16 Dip switch setting> |
| X1~X12 | Relay |
| LED1 | Power supply (FTC4) |
| LED2 | Power supply (Main controller) |
| LED3 | Communication (FTC4-Outdoor unit) |
| LED4 | Reading or writing data to SD card |
| CNPWM | Pump speed control signal for MP1 |
| CN108 | SD card connector |

1. Symbols used in wiring diagram are,
   ⊡⊡ : connector, □□□ : terminal block.
2. Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings,
3. Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
4. This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

## 6-14. EHPT20X-VM6B

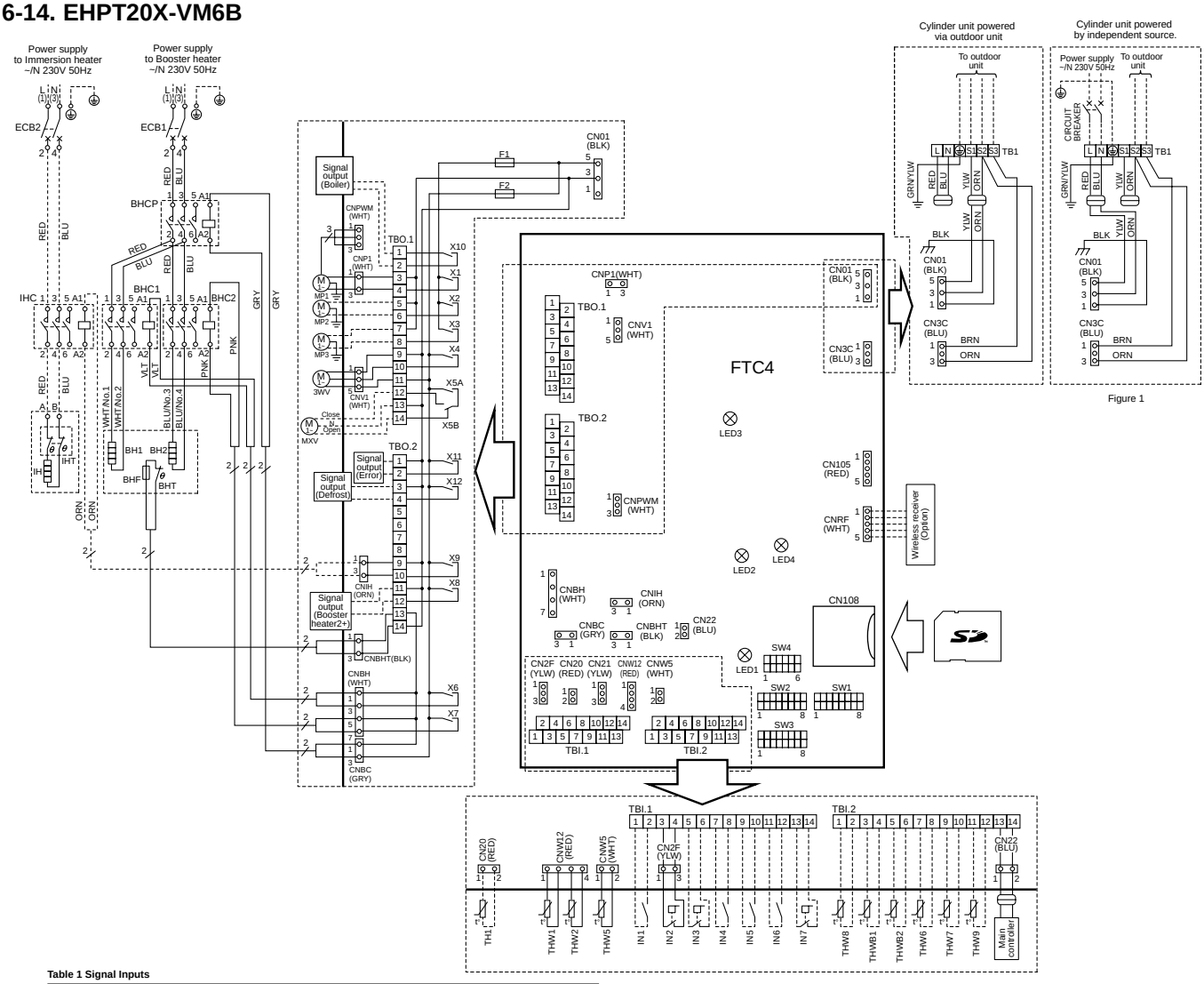



Figure 1

**Table 1 Signal Inputs**

| Name | Terminal block | Connector | Item | OFF (Open) | ON (Short) |
|---|---|---|---|---|---|
| IN1 | TBI.1 1-2 | — | Room thermostat 1 input | Refer to SW2-1 in <6-16 Dip switch setting> | |
| IN2 | TBI.1 3-4 | CN2F | Flow switch 1 input | Refer to SW2-2 in <6-16 Dip switch setting> | |
| IN3 | TBI.1 5-6 | — | Flow switch 2 input (Zone1) | Refer to SW3-2 in <6-16 Dip switch setting> | |
| IN4 | TBI.1 7-8 | — | Demand control input | Normal | Heat source OFF/Boiler operation *2 |
| IN5 | TBI.1 9-10 | — | Outdoor thermostat input *1 | Standard operation | Heater operation/Boiler operation *2 |
| IN6 | TBI.1 11-12 | — | Room thermostat 2 input | Refer to SW3-1 in <6-16 Dip switch setting> | |
| IN7 | TBI.1 13-14 | — | Flow switch 3 input (Zone2) | Refer to SW3-3 in <6-16 Dip switch setting> | |

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
*2. To turn on the boiler operation, use the main controller to select “Boiler” in “External/input setting“ screen in the service menu.

**Table 2 Outputs**

| Name | Terminal block | Connector | Item | OFF | ON |
|---|---|---|---|---|---|
| OUT1 | TBO.1 3-4 | CNP1 | Water circulation pump 1 output (Space heating & DHW) | OFF | ON |
| OUT2 | TBO.1 5-6 | — | Water circulation pump 2 output (Space heating for Zone1) | OFF | ON |
| OUT3 | TBO.1 7-8 | — | Water circulation pump 3 output (Space heating for Zone2) | OFF | ON |
| OUT4 | TBO.1 9-11 | CNV1 | 3-way valve output | Heating | DHW |
| OUT5 | TBO.1 12-13 | — | Mixing valve output | Stop | Close |
| | TBO.1 13-14 | | | Stop | Open |
| OUT6 | — | CNBH 1-3 | Booster heater 1 output | OFF | ON |
| OUT7 | — | CNBH 5-7 | Booster heater 2 output | OFF | ON |
| OUT8 | TBO.2 11-12 | — | Booster heater 2+ output | OFF | ON |
| OUT9 | TBO.2 9-10 | CNIH | Immersion heater output | OFF | ON |
| OUT10 | TBO.1 1-2 | — | Boiler output | OFF | ON |
| OUT11 | TBO.2 1-2 | — | Error output | Normal | Error |
| OUT12 | TBO.2 3-4 | — | Defrost output | Normal | Defrost |

| Symbol | Name |
|---|---|
| TB1 | Terminal block <Power supply, Outdoor unit> |
| ECB1 | Earth leakage circuit breaker for booster heater |
| ECB2 | Earth leakage circuit breaker for immersion heater (Option) |
| MP1 | Water circulation pump1(Space heating & DHW) |
| MP2 | Water circulation pump2 (Space heating for Zone1)(Field supply) |
| MP3 | Water circulation pump3 (Space heating for Zone2)(Field supply) |
| 3WV | 3-way valve |
| MXV | Mixing valve (Field supply) |
| BHT | Thermostat for booster heater |
| BHF | Thermal fuse for booster heater |
| BH1 | Booster heater 1 |
| BH2 | Booster heater 2 |
| BHC1 | Contactor for booster heater 1 |
| BHC2 | Contactor for booster heater 2 |
| BHCP | Contactor for booster heater protection |
| IHT | Thermostat (fixed temp.) for immersion heater (Option) |
| IH | Immersion heater (Option) |
| IHC | Contactor for immersion heater (Option) |

| Symbol | Name |
|---|---|
| TH1 | Thermistor (Room temp.)(Option) |
| THW1 | Thermistor (Flow water temp.) |
| THW2 | Thermistor (Return water temp.) |
| THW5 | Thermistor (DHW tank water temp.) |
| THW6 | Thermistor (Zone 1 flow temp.)(Option) |
| THW7 | Thermistor (Zone 1 return temp.)(Option) |
| THW8 | Thermistor (Zone 2 flow temp.)(Option) |
| THW9 | Thermistor (Zone 2 return temp.)(Option) |
| THWB1 | Thermistor (Boiler flow temp.)(Option) |
| THWB2 | Thermistor (Boiler return temp.)(Option) |
| IN1 | Room thermostat 1 (Field supply) |
| IN2 | Flow switch 1 |
| IN3 | Flow switch 2 (Field supply) |
| IN4 | Demand control (Field supply) |
| IN5 | Outdoor thermostat (Field supply) |
| IN6 | Room thermostat 2 (Field supply) |
| IN7 | Flow switch 3 (Field supply) |

| FLOW TEMP. CONTROLLER (FTC4) | |
|---|---|
| TBO.1~2 | Terminal block <Outputs> |
| TBI.1~2 | Terminal block <Signal inputs, Thermistor> |
| F1~F2 | Fuse (T6.3AL250V) |
| SW1~4 | Dip switch *See <6-16 Dip switch setting> |
| X1~X12 | Relay |
| LED1 | Power supply (FTC4) |
| LED2 | Power supply (Main controller) |
| LED3 | Communication (FTC4-Outdoor unit) |
| LED4 | Reading or writing data to SD card |
| CNPWM | Pump speed control signal for MP1 |
| CN108 | SD card connector |

1. Symbols used in wiring diagram are,
   ⊡⊡ : connector, ⊏⊐ : terminal block.
2. Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings,
3. Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
4. This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

## 6-15. EHPT20X-YM9B

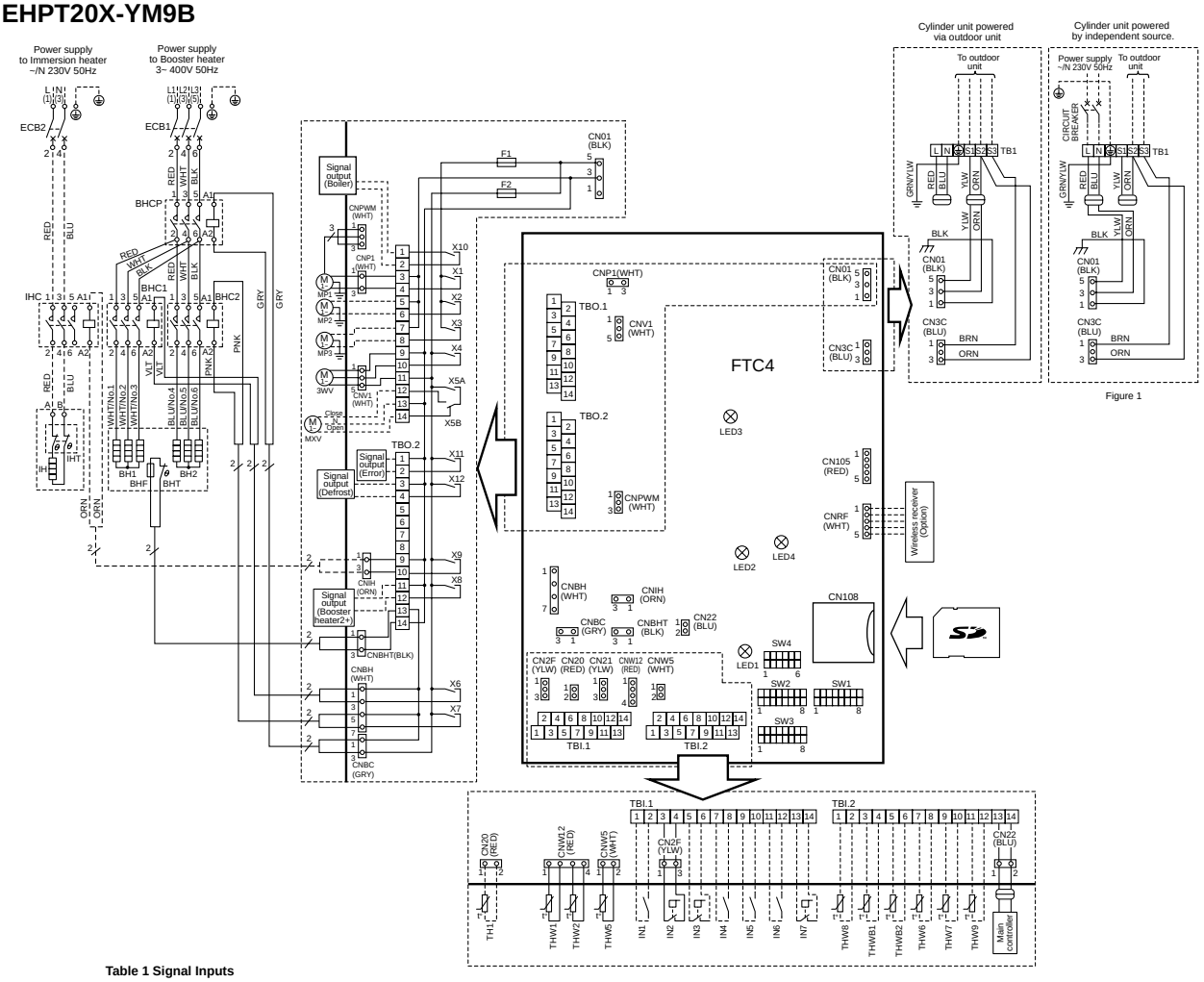



Figure 1

**Table 1 Signal Inputs**

| Name | Terminal block | Connector | Item | OFF (Open) | ON (Short) |
|---|---|---|---|---|---|
| IN1 | TBI.1 1-2 | — | Room thermostat 1 input | Refer to SW2-1 in <6-16 Dip switch setting> | |
| IN2 | TBI.1 3-4 | CN2F | Flow switch 1 input | Refer to SW2-2 in <6-16 Dip switch setting> | |
| IN3 | TBI.1 5-6 | — | Flow switch 2 input (Zone1) | Refer to SW3-2 in <6-16 Dip switch setting> | |
| IN4 | TBI.1 7-8 | — | Demand control input | Normal | Heat source OFF/Boiler operation *2 |
| IN5 | TBI.1 9-10 | — | Outdoor thermostat input *1 | Standard operation | Heater operation/Boiler operation *2 |
| IN6 | TBI.1 11-12 | — | Room thermostat 2 input | Refer to SW3-1 in <6-16 Dip switch setting> | |
| IN7 | TBI.1 13-14 | — | Flow switch 3 input (Zone2) | Refer to SW3-3 in <6-16 Dip switch setting> | |

*1. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
*2. To turn on the boiler operation, use the main controller to select “Boiler” in “External/input setting“ screen in the service menu.

**Table 2 Outputs**

| Name | Terminal block | Connector | Item | OFF | ON |
|---|---|---|---|---|---|
| OUT1 | TBO.1 3-4 | CNP1 | Water circulation pump 1 output (Space heating & DHW) | OFF | ON |
| OUT2 | TBO.1 5-6 | — | Water circulation pump 2 output (Space heating for Zone1) | OFF | ON |
| OUT3 | TBO.1 7-8 | — | Water circulation pump 3 output (Space heating for Zone2) | OFF | ON |
| OUT4 | TBO.1 9-11 | CNV1 | 3-way valve output | Heating | DHW |
| OUT5 | TBO.1 12-13 | — | Mixing valve output | Stop | Close |
| | TBO.1 13-14 | | | Stop | Open |
| OUT6 | — | CNBH 1-3 | Booster heater 1 output | OFF | ON |
| OUT7 | — | CNBH 5-7 | Booster heater 2 output | OFF | ON |
| OUT8 | TBO.2 11-12 | — | Booster heater 2+ output | OFF | ON |
| OUT9 | TBO.2 9-10 | CNIH | Immersion heater output | OFF | ON |
| OUT10 | TBO.1 1-2 | — | Boiler output | OFF | ON |
| OUT11 | TBO.2 1-2 | — | Error output | Normal | Error |
| OUT12 | TBO.2 3-4 | — | Defrost output | Normal | Defrost |

| Symbol | Name |
|---|---|
| TB1 | Terminal block <Power supply, Outdoor unit> |
| ECB1 | Earth leakage circuit breaker for booster heater |
| ECB2 | Earth leakage circuit breaker for immersion heater (Option) |
| MP1 | Water circulation pump1(Space heating & DHW) |
| MP2 | Water circulation pump2 (Space heating for Zone1)(Field supply) |
| MP3 | Water circulation pump3 (Space heating for Zone2)(Field supply) |
| 3WV | 3-way valve |
| MXV | Mixing valve (Field supply) |
| BHT | Thermostat for booster heater |
| BHF | Thermal fuse for booster heater |
| BH1 | Booster heater 1 |
| BH2 | Booster heater 2 |
| BHC1 | Contactor for booster heater 1 |
| BHC2 | Contactor for booster heater 2 |
| BHCP | Contactor for booster heater protection |
| IHT | Thermostat (fixed temp.) for immersion heater (Option) |
| IH | Immersion heater (Option) |
| IHC | Contactor for immersion heater (Option) |

| Symbol | Name |
|---|---|
| TH1 | Thermistor (Room temp.)(Option) |
| THW1 | Thermistor (Flow water temp.) |
| THW2 | Thermistor (Return water temp.) |
| THW5 | Thermistor (DHW tank water temp.) |
| THW6 | Thermistor (Zone 1 flow temp.)(Option) |
| THW7 | Thermistor (Zone 1 return temp.)(Option) |
| THW8 | Thermistor (Zone 2 flow temp.)(Option) |
| THW9 | Thermistor (Zone 2 return temp.)(Option) |
| THWB1 | Thermistor (Boiler flow temp.)(Option) |
| THWB2 | Thermistor (Boiler return temp.)(Option) |
| IN1 | Room thermostat 1 (Field supply) |
| IN2 | Flow switch 1 |
| IN3 | Flow switch 2 (Field supply) |
| IN4 | Demand control (Field supply) |
| IN5 | Outdoor thermostat (Field supply) |
| IN6 | Room thermostat 2 (Field supply) |
| IN7 | Flow switch 3 (Field supply) |

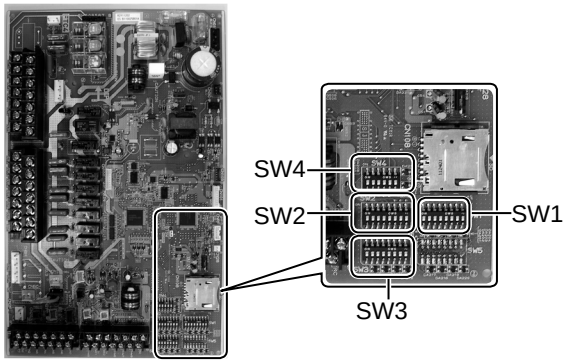
| FLOW TEMP. CONTROLLER (FTC4) | |
|---|---|
| TBO.1~2 | Terminal block <Outputs> |
| TBI.1~2 | Terminal block <Signal inputs, Thermistor> |
| F1~F2 | Fuse (T6.3AL250V) |
| SW1~4 | Dip switch *See <6-16 Dip switch setting> |
| X1~X12 | Relay |
| LED1 | Power supply (FTC4) |
| LED2 | Power supply (Main controller) |
| LED3 | Communication (FTC4-Outdoor unit) |
| LED4 | Reading or writing data to SD card |
| CNPWM | Pump speed control signal for MP1 |
| CN108 | SD card connector |

1. Symbols used in wiring diagram are, ⊙⊙ : connector, □□□ : terminal block.
2. Indoor unit and outdoor unit connecting wires have polarities, make sure to match terminal numbers (S1, S2, S3) for correct wirings,
3. Since the outdoor unit side electric wiring may change, be sure to check the outdoor unit electric wiring diagram for servicing.
4. This diagram shows the wiring of indoor unit and outdoor unit connecting wires (specification of 230V), adopting superimposed system of power and signal. When work to supply power separately to indoor unit and outdoor unit was applied, refer to Figure 1.

## 6-16. Dip switch setting

Located on the FTC4 printed circuit board are 4 sets of small white switches known as Dip switches. The Dip switch number is printed on the circuit board next to the relevant switches. The word ON is printed on the circuit board and on the Dip switch block itself. To move the switch you will need to use a pin or the corner of a thin metal ruler or similar.

Dip switch settings are listed below in the table below.
Before changing any switch settings, ensure power supplies to indoor and outdoor units are isolated/powered off.




| 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 | 55ºC | 60ºC | ON *1 |
| | SW1-3 | DHW tank | WITHOUT DHW tank | WITH DHW tank | ON |
| | SW1-4 | Immersion heater | WITHOUT Immersion heater | WITH Immersion heater | OFF: Except EHST20C-*M*HB EHPT20X-*M*HB<br>ON : EHST20C-*M*HB EHPT20X-*M*HB |
| | SW1-5 | Booster heater | WITHOUT Booster heater | WITH Booster heater | ON |
| | SW1-6 | Booster heater function | For heating only | For heating and DHW | ON |
| | SW1-7 | Outdoor unit type | Split type | Packaged type | OFF: EHST20C-*M**B<br>ON : EHPT20X-*M**B |
| | 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 | ON |
| | SW2-3 | Booster heater capacity restriction | Inactive | Active | OFF: Except EH*T20*-VM2*B<br>ON : EH*T20*-VM2*B |
| | SW2-4 | — | — | — | OFF |
| | SW2-5 | Automatic switch to backup heat source operation (When outdoor unit stops by error) | Inactive | Active *2 | OFF |
| | SW2-6 | Mixing tank | WITHOUT Mixing tank | WITH Mixing tank | OFF |
| | SW2-7 | 2-zone temperature control | Inactive | Active | OFF |
| | SW2-8 | — | — | — | OFF |
| 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 input (IN3) logic change | Failure detection at short | Failure detection at open | OFF |
| | SW3-3 | Flow switch 3 input (IN7) logic change | Failure detection at short | Failure detection at open | OFF |
| | SW3-4 | — | — | — | OFF |
| | SW3-5 | Heating mode function *3 | Inactive | Active | OFF |
| | SW3-6 | — | — | — | OFF |
| | SW3-7 | — | — | — | OFF |
| | SW3-8 | — | — | — | OFF |
| SW4 | SW4-1 | — | — | — | OFF |
| | SW4-2 | — | — | — | OFF |
| | SW4-3 | — | — | — | OFF |
| | SW4-4 | — | — | — | OFF |
| | SW4-5 | Emergency mode (Heater only operation) | Normal | Emergency mode (Heater only operation) (To be activated only when powered ON) | OFF *4 |
| | SW4-6 | Emergency mode (Boiler operation) | Normal | Emergency mode (Boiler operation) (To be activated only when powered ON) | OFF *4 |

**Note:**
**✻1. When the cylinder unit is connected with a PUHZ-RP outdoor unit of which maximum outlet water temperature is 55ºC, Dip SW1-2 must be changed to OFF.**
**✻2. 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.)**
**✻3 This switch functions only when the cylinder unit is connected with a PUHZ-FRP outdoor unit. When another type of outdoor unit is connected, the heating mode function is active regardless of the fact that this switch is ON or OFF.**
**✻4. If emergency mode is no longer required, return the switch to OFF position.**

### Automatic switch to backup heat source operation

Back-up heat source operation (*1) will automatically run when the outdoor unit stops abnormally.
To enable the function, switch Dip SW 2-5 to ON.
During the back-up operation, an error code(s) and the contact number will be displayed alternately.
External output (OUT11) will be available.
To clear the fault(s), reset the power breakers on the indoor and outdoor units.

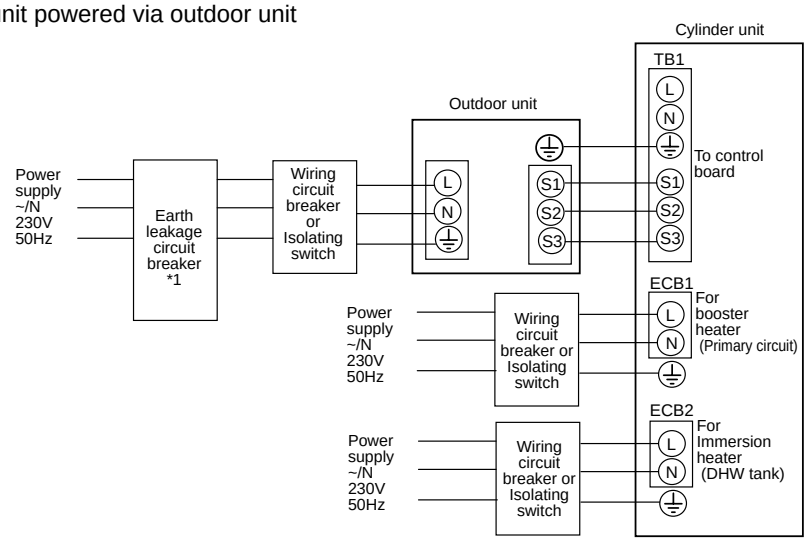
<Applicable error codes (*2)>
E6 to E9, ED, P6, P8, U1 to U8, UD, UE, UF, UL, UP

(*1) Prolonged running of the back-up operation may affect the life of the heat source.
(*2) For safety reasons, this function is not available for certain faults. (System operation must be stopped and only pump keeps running.)

# 7 FIELD WIRING

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

Option 1: Cylinder unit powered via outdoor unit
**<1 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.
*2 Affix label A which is included with the manuals near each wiring diagram for cylinder unit and outdoor units

<Figure 7-1>
Electrical connections 1 phase

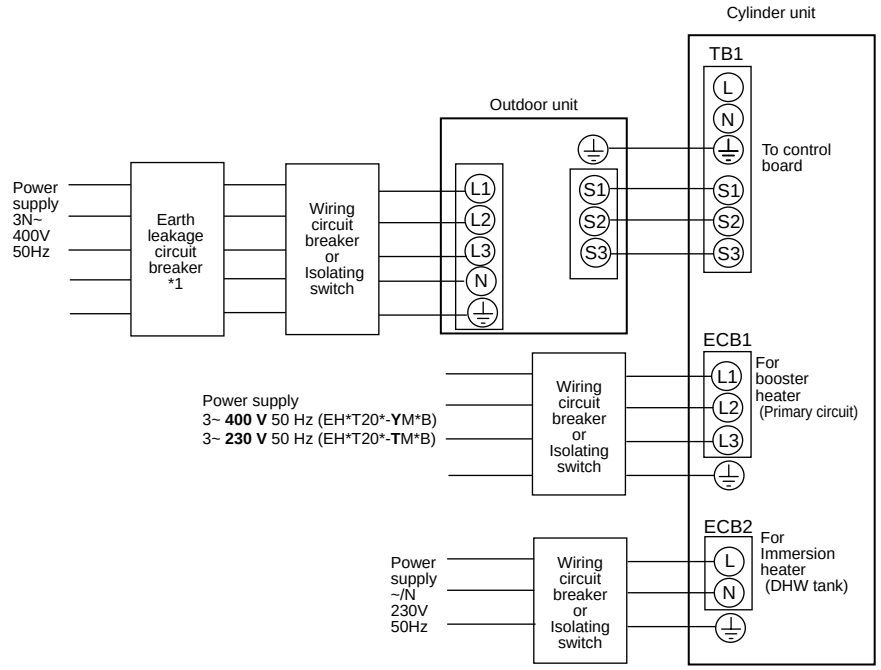
| Description | Power supply | Capacity | Breaker | Wiring |
|---|---|---|---|---|
| Booster heater (Primary circuit) | ~/N 230 V 50 Hz | 2 kW | 16 A *1 | 2.5 mm² |
| | | 6 kW | 32 A *1 | 6.0 mm² |
| Immersion heater (DHW tank) | ~/N 230 V 50 Hz | 3 kW | 16 A *1 | 2.5 mm² |

| | | | |
|---|---|---|---|
| Wiring (Wiring No. × size (mm²)) | Cylinder unit - Outdoor unit | *2 | 3 × 1.5 (polar) |
| | Cylinder unit - Outdoor unit earth | *2 | 1 × Min. 1.5 |
| Circuit rating | Cylinder unit - Outdoor unit S1 - S2 | *3 | 230V AC |
| | Cylinder unit - Outdoor unit S2 - S3 | *3 | 24V DC |

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

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

**<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.

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

<Figure 7-2>
Electrical connections 3 phase

| Description | Power supply | Capacity | Breaker | Wiring |
|---|---|---|---|---|
| Booster heater (Primary circuit) | 3~ 400 V 50 Hz | 9 kW | 16 A *1 | 2.5 mm² |
| | 3~ 230 V 50 Hz | 9 kW | 32 A *1 | 6.0 mm² |
| Immersion heater (DHW tank) | ~/N 230 V 50 Hz | 3 kW | 16 A *1 | 2.5 mm² |

| | | | |
|---|---|---|---|
| Wiring Wiring No. × size (mm²) | Cylinder unit - Outdoor unit | *2 | 3 × 1.5 (polar) |
| | Cylinder unit - Outdoor unit earth | *2 | 1 × Min. 1.5 |
| Circuit rating | Cylinder unit - Outdoor unit S1 - S2 | *3 | 230V AC |
| | Cylinder unit - Outdoor unit S2 - S3 | *3 | 24V DC |

*1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV). The breaker shall be provided to ensure disconnection of all active phase conductors of the supply.

