MITSUBISHI ELECTRIC

Changes for the Better

Mitsubishi Electric Quality

AIR TO WATER HEAT PUMP SYSTEMS

Exclusively for

Water to Water Heat Pump

EHWT17D-MHEDW

ecodan

Renewable Heating Technology

DATA BOOK

Vol.5.5

R32

Contents

When installing or relocating, or servicing the heat pump, use only the specified refrigerant (R32) to charge the refrigerant lines. Do not mix it with any other refrigerant and do not allow air to remain in the lines.
If air is mixed with the refrigerant, then it can be the cause of abnormal high pressure in the refrigerant line, and may result in an explosion and other hazards.
The use of any refrigerant other than that specified for the system will cause mechanical failure or system malfunction or unit breakdown. In the worst case, this could lead to a serious impediment to securing product safety.

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2.4 Water to Water Heat Pump (WTW)

Model name				EHWT17D-MHEDW
Dimensions	Height		mm	1750
	Width		mm	595
	Depth		mm	680
Casing	Munsell		-	6.2PB 9/0.9
	RAL code		-	260 90 05
	Material		-	Pre-coated metal
Product weight (empty)			kg	166
Product weight (full)			kg	345
Gross weight			kg	183
Water volume of heating circuit in the unit *1			L	5.47
Brine/Water volume of ambient loop circuit in the unit			L	3.16
Type of Installation			-	Floor standing
Electrical data	Heat pump (exclude immersion heater)	Power supply	Ph	~/N
			V	230
			Hz	50
		Breaker	A	16
	Booster heater	Power supply	Ph	-
			V	-
			Hz	-
		Capacity	kW	-
		Heater step	-	-
		Current	A	-
		Breaker	A	-
	Immersion heater	Power supply	Ph	~/N
			V	230
			Hz	50
		Capacity	kW	3
		Current	A	13
		Breaker	A	16
Water circulation pump (Primary circuit)	Type			DC motor
	Input (10/20/max L/min)	Speed 1		10/13/15
		Speed 2		16/21/27
		Speed 3		24/32/42
		Speed 4		34/46/58
		Speed 5		47/58/60
Performance curve: please refer to section 4.6.4	Current (10/20/max L/min)	Speed 1		0.2/0.2/0.3
		Speed 2		0.2/0.3/0.4
		Speed 3		0.3/0.4/0.5
		Speed 4		0.4/0.5/0.6
		Speed 5		0.5/0.6/0.6
Water circulation pump (DHW circuit)	Input	Speed Ⅰ		55
		Speed Ⅱ (Default setting)		69
		Speed Ⅲ		80
	Current	Speed Ⅰ		0.25
		Speed Ⅱ (Default setting)		0.31
		Speed Ⅲ		0.34
	Flow rate	Speed Ⅰ		13.5
		Speed Ⅱ (Default setting)		19.0
		Speed Ⅲ		22.9
Flow rate	Primary circuit	Max.*2	L/min	27.7
		Min.*3	L/min	7.1
	Ambient loop	Max.*2	L/min	24.0
		Min.*3	L/min	7.2
Heat exchanger	Ambient loop circuit - Refrigerant		-	MWA1-70PA
	Refrigerant - Primary circuit water		-	MWA1-44PA
	Primary circuit water - Domestic hot water		-	CBH18-18H
Domestic hot water tank	Volume		L	170
	Material		-	Duplex 2010 stainless steel (EN10088)
	Declared load profile		-	L
	Average climate	η_{wh} (water heating efficiency)	-	171
		Water heater energy efficiency class	-	A+
Expansion vessel (Primary circuit)	Volume		L	-
	Charge pressure		MPa	-
Safety device	Primary circuit	Control thermistor	°C	1 to 80
		Pressure relief valve	MPa	0.3
		Flow sensor (Min. flow)	L/min	5.0
		BH manual reset thermostat	°C	-
		BH thermal Cut Off	°C	-
	DHW tank	Control thermistor	°C	40 to 70
		IH manual reset thermostat	°C	85
		Temperature & pressure relief valve	°C	90
			MPa	0.7
Ambient loop	Control thermistor		°C	10 to 30
	Flow switch (Min. flow)		L/min	5.5
Refrigerant circuit	Control thermistor (High)		°C	-20 to 125
	Control thermistor (Low)		°C	-40 to 90
	Pressure switch		MPa	4.14 ± 0.1
	Pressure sensor		MPa	0 to 5.0
Connections	Water	Primary circuit	mm	φ28
		DHW circuit	mm	φ22
	Ambient loop		mm	φ22
Refrigerant			-	R32
Guaranteed operating range	Ambient *4		°C	0 to 35
			%RH	≦80
	Water inlet temperature (Ambient loop)		°C	10 to 30
	Min. Water outlet temperature (Ambient loop)		°C	4
Operating range	Heating	Room temperature	°C	10 to 30
		Flow temperature	°C	20 to 60
	DHW		°C	40 to 60
	Legionella prevention		°C	60 to 70
Sound power level			dB(A)	38