*2. Max. 45 m
If 2.5 mm² used, Max. 50 m
If 2.5 mm² used and S3 separated, Max. 80 m

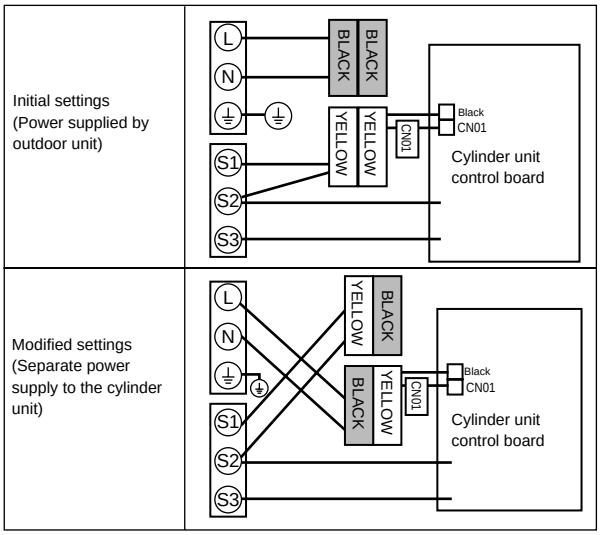
*3. The values given in the table above are not always measured against the ground value.

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

Option 2: Cylinder unit powered by independent source.

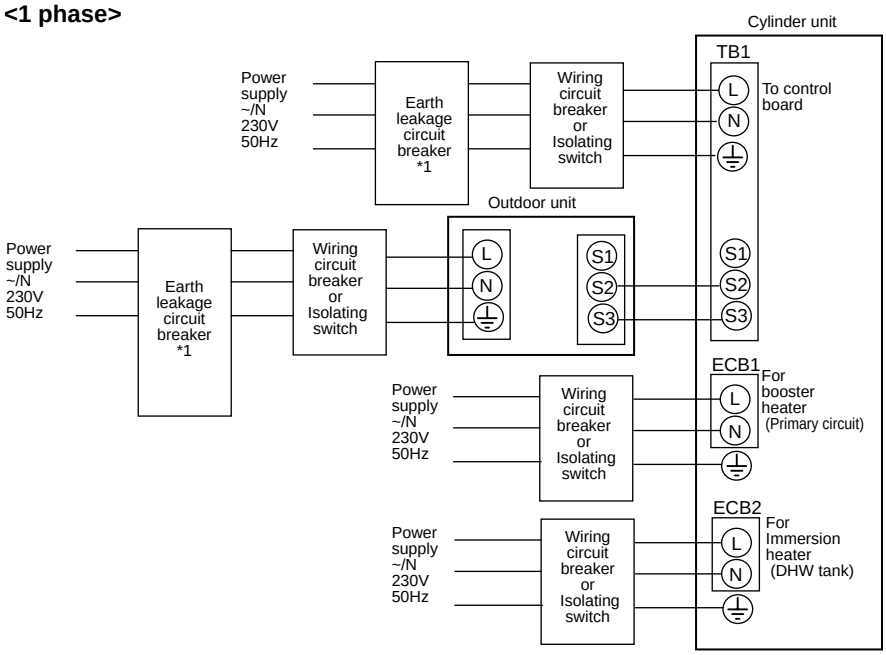
If the cylinder unit and outdoor unit have separate power supplies, the following requirements MUST be carried out:

- **Change the connector connections in the control and electrical box of the cylinder unit (see Figure 7-3)**
- **Turn the outdoor unit DIP switch SW8-3 to ON**
- **Turn on the outdoor unit BEFORE the cylinder unit.**




<Figure 7-3>

**<1 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.
*2 Affix label B which is included with the manuals near each wiring diagram for cylinder unit and outdoor units.

<Figure 7-4>
Electrical connections 1 phase

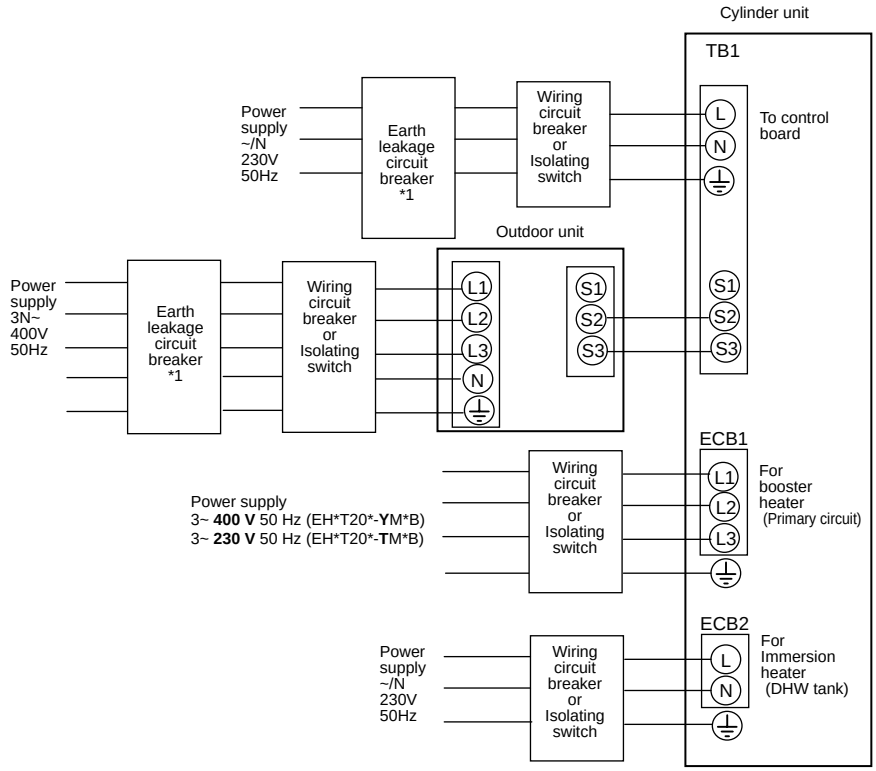
| Description | Power supply | Capacity | Breaker | Wiring |
|---|---|---|---|---|
| Booster heater (Primary circuit) | ~/N 230 V 50 Hz | 2 kW | 16 A *1 | 2.5 mm² |
| | | 6 kW | 32 A *1 | 6.0 mm² |
| Immersion heater (DHW tank) | ~/N 230 V 50 Hz | 3 kW | 16 A *1 | 2.5 mm² |

| | | | |
|---|---|---|---|
| Cylinder unit power supply | | | ~/N 230 V 50 Hz |
| Cylinder unit input capacity Main switch (Breaker) | | *1 | 16 A |
| Wiring Wiring No. × size (mm²) | Cylinder unit power supply | | 2 × Min. 1.5 |
| | Cylinder unit power supply earth | | 1 × Min. 1.5 |
| | Cylinder unit - Outdoor unit | *2 | 2 × Min. 0.3 |
| | Cylinder unit - Outdoor unit earth | | — |
| Circuit rating | Cylinder unit L - N | *3 | 230V AC |
| | Cylinder unit - Outdoor unit S1 - S2 | *3 | — |
| | Cylinder unit - Outdoor unit S2 - S3 | *3 | 24V DC |

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

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

**<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.

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

<Figure 7-5>
Electrical connections 3 phase

| Description | Power supply | Capacity | Breaker | Wiring |
|---|---|---|---|---|
| Booster heater (Primary circuit) | 3~ 400 V 50 Hz | 9 kW | 16 A *1 | 2.5 mm² |
| | 3~ 230 V 50 Hz | 9 kW | 32 A *1 | 6.0 mm² |
| Immersion heater (DHW tank) | ~/N 230 V 50 Hz | 3 kW | 16 A *1 | 2.5 mm² |

| | | | |
|---|---|---|---|
| Cylinder unit power supply | | | ~/N 230 V 50 Hz |
| Cylinder unit input capacity Main switch (Breaker) | | *1 | 16 A |
| Wiring (Wiring No. × size (mm²)) | Cylinder unit power supply | | 2 × Min. 1.5 |
| | Cylinder unit power supply earth | | 1 × Min. 1.5 |
| | Cylinder unit - Outdoor unit | *2 | 2 × Min. 0.3 |
| | Cylinder unit - Outdoor unit earth | | — |
| Circuit rating | Cylinder unit L - N | *3 | 230V AC |
| | Cylinder unit - Outdoor unit S1 - S2 | *3 | — |
| | Cylinder unit - Outdoor unit S2 - S3 | *3 | 24V DC |

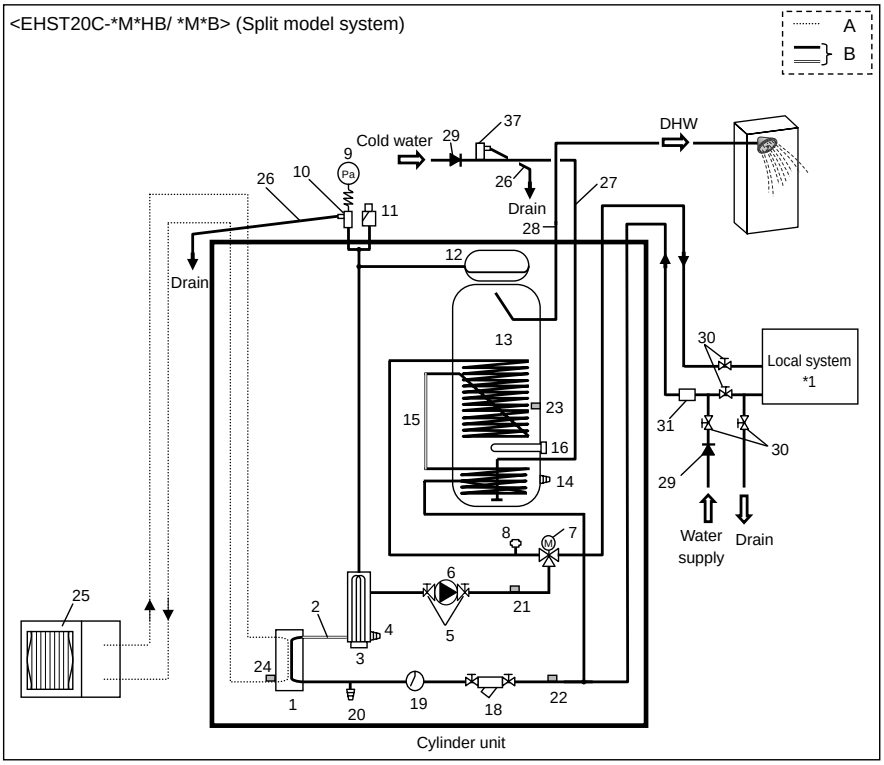
*1. A breaker with at least 3.0 mm contact separation in each pole shall be provided. Use earth leakage breaker (NV). The breaker shall be provided to ensure disconnection of all active phase conductors of the supply.

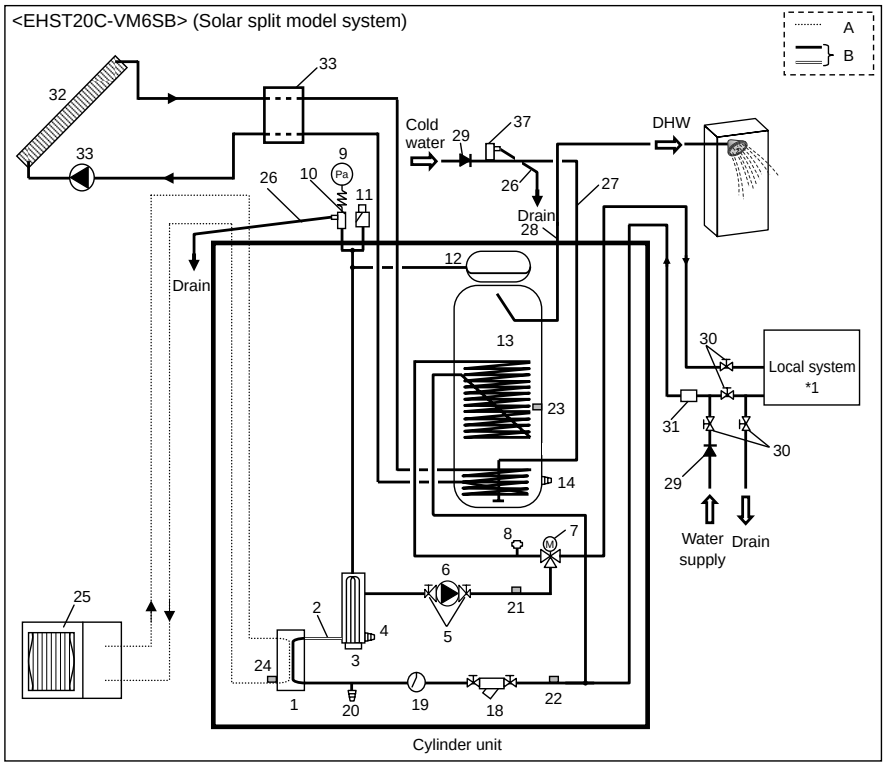
*2. Max. 120 m

*3. The values given in the table above are not always measured against the ground value.

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

# 8 WATER SYSTEM DIAGRAM



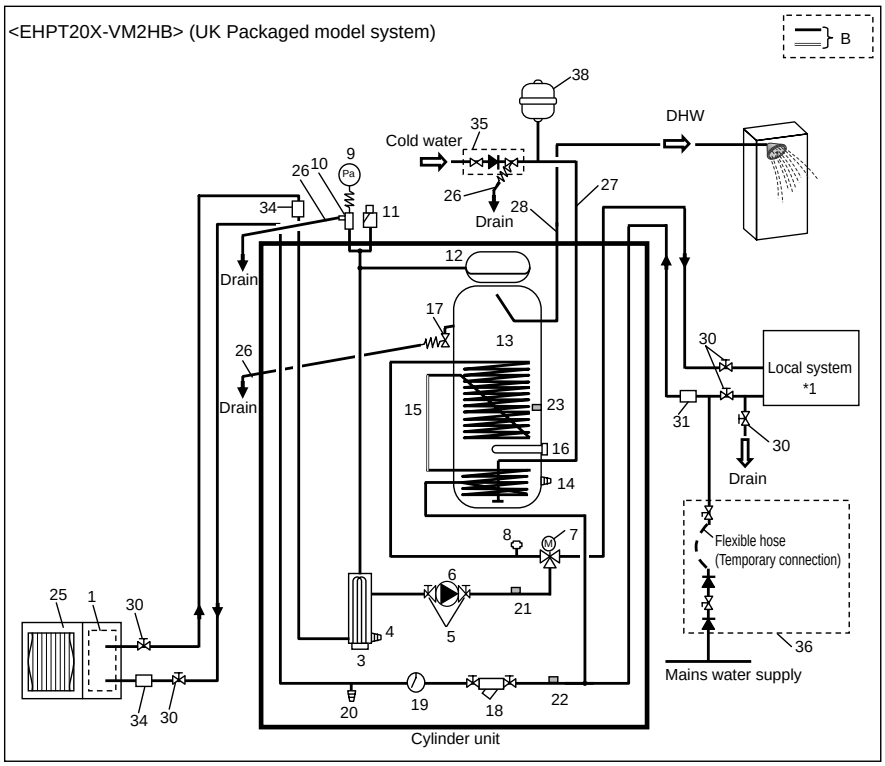




A. Refrigerant pipe
B. Water pipe
1. Plate heat exchanger
2. Flexible hose
3. Booster heater 1,2
4. Drain cock (booster heater)
5. Pump valve
6. Water circulation pump 1
7. 3-way valve
8. Manual air vent
9. Manometer
10. Pressure relief valve (3 bar)
11. Automatic air vent
12. Expansion vessel (except EHST20C-*M*EB)
13. DHW tank
14. Drain cock (DHW tank)
15. Flexible hose
16. Immersion heater (only for EH*T20*-*M*HB)
18. Strainer valve
19. Flow switch
20. Drain cock (primary circuit)
21. THW1
22. THW2
23. THW5
24. TH2
25. Outdoor unit
26. Drain pipe (field supply)
27. Cold water inlet pipe
28. DHW outlet connection
29. Back flow prevention device (field supply)
30. Isolating valve (field supply)
31. Magnetic filter (field supply) (recommended)
32. Solar panel (field supply)
33. Solar hydraulic kit (kit to be compatible for use with FTC 4 (field supply)
37. Pressure relief valve (10 bar) (accessory)

*1 Refer to page 34.

Note
- To enable draining of the cylinder unit an isolating valve should be positioned on both the inlet and outlet pipework. No valve should be fitted between the pressure relief valve (item 37) and the cylinder unit (safety matter).
- Be sure to install a strainer, on the inlet pipework to the cylinder unit.
- Suitable drain pipework should be attached to all relief valves in accordance with your country's regulations.
- A backflow prevention device must be installed on the cold water supply pipework (IEC 61770)
- When using components made from different metals or connecting pipes made of different metals insulate the joints to prevent any corrosive reaction taking place which may damage the pipework.

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




| Model name | EHPT20X-VM2HB |
|---|---|
| Maximum supply pressure to the pressure reducing valve | 16 bar |
| Operating pressure (Potable side) | 3.5 bar |
| Expansion vessel charge setting pressure (Potable side) | 3.5 bar |
| Expansion valve setting pressure (Potable side) | 6.0 bar |
| Immersion heater specification (Potable side)<br>* EN60335/Type 3000W single phase 230V 50Hz, length 460 mm<br>** Use only Mitsubishi Electric service parts as a direct replacement. | 3000 W, 230 V |
| DHW tank capacity | 200 L |
| Mass of the unit when full | 326 kg |
| Maximum primary working pressure | 2.5 bar |

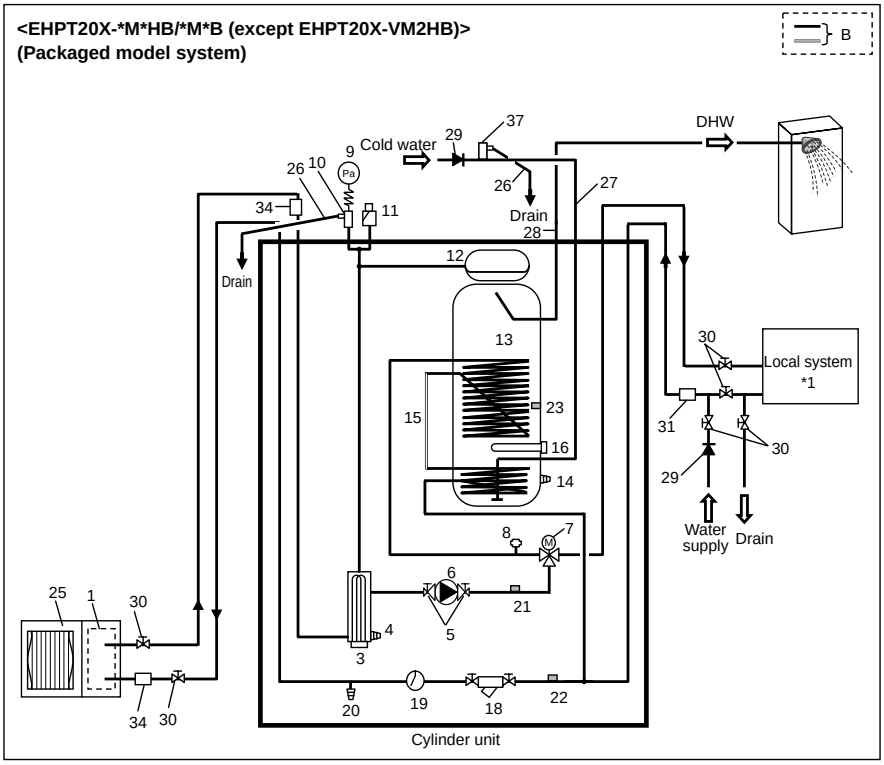
B. Water pipe
1. Plate heat exchanger
3. Booster heater 1,2
4. Drain cock for booster heater)
5. Pump valve
6. Water circulation pump 1
7. 3-way valve
8. Manual air vent
9. Manometer
10. Pressure relief valve
11. Automatic air vent
12. Expansion vessel
13. DHW tank
14. Drain cock for DHW tank
15. Flexible hose
16. Immersion heater (only for EH*T20*-*M*HB)
17. T&P relief valve
18. Strainer valve
19. Flow switch
20. Drain cock for primary circuit
21. THW1
22. THW2
23. THW5
25. Outdoor unit
26. Drain pipe (field supply)
27. Cold water inlet pipe
28. DHW outlet connection
30. Isolating valve (field supply)
31. Magnetic filter (field supply) (recommended)
34. Strainer (field supply)
35. Inlet control group supplied with UK model ONLY*
36. Filling loop (Ball valves, check valves, and flexible hose) supplied with UK model ONLY*
38. Potable expansion vessel supplied with UK model ONLY*

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

*1 Refer to page 34.

Note
- To enable draining of the cylinder unit an isolating valve should be positioned on both the inlet and outlet pipework. No valve should be fitted between the expansion valve (item 35) and the cylinder unit (safety matter).
- Be sure to install a strainer, on the inlet pipework to the cylinder unit.
- Suitable drain pipework should be attached to all relief valves in accordance with your country's regulations.
- When using components made from different metals or connecting pipes made of different metals insulate the joints to prevent any corrosive reaction taking place which may damage any pipework.
- Filling loop's flexible hose must be removed following the filling procedure. Item provided with unit as loose accessory.
- Install the inlet control group (item 35) above the level of the T&P relief valve (item 17). This will ensure DHW tank will not require drain-down to service/maintain the inlet control group.

**<EHPT20X-*M*HB/*M*B (except EHPT20X-VM2HB)>**
**(Packaged model system)**




B. Water pipe
1. Plate heat exchanger
3. Booster heater 1,2
4. Drain cock for booster heater)
5. Pump valve
6. Water circulation pump 1
7. 3-way valve
8. Manual air vent
9. Manometer
10. Pressure relief valve (3 bar)
11. Automatic air vent
12. Expansion vessel
13. DHW tank
14. Drain cock for DHW tank
15. Flexible hose
16. Immersion heater (only for EH*T20*-*M*HB)
18. Strainer valve
19. Flow switch
20. Drain cock for primary circuit
21. THW1
22. THW2
23. THW5
25. Outdoor unit
26. Drain pipe (field supply)
27. Cold water inlet pipe
28. DHW outlet connection
29. Back flow prevention device (field supply)
30. Isolating valve (field supply)
31. Magnetic filter (field supply) (recommended)
34. Strainer (field supply)
37. Pressure relief valve (10 bar) (accessory)

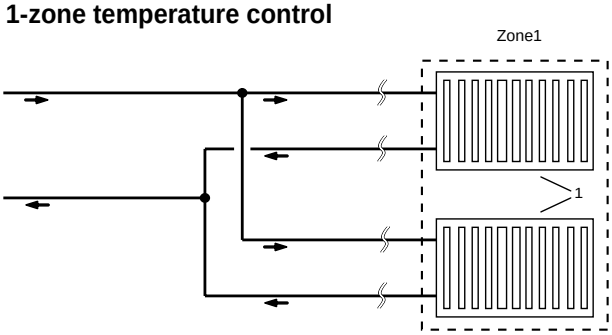
*1 Refer to page 34.

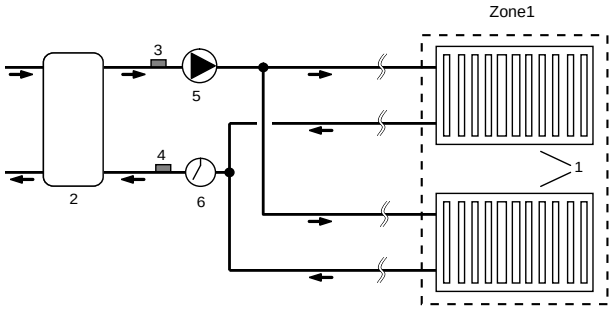
Note

- To enable draining of the cylinder unit an isolating valve should be positioned on both the inlet and outlet pipework. No valve should be fitted between the pressure relief valve (item 37) and the cylinder unit (safety matter).
- Be sure to install a strainer, on the inlet pipework to the cylinder unit.
- Suitable drain pipework should be attached to all relief valves in accordance with your country's regulations.
- A backflow prevention device must be installed on the cold water supply pipework (IEC 61770)
- When using components made from different metals or connecting pipes made of different metals insulate the joints to prevent any corrosive reaction taking place which may damage the pipework.

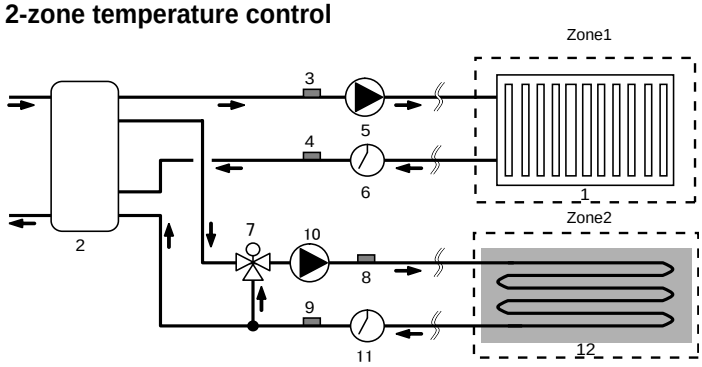
## Local system

### 1-zone temperature control

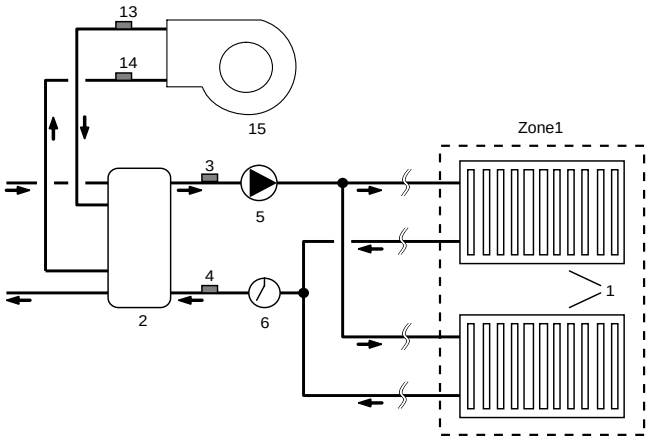


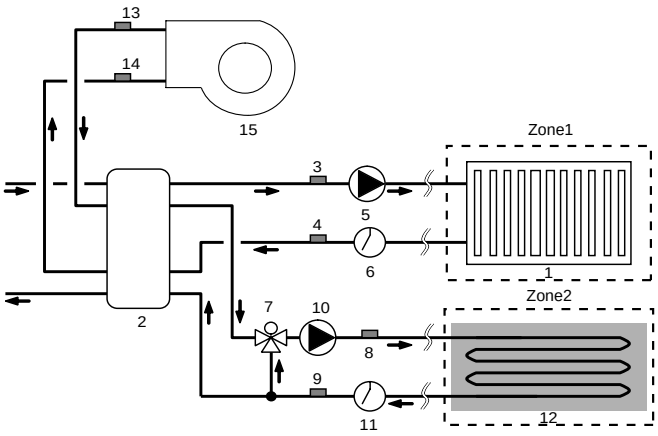

### 2-zone temperature control




### 1-zone temperature control with boiler




### 2-zone temperature control with boiler




1. Zone1 heat emitters (e.g. radiator, fan coil unit) (field supply)
2. Mixing tank (field supply)
3. Zone1 flow water temp. thermistor (THW6)
4. Zone1 return water temp. thermistor (THW7) } Optional part : PAC-TH011-E
5. Zone1 water circulation pump (field supply)
6. Zone1 flow switch (field supply) *
7. Motorized mixing valve (field supply)
8. Zone2 flow water temp. thermistor (THW8)
9. Zone2 return water temp. thermistor (THW9) } Optional part : PAC-TH011-E
10. Zone2 water circulation pump (field supply)
11. Zone2 flow switch (field supply) *
12. Zone2 heat emitters (e.g. underfloor heating) (field supply)
13. Boiler flow water temp. thermistor (THWB1)
14. Boiler return water temp. thermistor (THWB2) } Optional part : PAC-TH011HT-E
15. Boiler

* Flow switch specifications: DC13 V / 0.1 mA / Both normally-open and normally-closed types can be used. (Set Dip switch 3 to select the logics. Refer to " 6-16 Dip switch setting".)

## Filling the cylinder unit (Primary circuit)

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

- Anti-freeze should always be used for packaged model systems (see section 4.2 for instruction). It is the responsibility of the installer to decide if anti-freeze solution should be used in split model systems depending on each site's conditions. Corrosion inhibitor should be used in both split model and packaged model systems.
- When connecting metal pipes of different materials insulate the joints to prevent a corrosive reaction taking place which will damage the pipework.

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

## Filling the cylinder unit (Potable/DHW circuit)

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

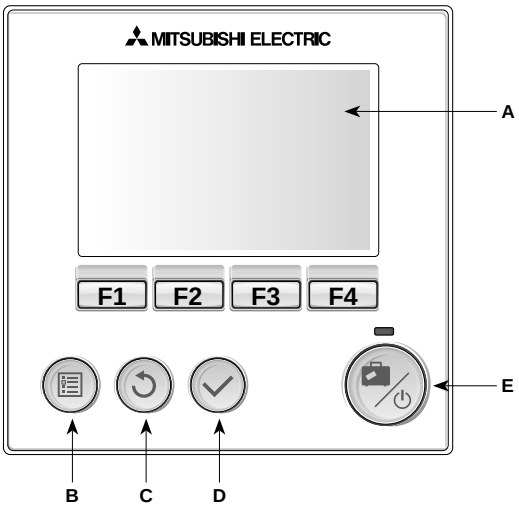
Initial flush procedure:
1. Energise system to heat-up cylinder contents to a temperature of approx. 30 – 40°C.
2. Flush/drain the water contents to remove any residue/impurities resulting from the installation works. Use the cylinder drain cock to safely discharge the warmed water to drain via a suitable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

## Draining the cylinder unit

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

# 9 CONTROLS

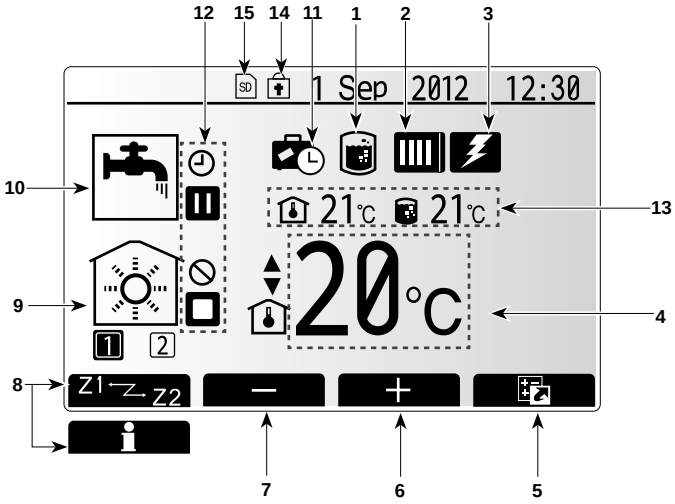
## 9-1. Main Controller




**<Main controller parts>**

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

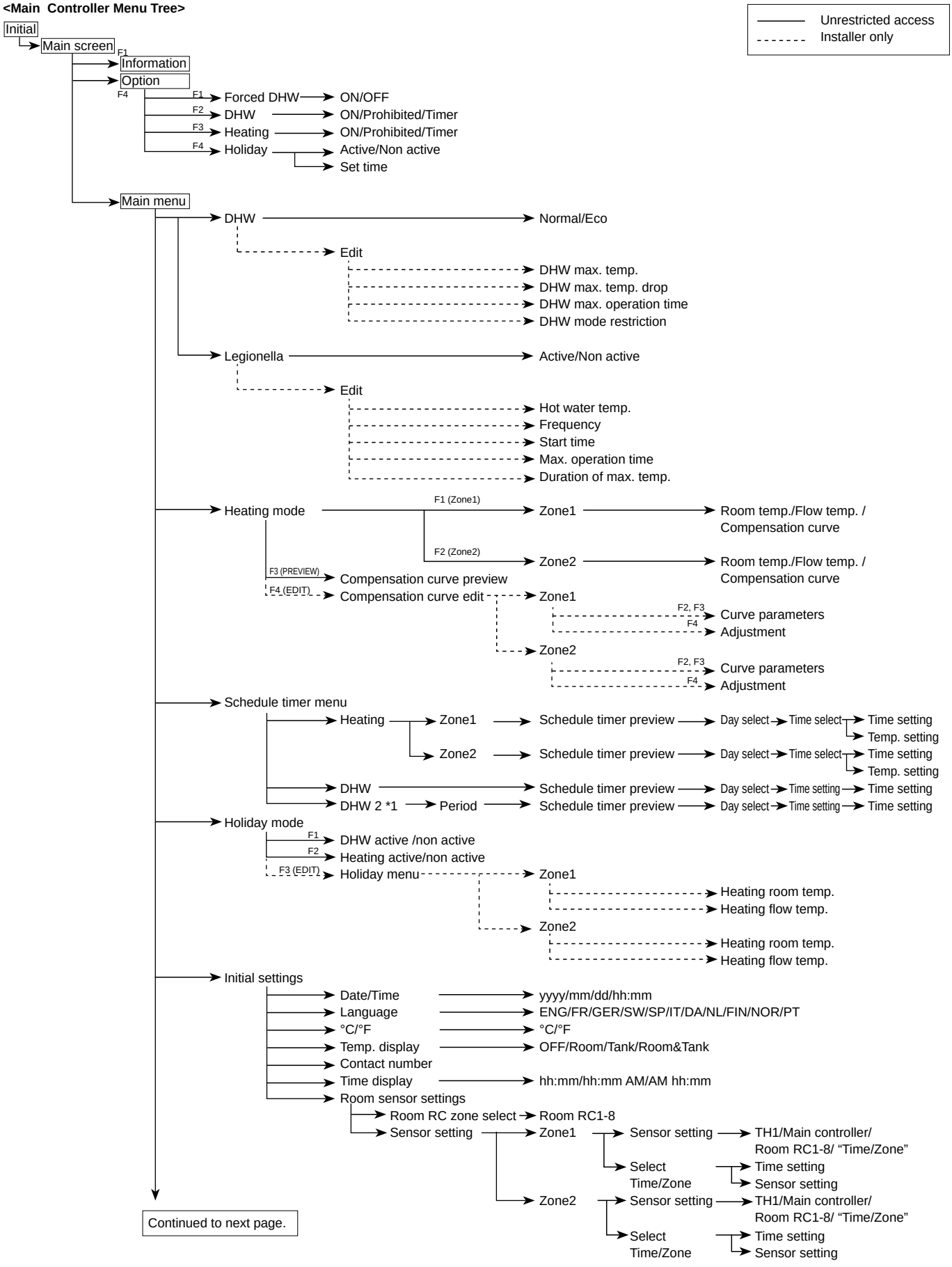
***1**
**When the system is switched off or the power supply is disconnected, the cylinder unit protection functions (e.g. freeze stat. function) will NOT operate. Please beware that without these safety functions enabled the cylinder unit may potentially become exposed to damage.**




**<Main screen icons>**

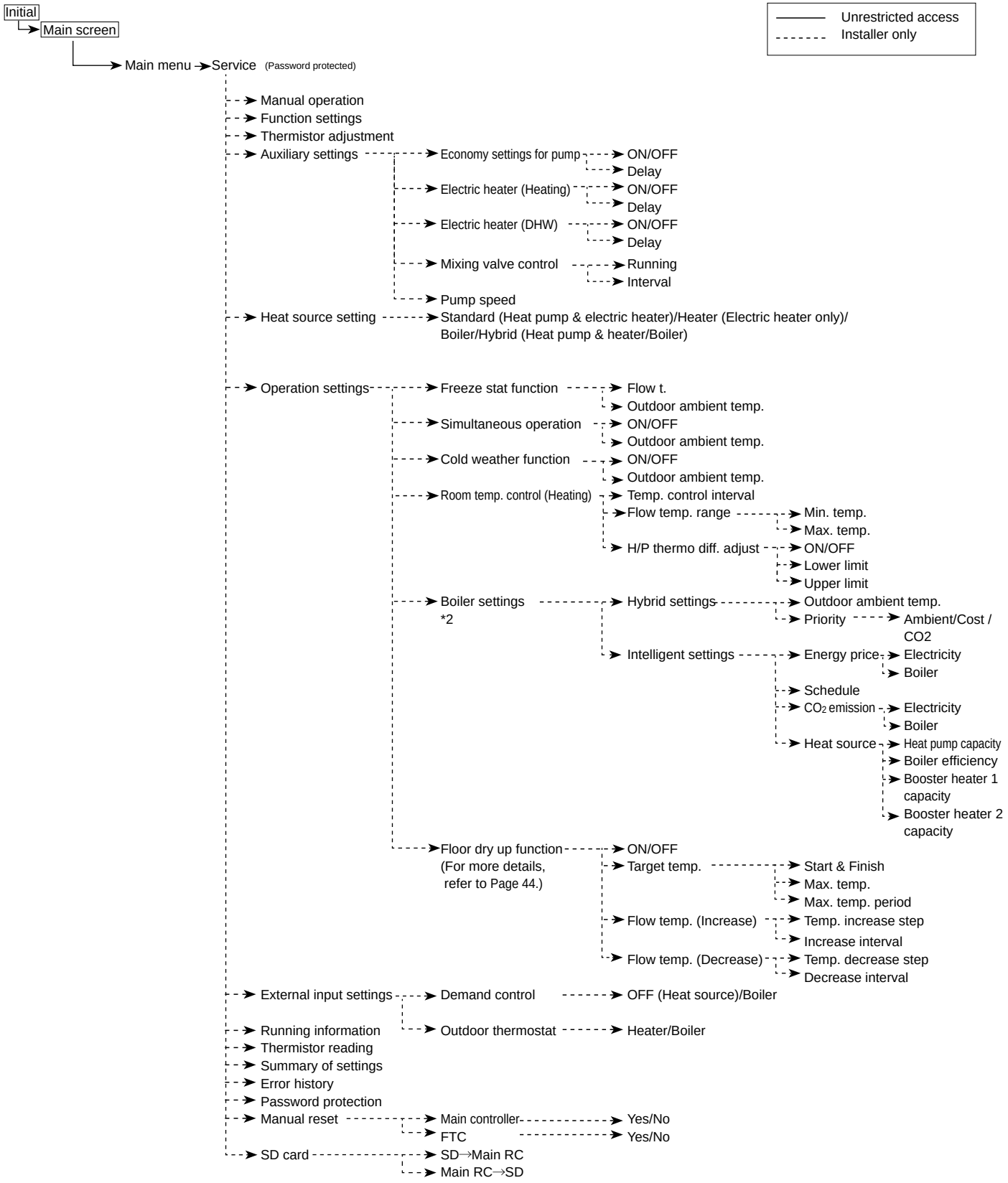
| | Icon | Description | |
|---|---|---|---|
| 1 | Legionella prevention | When this icon is displayed 'Legionella prevention mode' is active. | |
| 2 | Heat pump | | 'Heat pump' is running. |
| | | | Defrosting. |
| | | | Emergency heating. |
| 3 | Electric heater | When this icon is displayed the 'Electric heaters' (booster or immersion heater) are in use. | |
| 4 | Target temperature | | Target flow temperature |
| | | | Target room temperature |
| | | | Compensation curve |
| 5 | OPTION | Pressing the function button below this icon will display the quick view menu. | |
| 6 | + | Increase desired temperature. | |
| 7 | - | Decrease desired temperature. | |
| 8 | 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 mode | | Heating mode<br>Zone1 or Zone2 |
| 10 | DHW mode | Normal or ECO mode | |
| 11 | Holiday mode | When this icon is displayed 'Holiday mode' activated. | |
| 12 | | Timer | |
| | | Prohibited | |
| | | Stand-by | |
| | | Stop | |
| | | Operating | |
| 13 | Current temperature | | 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. | |
| 15 | | SD memory card is inserted. Normal operation. | |
| | | SD memory card is inserted. Abnormal operation. | |

**<Main Controller Menu Tree>**




*1 When a PUHZ-FRP outdoor unit is connected.

**<Main Controller Menu Tree>**



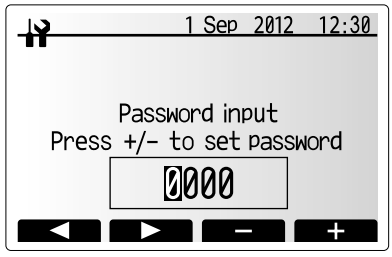

*2 For more details, refer to the installation manual of PAC-TH011HT-E.

Continued from the previous page.

## 9-2. Service Menu

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

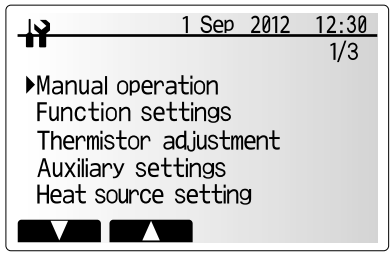
1. From the main setting menu use F2 and F3 to highlight the service icon then press CONFIRM.
2. You will be prompted to enter a password. **THE FACTORY DEFAULT PASSWORD IS "0000".**
3. Press CONFIRM.
   (It takes approx. 30 secs to load the service menu.)




Screen 1 of service menu

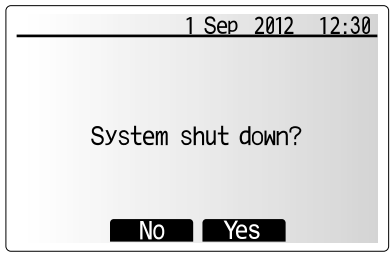
The service menu is navigated using the F1 and F2 buttons to scroll through the functions. The menu is split across three screens and is comprised of the following functions;

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




Screen 2 of service menu

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

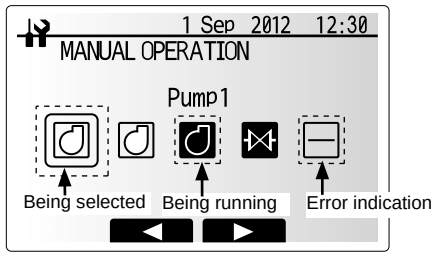



System off prompt screen

### Manual operation

During the filling of the system the water circulation pump, 3-way valve, and mixing 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 FTC4.

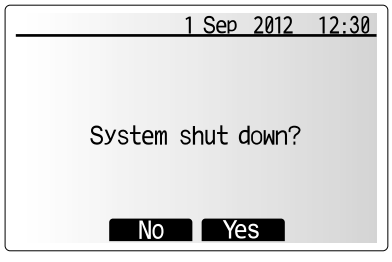
1. From the service menu use F1 and F2 buttons to scroll through list until Manual Operation is highlighted.
2. Press CONFIRM.
3. Manual operation menu screen is displayed.
4. To activate manual operation, press the function button under the desired part.




Manual operation menu screen

►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 FTC4 will resume control of the part.

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




System off prompt screen

## Function settings

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

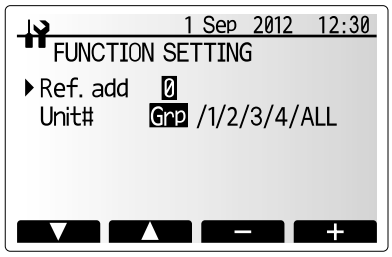
1. From the service menu use F1 and F2 to highlight Function Setting.
2. Press CONFIRM.
3. Ensure the Ref address and unit number are displayed to the right.
4. Press CONFIRM.
5. Use F3 and F4 to highlight either 1/2/3 (see below).

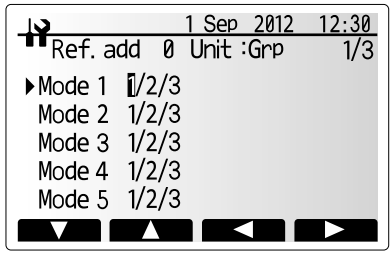
Note: Changes can ONLY be made to Mode 1.

6. Press CONFIRM.

Mode 1 Setting number meanings

1 - Power failure automatic recovery NOT available
2 - Power failure automatic recovery AVAILABLE
(Approx 4-minute delay after power is restored.)
3 - NO FUNCTION

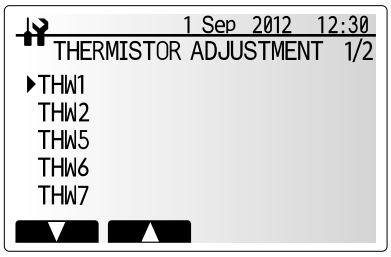


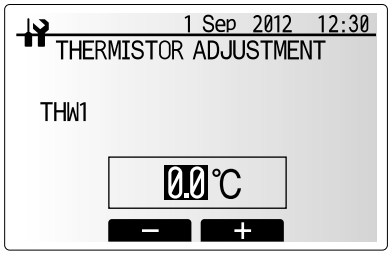




## Thermistor adjustment

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

1. From the Service menu highlight Thermistor Adjustment
2. Press CONFIRM.
3. Use F1 and F2 to select thermistor.
4. Press CONFIRM.
5. Use F2 and F3 to change the thermistor temperature.
6. Press CONFIRM.

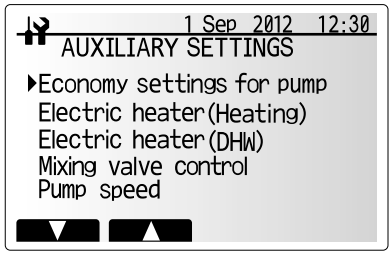



## Auxiliary settings

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

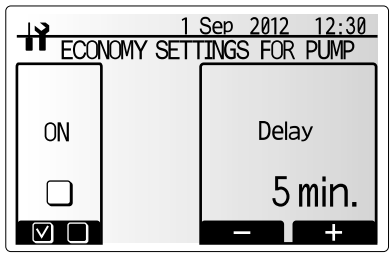
From the service menu use F1 and F2 buttons to highlight Auxiliary settings then press CONFIRM.




Auxiliary settings menu screen

**<Economy settings for pump>**

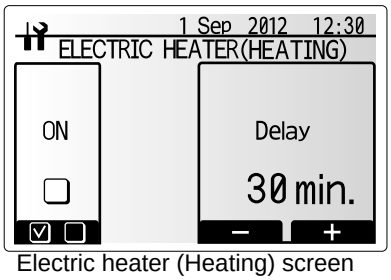
1. From the Auxiliary settings menu highlight Economy Settings for water circulation pump.
2. Press CONFIRM.
3. The economy settings for water circulation pump screen is displayed.
4. Use button F1 to switch the economy settings ON/OFF.
5. Use buttons F3 and F4 to adjust the time the water circulation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




Economy settings for pump screen

**<Electric heater (Heating)>**

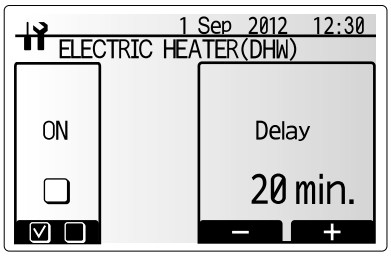
1. From the Auxiliary settings menu highlight Electric heater (Heating).
2. Press CONFIRM.
3. The Electric heater (Heating) screen is displayed.
4. Press F1 button to switch the function ON/OFF.
5. Use F3 and F4 buttons to adjust the time period of heat pump only operation before the booster heater will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



Electric heater (Heating) screen

**<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 button to switch the function ON/OFF.
5. Use F3 and F4 buttons to adjust the time period of heat pump only operation before the booster heater and the immersion heater (if present) will assist in DHW heating. (15 -30mins)



Electric heater (DHW) screen

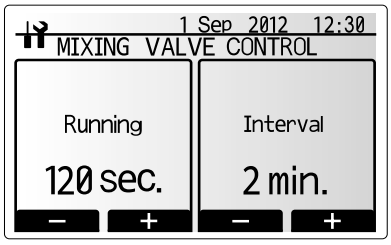
**<Mixing valve control>**

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 mins.

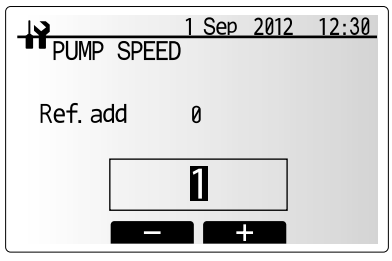
**Note: It is recommended to set the interval to 2 minutes that is a default value. With the interval set longer, it could take longer to warm up a room.**



Mixing valve setting screen

**<Pump speed>**

1. From the Auxiliary settings menu highlight water circulation 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.
4. Press CONFIRM.
5. The Pump speed screen is displayed.
6. Use F2 and F3 buttons to set the pump speed of the water circulation pump between 1 to 5.

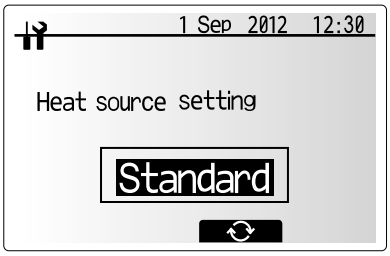


Pump speed setting screen

### Heat source setting

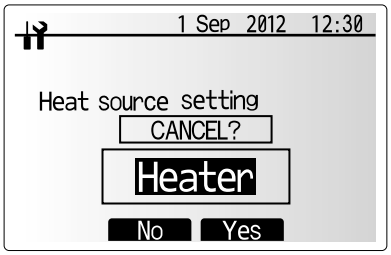
The default heat source setting is heat pump and all electric heaters present in the system to be operational. This is referred to as Standard operation on the menu.

1. From the service menu use F1 and F2 buttons to scroll through list until Heat Source Setting is highlighted.
2. Press CONFIRM.
3. Heat source setting menu screen is displayed.
4. Press F3 button until preferred heat source is displayed.
5. Press CONFIRM.




Heat source setting screen

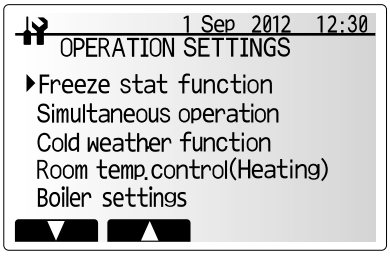
6. If you wish to return to the service menu without saving the setting press return button. You will be asked if you are sure you wish to cancel the changes. Choose Yes or No as appropriate.




Cancel last action screen

### Operation settings

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

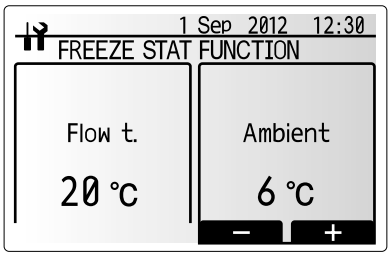



Operation settings menu screen

**<Freeze stat function>**

1. From the Auxiliary settings menu highlight Freeze Stat Function.
2. Press CONFIRM.
3. The freeze stat function screen will be displayed.
4. Use buttons F3 and F4 to adjust the minimum outdoor 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)

**Note: When the system is turned off, freeze stat function is not enabled.**




Freeze stat function screen

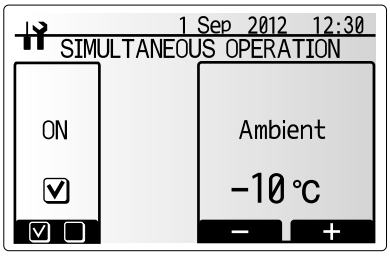
**<Simultaneous Operation>**

For periods of very low outside temperature this mode can be used. Simultaneous operation allows both DHW and space heating to run together by using the heat pump 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.

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

**Note:**

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

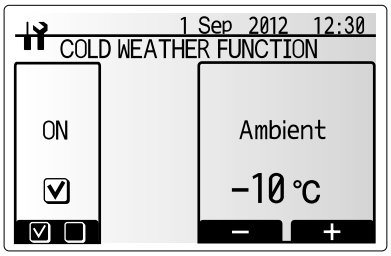



Simultaneous operation screen

**<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 electric usage and may reduce working life of heaters and related parts.

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

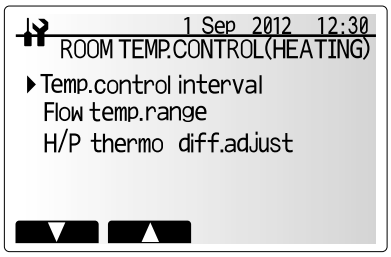
**Note:**
- **Range of outdoor ambient temperature is −15°C to −10°C (default −15°C).**
- **System shall automatically return to routine operation. This will happen when the outdoor ambient temp rises above the selected temp for this specific mode of operation.**




Cold weather function screen

**<Room Temp. Control (Heating)>**
This function allows operational setting of flow temperature range from the Ecodan and also the time interval at which the FTC4 collects and processes data for the auto adaptation mode.

1. From the Operation settings menu use F1 and F2 buttons to scroll through the list until Room temp. control (HEATING) is highlighted.
2. Press CONFIRM.
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.




Room temp. control (HEATING) screen

| Menu subtitle | | Function | Range | Unit | Default |
|---|---|---|---|---|---|
| Temp. control interval | | Selectable according to the heat emitter type and the materials of floor (i.e. radiators, floor heating-thick, -thin concrete, wood, etc.) | 10 - 60 | mins. | 10 |
| Flow temperature range | Minimum temp. | To minimize the loss by frequent ON and OFF in mild outdoor ambient temp. seasons. | 25 - 45 | ºC | 30 |
| | Maximum temp. | To set max. possible flow temp according to the type of heat emitters. | 35 - 60 | ºC | 50 |
| Heat pump thermo diff.adjust | On/Off | To minimize the loss by frequent ON and OFF in mild outdoor ambient temp. seasons. | On/Off | — | On |
| | Lower limit | Prohibits heat pump operation until the flow temperature drops below the target flow temperature minus lower limit value. | −9 - −1 | ºC | −5 |
| | Upper limit | Allows heat pump operation until the flow temperature rises above the target flow temperature plus upper limit value. | +3 - +5 | ºC | +5 |

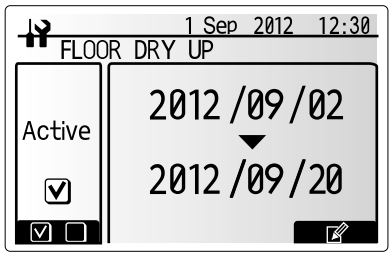
*1 The minimum flow temperature that prohibits heat pump operation is 20ºC.
*2 The maximum flow temperature that allows heat pump operation equals to the maximum temperature set in the flow temp. range menu.

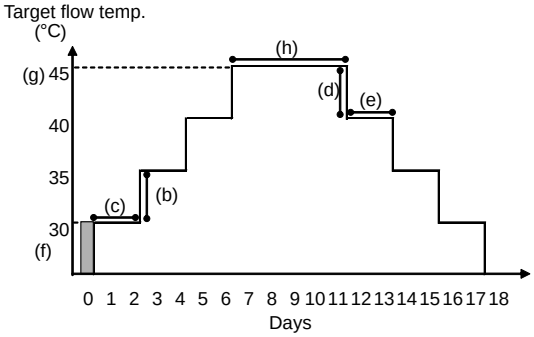
**<Floor dry up function>**
The Floor dry up function automatically changes the target hot water temperature in stages to gradually dry concrete when this particular type of underfloor heating system is installed.

1. Turn off the system using the main controller.
2. From the Operation settings in the service menu, use F1 and F2 buttons to scroll through the list until Floor dry up function is highlighted.
3. Press CONFIRM to display the FLOOR DRY UP screen.
4. To change settings, press F4. For details on settings, refer to the table below.
5. To start the Floor dry up operation, press F1 button to check a box below "Active" and press CONFIRM.

*1. Upon completion of the operation the system stops all the operations except the Freeze stat. operation.
*2. For Floor dry up function, the target flow temp. of Zone1 is the same as that of Zone2.

**Note:**
- **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 temp. may not be maintained.**



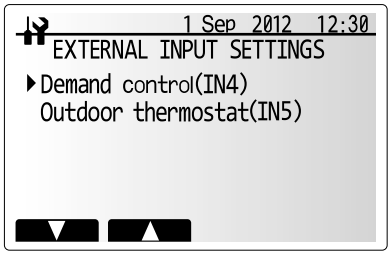




| Functions | | Symbol | Description | Option/Range | Unit | Default |
|---|---|---|---|---|---|---|
| Floor dry up function | | a | Set the function to ON and power on the system using the main controller, and the dry up heating operation will start. | On/Off | — | Off |
| Flow temp. (increase) | Flow temp. increase step | b | Sets the increase step of the target flow temp. | +1 - +10 | ºC | +5 |
| | Increase interval | c | Sets the period for which the same target flow temp is maintained. | 1 - 7 | day | 2 |
| Flow temp. (decrease) | Flow temp. decrease step | d | Sets the decrease step of the target flow temp. | −1 - −10 | ºC | −5 |
| | Decrease interval | e | Sets the period for which the same target flow temp is maintained. | 1 - 7 | day | 2 |
| Target temperature | Start & Finish | f | Sets the target flow temp. at the start and the finish of the operation. | 25 - 60 | ºC | 30 |
| | Max. target temp. | g | Sets the maximum target flow temp. | 25 - 60 | ºC | 45 |
| | Max. temp. period | h | Sets the period for which the maximum target flow temp. is maintained. | 1 - 20 | day | 5 |

## External input settings

From the service menu use F1 and F2 buttons to highlight External input settings then press CONFIRM.

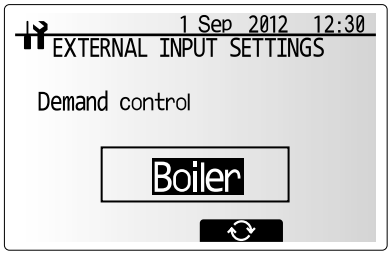
**<Demand control (IN4)>**
1. From the External input settings menu highlight Demand control (IN4).
2. Press CONFIRM.
3. The Demand control screen is displayed.