*1 Volume of sanitary water circuit is not included in this value.
*2 If the water flow rate exceeds maximum, the flow speed will be greater than 1.5 m/s, which could corrode the pipes.
*3 If the water flow is less than the minimum, the flow error will be activated.
*4 The environment must be frost-free.

3.4 Water to Water Heat Pump (WTW)

■ EHWT17D-MHEDW

Flow rate

Ambient loop: 19.2 L/min Heating: 12.4 L/min

W10W35

Capacity		COP
%	kW	
100%	6.5	5.7
75%	4.8	5.9
50%	3.2	5.7
25%	1.6	4.2

W10W45

Capacity		COP
%	kW	
100%	6.3	4.3
75%	4.7	4.4
50%	3.1	4.1
25%	1.5	2.8

W10W55

Capacity		COP
%	kW	
100%	5.9	3.0
75%	4.4	3.1
50%	2.9	2.6
25%	1.4	1.6

Ambient loop: 14.4 L/min Heating: 12.4 L/min

W15W35

Capacity		COP
%	kW	
100%	7.4	6.4
75%	5.5	7.2
50%	3.7	6.6
25%	1.8	4.7

W15W45

Capacity		COP
%	kW	
100%	7.1	4.8
75%	5.3	5.2
50%	3.5	4.5
25%	1.7	3.1

W15W55

Capacity		COP
%	kW	
100%	6.7	3.5
75%	5.0	3.5
50%	3.3	2.9
25%	1.6	1.8

Ambient loop: 9.6 L/min Heating: 12.4 L/min

W20W35

Capacity		COP
%	kW	
100%	7.5	6.8
75%	5.6	7.6
50%	3.7	7.2
25%	1.8	6.0

W20W45

Capacity		COP
%	kW	
100%	7.3	5.2
75%	5.4	5.4
50%	3.6	4.8
25%	1.8	3.4

W20W55

Capacity		COP
%	kW	
100%	7.0	3.8
75%	5.2	3.7
50%	3.5	3.2
25%	1.7	2.2

Ambient loop: 9.6 L/min Heating: 12.4 L/min

W25W35

Capacity		COP
%	kW	
100%	8.3	8.4
75%	6.2	9.3
50%	4.1	9.2
25%	2.0	9.1

W25W45

Capacity		COP
%	kW	
100%	8.1	5.9
75%	6.0	6.9
50%	4.0	6.3
25%	2.0	4.2

W25W55

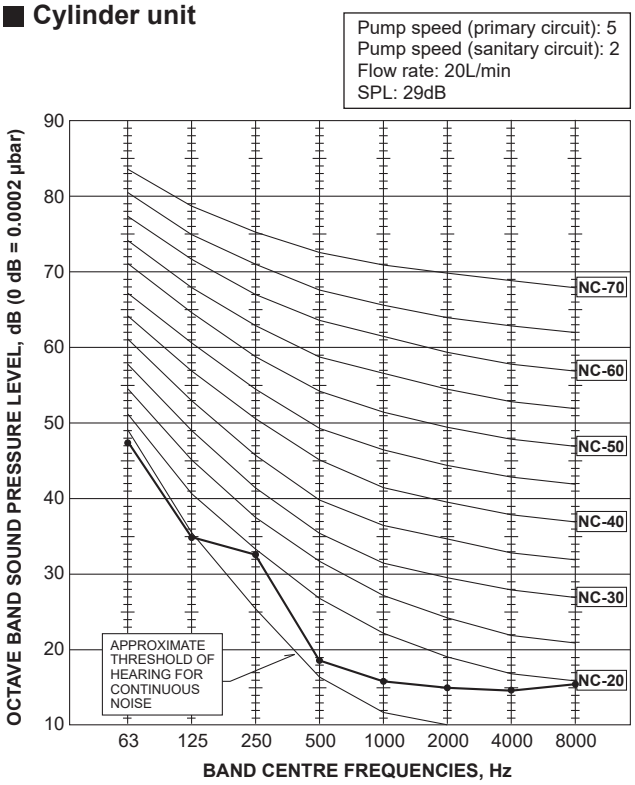
Capacity		COP
%	kW	
100%	7.8	4.3
75%	5.8	5.1
50%	3.9	4.6
25%	1.9	2.9

COP contains the "pump input (Based on EN 14511)"

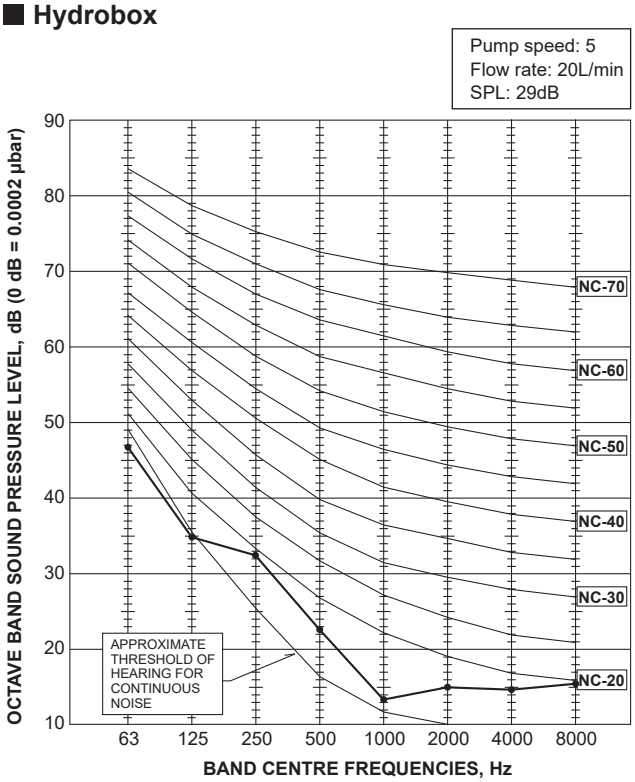
100%: MAX Capacity

3.5 Noise criterion curves

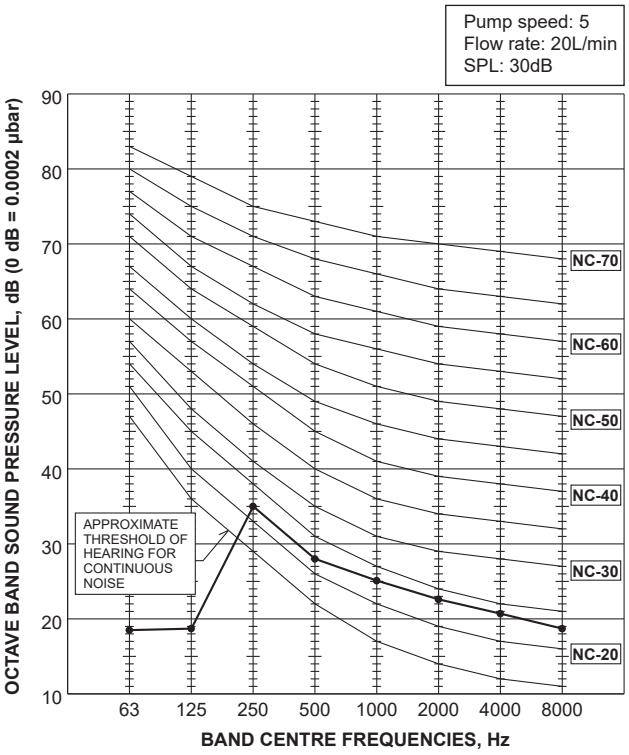
■ Cylinder unit



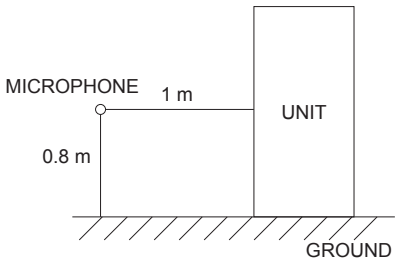
■ Hydrobox



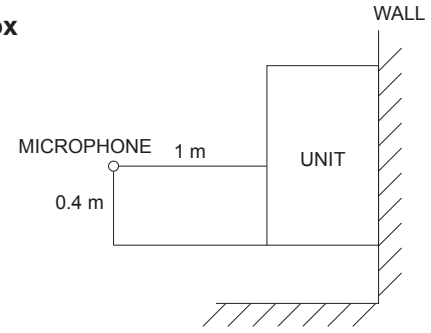
■ Ground source heat pump (GSHP)



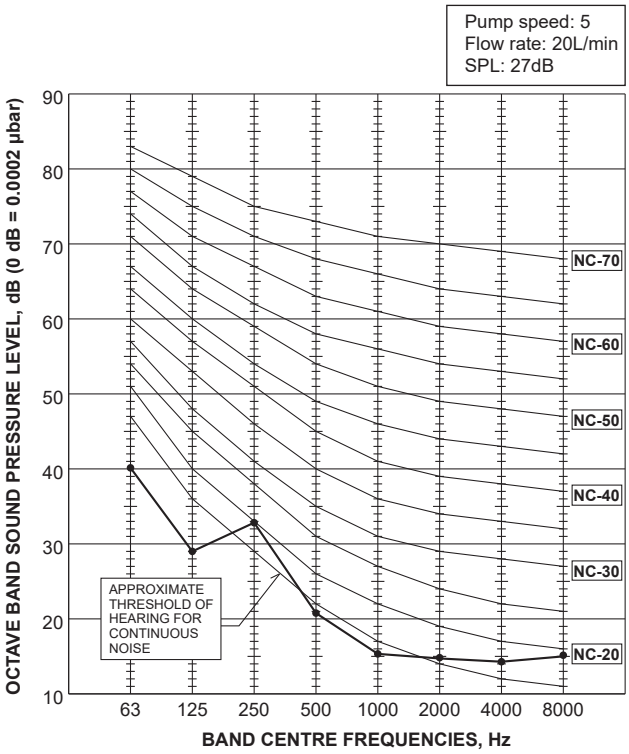
■ Cylinder unit
Ground source heat pump (GSHP)
Water to Water heat pump (WTW)



■ Hydrobox



■ Water to Water heat pump (WTW)



■ Service access diagrams

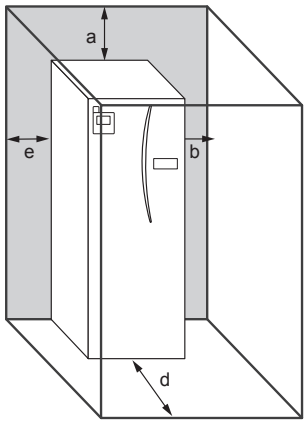
Service access	
Parameter	Dimension (mm)
a	300
b	150
c (distance behind unit not visible in Figure 7.1.2)	10
d	700**
e	150*

<Table 7.1.2>

* An additional space is required, when brine pipe connecting to the side.
** Including service space for Module removal.