External input settings menu screen

4. Press F3 button to select Heat source OFF or Boiler.
5. Press CONFIRM.

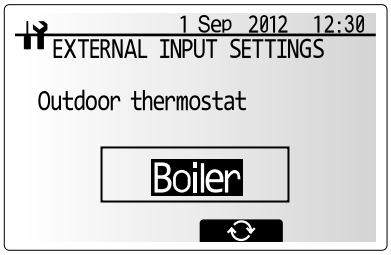
**Note: The selection of "OFF", whilst a signal is being sent to IN4, forcefully stops all the heat source operations and the selection of "Boiler" stops operations of heat pump and electric heater and performs boiler operation.**




Demand control screen

**<Outdoor thermostat (IN5)>**
1. From the External input settings menu highlight Outdoor thermostat (IN5).
2. Press CONFIRM.
3. The Outdoor thermostat screen is displayed.
4. Press F3 button to select Heater or Boiler.
5. Press CONFIRM.

**Note: 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.**




Outdoor thermostat setting screen

## Running information

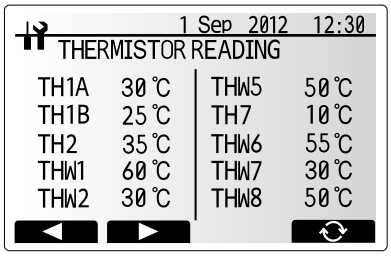
This function shows current temperature and other data of main component parts of both the indoor and outdoor units.

1. From the Service menu highlight Running information.
2. Press CONFIRM.
3. Press F3 and F4 buttons to set the Ref. address.
4. Use the function buttons to enter index code for the component to be viewed. (See the Table 9-2-1 for component index codes.)
4. Press CONFIRM.


## Thermistor reading

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

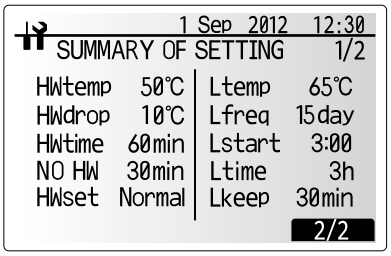
| Thermistor | Description | Thermistor | Description |
|---|---|---|---|
| TH1A | Zone 1 room temperature | THW6 | Zone 1 flow water temperature |
| TH1B | Zone 2 room temperature | THW7 | Zone 1 return water temperature |
| TH2 | Refrigerant return temperature | THW8 | Zone 2 flow water temperature |
| THW1 | Water flow temperature | THW9 | Zone 2 return water temperature |
| THW2 | Water return temperature | THWB1 | Boiler flow water temperature |
| THW5 | DHW tank water temperature | THWB2 | Boiler return water temperature |
| TH7 | Ambient (outdoor) temperature | | |

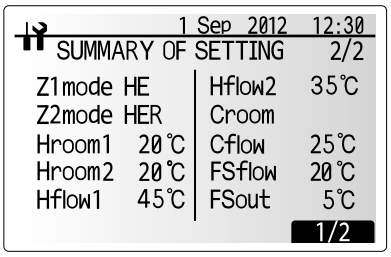



## Summary of settings

This function shows the current installer/user entered settings.

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




## Error history

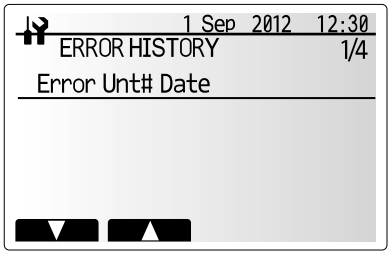
Error history allows the service engineer to view previous Error codes, the unit address and the date on which they occurred. Up to 16 Error codes can be stored in the history the most recent Error event is displayed at the top of the list.

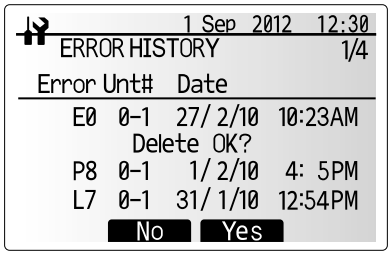
1. From the service menu select Error history
2. Press CONFIRM.

Please see chapter 10-4. for error 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.

1. From the service menu use F1 and F2 buttons to scroll through list until *Password protection* is highlighted.
2. Press CONFIRM.
3. When password input screen is displayed use buttons F1 and F2 to move left and right between the four digits, F3 to lower the selected digit by 1, and F4 to increase the selected digit by 1.
4. When you have input your password press CONFIRM.


Password input screen

5. The password verify screen is displayed.
6. To verify your new password press button F3.
7. Your password is now set and the completion screen is displayed.


Password verify screen

**<Resetting the password>**

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

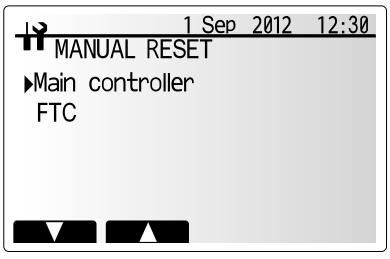
1. From the main settings menu scroll down the functions until Service Menu is highlighted.
2. Press CONFIRM.
3. You will be prompted to enter a password.
4. Hold down buttons F3 and F4 together for 3 secs
5. You will be asked if you wish to continue and reset the password to default setting.
6. To reset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


Completion screen

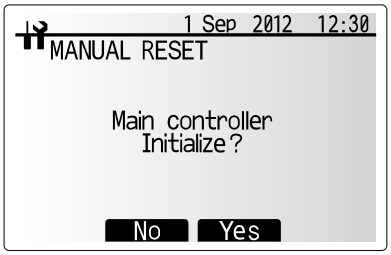
## Manual reset

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

1. From the service menu use F1 and F2 buttons to scroll through list until Manual Reset is highlighted.
2. Press CONFIRM.
3. The Manual reset screen is displayed.
4. Choose either Manual Reset for FTC4 or Main Controller.

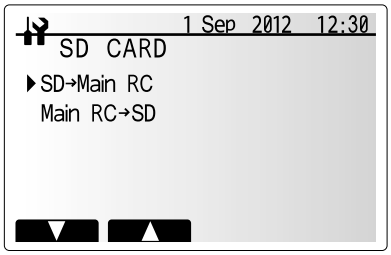



5. Press F3 button to confirm manual reset of chosen device.



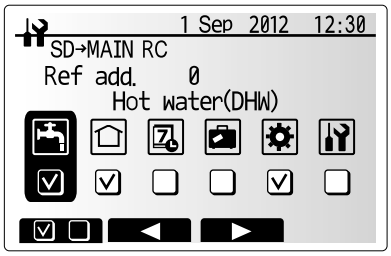
## SD card

The use of an SD memory card simplifies the main controller settings in the field.
*Ecodan service tool (for use with PC tool) is necessary for the setting.



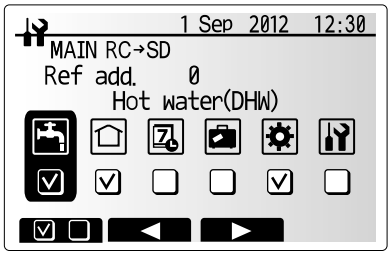

**<SD → Main RC>**

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. Use F1, F2 and F3 buttons to select a menu to write to the main controller.
4. Press CONFIRM to start downloading.
5. Wait for a few minutes until "Complete!" appears.




**<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. Use F1, F2 and F3 buttons to select a menu to write to the SD memory card.
4. Press CONFIRM to start uploading.
5. Wait for a few minutes until "Complete!" appears.



<Table 9-2-1>

| Request code | Request content | Range | Unit |
|---|---|---|---|
| 103 | Error history 1 (latest) | Displays error history. ("– –" is displays if no history is present.) | Code |
| 104 | Error history 2 (second to last) | Displays error history. ("– –" is displays if no history is present.) | — |
| 105 | Error history 3 (third to last) | Displays error history. ("– –" is displays if no history is present.) | — |
| 154 | Water circulation pump 1 - Accumulated operating time (after reset) | 0 - 9999 | 10 hours |
| 156 | Water circulation pump 2 - Accumulated operating time (after reset) | 0 - 9999 | 10 hours |
| 157 | Water circulation pump 3 - Accumulated operating time (after reset) | 0 - 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. | — |
| 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 - 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. | — |
| 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 | — | — |
| 504 | Indoor unit - Zone 1 room temp. (TH1A) | –39 - 88 | °C |
| 505 | Indoor unit - Ref. liquid temp. (TH2) | –39 - 88 | °C |
| 506 | Indoor unit - Return water temp. (THW2) | –39 - 88 | °C |
| 507 | Indoor unit - Zone 2 room temp. (TH1B) | –39 - 88 | °C |
| 508 | Indoor unit - DHW tank water temp. (THW5) | –39 - 88 | °C |
| 509 | Indoor unit - Zone 1 flow water temp. (THW6) | –39 - 88 | °C |
| 510 | Indoor unit - Outside air temp. (TH7) | –39 - 88 | °C |
| 511 | Indoor unit - Flow water temp. (THW1) | –39 - 88 | °C |
| 512 | Indoor unit - Zone 1 return water temp. (THW7) | –39 - 88 | °C |
| 513 | Indoor unit - Zone 2 flow water temp. (THW8) | –39 - 88 | °C |
| 514 | Indoor unit - Zone 2 return water temp. (THW9) | –39 - 88 | °C |
| 515 | Indoor unit - Boiler flow water temp. (THWB1) | –40 - 140 | °C |
| 516 | Indoor unit - Boiler return water temp. (THWB2) | –40 - 140 | °C |
| 550 | Indoor unit - Error postponement history 1 (latest) | Displays postponement code.<br>("– –" is displays 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 | — |
| 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 - Zone 1 room temp. (TH1A) at time of error | –39 - 88 | °C |
| 556 | Indoor unit - Zone 2 room temp. (TH1B) at time of error | –39 - 88 | °C |
| 557 | Indoor unit - Ref. liquid temp. (TH2) at time of error | –39 - 88 | °C |
| 558 | Indoor unit - Flow water temp. (THW1) at time of error | –39 - 88 | °C |
| 559 | Indoor unit - Return water temp. (THW2) at time of error | –39 - 88 | °C |
| 560 | Indoor unit - DHW tank water temp. (THW5) at time of error | –39 - 88 | °C |
| 561 | Indoor unit - Zone 1 flow water temp. (THW6) at time of error | –39 - 88 | °C |
| 562 | Indoor unit - Zone 1 return water temp. (THW7) at time of error | –39 - 88 | °C |
| 563 | Indoor unit - Zone 2 flow water temp. (THW8) at time of error | –39 - 88 | °C |
| 564 | Indoor unit - Zone 2 return water temp. (THW9) at time of error | –39 - 88 | °C |
| 565 | Indoor unit - Boiler flow water temp. (THWB1) at time of error | –40 - 140 | °C |
| 566 | Indoor unit - Boiler return water temp. (THWB2) at time of error | –40 - 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 THW5, 7 THWB2, 8 TH1B, A THW6, B THW7, C THW8, D THW9 | — |
| 568 | Mixing valve opening stop at time of error | 0 - 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 | — |

**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 four digits can be displayed at one time the software version number is displayed in two halves.**
**Enter code 190 to see the first four digits and code 191 to see the last four 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.**

## Indoor unit switch setting display (Request code: 162 to 165)

0: OFF 1: ON

| SW1, SW2, SW3, SW4 | | | | | | | | 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 | | | | | | | | 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 |

## Indoor unit switch setting display (Request code: 162 to 165)

0: OFF 1: ON

| SW1, SW2, SW3, SW4 | | | | | | | | 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 | | | | | | | | 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 |

## 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 |

## 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 |

## 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 |

## Mixing valve state

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

## 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)

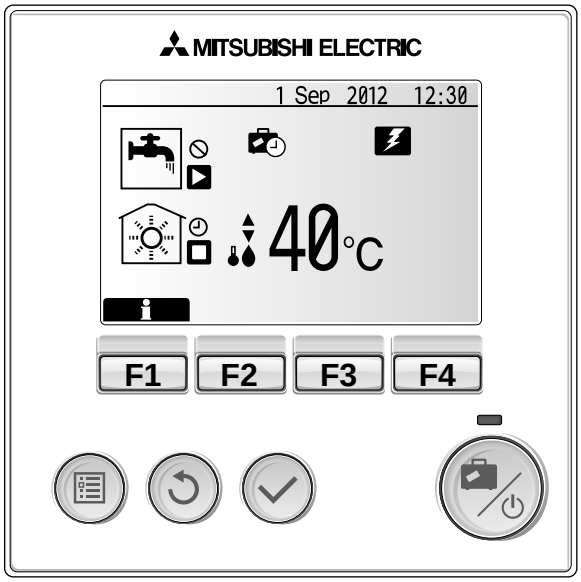
| IN | | | | | | | | Display |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 00 40 |
| 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 00 41 |
| 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 00 42 |
| 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 00 43 |
| 0 | 0 | 1 | 0 | 0 | 0 | 1 | 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 |

**<Emergency operation (Heater)>**
In Emergency operation mode the outdoor heat pump unit will not operate. Heating for DHW and space heating is provided by the booster heater and the tank immersion heater (if installed). Space heating flow temp is restricted 40°C if an immersion heater is not present on the DHW tank then the booster heater will also indirectly heat the DHW.

When in Emergency operation the main control has NO control functions. It's only function is to display the Main screen and Information screen by pressing F1, all other buttons are disabled.

**• 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.

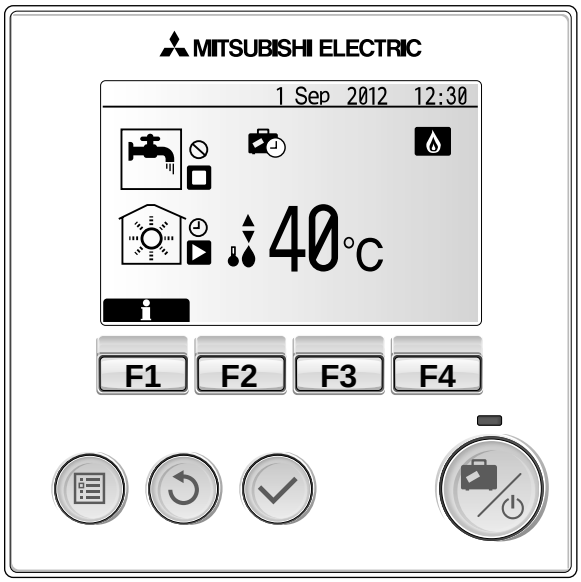



**<Emergency operation (Boiler)>**
In Emergency operation mode the outdoor heat pump unit will not operate. Heating for space heating is provided by the boiler.

When in Emergency operation the main control has NO control functions. It's only function is to display the Main screen and Information screen by pressing F1, all other buttons are disabled.

**• 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 ELECTROCUTION.**

# 10 TROUBLESHOOTING

## 10-1. Troubleshooting

**<Summary of self diagnosis based on Error Codes and Service Procedures>**

Present and past Error codes are logged and displayed on the main 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 | Error 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.<br>2. Reset Error 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 Tables 10-4. and 10-5. Error Codes and Inferior Phenomena fully before resorting to replacing parts.**

## 10-2. Test Run

Before a test run

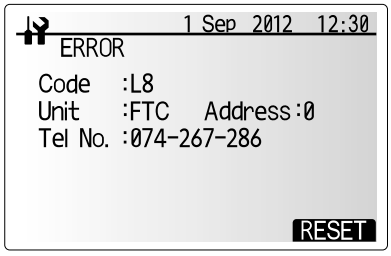
- After installation of outdoor unit, pipework and electrical wiring, recheck that there is no water leakage, loosened connections or miswiring.
- Measure impedance between the ground and the power supply terminal block (L,N) on the outdoor and indoor units with suitable (500V) ohmmeter. Resistance should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

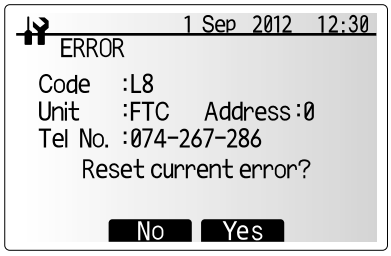
## 10-3. Malfunction diagnosis method by main controller

If during start up or operation a malfunction occurs the error code screen may be displayed on the main controller.
The error code screen shows the following; code, unit, ref. address, and telephone number of installer (only if previously entered by the installer)
Please not in the case of some malfunctions an error code is not generated please refer to table 10-5. for more details.

To reset

1. To reset the main controller press F4 button (Reset).
2. Then press F3 (Yes) to confirm.



## 10-4. Self diagnosis and action

Check if Dip SW is set correctly. (Refer to Chapter 6-16.)

| Error code | Title and display conditions | Possible Cause | Diagnosis and action |
|---|---|---|---|
| L3 | **Circulation water temperature overheat protection**<br><DHW/Heating/LP/FS/OS><br>Error code displayed when THW1 detects a temp. ≥ 80ºC for 10 consecutive seconds or THW2 detects a temp. ≥ 80ºC for 10 consecutive seconds.<br><br>DHW : Domestic hot water mode<br>Heating : Heating mode<br>LP : Legionella prevention mode<br>FS : Freeze stat<br>OS : Operation stop<br>TH1A/B : Room temp. thermistor<br>TH2 : Liquid refrigerant temp. thermistor<br>THW1 : Flow water temp. thermistor<br>THW2 : Return water temp. thermistor<br>THW5 : Tank water temp. thermistor<br>THW6 : Zone 1 flow water temperature thermistor<br>THW7 : Zone 1 return water temperature thermistor<br>THW8 : Zone 2 flow water temperature thermistor<br>THW9 : Zone 2 return water temperature thermistor<br>THWB1 : Boiler flow water temperature thermistor<br>THWB2 : Boiler return water temperature thermistor | 1. Insufficient system head<br><br>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.<br><br>3. Valve operation fault<br><br>4. 2-way valve (field supply) actuator fault<br><br>5. 3-way valve actuator fault<br><br>6. Booster heater relay (BHC1, BHC2, BHCP) operating fault<br><br>7. Power supply voltage increase<br><br>8. THW1 or THW5 has become detached from its holder.<br><br>9. THW1 or THW2 fault<br><br>10. FTC4 board failure | 1. Refer to table in section 10-6. to determine if system pump meets requirements. If more head required either add an pump of the same size or replace existing pump with capacity model. See 11. DISASSEMBLY PROCEDURE for how to replace pump.<br><br>2. Check circulation pump (See 10-6. 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.<br><br>3. Check valves on primary water circuit are installed level.<br><br>4. Electrically test to determine fault.<br><br>5. 1) Electrically test to determine fault.<br>2) Operate 3-way valve manually using the main remote controller. (Refer to <Manual operation> in 9.2).<br>3) Replace 3-way valve coil.<br>4) Replace 3-way valve. (Refer to Procedure 6 in “11. DISASSEMBLY PROCEDURE.”<br><br>6. Electrically test the relays (BHC1, BHC2, BHCP) to determine fault. See 10-6. for how to check.<br><br>7. Check the supply voltage.<br><br>8. Visually inspect location and reattach as necessary.<br><br>9. Check resistance of thermistor against table in section 10-6. Compare FTC4 detected temperature to hand held detector.<br><br>10. Replace board. |
| L4 | **Tank water temperature overheat protection**<br><DHW/Heating/LP/FS/OS><br>Error code display when THW5 detects a temp. ≥ 75ºC for 10 consecutive seconds. | 1. 3-way valve actuator fault<br><br>2. Immersion heater relay (IHC) operating fault<br><br>3. THW5 fault<br><br>4. FTC4 board failure | 1. 1) Electrically test to determine fault.<br>2) Operate 3-way valve manually using the main remote controller. (Refer to <Manual operation> in 9.2).<br>3) Replace 3-way valve coil.<br>4) Replace 3-way valve. (Refer to Procedure 6 in “11. DISASSEMBLY PROCEDURE.”<br><br>2. Check immersion heater relay (IHC)<br><br>3. Check resistance of thermistor against table in section 10-6. Compare FTC4 detected temperature to hand held detector.<br><br>4. Replace board. |

| Error code | Title and display conditions | Possible Cause | Diagnosis and action |
|---|---|---|---|
| P1/P2/L5/LD | **Indoor unit temperature thermistor failure**<br>* The thermistors subject to failure can be checked in “Request code: 567” in “Running information<br><br><DHW/Heating/LP/FS/OS><br>Error code displayed when thermistor is at open or short (see table).<br><br><u>Exceptions</u><br>Error code will not be displayed for TH2; During defrost and for 10 mins after defrost operation. | 1. Connector/terminal wire has become detached or loose wiring.<br>2. Thermistor fault<br>3. FTC4 board failure<br>4. 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 Controller or Room RC 1-8 is chosen for the Room Sensor setting in the Initial setting)<br>5. Incorrect setting of the Dip switch(es) | 1. Visually check the terminals and connections and reattachas appropriate.<br>2. Check resistance of thermistor against table in section 10-6.<br>Compare FTC4 detected temperature to hand held detector.<br>3. Replace board.<br>4. Replace wireless remote controller or main remote controller<br>5. Check the Dip switch setting(s). |

| Error code | Thermistor | | Open detection | Short detection |
|---|---|---|---|---|
| | Symbol | Name | | |
| P1 | TH1A/TH1B | Room temperature thermisitor | -39ºC or below | 88.5ºC or above |
| P2 | TH2 | Liquid temperature thermisitor | -39ºC or below | 88.5ºC or above |
| L5 | THW1 | Flow water temperature thermisitor | -39ºC or below | 88.5ºC or above |
| | THW2 | Return water temperture thermisitor | -39ºC or below | 88.5ºC or above |
| | THW5 | Tank water temperture thermisitor | -39ºC or below | 88.5ºC or above |
| | THW6 | Zone 1 flow water temperature thermistor | -39ºC or below | 88.5ºC or above |
| | THW7 | Zone 1 return water temperature thermistor | -39ºC or below | 88.5ºC or above |
| | THW8 | Zone 2 flow water temperature thermistor | -39ºC or below | 88.5ºC or above |
| | THW9 | Zone 2 return water temperature thermistor | -39ºC or below | 88.5ºC or above |
| LD | THWB1 | Boiler flow water temperature thermistor | -40ºC or below | 140ºC or above |
| | THWB2 | Boiler return water temperature thermistor | -40ºC or below | 140ºC or above |

| | | | |
|---|---|---|---|
| L6 | **Circulation water freeze protection**<br>**<DHW/Heating/LP/FS/OS>**<br>Error code displayed when THW1 detects a temp. ≤ 1ºC for 10 consecutive seconds or THW2 detects a temp. ≤ 3ºC for 10 consecutive seconds.<br><br><u>Exception</u><br>Error code will not be displayed if;<br>FS function is disabled,<br>For 10 mins after water circulation pump1 is switched on. | 1. Insufficient system head<br>2. Reduced flow in primary water circuit. Due to 1 or more of the following; Faulty pump, insufficient air purge, blockedstrainer, leak in water circuit.<br>3. Valve operation fault<br>4. 2-way valve (field supply) actuator fault<br>5. 3-way valve actuator fault<br>6. THW1 has become detached from its holder.<br>7. THW1 or THW2 fault<br>8. FTC4 board failure | 1. Refer to table in section 10-6. to determine if system pump meets requirements.<br>If more head required either add an pump of the same size or replace existing pump with capacity model.<br>See 11. DISASSEMBLY PROCEDURE for how to replace pump.<br>2. Check circulation pump (See 10-6. for how to check).<br>Open purge valve to remove trapped air.<br>Check the strainer for blockages.<br>Check the primary water circuit for leaks.<br>Check that the flow amount is within the recommended range.<br>3. Check valves on primary water circuit are installed level.<br>4. Electrically test to determine fault.<br>5. 1) Electrically test to determine fault.<br>2) Operate 3-way valve manually using the main remote controller. (Refer to <Manual operation> in 9.2).<br>3) Replace 3-way valve coil.<br>4) Replace 3-way valve. (Refer to Procedure 6 in “11. DISASSEMBLY PROCEDURE.”<br>6. Visually inspect location and reattach as necessary.<br>7. Check resistance of thermistor against table in section 10-6.<br>Compare FTC4 detected temperature to hand held detector.<br>8. Replace board. |

| Error code | Title and display conditions | Possible Cause | Diagnosis and action |
|---|---|---|---|
| L8 | **Heating operation error**<br>* "3" is displayed in "Request code: 567" in "Running information".<br><Heating/FS><br>If a), b) and c) occur, L8 is displayed;<br>a) No change on THW1 and THW5 (under 1 °C for 20 minutes from unit starts operation)<br>b) No change on THW1 (under 1 °C for 10 minutes from booster heater starts operation)<br>c) THW1 - THW2 < -5 °C (for 10 minutes continuously) | 1. THW1 has become detached from its holder.<br>2. Booster heater fault<br>3. THW1 or THW2 or THW5 fault<br>4. FTC4 board failure | 1. Visually inspect location and reattach as necessary.<br>2. Electrically test to determine fault. See 10-6. for how to check.<br>3. Check resistance of thermistor against table in section 10-6. Compare FTC4 detected temperature to hand held detector.<br>4. Replace board. |
| | **Heating operation error**<br>* "a" is displayed in "Request code: 567" in "Running information". | 1. THW6 has become detached from its holder.<br>2. THW6 or THW7 fault<br>3. FTC4 board failure | 1. Visually inspect location and reattach as necessary.<br>2. Check resistance of thermistor against table in section 10-6. Compare FTC4 detected temperature to hand held detector.<br>3. Replace board. |
| | **Heating operation error**<br>* "c" is displayed in "Request code: 567" in "Running information". | 1. THW8 has become detached from its holder.<br>2. THW8 or THW9 fault<br>3. FTC4 board failure | 1. Visually inspect location and reattach as necessary.<br>2. Check resistance of thermistor against table in section 10-6. Compare FTC4 detected temperature to hand held detector.<br>3. Replace board. |
| L9 | **Low primary circuit (Heat source side) flow rate detected by flow switch**<br>* "1" is displayed in "Request code: 569" in "Running information".<br><DHW/Heating/LP/FS><br>Error code displayed when flow switch detects low flow rate for 10 seconds.<br><br><u>Exception</u><br>For 1 min after water circulation pump1 is switched on. | 1. Insufficient system head<br>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.<br>3. Valve operation fault<br>4. 2-way valve (field supply) actuator fault<br>5. Connector/terminal wire has become detached or loose wiring.<br>6. Flow switch fault<br>7. Incorrect setting of the SW2-2<br>8. FTC4 board failure | 1. Refer to table in section 10-6. to determine if system pump meets requirements. If more head required either add an pump of the same size or replace existing pump with capacity model. See 11. DISASSEMBLY PROCEDURE for how to replace pump.<br>2. Check circulation pump (See 10-6. 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.<br>3. Check valves on primary water circuit are installed level.<br>4. Electrically test to determine fault.<br>5. Visually check the CN2F connector and IN2 terminal and reattach if necessary.<br>6. Electrically test to determine fault. See 10-6. for how to check.<br>7. Check the SW2-2 setting.<br>8. Replace board. |
| | **Low primary circuit (Zone1 side) flow rate detected by flow switch**<br>* "2" is displayed in "Request code: 569" in "Running information". | 1. Insufficient system head<br>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.<br>3. Terminal wire has become detached or loose wiring.<br>4. Flow switch fault<br>5. Incorrect setting of the SW3-2<br>6. FTC4 board failure | 1. If more head required either add an pump of the same size or replace existing pump .<br>2. Check circulation pump (See 10-6. 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.<br>3. Visually check the IN3 terminal and reattach if necessary.<br>4. Electrically test to determine fault.<br>5. Check the SW3-2 setting.<br>6. Replace board. |

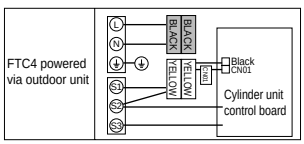
| Error code | Title and display conditions | Possible Cause | Diagnosis and action |
|---|---|---|---|
| L9 | **Low primary circuit (Zone2 side) flow rate detected by flow switch**<br>* "3" is displayed in "Request code: 569" in "Running information". | 1. Insufficient system head | 1. If more head required either add an pump of the same size or replace existing pump. |
| | | 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. | 2. Check circulation pump (See 10-6. for how to check).<br>Open purge valve to remove trapped air.<br>Check the strainer for blockages.<br>Check the primary water circuit for leaks.<br>Check that the flow amount is within the recommended range. |
| | | 3. Terminal wire has become detached or loose wiring. | 3. Visually check the IN7 terminal and reattach if necessary. |
| | | 4. Flow switch fault | 4. Electrically test to determine fault. |
| | | 5. Incorrect setting of the SW3-3 | 5. Check the SW3-3 setting. |
| | | 6. FTC4 board failure | 6. Replace board. |
| LC | Boiler circulation water temperature overheat protection<br><DHW/Heating/LP/FS/OS><br>Error code displayed when THWB1 detects a temp. ≥80ºC for 10 consecutive seconds or THWB2 detects a temp. ≥80ºC for 10 consecutive seconds | 1. The set temperature for Boiler is too high. | 1. Check if the set temperature for Boiler for heating exceeds the restriction. (See the manual for the thermistors "PAC-TH011HT-E") |
| | | 2. Flow rate of the heating circuit from the boiler may be reduced. | 2. Check for<br>• water leakage<br>• strainer blockage<br>• water circulation pump function. |
| LD | Boiler temperature thermistor (THWB1, THWB2) failure | Refer to error codes (P1/P2/L5/LD). | |
| LE | Boiler operation error<br><Heating><br>Boiler is running and THW6 detects a temperature <30ºC for consecutive 60 minutes. | 1. THW6 has become detached from its holder. | 1. Visually inspect location and reattach as necessary. |
| | | 2. Incorrect wiring between FTC4 (OUT10) and the boiler. | 2. See the manual of the thermistors "PAC-TH011HT-E". |
| | | 3. Boiler fuel has run out or the system is OFF. | 3. Check the status of the boiler. |
| | | 4. Boiler failure | 4. Check the status of the boiler. |
| | | 5. FTC4 board failure | 5. Replace board. |
| LH | Boiler circulation water freeze protection | Flow rate of the heating circuit from the boiler may be reduced. | Check for<br>• water leakage<br>• strainer blockage<br>• water circulation pump function. |
| LL | Setting errors of Dip switches on FTC4 control board | Incorrect setting of Dip switches. | |
| | | 1. Boiler operation | 1. 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). |
| | | 2. 2-zone temperature control | 2. 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). |
| P1 | Indoor unit temperature thermistor (TH1) failure | Refer to error codes (P1/P2/L5/LD). | |
| P2 | Indoor unit temperature thermistor (TH2) failure | Refer to error codes (P1/P2/L5/LD). | |
| P6 | Anti-freeze protection of plate heat exchanger<br><Defrosting><br>THW2 detects a temperature ≤15ºC and TH2 detects a temperature ≤−16ºC for consecutive 10 seconds. | 1. Reduced water flow<br>• Clogged filter<br>• Leakage of water | 1. and 2.<br>Check water piping. |
| | | 2. Low temperature<br>• Low load<br>• Inlet water is cold | |
| | | 3. Defective water pump | 3. Check water pump. |
| | | 4. Leakage or shortage of refrigerant | 4. Correct to proper amount of refrigerant. |
| | | 5. Malfunction of linear expansion valve | 5. Check linear expansion valve. |

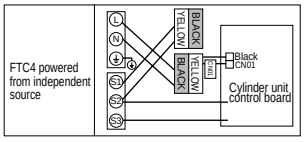
| Error code | Title and display conditions | Possible Cause | Diagnosis and action |
|---|---|---|---|
| E0/E4 | **Main controller communication failure (Reception error)**<br>Error code E0 is displayed if main controller does not receive any signal from the indoor unit for ref. address "0" for 3 mins.<br>Error code E4 is displayed if indoor unit does not receive any data from the main controller for 3 mins or indoor unit does not receive any signal from the main controller for 2 mins. | 1. Contact failure with transmission cable<br>2. Wiring procedure not observed. (Cable length/cable diameter/number of indoor units/number of main controllers)<br>3. Fault on the indoor unit FTC4 board section controlling Ref. address "0"<br>4. Fault with the main controller circuit board<br>5. Electrical noise causes interference with transmission/reception of data for main controller. | 1. Check connection cable for damage or loose connections at the FTC4 and main controller terminals.<br>2. Check main controller and FTC4 common wiring max cable length 500 m.<br>Only use 2 core cable.<br>Only connect 1 main controller to 1 FTC4 indoor unit board.<br>3. to 5.<br>If the problem is not solved by the above measures then:<br>Turn the power to the indoor unit OFF and then ON.<br>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).<br>If the E4 code is still displayed the FTC4 and/or the main controller circuit board should be replaced. |
| E3/E5 | **Main controller communication failure (Transmission error)**<br>Error code E3 is displayed if the main controller an not find an empty transmission path and thus fails to transmit for 6 secs or the data received bythe main controller is different to what was sent (by the main controller) 30 consecutive times.<br>Error code E5 is displayed if the FTC4 can not find an empty transmission path for 3 mins and thus cannot transmit or the data sent by the FTC4 is different to what was expected 30 consecutive times. | 1. 2 or more main controllers have been connected to the FTC4.<br>2. Fault with main controller transmission/ receiving circuit board<br>3. Fault with the main controller circuit board<br>4. Electrical noise causes interference with transmission/reception of data for main controller. | 1. Only connect 1 main controller to 1 FTC4 indoor unit board.<br>2. to 4.<br>Turn the power to the indoor unit OFF and then ON.<br>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).<br>If the E3/E5 code is still displayed the FTC4 and/or the main controller circuit board should be replaced. |
| E6 | **Indoor/outdoor communication failure (Reception error)**<br>Error code E6 is displayed if after the power is switched ON to the indoor unit, the FTC4 board does not receive any signal or the signal receive-dis not complete for 6 mins, or after a period of operation the FTC4 board does not receive any signal or the signal received is not complete for 3 mins. | 1. Contact failure/short circuit/miswiring<br>2. Fault with outdoor unit transmission/ receiving circuit board<br>3. Fault with FTC4 transmission/receiving circuit board<br>4. Electrical noise causes interference with FTC4-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.<br>1. Check the connections on the indoor and outdoor units have not become loose and that the connecting cable is not damaged.<br>2. to 4.<br>Turn the power to the indoor unit OFF and then ON.<br>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).<br>If the E6 code is still displayed the FTC4 and/or the outdoor unit circuit board should be replaced. |
| E7 | **Indoor/outdoor communication failure (Transmission error)**<br>Error code E7 is displayed if despite the FTC4 board sending signal "0", signal "1" is received 30 consecutive times. | 1. Fault with FTC4 transmission/receiving<br>2. circuit board<br>Electrical noise causes interference with power supply.<br>3. Electrical noise causes interference with FTC4-outdoor unit transmission cable. | 1. to 3.<br>Turn the power to the indoor unit OFF and then ON.<br>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).<br>If the E7 code is still displayed the FTC4 circuit board should be replaced. |
| E1/E2 | **Main controller control board failure**<br>Error code E1 displayed if main controller can not access it's non volatile (non power dependent) memory.<br>Error code E2 is displayed when there is a fault with the main controller's internal clock. | 1. Fault with the main controller circuit board | 1. Replace main controller circuit board. |

| Error code | Title and display conditions | Possible Cause | Diagnosis and action |
|---|---|---|---|
| J0 | **Indoor unit/wireless receiver communication failure**<br>Error code J0 is displayed when the FTC4 can not receive data from the wireless receiver for 1 min. | 1. Connection fault with wireless receiver-FTC4 connection<br>2. Fault with FTC4 receiving circuit board<br>3. Fault with wireless receiver's transmission circuit board<br>4. Electrical noise causes interference with wireless receiver communication cable. | 1. Check the connections to the wireless receiver and FTC4 have not become loose and that the connecting cable is not damaged.<br>2. to 4.<br>Turn the power to the indoor unit OFF and then ON.<br>Power to both the indoor unit and outdoor units should be switched OFF then ON.<br>(This may require switching 1 or 2 breakers depending if the unit is powered independently from the outdoor unit).<br>If the J0 code is still displayed the FTC4 and/or the wireless receiver circuit board should be replaced. |
| J1 to J8 | **Wireless remote controller/wireless receiver communication failure**<br>**(Reception error)**<br>Error code displayed if wireless receiver receives no/incomplete data from the wireless remote controller for 15 consecutive minutes.<br><br>The digit after the J refers to the address of the wireless remote controller that has the error.<br>E.g. Error code "J3" refers to a communication fault between the wireless receiver and wireless remote control with address 3. | 1. Battery on wireless remote control may be flat<br>2. The wireless remote controller is out of range of the wireless receiver.<br>3. Fault with wireless remote controller transmission circuit board<br>4. Fault with wireless receiver's reception circuit board | 1. Check and replace the battery if necessary the wireless remote controller battery.<br>2. to 4.<br>Reposition the wireless remote control closer to the receiver and perform a communication test.<br>For procedure refer to wireless remote controller installation manual.<br>If "OK" is displayed then the cause of the J1 to J8 error was the controller was out of range of the receiver.<br>The wireless remote controller should be installed within range of the receiver.<br>If "Err" is displayed replace wireless remote controller with a new controller and perform the pairing procedure.<br>If after this procedure the "Err" code is still displayed the fault is with the receiver unit (attached to the indoor unit).<br>The receiver unit should be replaced with a new part and the original remote control can be reconnected.<br>If "OK" is displayed then the fault is with the remote control and this should be replaced. |

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

## 10-5. Troubleshooting by inferior phenomena

| No. | Fault symptom | Possible cause | Explanation - Solution |
|---|---|---|---|
| 1 | Main controller display is blank. | 1. There is no power supply to main controller. | 1. Check LED2 on FTC4. (See 6. WIRING DIAGRAM.)<br>(i) When LED2 is lit.<br>Check for damage or contact failure of the main controller wiring.<br>(ii) When LED2 is blinking.<br>Refer to No. 5 below.<br>(iii) When LED2 is not lit.<br>Refer to No. 4 below. |
| | | 2. Power is supplied to main controller, however, the display on the main controller does not appear. | 2. Check the following:<br>• Disconnection between the main controller cable and the FTC4 control board<br>• Failure of the main controller if “Please Wait” is not displayed.<br>• Refer to No. 2 below if “Please Wait” is displayed. |
| 2 | “Please Wait” remains displayed on the main controller. | 1. "Please Wait" is displayed for up to 6 minutes.<br>2. Communication failure between the main controller and FTC4.<br>3. Communication failure between FTC4 and outdoor unit. | 1. Normal operation.<br>2, 3. Main controller start up checks/procedure.<br>(i) If “0%” or “50-99%” is displayed below "Please Wait" there is a communication error between the main controller and the FTC4 control board.<br>• Check wiring connections on the main controller.<br>• Replace the main controller or the FTC4 control board.<br>(ii) If “1-49%” is displayed there is a communication error between the outdoor unit's and FTC4's control boards.<br>• Check the wiring connections on the outdoor unit control board and the FTC4 control board.<br>(Ensure S1 and S2 are not cross-wired and S3 is securely wired with no damage. (See 7. FIELD WIRING.)<br>• Replace the outdoor unit's and/or the FTC4's control boards. |
| 3 | The main screen appears with a press of the “ON” button, but disappears in a second. | The main 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. | Normal operation.<br>The indoor unit is applying updated settings made in the service menu. Normal operation will start shortly. |
| 4 | LED2 on FTC4 is off. (See 6. WIRING DIAGRAM.) | When LED1 on FTC4 is also off. (See 6. WIRING DIAGRAM.)<br><FTC4 powered via outdoor unit.> | |
| | | 1. The outdoor unit is not supplied at the rated voltage. | 1. Check the voltage across the terminals L and N or L3 and N on the outdoor power board. (See 7. FIELD WIRING.)<br>• When the voltage is not 220 to 240V AC, check wiring of the outdoor unit and of the breaker.<br>• When the voltage is at 220 to 240V AC, go to “2.” below. |
| | | 2. Defective outdoor controller circuit board. | 2. Check the voltage across the outdoor unit terminals S1 and S2. (See 7. FIELD WIRING.)<br>• When the voltage is not 220 to 240V AC, check the fuse on the outdoor control board and check for faulty wiring.<br>• When the voltage is 220 to 240V AC, go to “3.” below. |
| | | 3. FTC4 is not supplied with 220 to 240V AC. | 3. Check the voltage across the indoor unit terminals S1 and S2. (See 7. FIELD WIRING.)<br>• When the voltage is not 220 to 240V AC, check FTC4-outdoor unit wiring for faults.<br>• When the voltage is 220 to 240V AC, go to “4.” below. |
| | | 4. FTC4 failure. | 4. Check the FTC4 control board.<br>• Check the fuse on FTC4 control board.<br>• Check for faulty wiring.<br>• If no problem found with the wiring, the FTC4 control board is faulty. |
| | | 5. Faulty connector wiring. | 5. Check the connector wiring.<br>• When the connectors are wired incorrectly, re-wire the connectors referring to below. (See 7. FIELD WIRING.)<br>  |

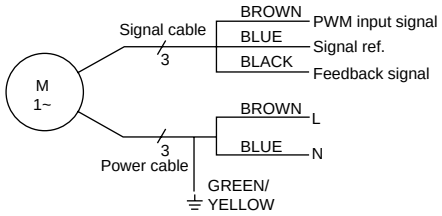
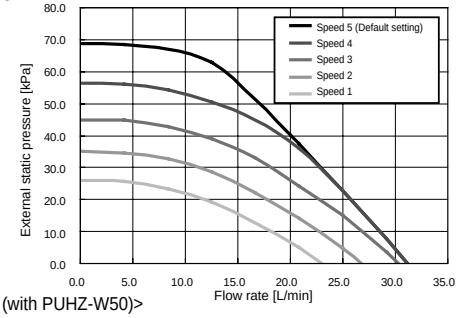
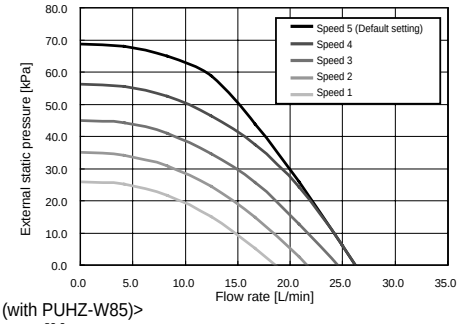
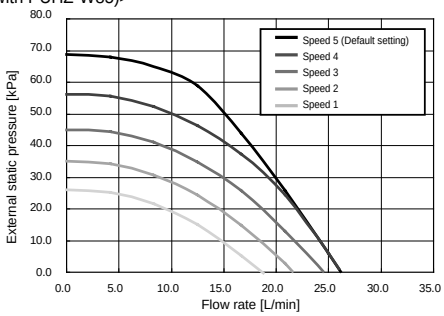
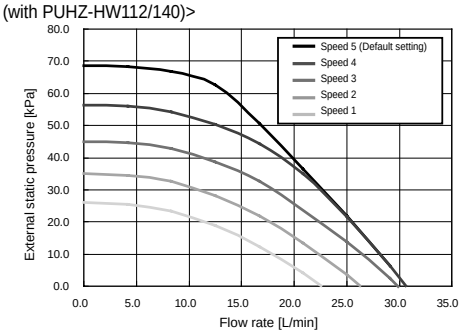
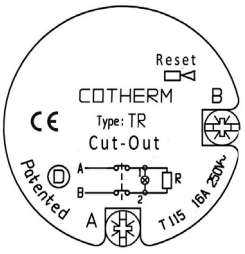
| No. | Fault symptom | Possible cause | Explanation - Solution |
|---|---|---|---|
| 4. | LED2 on FTC4 is off. (See 6. WIRING DIAGRAM) | <FTC4 powered on independent source> | |
| | | 1. FTC4 is not supplied with 220 to 240V AC. | 1. Check the voltage across the L and N terminals on the indoor power supply terminal block. (See 7. FIELD WIRING.)<br>• When the voltage is not 220 to 240V AC, check for faulty wiring to power supply.<br>• When the voltage is 220 to 240V AC, go to 2. below. |
| | | 2. There are problems in the method of connecting the connectors. | 2. Check for faulty wiring between the connectors.<br>• 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.)<br>  <br>• If no problem found with the wiring, go to 3. below. |
| | | 3. FTC4 failure. | 3. Check the FTC4 control board.<br>• Check the fuse on FTC4 control board.<br>• Check for faulty wiring.<br>• If no problem found with the wiring, the FTC4 control board is faulty. |
| | | When LED1 on FTC4 is lit.<br>Incorrect setting of refrigerant address for outdoor unit.<br>(None of the refrigerant address is set to "0".) | Recheck the refrigerant address setting on the outdoor unit.<br>Set the refrigerant address to “0”.<br>(Set refrigerant address using SW1(3 - 6) on outdoor controller circuit board.) |
| 5 | LED2 on FTC4 is blinking. (See 6. WIRING DIAGRAM) | When LED1 is also blinking on FTC4 .<br>Faulty wiring between FTC4 and outdoor unit | Check for faulty wiring between FTC4 and outdoor unit. |
| | | When LED1 on FTC4 is lit. | |
| | | 1. Faulty wiring in main controller<br>Multiple indoor units have been wired to a single outdoor unit. | 1. Check for faulty wiring in main controller.<br>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. |
| | | 2. Short-circuited wiring in main controller<br>3. Main controller failure | 2.,3. Remove main controller wires and check LED2 on FTC4. (See 6. WIRING DIAGRAM.)<br>• If LED2 is blinking check for short circuits in the main controller wiring .<br>• If LED2 is lit, wire the main controller again and:<br>- if LED2 is blinking, the main controller is faulty;<br>- if LED2 is lit, faulty wiring of the main controller has been corrected. |
| 6 | LED4 on FTC4 is off. (See 6. WIRING DIAGRAM) | 1. SD memory card is NOT inserted into the memory card slot with correct orientation.<br>2. Not an SD standards compliant memory card. | 1. Correctly insert SD memory card in place until a click is heard.<br>2. Use an SD standards compliant memory card. (Refer to installation manual, "5.5 Using SD memory card".) |
| | LED4 on FTC4 is blinking. (See 6. WIRING DIAGRAM) | 1. Full of data.<br>2. Write-protected.<br>3. NOT formatted.<br>4. Formatted in NTFS file system. | 1. Move or delete data, or replace SD memory card with a new one.<br>2. Release the write-protect switch.<br>3. Refer to installation manual, "5.5 Using SD memory card".<br>4. FTC4 is Not compatible with NTFS file system. Use an SD memory card formatted in FAT file system. |
| 7 | No water at hot tap. | 1. Cold main off<br>2. Strainer (field supply) blocked. | 1. Check and open stop cock.<br>2. Isolate water supply and clean strainer. |
| 8 | Cold water at tap. | 1. Hot water run out.<br>2. Prohibit, schedule timer or holiday mode selected.<br>3. Heat pump not working.<br>4. Booster heater cut-out tripped.<br>5. The earth leakage circuit breaker for booster heater breaker (ECB1) tripped.<br>6. The booster heater thermal cut-out has tripped and cannot be reset using the manual reset button.<br>7. Immersion heater cut-out tripped.<br>8. Immersion heater breaker (ECB2) tripped.<br>9. 3-way valve fault | 1. Ensure DHW mode is operating and wait for DHW tank to re-heat.<br>2. Check settings and change as appropriate.<br>3. Check heat pump – consult outdoor unit service manual.<br>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.<br>5. Check the cause and reset if safe.<br>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.<br>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.<br>8. Check the cause and reset if safe.<br>9. Check plumbing/wiring to 3-way valve.<br>(i) Manually override 3-way valve using the main controller. (Refer to <Manual operation> in section 9-2.) If the valve does not still function, go to (ii) below.<br>(ii) Replace 3-way valve coil. If the valve does not still function, go to (iii) below.<br>(iii) Replace 3-way valve. (Refer to 11. DISASSEMBLY PROCEDURE.) |

| No. | Fault symptom | Possible cause | Explanation - Solution |
|---|---|---|---|
| 9 | Water heating takes longer. | 1. Heat pump not working.<br>2. Booster heater cut-out tripped.<br>3. Booster heater breaker (ECB1) tripped.<br>4. The booster heater thermal cut-out has tripped and cannot be reset using the manual reset button.<br>5. Immersion heater cut-out has been triggered.<br>6. Immersion heater breaker (ECB2) tripped. | 1. Check heat pump – consult outdoor unit service manual.<br>2. 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.<br>3. Check the cause and reset if safe.<br>4. 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.<br>5. 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.<br>6. Check the cause and reset if safe. |
| 10 | Temperature of DHW tank water dropped. | 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.<br>1. Water leakage in the pipes that connect to the DHW tank<br>2. Insulation material coming loose or off.<br>3. 3-way valve failure | 1. Take the following measures.<br>• Retighten the nuts holding the pipes onto the DHW tank.<br>• Replace seal materials.<br>• Replace the pipes.<br>2. Fix insulation.<br>3. Check plumbing/wiring to 3-way valve.<br>(i) Manually override 3-way valve using the main controller. (Refer to <Manual operation> in section 9-2.) If the valve does not still function, go to (ii) below.<br>(ii) Replace 3-way valve motor. If the valve does not still function, go to (iii) below.<br>(iii) Replace 3-way valve. (Refer to 11. DISASSEMBLY PROCEDURE.) |
| 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 | 1. Poorly sealed connections of water circuit components<br>2. Water circuit components reaching the end of life | 1. Tighten connections as required.<br>2. Refer to PARTS CATALOG for expected part lifetimes and replace them as necessary. |
| 13 | Heating system does not reach the set temperature. | 1. Prohibit, schedule timer or holiday mode selected.<br>2. Check settings and change as appropriate.<br>3. The temperature sensor is located in a room that has a different temperature relative to that of the rest of the house.<br>4. Heat pump not working.<br>5. Booster heater cut-out tripped.<br>6. Booster heater breaker (ECB1) tripped.<br>7. The booster heater thermal cut-out tripped and can not be reset using the manual reset button.<br>8. Incorrectly sized heat emitter.<br>9. 3-way valve failure<br>10. Battery problem (*wireless control only)<br>11. 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. | 1. Check settings and change as appropriate.<br>2. Check the battery power and replace if flat.<br>3. Relocate the temperature sensor to a more suitable room.<br>4. Check heat pump – consult outdoor unit service manual.<br>5. 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.)<br>6. Check the cause of the trip and reset if safe.<br>7. 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.<br>8. Check the heat emitter surface area is adequate Increase size if necessary.<br>9. Check plumbing/wiring to 3-way valve.<br>(i) Manually override 3-way valve using the main controller. (Refer to <Manual operation> in 9-2). If the 3-way valve does not function, go to (ii) below.<br>(ii) 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.<br>(iii) Replace 3-way valve. (Refer to 11. DISASSEMBLY PROCEDURE.)<br>10. Check the battery power and replace if flat.<br>11. Increase the flow rate between the mixing tank and the cylinder unit decrease that between the mixing tank and the local system. |

| No. | Fault symptom | Possible cause | Explanation - Solution |
|---|---|---|---|
| 14 | In 2-zone temperature control, only Zone2 does not reach the set temperature. | 1. When Zone1 and Zone2 are both in heating mode, the hot water temperature in Zone2 does not exceed that in Zone1.<br>2. Faulty wiring of motorized mixing valve<br>3. Faulty installation of motorized mixing valve<br>4. Incorrect setting of Running time<br>5. Motorized mixing valve failure | 1. Normal action no action necessary.<br>2. Refer to installation manual, "5.3 Wiring for 2-zone temperature control".<br>3. Check for correct installation. (Refer to the manual included with each motorized mixing valve.)<br>4. Check for correct setting of Running time.<br>5. Inspect the mixing valve. (Refer to the manual included with each motorized mixing valve.) |
| 15 | 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 controller settings "Electric heater (Heating)" or "Electric heater (DHW)" is turned off. | Turn ON Electric heater (Heating) or Electric heater (DHW) using the main controller. |
| 16 | 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.<br>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. |
| 17 | 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.<br>This is done to prevent the cylinder unit components from overheating.<br>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. |
| 18 | The room temperature rises during DHW operation. | 3-way valve failure | Check the 3-way valve.<br>(i) Manually override 3-way valve using the main controller. (Refer to <Manual operation> in 9-2). If the 3-way valve does not function, go to (ii) below.<br>(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.<br>(iii) Replace 3-way valve. (Refer to 11. DISASSEMBLY PROCEDURE.) |
| 19 | Water discharges from pressure relief valve.<br>(Primary circuit) | 1. If continual – pressure relief valve could bite foreign objects and the valve seat may be damaged.<br>2. If intermittent – expansion vessel charge may have reduced/bladder perished. | 1. Turn the handle on the pressure relief valve several turns. If leakage persists, replace the pressure relief valve with a new one.<br>2. Check pressure in expansion vessel.<br>Recharge to 1 bar if necessary.<br>If bladder perished replace expansion vessel with a new one. |
| 20 | Water discharges from pressure relief valve (accessory supplied item).<br>(Sanitary circuit) | 1. If continual – field supplied pressure reducing valve not working.<br>2. If continual – pressure relief valve could bite foreign objects and the valve seat may be damaged.<br>3. If intermittent – expansion vessel charge may have reduced/bladder perished.<br>4. DHW tank may have subjected to backflow. | 1. Check function of pressure reducing valve and replace if necessary.<br>2. Turn the handle on the pressure relief valve several turns. If leakage persists, replace the pressure relief valve with a new one.<br>3. Check gas-side pressure in expansion vessel.<br>Recharge to correct precharge pressure if necessary.<br>If bladder perished replace expansion vessel with a new one with appropriate pre-charge.<br>4. 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. |
| 21 | Water discharges from temperature and pressure relief valve (EHPT20X-VM2HB only) (Sanitary circuit) | 1. If continual – field supplied pressure reducing valve not working.<br>2. If continual – temperature and pressure relief valve could bite foreign objects and the valve seat may be damaged.<br>3. If intermittent – expansion vessel charge may have reduced/bladder perished.<br>4. DHW tank may have subjected to backflow.<br>5. Unit has overheated – thermal controls have failed. | 1. Check function of pressure reducing valve and replace if necessary.<br>2. 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.<br>3. Check gas-side pressure in expansion vessel.<br>Recharge to correct precharge pressure if necessary.<br>If bladder perished replace expansion vessel with a new one with appropriate pre-charge.<br>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.<br>5. Switch off power to the heat pump and immersion heaters.<br>Leave water running.<br>Wait until discharge stops. Isolate water supply and replace if faulty. |

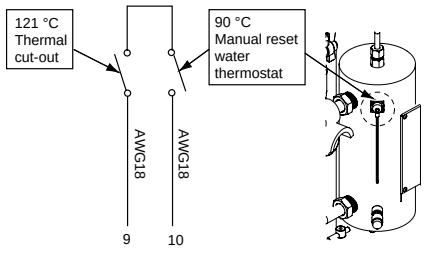
| No. | Fault symptom | Possible cause | Explanation - Solution |
|---|---|---|---|
| 22 | Water discharges from expansion relief valve - part of Inlet Control Group (EHPT20X-VM2HB only) (sanitary circuit). | 1. If continual – field supplied pressure reducing valve not working.<br>2. If continual – expansion relief valve may be damaged.<br>3. If intermittent – expansion vessel charge may have reduced/bladder perished.<br>4. DHW tank may have subjected to backflow.<br>5. Unit has overheated – thermal controls have failed. | 1. Check function of pressure reducing valve and replace if necessary.<br>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.<br>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.<br>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.<br>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. |
| 23 | 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. |
| 24 | Noise during hot water draw off typically worse in the morning. | 1. Loose airing cupboard pipework.<br>2. Heaters switching on/off. | 1. Install extra pipe fastening clips.<br>2. Normal operation no action necessary. |
| 25 | Mechanical noise heard coming from the cylinder unit. | 1. Heaters switching on/off.<br>2. 3-way valve changing position between DHW and heating mode. | Normal operation no action necessary. |
| 26 | 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. |
| 27 | 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. |
| 28 | 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” . |
| 29 | 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. | • Normal operation.<br>• 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). |

## 10-6. Checking component parts' function

| Part Name | Check Points |
|---|---|
| **Water circulation pump**<br>  <br> | **<Water circulation pump characteristics>**<br><EHST20 series><br>  <br><br><EHPT20 series (with PUHZ-W50)><br>  <br><br><EHPT20 series (with PUHZ-W85)><br>  <br><br><EHPT20 series (with PUHZ-HW112/140)><br>  <br> |
| **<Recommended water flow rate range>**<br>**Outdoor heat pump unit** / **Water flow rate range [L/min]**<br>Packaged: PUHZ-W50 7.1 - 14.3; PUHZ-W85 10.0 - 25.8; PUHZ-HW112 14.4 - 27.7; PUHZ-HW140 17.9 - 27.7<br>Split: PUHZ-RP35 7.1 - 11.8; PUHZ-RP50 7.1 - 17.2; PUHZ-RP60 8.6 - 20.1; PUHZ-(H)RP71 10.2 - 22.9; PUHZ-(H)RP100 14.4 - 27.7; PUHZ-(H)RP125 17.9 - 27.7; PUHZ-RP140 20.1 - 27.7; PUHZ-SW40 7.1 - 11.8; PUHZ-SW50 7.1 - 17.2; PUHZ-SW75 10.2 - 22.9; PUHZ-SW100 14.4 - 27.7; PUHZ-SW120 20.1 - 27.7; PUHZ-SHW80 10.2 - 22.9; PUHZ-SHW112 14.4 - 27.7; PUHZ-SHW140 17.9 - 27.7 | |
| **Immersion heater**<br>  <br> | Measure the resistance between the terminals with a tester.<br>(Winding temperate 20°C)<br>**Terminal** / **Normal** / **Abnormal**<br>A-B: 19.2 Ω: Open or Short<br>To reset the immersion heater use a pin or similar to press the reset button located on the top of the immersion boss.<br>See diagram on the left. |

| Part Name | Check Points |
|---|---|
| **Booster heater** | Measure the resistance between the terminals with a tester. |

Thermostat (90 °C) and thermal cut out (121 °C)

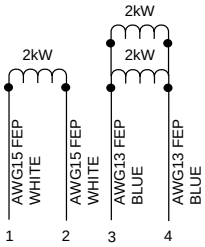



| Terminal | Normal | Abnormal |
|---|---|---|
| 9-10 | 110(±35)mΩ | Open or Short |

2kW heater (230V, 1 phase)

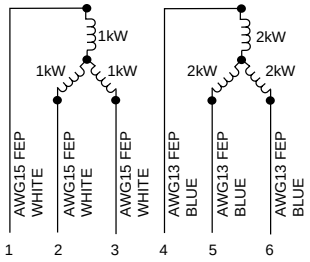

| Terminal | Normal | Abnormal |
|---|---|---|
| 1-2 | 26.5(+3/-1.3)Ω | Open or Short |

2 + 4kW heater (230V, 1 phase)



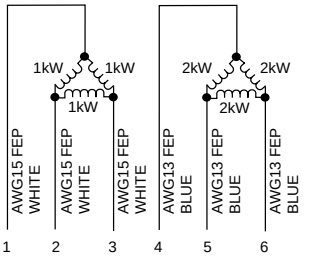

| Terminal | Normal | Abnormal |
|---|---|---|
| 1-2 | 26.5(+3/-1.3)Ω | Open or Short |
| 3-4 | 13.3(+1.5/-0.6)Ω | Open or Short |

3 + 6kW heater (400V, 3 phase)




| Terminal | Normal | Abnormal |
|---|---|---|
| 1-2=2-3=1-3 | 105.8(+11.8/-5)Ω | Open or Short |
| 4-5=5-6=4-6 | 52.9(+5.8/-2.5)Ω | Open or Short |

3 + 6kW heater (230V, 3 phase)

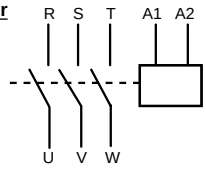



| Terminal | Normal | Abnormal |
|---|---|---|
| 1-2=2-3=3-1 | 35.3(+3.9/-1.8)Ω | Open or Short |
| 4-5=5-6=6-4 | 17.6(+1.9/-0.9)Ω | Open or Short |

**Earth leakage circuit breaker for heater**

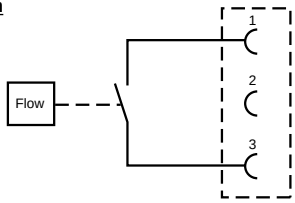
If a short circuit occurs on the booster heater, immersion heater, or each power line, a short-circuit breaker will trip and power source will be blocked.
Eliminate the causes of short circuit and then turn on the breaker again.

**Relay for heater**



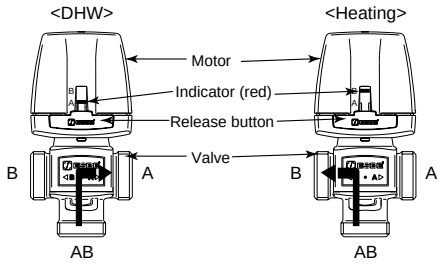

When the applied voltage is not 230V AC across the terminals A1-A2, check the terminals R-U, S-V, and T-W are open.
When the applied voltage is 230V AC across the terminals A1-A2, check the terminals R-U, S-V, and T-W are short.

**Flow switch**




Measure the resistance between the terminals with a tester.

| State of moving part | Normal | Abnormal |
|---|---|---|
| Paddle vertical (Flow < 5.5 l/min) | Open | Other than open |
| Paddle inclined (Flow > 5.5 l/min) | Short | Other than short |

| Part Name | Check Points |
|---|---|
| **3-way valve**<br>  | (1) Check the movement of the red indicator. The red indicator normally points to A in DHW mode and to B in Heating mode as shown to the left.<br>(2) If each indicator position is correct but the 3-way valve does not work properly, the motor may not fit onto the valve securely, so remove the motor by pressing the release button, and reinstall it. |
| **Thermistors** | Disconnect the connector then measure the resistance with a tester.<br>(At ambient temperatures of 10 - 30°C.) |

| Thermistor | Normal | Abnormal |
|---|---|---|
| TH1 | 4.3 - 9.5 kΩ | Open or short |
| TH2 | | |
| THW1 | | |
| THW2 | | |
| THW5 | | |
| THW6 | | |
| THW7 | | |
| THW8 | | |
| THW9 | | |
| THWB1 | 40 - 100 kΩ | Open or short |
| THWB2 | | |

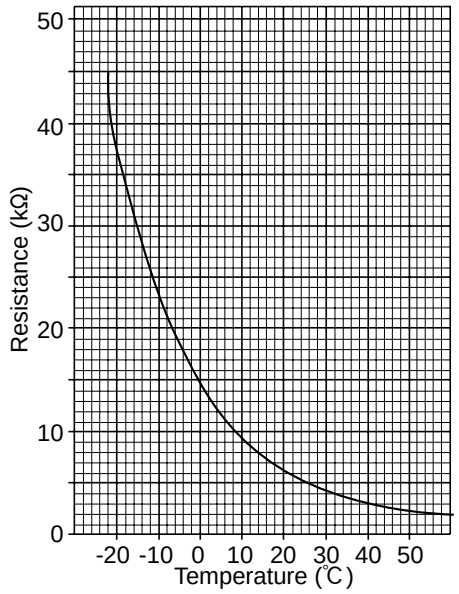
<Thermistor Characteristics Charts>

- Room temperature thermistor (TH1)
- Liquid refrigerant temperature thermistor (TH2)
- Flow water temperature thermistor (THW1)
- Return water temperature thermistor (THW2)
- DHW tank temperature thermistor (THW5)
- Zone 1 flow water temperature thermistor (THW6)
- Zone 1 return water temperature thermistor (THW7)
- Zone 2 flow water temperature thermistor (THW8)
- Zone 2 return water temperature thermistor (THW9)

Thermistor R0 = 15kΩ ± 3%
B constant = 3480 ± 2%

$$Rt = 15\exp\{3480\,(\frac{1}{273+t} - \frac{1}{273})\}$$

| | |
|---|---|
| 0°C | 15kΩ |
| 10°C | 9.6kΩ |
| 20°C | 6.3kΩ |
| 25°C | 5.2kΩ |
| 30°C | 4.3kΩ |
| 40°C | 3.0kΩ |

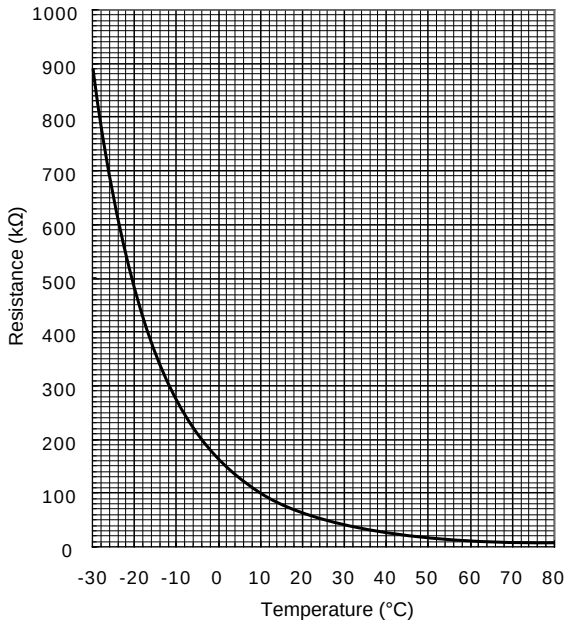



- Boiler flow water temperature thermistor (THWB1)
- Boiler return water temperature thermistor (THWB2)

Thermistor R100 = 3.3kΩ ± 2%
B constant = 3970 ± 1%

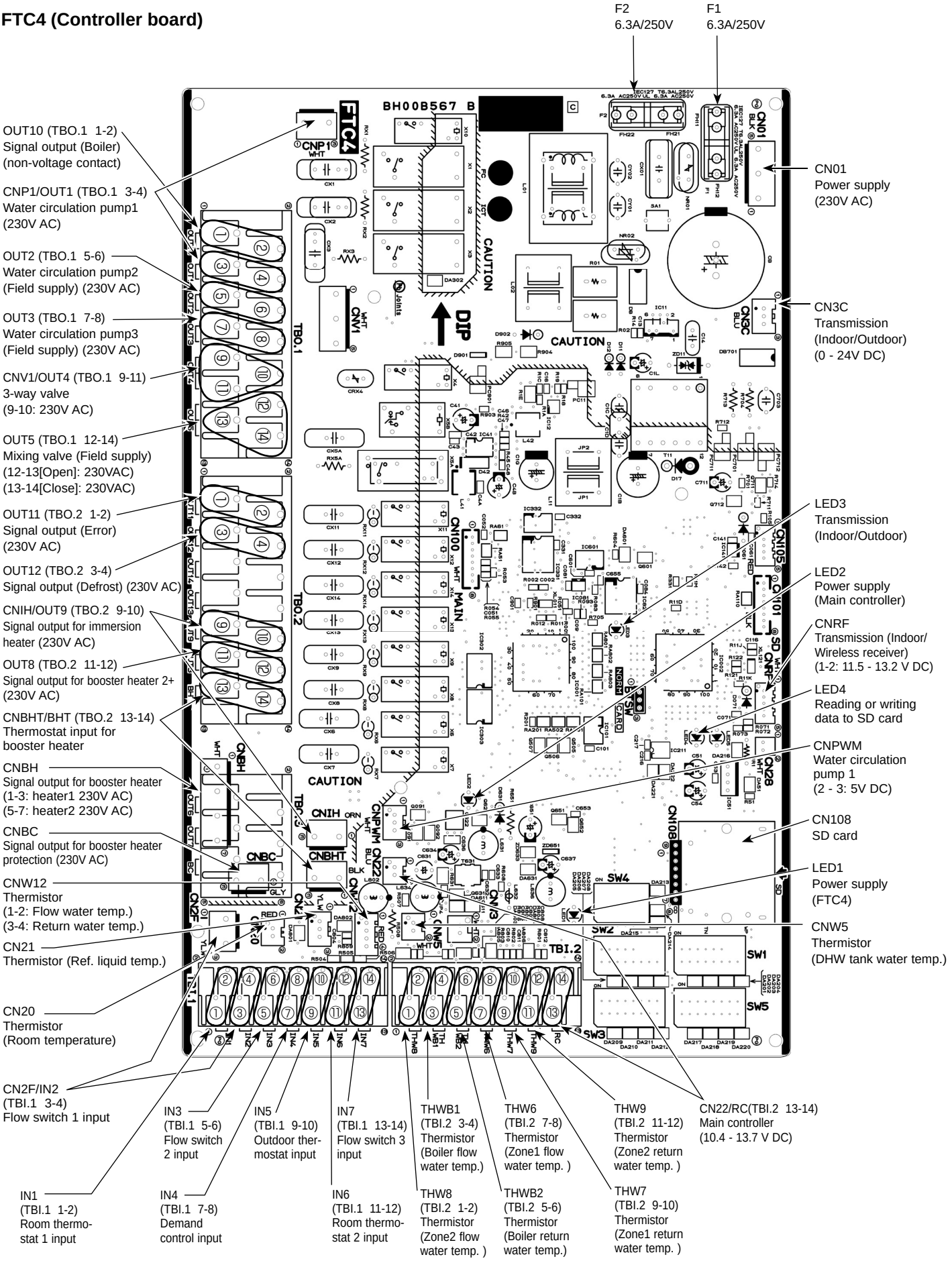
$$Rt = 3.3\exp\{3970\,(\frac{1}{273+t} - \frac{1}{273})\}$$

| | |
|---|---|
| 0°C | 162.8kΩ |
| 10°C | 97.4kΩ |
| 20°C | 60.3kΩ |
| 25°C | 48.1kΩ |
| 30°C | 38.6kΩ |
| 40°C | 25.4kΩ |
| 50°C | 17.1kΩ |
| 60°C | 11.9kΩ |
| 70°C | 8.4kΩ |
| 80°C | 6.0kΩ |



## 10-7. Test point diagram

### FTC4 (Controller board)



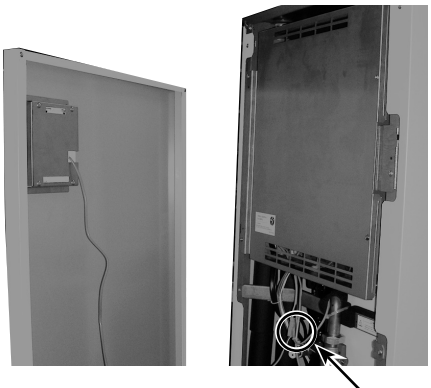
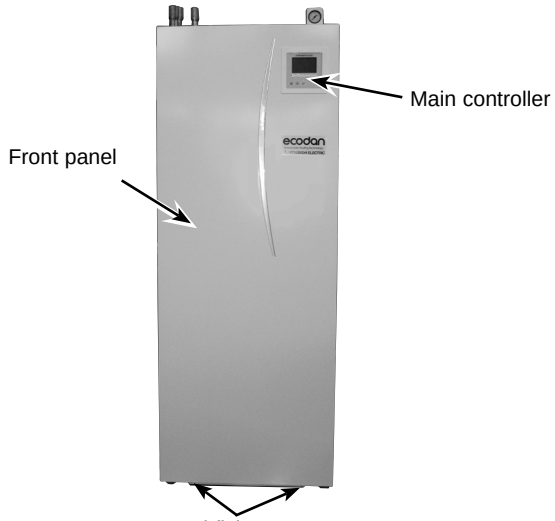
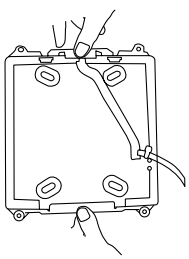
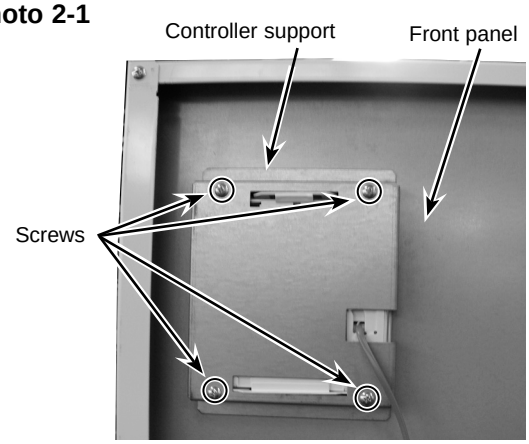
# 11 DISASSEMBLY PROCEDURE

**<Preparation for the repair service>**

- Prepare the proper tools.
- Prepare the proper protectors.
- Provide adequate ventilation.
- After stopping the operation of the cylinder and outdoor unit, turn off the power-supply breaker and remove the power plug.
- Discharge the condenser before the work involving the electric parts.
- Allow parts to cool.
- Do not expose the electric parts to water.
- When replacing or servicing water circuit parts, drain system first.

**EHST20C-VM6HB, EHST20C-YM9HB, EHST20C-TM9HB, EHST20C-VM2B, EHST20C-VM6B, EHST20C-YM9B, EHST20C-VM6EB, EHST20C-YM9EB, EHST20C-VM6SB, EHPT20X-VM2HB, EHPT20X-VM6HB, EHPT20X-YM9HB, EHPT20X-TM9HB, EHPT20X-VM6B, EHPT20X-YM9B**

Check individual illustrations and positions of the parts by referring to the parts catalog included in this manual.
Some lead wires and pipes are bundled with bands. Cut the bands to undo the fastened pipes and lead wires if necessary. When bundling the lead wires and pipes again, use new commercially available bands.
When removing the parts associated with water pipe work, drain the cylinder unit as necessary (Refer to "Draining the cylinder unit" on page 35.
When draining the cylinder unit, keep water from splashing on the internal parts (mainly electric parts and insulations).

| DISASSEMBLY PROCEDURE | PHOTOS & ILLUSTRATION |
|---|---|
| **1. How to remove the front panel**<br>(1) Remove the 2 screws at the bottom of the cylinder unit. (Photo 1-1)<br>(2) Slightly lift and pull out the front panel from the cylinder unit. (Photo 1-1)<br>(3) Disconnect the relay connector connecting from the main controller. (Photo 1-2)<br>**Photo 1-2**<br>  <br>Connector | **Photo 1-1**<br>  <br> |
| **2. How to remove the main controller**<br>(1) Remove the front panel. (Refer to Procedure 1).<br>(2) Turn the front panel over and remove the 4 screws retaining the controller support. (Photo 2-1)<br>(3) Remove the main controller from the case while moving up the claw at the top of the case. (Figure 2-1)<br>**Figure 2-1**<br>  | **Photo 2-1**<br>  <br> |

## DISASSEMBLY PROCEDURE

### 3. How to remove the electrical parts

**(Steps (1) through (3) are applied to all the following parts.)**

**<Control box cover> (Photo 3-1)**

(1) Remove the front panel. (Refer to Procedure 1).
(2) Remove the 4 screws holding the control box cover.
(3) Slightly lift and pull out the control box cover.

**<Earth leakage circuit breaker> (Photo 3-2)**

(4) Disconnect all the lead wires from the earth leakage circuit breaker.
(5) Remove the 2 screws on the earth leakage circuit breaker.

**Note:**

**To avoid dropping of the breaker, hold the breaker by hand when removing the last screws.**

**<Contactor> (Photo 3-2)**

(4) Disconnect all the lead wires from the contactors.
(5) Remove the 2 screws on each contactor.

**Note:**

**To avoid dropping of the contactors, hold the contactors by hand when removing the last screws.**
**To prevent an electrical shock, wait until all the LED lamps on the FTC4 control board are turned off.**

**<Terminal block> (Photo 3-2)**

(4) Disconnect all the lead wires from the terminal block. (To disconnect the S1, S2 and S3 lead wires, disengage the locks by pressing on the claws.)
(5) Remove the screw on the terminal block.

**Note:To avoid dropping of the terminal block, hold the terminal block by hand when removing the screw .**

**<Controller board> (Photo 3-3)**

(4) Disconnect all the lead wires from the controller board.
(5) Remove the controller board from the 6 board supports.

## PHOTOS

**Photo 3-1**

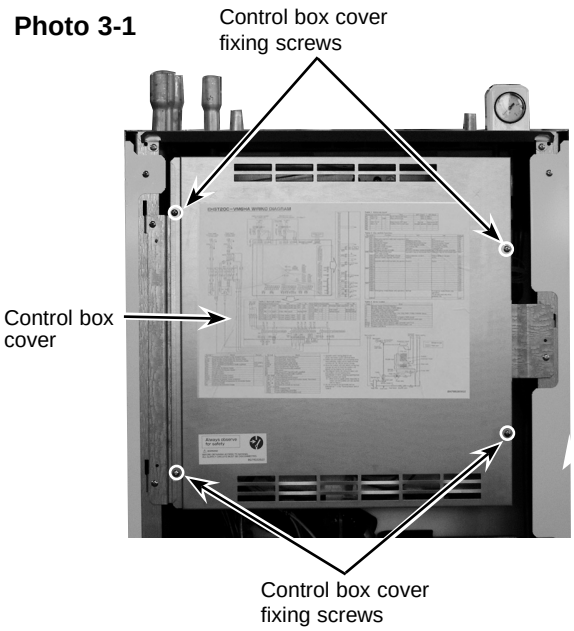
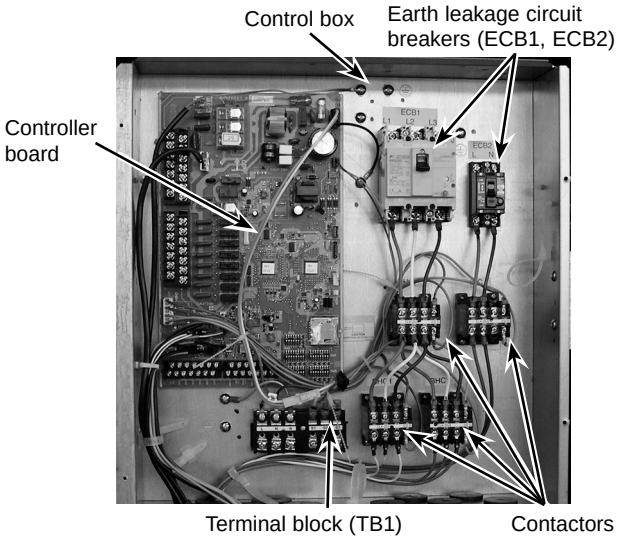
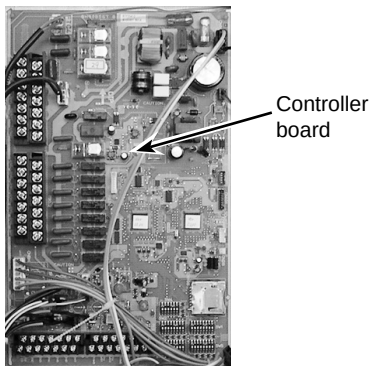



**Photo 3-2**




※ The photos shown are of the EHST20C-YM9HB model.

**Photo 3-3**



## DISASSEMBLY PROCEDURE

**4. How to remove the control box**

(1) Remove the front panel. (Refer to Procedure 1.)
(2) Remove the control box cover. (Refer to Procedure 3.)
(3) Disconnect only the lead wires in the control box that connect to the components in the cylinder unit.
Photo 4-2 shows the control box after the related lead wires are disconnected.
(4) Remove the screw on the bracket (R) and disengage the tab on the control box bracket from the right hand frame. (Photo 4-1)
(5) Disengage the 2 tabs on the control box bracket (L) from the left hand-side frame. (Photo 4-1)
(6) Slightly lift and pull out the control box from the cylinder unit while tilting the control box backward.

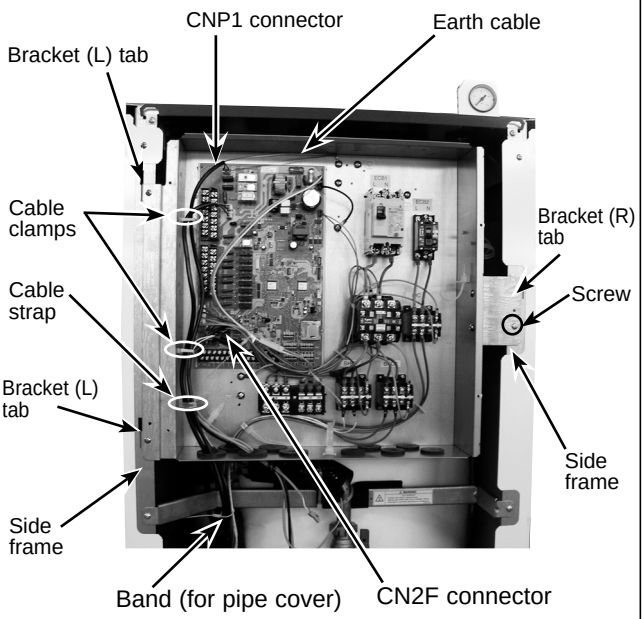
**<When swinging the control box to the front>**

(3) Remove the screw on the bracket (R) . (Photo 4-1)
(4) Remove the band. (Photo 4-1)
(5) Disengage the tab on the control box bracket (R) from the right-hand side frame and pull the control box by lifting the right- hand side to swing the control box. (Photo 4-3)

**Note:**
**Disconnect the field wiring as necessary.**

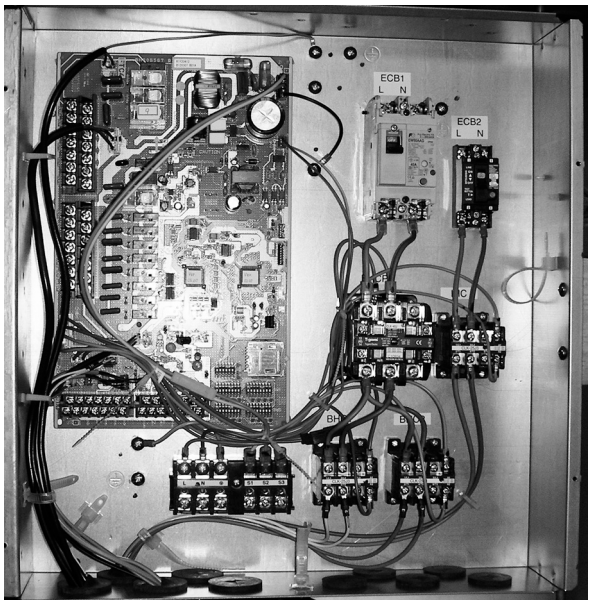
## PHOTOS

**Photo 4-1**



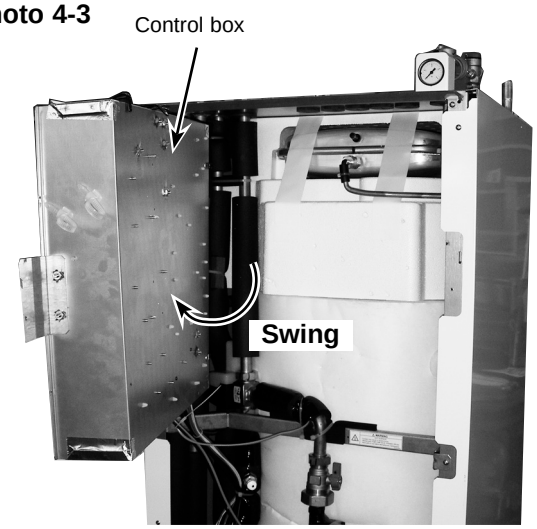

* The photos shown are of the EHST20C-VM6HB model.

**Photo 4-2**




* The photos shown are of the EHST20C-VM6HB model.

**Photo 4-3**



## DISASSEMBLY PROCEDURE

**5. How to remove water pump/ pump valve**

**<Water pump>**

(1) Remove the front panel. (Refer to Procedure 1.)
(2) Remove the control box cover. (Refer to Procedure 3.)
(3) Disconnect the CNP1 and CNPWM connector on the controller board and release the lead wire from the 2 cable clamps and the cable strap in the control box, and the 3 bands and the fastener below the control box, and disconnect the earth cable in the control box. (Photos 4-1 10-1, 10-2)
(4) Close (OFF) the 2 pump valves and remove the water pump by removing the two G1-1/2" nuts using two spanners: one to hold the pump and the other to turn the individual nuts. (Photo 5-1)
* When either of the pump valve handles is stiff, remove the individual handles and turn the individual stems 90 degree mainly by using a spanner. (Photo 5-2)
* When reinstalling the G1-1/2" nuts, use new G1-1/2" gaskets. (Photo 5-4)
* Set the water pump in the orientation of the arrow printed on the water pump and in the way that the terminal box faces to the front.

**<Pump valve>**

(5) Remove the pump valves by removing the G1" nuts using two spanners: one to hold each valve and the other to turn each G1" nut.
* When reinstalling the G1" nuts, use new G1" gaskets. (Photo 5-3)
* When either of the pump valve handles is stiff, remove the individual handles and turn the individual stems 90 degree mainly by using a spanner. (Photo 5-2)
* When reinstalling the pump valves, face the individual handles to the right-hand side of the valve as specified.

Note: Skip Steps (2) and (3) above when replacing the pump valves only.
When replacing both the water pump and the pump valves, skip Step (4) above.

## PHOTOS

**Photo 5-1**

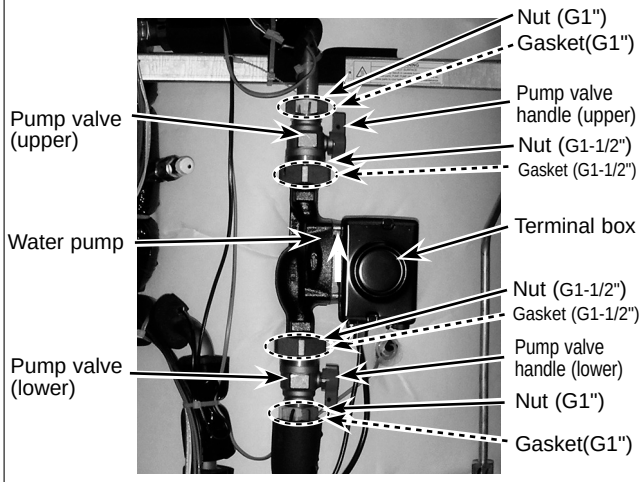



**Photo 5-2**

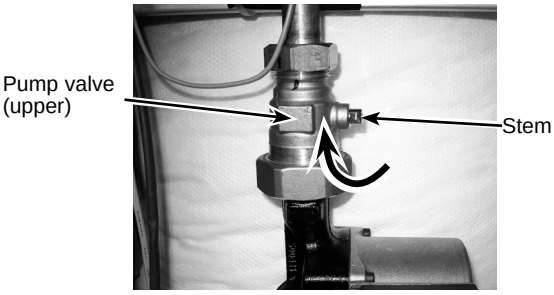



**Photo 5-3**

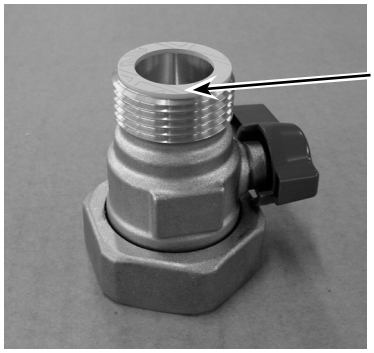
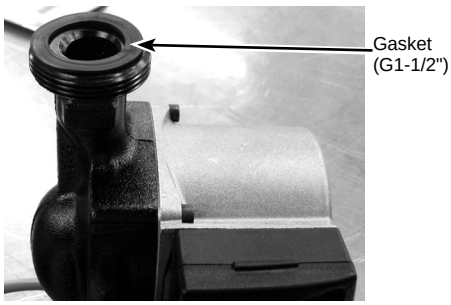



**Photo 5-4**



## DISASSEMBLY PROCEDURE

**6. How to remove the 3-WAY VALVE / 3-WAY VALVE MOTOR**

(1) Remove the front panel. (Refer to Procedure 1.)

(2) Remove the control box. (Refer to Procedure 4.)

(3) Remove the 3-way valve motor from the 3-way valve while pressing the button on the front of the motor that is with motor cap (viewed from the front of the cylinder unit). (Photo 6-2)

* Press the button also when reinstalling the 3-way valve motor.

(4) Remove the motor cap from the 3-way valve motor. (Photo 6-1).

(5) Remove the 3-way valve by removing the three G1" nuts in the order of the bottom, middle and top using two spanners: one to hold the 3-way valve and the other to turn each nut. (Photo 6-2)

* When reinstalling the G1" nuts, use new G1" gaskets. A and B shown represent the bottom and the top directions of the 3-way valve, respectively.

Note:

Before replacing the motor, be sure to power off the cylinder unit.

Failure to do so may cause electric shock or cause the 3-way valve to malfunction.

## PHOTOS

**Photo 6-1**

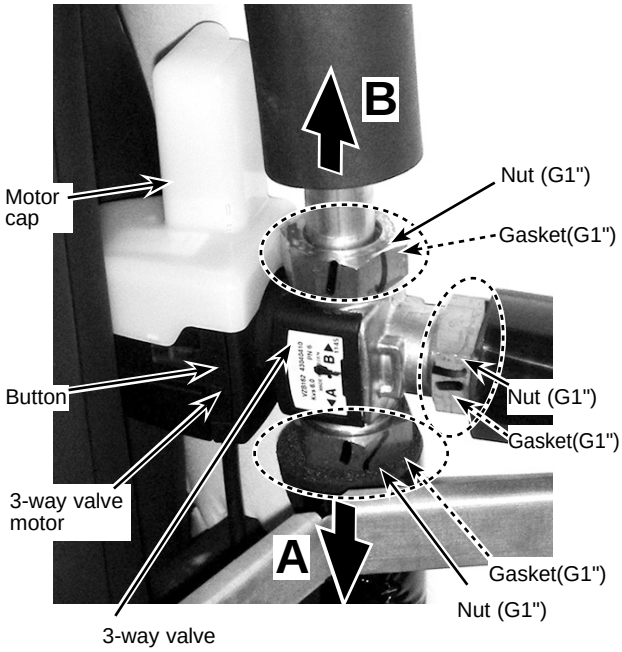
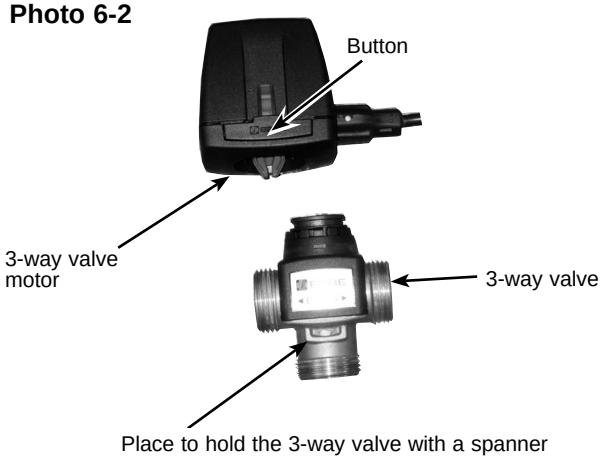



**Photo 6-2**



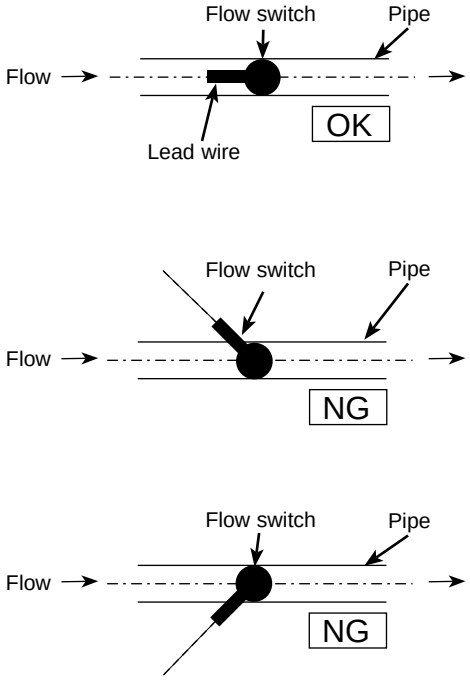
## DISASSEMBLY PROCEDURE

**7. How to remove the flow switch**

(1) Remove the front panel. (Refer to Procedure 1.)
(2) Remove the control box cover. (Refer to Procedure 3.)
(3) Disconnect the CN2F connector on the controller board. (Photo 4-1)
(4) Release the lead wire from the 5 bands and 2 cable straps. (Photos 10-1, 10-2)
(5) Close (OFF) the strainer valve handle (under). (Photo 10-2)
* When the valve handle is stiff, remove the handle and turn the vertical stem 90 degree mainly by using a spanner. (Photo 5-2)
(6) Remove the flow switch by loosening the nut. (Photo 7-1)
* When reinstalling the flow switch, use a new O-ring. (Photo 7-2)

Note: To ensure the correct functioning of the flow switch, check the following when installing it:
- The flow switch paddle is set perpendicularly to the water flow. (Photo 7-2)
- The lead wire of the flow switch points toward the left-hand. (Photo 7-1)
- The lead wire runs parallel to the water pipe. (Figure 7-1)

**Figure 7-1**




## PHOTOS

**Photo 7-1**

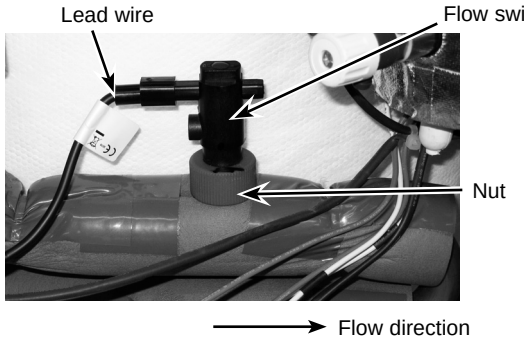
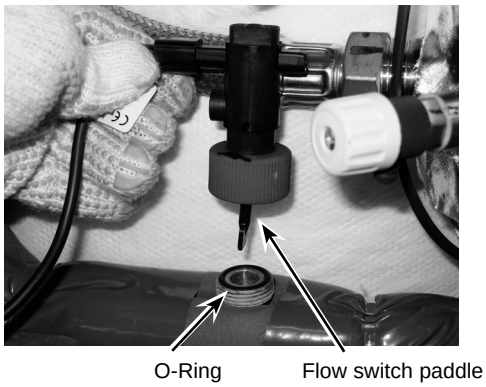



**Photo 7-2**



## DISASSEMBLY PROCEDURE

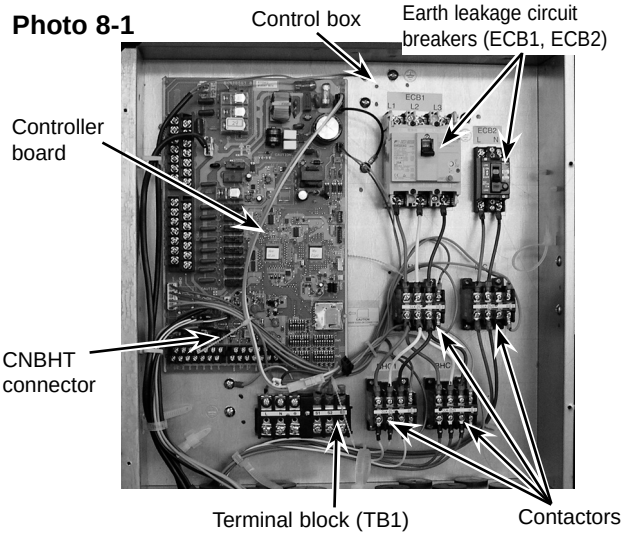
**8. How to remove the booster heater**

(1) Remove the front panel. (Refer to Procedure 1.)
(2) Remove the control box cover. (Refer to Procedure 3.)
(3) Disconnect the CNBHT connector on the controller board, and the 4 booster heater lead wires wired to the BHC1 and BHC2 contactors and release the lead wires from the fastener, the 6 bands and the 2 cable straps. (Photos 8-1, 10-1, 10-2)
(4) Close (OFF) the pump valve (lower) to stop flow. (Photo 8-2)
(5) Remove the two G1" nuts. (Photo 8-3)
* When reinstalling the G1" nuts, use new G1" gaskets.
(6) Hold the top of the booster heater using a pipe wrench and turn the flare nut using a spanner. (Photo 8-3)
(7) Remove the two screws on the heater stay. Lift the booster heater slightly and remove the booster heater from the heater stay. (Photo 8-4)
(8) Remove the drain cock from the booster heater. (Photo 8-3)
* Replace the removed drain cock (primary circuit). The reused drain cock could cause water leakage.

**Photo 8-4**

## PHOTOS

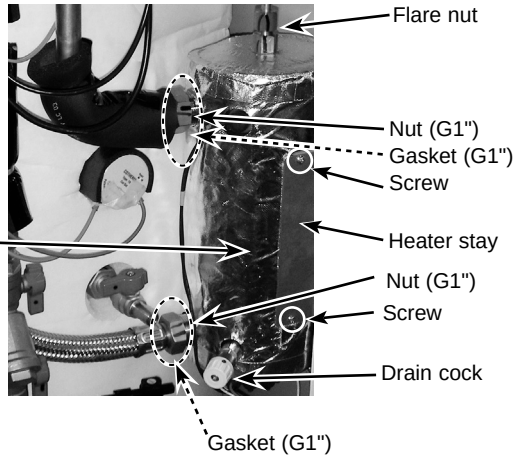
**Photo 8-1**




* The photos shown are of the EHST20C-YM9HB model.

**Photo 8-2**


**Photo 8-3**



## DISASSEMBLY PROCEDURE

**9. How to remove the thermostat/immersion heater**

**<Thermostat>**

(1) Remove the front panel. (Refer to Procedure 1.)

(2) Peel off the water-proof tapes on the plastic head of the thermostat in order to reveal the thermostat terminals, and disconnect the lead wires from the terminals. (Photo 9-1)

* Use new commercially available water-proof tapes to cover the terminals again.

(3) Pull out the thermostat.

**<Immersion heater>**

(4) Remove the tab cover and remove the back nut (G1-3/4") using the tool included with the immersion heater. (Photo 9-2)

(5) Pull out the immersion heater.

* When reinstalling the immersion heater, use a new G1-3/4" gasket.

Note: When replacing the immersion heater only, skip Step (2). After reinstalling the back nut with the tab cover onto the tank, insert the immersion heater straight into the tank through the back nut in order to provide adequate sealing. Failure to do so may cause water leakage. Always check for water leakage after installation.

## PHOTOS

**Photo 9-1**

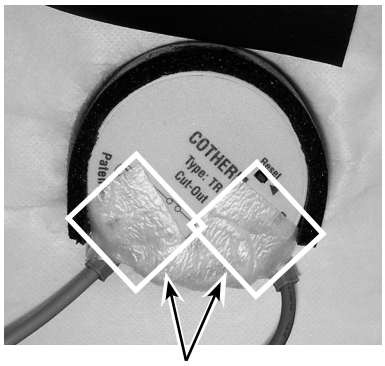
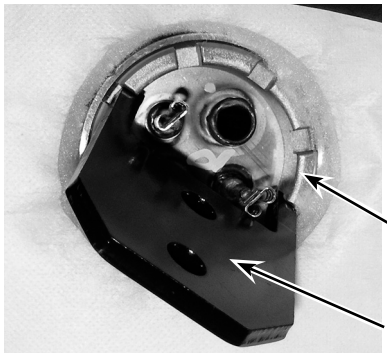
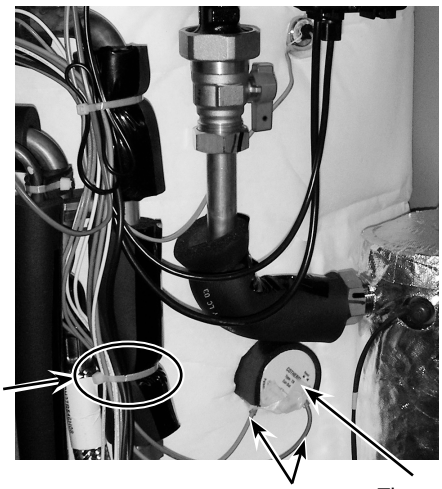



**Photo 9-2**




(*1) When the model is the cylinder unit including immersion heater, the tool is included with the unit. The tool is also included with the immersion heater of optional parts.

**Photo 9-3**

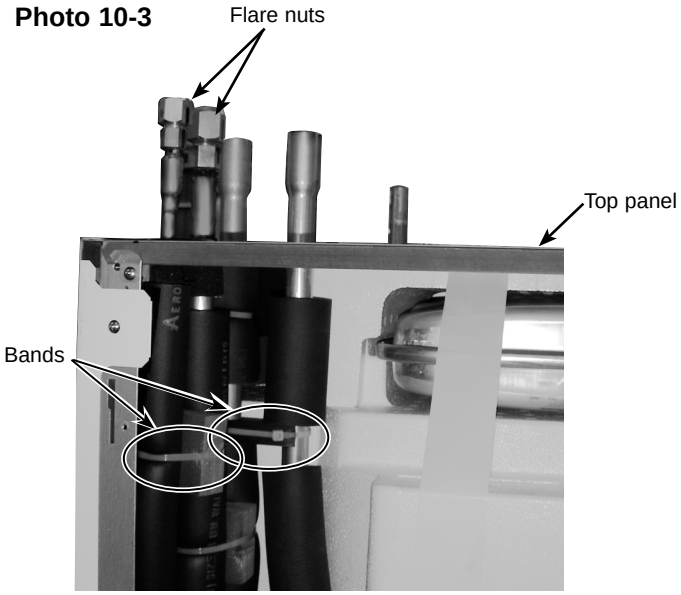


## DISASSEMBLY PROCEDURE

**10. How to remove the plate heat exchanger**

(1) Remove the front panel. (Refer to Procedure 1.)
(2) Pump down the refrigerant circuit and close the stop valve at the outdoor unit side. (Refer to 12. SUPPLEMENTARY INFORMATION.)
(3) Remove the control box. (Refer to Procedure 4.)
(4) Cut the bands and remove the pump frame. (Photo 10-1)
(5) Cut the bands bundling the pipes. (Photos 10-2, 10-3)
(6) Remove the 2 flare nuts on the refrigerant piping on top of the cylinder unit. (Photo 10-3)
(7) Close (OFF) the strainer valve handle (under).
* When the valve handle is stiff, remove the handle and turn the vertical stem 90 degree mainly by using a spanner. (Photo 5-2)
(8) Remove the G1" nut at the booster heater side of the flexible hose. (Photo 10-2)
* When reinstalling the G1" nut, use a new G1" gasket.
(9) Remove the G1" nut under the strainer valve. (Photo 10-2)
* When reinstalling the G1" nut, use a new G1" gasket.
(10) Remove the 4 screws fixing the plate heat exchanger. (Photo 10-2)

**Photo 10-3**




## PHOTOS

**Photo 10-1**

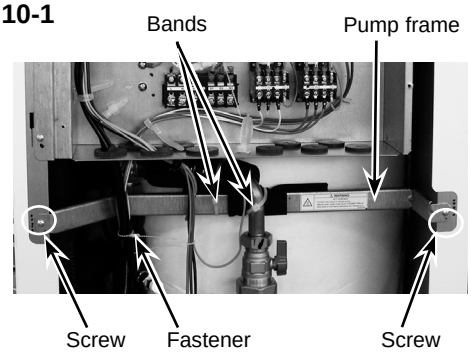
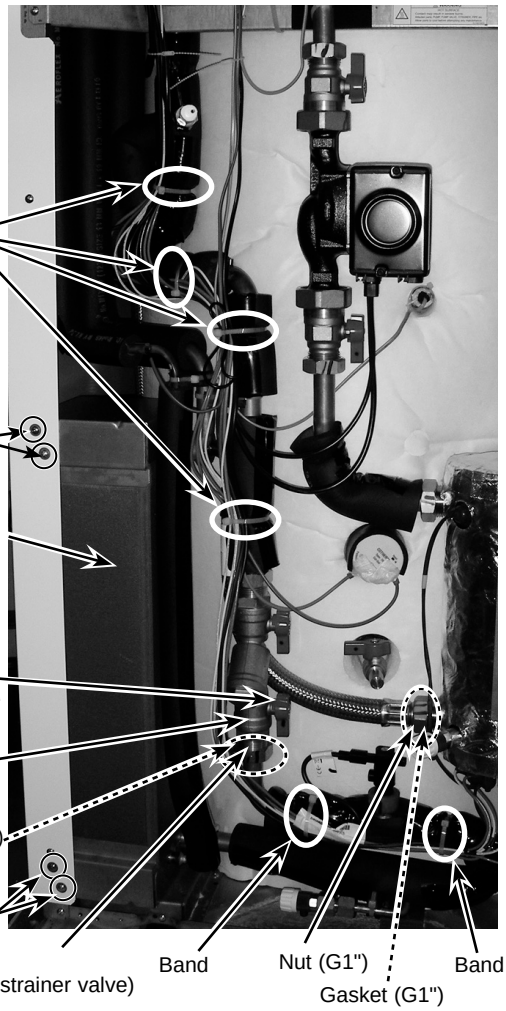



**Photo 10-2**




Continue to the next page.

From the previous page.

## DISASSEMBLY PROCEDURE

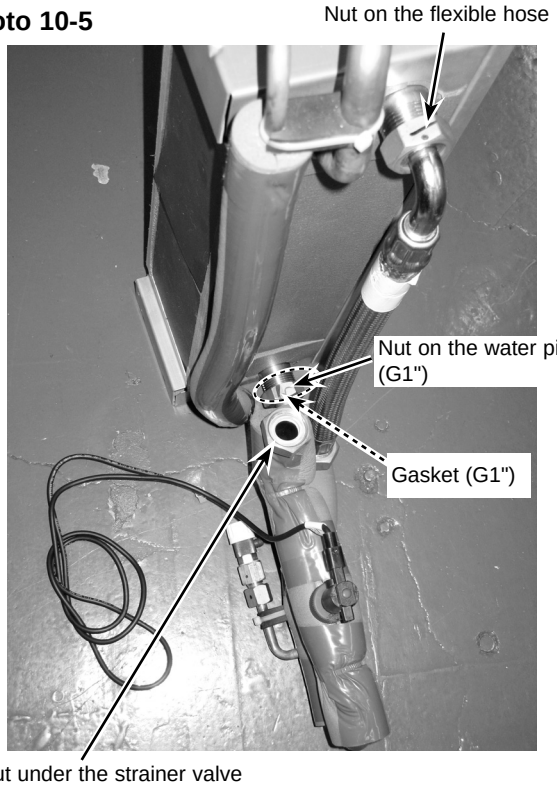
**10. How to remove the plate heat exchanger**

(11) Displace the plate heat exchanger together with the refrigerant pipes, the water pipe and the flexible hose to the front of the cylinder unit while feeding the top ends of the 2 refrigerant pipes though the openings in the top panel and remove the heat exchanger unit from the cylinder unit. (Photos 10-3, 10-4, 10-5)

(12) Loosen the G1" nut on the water pipe and remove the water pipe form the plate heat exchanger.

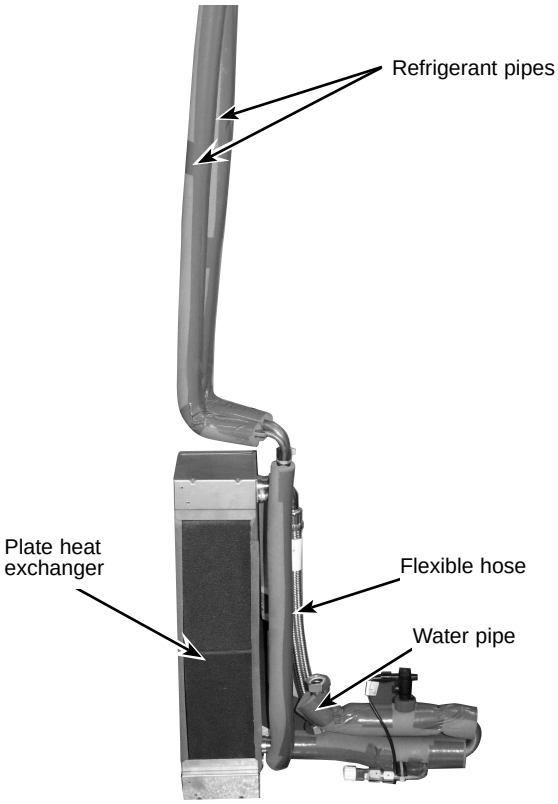
* When reinstalling the nut, use a new G1" gasket.
* When reinstalling the plate heat exchanger, reuse the water pipe.

**Photo 10-5**




## PHOTOS

**Photo 10-4**




**11. How to remove the strainer**

(1) Remove the front panel. (Refer to Procedure 1.)

(2) Close (OFF) the 2 strainer valves.

* When either of the strainer valve handles is stiff, remove the individual handles and turn the individual stems 90 degree mainly by using an adjustable spanner. (Photo 5-2)

(3) Remove the two G1" nuts using two spanners: one to hold the strainer and the other to turn the individual G1" nuts.

* When reinstalling the G1" nuts, use new G1" gaskets.

<Removal of the strainer cover (debris recovery)>

(3) Remove the cover using two spanners: one to hold the strainer and the other to turn the cover.

* Be sure to reattach the mesh after washing it.
* When placing the strainer back into place, use a new O-ring. (Photo11-2)

**Photo 11-2**

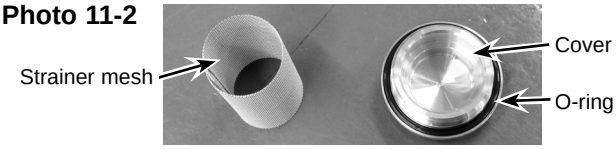
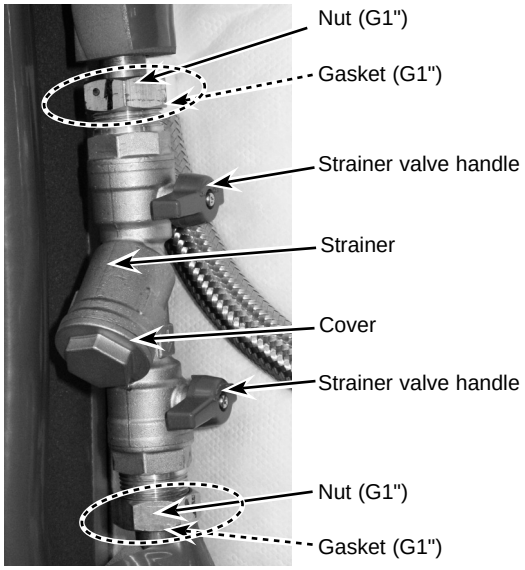



**Photo 11-1**



## DISASSEMBLY PROCEDURE

**12. How to remove the pressure relief valve / manometer / air vent (automatic)**

(1) Remove the front panel. (Refer to Procedure 1.)
(2) Swing the control box to the front. (Refer to Procedure 4.)

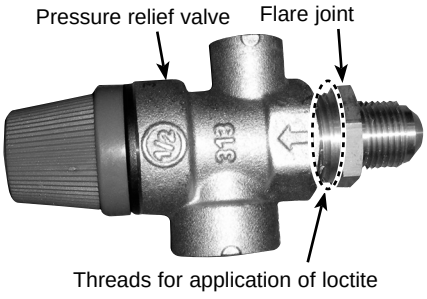
**<Manometer>**

(3) Hold the bottom of the manometer cover and disengage 2 claws, and remove the manometer cover from the top panel by sliding it backward. (Photo 12-1)
(4) Remove the G1/4" nut from the pressure relief valve and remove the capillary tube from the pressure relief valve.
* When reinstalling the G1/4" nut, use a new G1/4" gasket. (Photo 12-2)
(5) Remove the manometer assembly from the cylinder unit.
(6) Remove the manometer from the manometer cover while pressing on the claws. (Photo 12-3)
* Beware not to put strain on the root of the capillary tube as the capillary tube is easy to break at the root. (Photo 12-3)

**<Pressure relief valve>**

(3) Remove the field piping from the pressure relief valve.
(4) Remove the G1/4" nut and remove the capillary tube from the pressure relief valve. (Photo 12-2)
* When reinstalling the G1/4" nut, use a new G1/4" gasket. (Photo 12-2)
(5) Remove the pressure relief valve with a flare joint using two spanners: the one to hold the flare joint and the other to turn the flare nut. (Photo 12-2)
(6) Remove the pressure relief valve using two spanners: one to hold the flare joint and the other to turn the pressure relief valve. (Photo 12-4)
(7) Eliminate locktite on the thread surfaces using remover. (Photo 12-4)
* Before reinstallation, apply locktite over the thread surface on the pressure relief valve.
* For more details about the locktite and the remover, refer to Page 87.

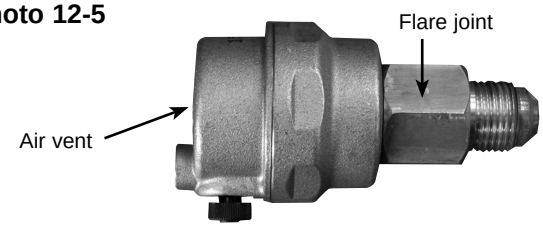
**Photo 12-4**




**<Air vent (automatic)>**

(3) Remove the air vent (automatic) using two spanners: one to hold the flare joint and the other to turn the flare nut. (Photos 12-2)
(4) Remove the air vent with the flare joint. (Photo 12-2)
(5) Remove the flare joint from the air vent. (Photo 12-5)

**Photo 12-5**




## PHOTOS

**Photo 12-1**

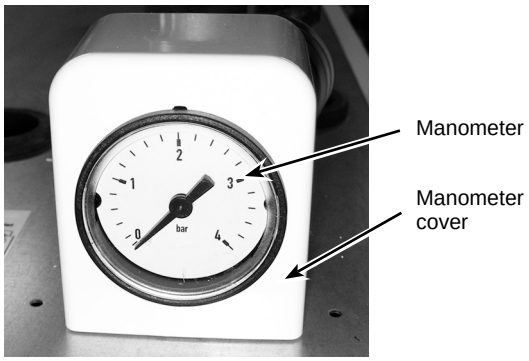



**Photo 12-2**

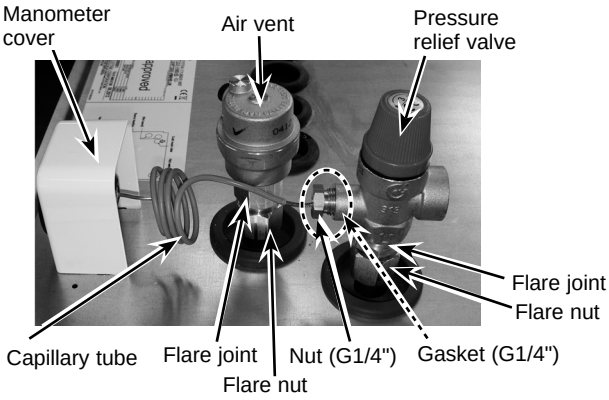
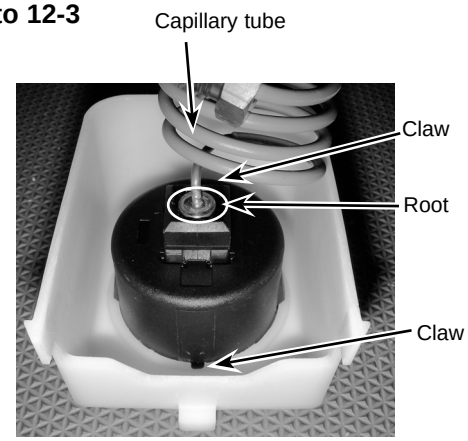
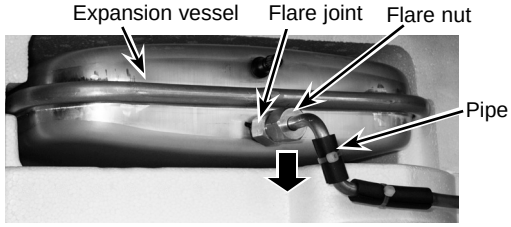
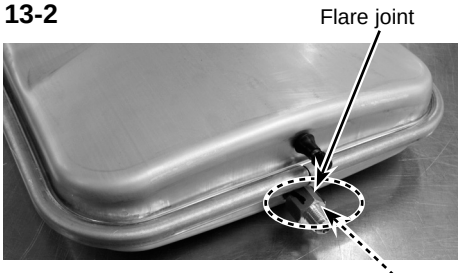
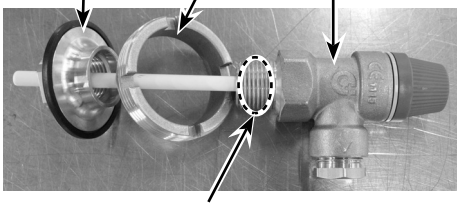
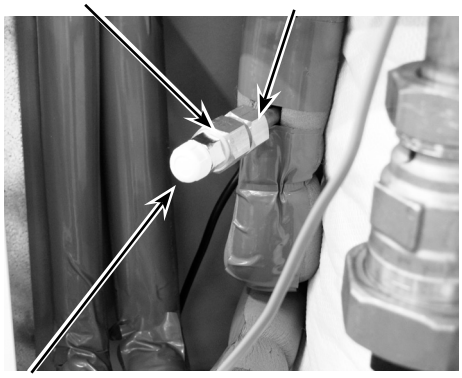
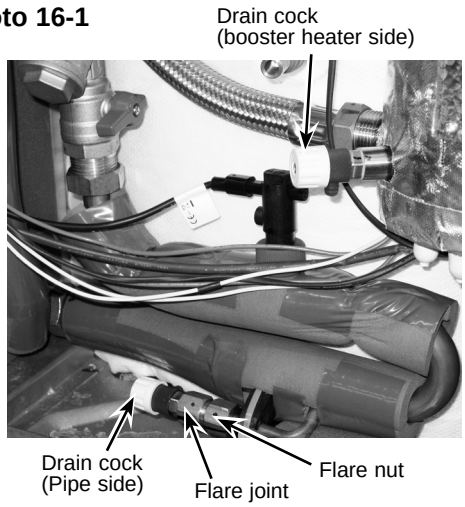
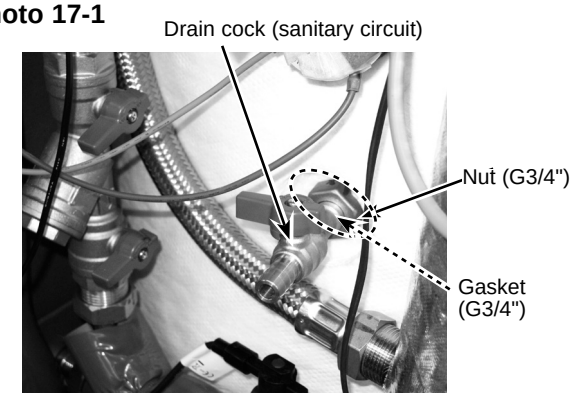
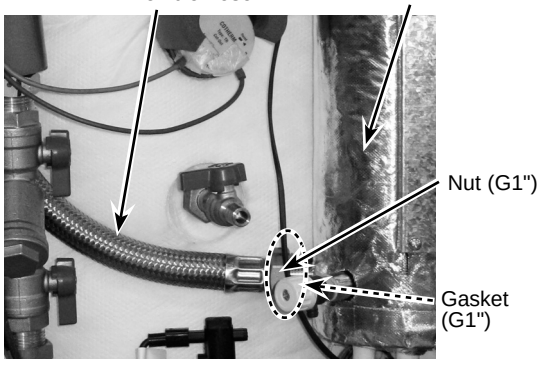
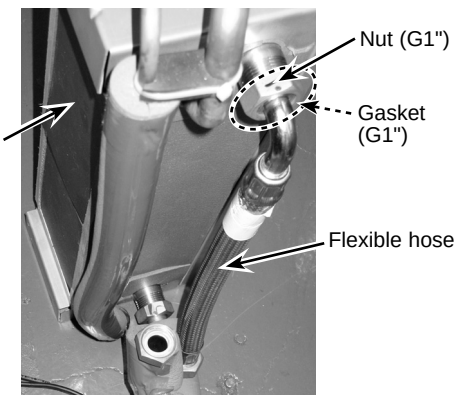
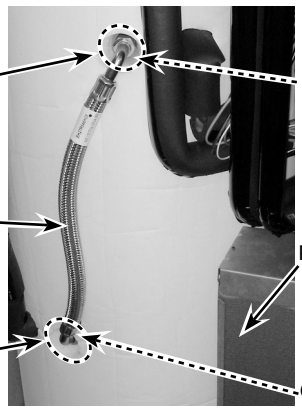



**Photo 12-3**



| DISASSEMBLY PROCEDURE | PHOTOS |
|---|---|
| **13. How to remove the expansion vessel**<br>(1) Remove the front panel. (Refer to Procedure 1.)<br>(2) Swing the control box to the front. (Refer to Procedure 4.)<br>(3) Remove the flare nut using two spanners: one to hold the flare joint and the other to turn the flare nut.<br>(4) Displace the pipe slightly downward and pull out the expansion vessel.<br>(5) Remove the flare joint from the expansion vessel.<br>* When reinstalling the flare joint, use a new G3/8" gasket.<br>Note: To avoid dropping of the expansion vessel, hold it by hand when removing it. | **Photo 13-1**<br>  <br><br>**Photo 13-2**<br>  <br> |
| **14. How to remove the temperature and pressure (T&P) relief valve (EHPT20X-VM2HB only)**<br>(1) Remove the front panel. (Refer to Procedure 1.)<br>(2) Swing the control box to the front. (Refer to Procedure 4.)<br>(3) Remove the field piping from the temperature and pressure relief valve.<br>(4) Turn the back nut (G1-3/4") using a specified tool and remove the temperature and pressure relief valve. (Photo 14-2)<br>(5) Eliminate locktite on the thread surfaces using remover. (Photo 14-3)<br>* Before reinstallation, apply locktite over the thread surface on the temperature and pressure relief valve and install the temperature and pressure relief valve with the T&P joint and the back nut.<br>* When reinstalling the T&P relief valve, point the nut to the bottom as specified. (Photo 14-1)<br>* For more details about the locktite and the remover, refer to Page 87.<br>* When reinstalling the T&P, use a new G1-3/4" gasket. | **Photo 14-1**<br>  <br><br>**Photo 14-2**<br>  <br><br>(*2) The JIG is set as a service part.<br>**Photo 14-3**<br>  <br> |
| **15. How to remove the air vent (manual)**<br>(1) Remove the front panel. (Refer to Procedure 1.)<br>(2) Remove the air vent (manual) with a flare joint using two spanners: one to hold the flare joint and the other to turn the flare nut.<br>(3) Remove the flare joint from the air vent. | **Photo 15-1**<br>  <br> |

| DISASSEMBLY PROCEDURE | PHOTOS |
|---|---|
| **16. How to remove the drain cock (primary circuit)**<br>(1) Remove the front panel. (Refer to Procedure 1.)<br><br>**Booster heater side**<br>(2) Remove the drain cock from the booster heater by turning the drain cock.<br><br>**Pipe side**<br>(2) Remove the drain cock from the pipe using two spanners: one to hold the flare joint and the other to turn the flare joint nut.<br>(3) Remove the flare joint from the drain cock. | **Photo 16-1**<br>  <br> |
| **17. How to remove the drain cock (sanitary circuit)**<br>(1) Remove the front panel. (Refer to Procedure 1.)<br>(2) Remove the drain cock by removing the nut.<br>* When reinstalling the nut, use a new G3/4" gasket. | **Photo 17-1**<br>  <br> |
| **18. How to remove the flexible hose**<br>**Between the plate heat exchanger and the booster heater**<br>(1) Remove the plate heat exchanger from the cylinder unit. (Refer to Procedure 10.)<br>(2) Remove the flexible hose from the plate heat exchanger by removing the G1" nut. (Photo 18-2)<br>* When reinstalling the G1" nuts, use new G1" gaskets.<br><br>**DHW tank side**<br>(1) Remove the left-hand side panel. (Refer to Procedure 20.)<br>(2) Disconnect the flexible hose by turning the nuts on the hose ends.<br>* When reinstalling the nuts, use new G3/4" gaskets. | **Photo 18-1**<br>  <br><br>**Photo 18-2**<br>  <br> |
| **Photo 18-3**<br>  <br> | |

## DISASSEMBLY PROCEDURE

**19. Remove the liquid refrigerant temp. thermistor (TH2) / flow water temp. & return water temp. thermistor (THW1,THW2) / tank water temp. thermistor (THW5)**

(1) Remove the front panel. (Refer to Procedure 1.)

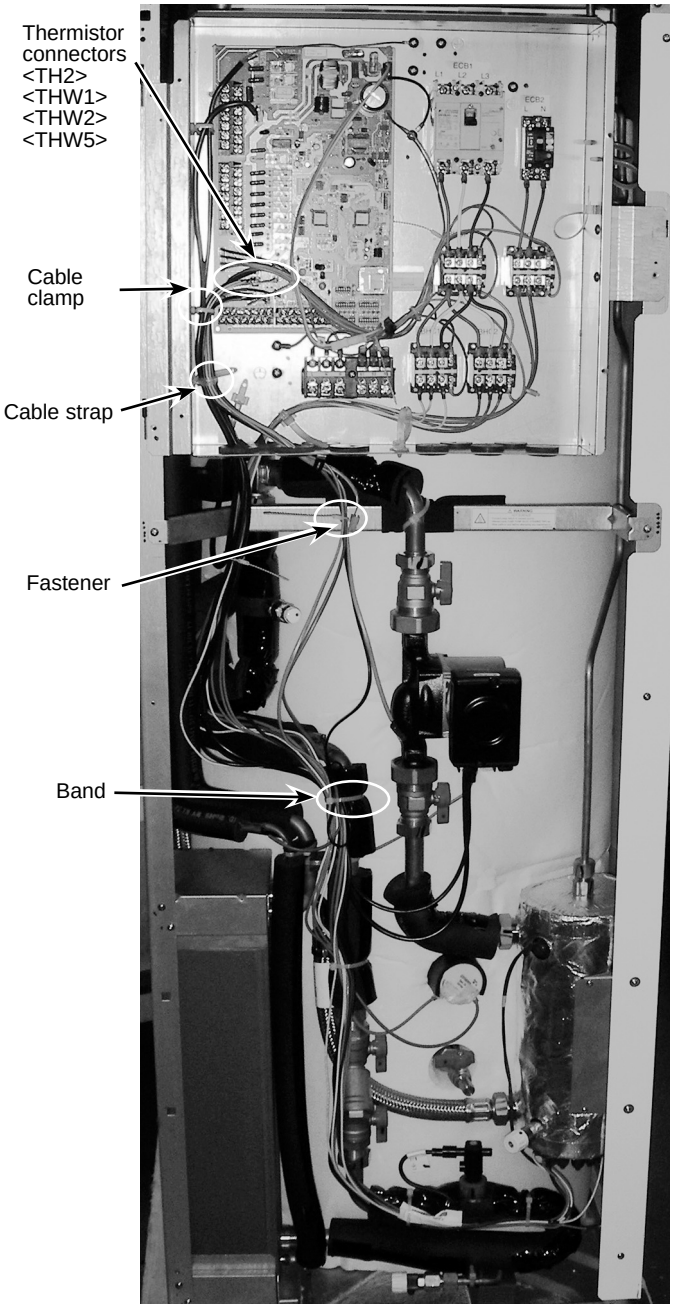
(2) Remove the control box cover. (Refer to Procedure 3.)

(3) Disconnect the following thermistor connectors on the controller board and release the lead wires from cable clamps and bands.

- TH2 (TH2) (cable clamp, cable strap, fastener and band)
- THW1, THW2 (THW12) (cable clamp, cable strap, fastener and band)
- THW5 (THW5) (cable clamp, cable strap, fastener and band)

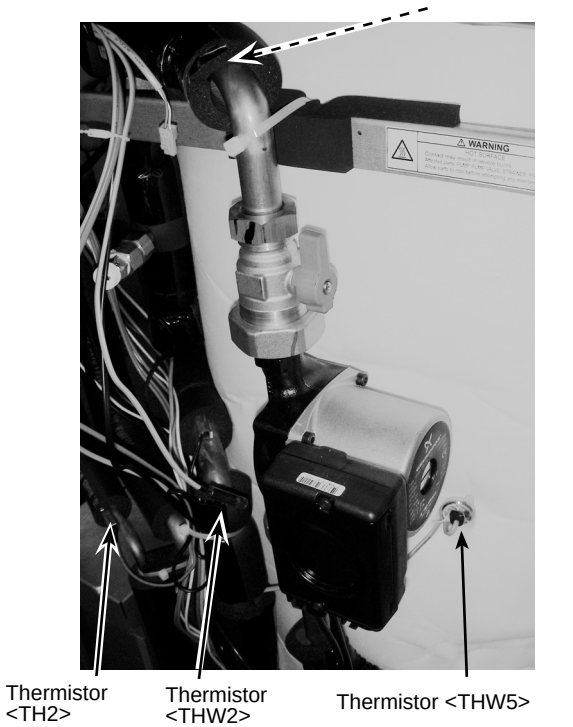
(4) Remove the thermistors from the thermistor holders.

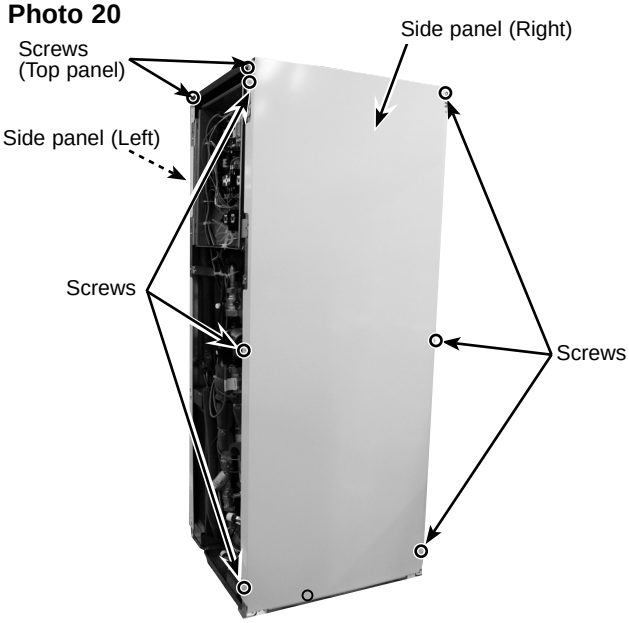
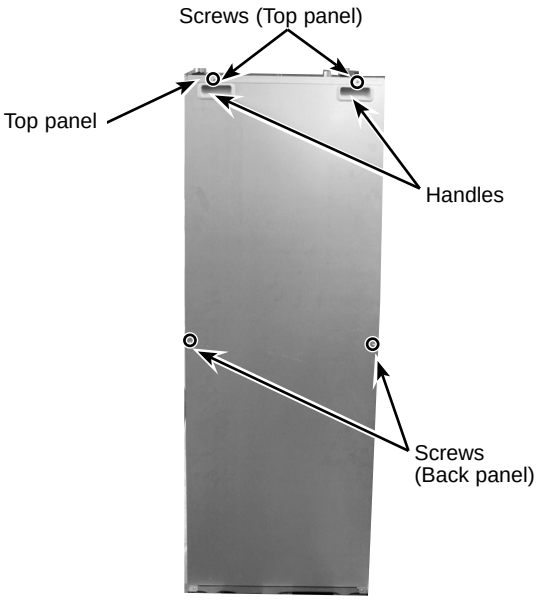
**Photo 19-2**




## PHOTOS

**Photo 19-1**



| DISASSEMBLY PROCEDURE | PHOTOS |
|---|---|
| **20. How to remove the side panels**<br>(1) Remove the front panel. (Refer to Procedure 1.)<br>(2) Remove the side panel by removing 12 screw fixing the side panels (6 screws each on the right and left panels).<br><br>Note:<br>Photo 20 shows the right side panel only. The left side panel will be removed by the same procedure. | **Photo 20**<br>  <br> |
| **21. How to remove the back panel**<br>(1) Remove the front panel. (Refer to Procedure 1.)<br>(2) Remove the side panels. (Refer to Procedure 20.)<br>(3) Remove the 4 screws (2 each at the front and back) on the top panel .<br>(4) Remove the 2 screws on the back panel, and pull out the back panel while lifting the top panel.<br><br>Note:<br>The handles are removed by pushing them up. | **Photo 21**<br>  <br> |

## Notes on replacing the parts

Replacement of the parts listed below requires the following procedure.
After the parts are removed, eliminate loctite on threads by applying loctite remover, apply new loctite, and then install and tighten the parts to the specified tightening torques below. For details about recommended loctite and loctite remover, refer to Table 11-1, and for details about the replacement parts and their tightening torques, refer to Table 11-2.

**Table 11-1**

| Recommended | Manufacturer | No. | Note |
|---|---|---|---|
| Loctite | Henkel | Loctite 577 | Apply loctite all over from the end of external thread to the second ridge. After installing the parts, fix the parts for at least 30 minutes |
| Loctite remover | Henkel | Loctite 7200 Gasket Remover | Spray loctite remover over sealant on the threads, let the sealant sit until soft, and then eliminate it with a wire brush. |

Note: When using the products above, refer to the appropriate manuals that come with the individual products.

**Table 11-2**

| Part name *1 | Recommended tightening torque [Nm] *2 |
|---|---|
| PRESSURE RELIEF VALVE 3bar | 15 ± 1 |
| TEMPERATURE AND PRESSURE RELIEF VALVE | 15 ± 1 |

*1. For more details about the listed parts refer to the parts catalogue included in this manual.
*2. Undertightening and overtightening the parts affect water seal life. Tighten the parts to the appropriate tightening torques.

When installing the parts that are not listed above, observe the tightening torques in accordance with Table 11-3.
Always use a new O-ring or gasket.

**Table 11-3**

| Size [inch] | | Recommended tightening torque [Nm] |
|---|---|---|
| Gasket | G1/4" | 8 ± 1 |
| | G3/8" | 15 ± 1 |
| | G3/4" | 36 ± 2 |
| | G1" | 42 ± 2 |
| | G1 1/2" | 42 ± 2 |
| | G1 3/4" | 10 ± 1 |
| O-ring | Strainer cover | 45 ± 4.5 |
| | Flow switch | 8 ± 1 |
| | Air vent (Automatic) | 15 ± 1 |
| Attached packing | Drain cock (primary circuit) | 15 ± 1 |
| | Air vent (manual) | 15 ± 1 |
| Flare joint (for water circuit parts) | | 35 ± 2 |

After the procedure is complete, ensure that no water leaks.

# 12 SUPPLEMENTARY INFORMATION

## ■ Refrigerant collecting (pumpdown) for split model systems only

Refer to “Refrigerant collection” in the outdoor unit installation manual or service manual.

## ■ Back-up operation of boiler

Heating operation is backed up by boiler.
For more details, refer to the installation manual of PAC-TH011HT-E.

**<Installation & System set up>**

1. Set Dip-SW 1-1 to ON "With boiler" and SW2-6 to ON “With Mixing tank”.
2. Install the thermistors THWB1 (Flow temp.) and THWB2 (return temp.) *1 on the boiler circuit.
3. Connect the output wire (OUT10: Boiler operation) to the input (room thermostat input) on the boiler. *2
4. Install one of the following room temp. thermostats. *3

- Wireless remote controller (option)
- Room temp. thermostat (field supply)
- Main controller (remote position)

*1 The boiler temp. thermistor is an optional part.
*2 OUT10 has no voltage across it.
*3 Boiler heating is controlled on/off by the room temp. thermostat.

**<Remote controller settings>**

1. Go to Service menu > Heat source setting and choose “Boiler” or “Auto”. *4
2. Go to Service menu > Operation settings > Boiler settings to make detailed settings for “Auto” above .

*4 The “Auto” automatically switches heat sources between Heat pump (and Electric heater) and boiler.

# 13 SERVICE AND 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 controller screen | | | | | Parameters | Default setting | Field setting | Notes |
|---|---|---|---|---|---|---|---|---|
| **Main** | | | Zone1 heating room temp. | | 10°C - 30°C | 20°C | | |
| | | | Zone2 heating room temp. *1 | | 10°C - 30°C | 20°C | | |
| | | | Zone1 heating flow temp. | | 25°C - 60°C | 45°C | | |
| | | | Zone2 heating flow temp. *1 | | 25°C - 60°C | 35°C | | |
| | | | Zone1 heating compensation curve | | −9°C - + 9°C | 0°C | | |
| | | | Zone2 heating compensation curve *1 | | −9°C - + 9°C | 0°C | | |
| | | | Holiday mode | | Active/Non active/Set time | — | | |
| **Option** | | | Forced DHW operation | | On/Off | — | | |
| | | | DHW | | On/Off/Timer | On | | |
| | | | Heating | | On/Off/Timer | On | | |
| | | | Holiday mode | | Active/Non active/Set time | — | | |
| **Setting** | DHW | | Operation mode | | Normal/Eco | Normal | | |
| | | | DHW max. temp. | | 40°C - 60°C | 50°C | | |
| | | | DHW temp. drop | | 5°C - 30°C | 10°C | | |
| | | | DHW max. operation time | | 30 - 120 mins | 60 mins | | |
| | | | DHW mode restriction | | 30 - 120 mins | 30 mins | | |
| | Legionella prevention | | Active | | Yes/No | Yes | | |
| | | | Hot water temp. | | 60°C - 70°C | 65°C | | |
| | | | Frequency | | 1 - 30 days | 15 days | | |
| | | | Start time | | 00.00 - 23.00 | 03.00 | | |
| | | | Max. operation time | | 1 - 5 hours | 3 hours | | |
| | | | Duration of maximum temp. | | 1 - 120 mins | 30 min | | |
| | Heating | | Zone1 operation mode | | Room temp/Flow temp/Compensation curve | Room temp | | |
| | | | Zone2 operation mode *1 | | Room temp/Flow temp/Compensation curve | Compensation curve | | |
| | Compensation curve | Hi set point | Zone1 outdoor ambient temp. | | −15°C - +35°C | −15°C | | |
| | | | Zone1 flow temp. | | 25°C – 60°C | 50°C | | |
| | | | Zone2 outdoor ambient temp. *1 | | −15°C - +35°C | −15°C | | |
| | | | Zone2 flow temp. *1 | | 25°C - 60°C | 40°C | | |
| | | Lo set point | Zone1 outdoor ambient temp. | | −15°C - +35°C | 35°C | | |
| | | | Zone1 flow temp. | | 25°C - 60°C | 25°C | | |
| | | | Zone2 outdoor ambient temp. *1 | | −15°C - +35°C | 35°C | | |
| | | | Zone2 flow temp. | | 25°C - 60°C | 25°C | | |
| | | Adjust | Zone1 outdoor ambient temp. | | −14°C - +34°C | — | | |
| | | | Zone1 flow temp. | | 25°C - 60°C | — | | |
| | | | Zone2 outdoor ambient temp. *1 | | −14°C - +34°C | — | | |
| | | | Zone2 flow temp. *1 | | 25°C - 60°C | — | | |
| | Holiday | | DHW | | Active/Non active | Non active | | |
| | | | Heating | | Active/Non active | Active | | |
| | | | Zone1 heating room temp. | | 10°C - 30°C | 15°C | | |
| | | | Zone2 heating room temp. *1 | | 10°C - 30°C | 15°C | | |
| | | | Zone1 heating flow temp. | | 25°C - 60°C | 35°C | | |
| | | | Zone2 heating flow temp. *1 | | 25°C - 60°C | 25°C | | |
| | Initial settings | | Language | | ENG/FR/GER/SW/SP/IT/DA/NL/FIN/NOR/PT | ENG | | |
| | | | °C/°F | | °C/°F | °C | | |
| | | | 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 RC1-8/"Time/Zone" | TH1 | | |
| | | | Room sensor settings for Zone2 *1 | | TH1/Main RC/Room RC1-8/"Time/Zone" | TH1 | | |
| | | | Room RC zone select *1 | | Zone1/Zone2 | Zone1 | | |
| | Service menu | | Thermistor adjustment | THW1 | −10°C - +10°C | 0°C | | |
| | | | | THW2 | −10°C - +10°C | 0°C | | |
| | | | | THW5 | −10°C - +10°C | 0°C | | |
| | | | | THW6 | −10°C - +10°C | 0°C | | |
| | | | | THW7 | −10°C - +10°C | 0°C | | |
| | | | | THW8 | −10°C - +10°C | 0°C | | |
| | | | | THW9 | −10°C - +10°C | 0°C | | |
| | | | | THWB1 | −10°C - +10°C | 0°C | | |
| | | | | THWB2 | −10°C - +10°C | 0°C | | |
| | | | Auxiliary settings | Economy settings for pump. | On/Off *4 | On | | |
| | | | | | Time before pump switched off (3 - 60 mins) *2 | 10 mins | | |
| | | | | Electric heater (Heating) | Space heating: On (used)/Off (not used) | On | | |
| | | | | | Electric heater delay timer (5 - 180 mins) | 30 mins | | |
| | | | | Electric heater (DHW) | DHW: On (used)/Off (not used) | On | | |
| | | | | | Electric heater delay timer (15 - 30 mins) | 15 mins | | |
| | | | | Mixing valve control | Running (10 - 240 secs) | 120 secs | | |
| | | | | | Interval (1 - 30 mins) | 2 mins | | |
| | | | | Pump speed | Pump speed (1 - 5) | 5 | | |

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

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

(Continued to next page.)

(From the previous page.)

## Engineers Forms

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

| Main controller screen | | | | Parameters | | | Default setting | Field setting | Notes |
|---|---|---|---|---|---|---|---|---|---|
| | Service menu | Heat source setting | | Standard/Heater/Boiler/Hybrid *3 | | | Standard | | |
| | | Operation settings | Freeze stat function | Outdoor ambient temp. (3 - 20°C) | | | 5°C | | |
| | | | Simultaneous operation (DHW/ Heating) | On/Off *4 | | | Off | | |
| | | | | Outdoor ambient temp. (−15 - +10°C) | | | −15°C | | |
| | | | Cold weather function | On/Off *4 | | | Off | | |
| | | | | Outdoor ambient temp. (−15 - −10°C) | | | −15°C | | |
| | | | Room temp control (Heating) | Temp. control interval (10 - 60 mins) | | | 10 mins | | |
| | | | | Flow temp. range | Min. temp. (25 - 45°C) | | 30°C | | |
| | | | | | Max. temp. (35 - 60°C) | | 50°C | | |
| | | | | Heat pump thermo diff. adjust | On/Off *4 | | On | | |
| | | | | | Lower limit (−9 - –1°C) | | −5°C | | |
| | | | | | Upper limit (+3 - +5°C) | | 5°C | | |
| | | | Boiler operation | Hybrid settings | Outdoor ambient temp. (−15 - +10°C) | | −15°C | | |
| | | | | | Priority mode (Ambient/Cost/$CO_2$) | | Ambient | | |
| | | | | Intelligent settings | Energy price *5 | Electricity (0.001 - 999 */kWh) | 0.5 */kWh | | |
| | | | | | | Boiler (0.001 - 999 */kWh) | 0.5 */kWh | | |
| | | | | | $CO_2$ emission | Electricity (0.001 - 999 kg -CO2/kWh) | 0.5 kg -CO2/kWh | | |
| | | | | | | Boiler (0.001 - 999 kg -CO2/kWh) | 0.5 kg -CO2/kWh | | |
| | | | | | Heat source | Heat pump capacity (1 - 40 kW) | 11.2 kW | | |
| | | | | | | Boiler efficiency (25 - 150%) | 80% | | |
| | | | | | | Booster heater 1 capacity (1 - 20 kW) | 2 kW | | |
| | | | | | | Booster heater 2 capacity (1 - 20 kW) | 4 kW | | |
| | | | Floor dry up function | On/Off *4 | | | Off | | |
| | | | | Target temp. | Start&Finish (25 - 60°C) | | 30°C | | |
| | | | | | Max. temp. (25 - 60°C) | | 45°C | | |
| | | | | | Max. temp. period (1 - 20 days) | | 5 days | | |
| | | | | Flow temp. (Increase) | Temp. increase step (+1 - +10°C) | | +5°C | | |
| | | | | | Increase interval (1 - 7 days) | | 2 days | | |
| | | | | Flow temp. (Decrease) | Temp. decrease step (−1 - −10°C) | | −5°C | | |
| | | | | | Decrease interval (1 - 7 days) | | 2 days | | |
| | | External input settings | Demand control (IN4) | Heat source OFF/Boiler operation | | | Boiler operation | | |
| | | | Outdoor thermostat (IN5) | Heater operation/Boiler operation | | | Boiler operation | | |

*3 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.
*4 On: the function is active; Off: the function is inactive.
*5 “*” of “*/kwh” represents currency unit (e.g. € or £ or the like)

## 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 reseat 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 reseat correctly. | | |
| 3 | Check battery power of wireless thermostat and replace if necessary. | | |

| Outdoor heat pump unit maintenance record sheet | | | |
|---|---|---|---|
| Model number | | Serial number | |
| | Mechanical | Frequency | Notes |
| 1 | Inspect grill and air inlet for trapped debris/damage. | | |
| 2 | Check condensate drain provision. | | |
| 3 | Check integrity of water 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 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 | Replace every | Possible failures |
|---|---|---|
| Pressure relief valve (PRV)<br>Air vent (Auto/Manual)<br>Drain cock (Primary circuit)<br>Flexible hose<br>Manometer<br>Inlet control group (ICG)* | 6 years | Water leakage due to brass/copper corrosion (Dezincification) |

***** OPTIONAL PARTS for UK

**Parts which require regular inspection**

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

**Parts which must NOT be reused when servicing**

* O-ring
* Gasket

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

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