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

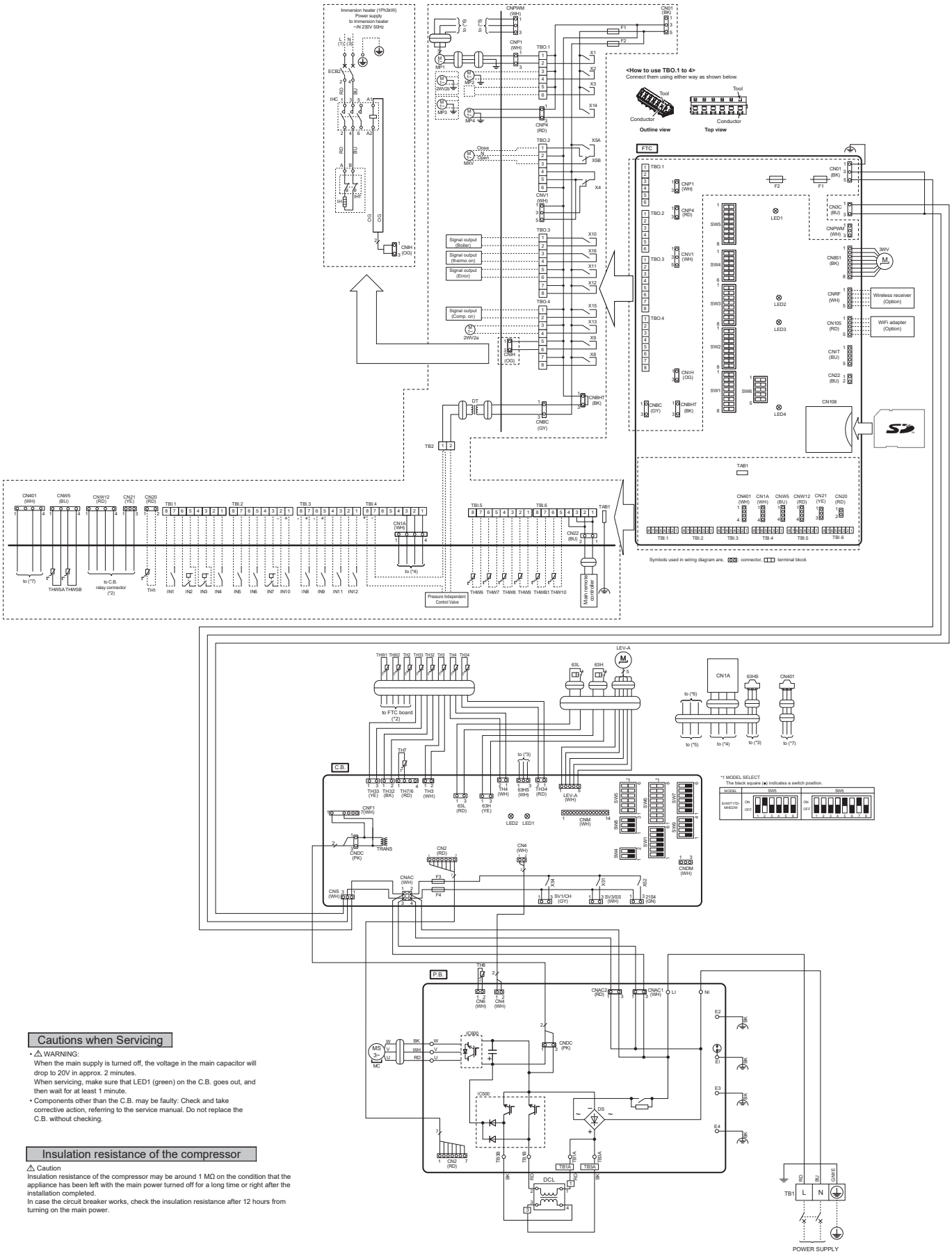
The heat pump unit must be located indoors and in a frost-free environment, for example in a utility room, to minimise heat loss from stored water.



<Figure 7.1.2>
Service access

7.2. Wiring diagrams

■ EHWT17D-MHEDW



Cautions when Servicing

- ⚠ WARNING:
  When the main supply is turned off, the voltage in the main capacitor will drop to 20V in approx. 2 minutes.
  When servicing, make sure that LED1 (green) on the C.B. goes out, and then wait for at least 1 minute.
- Components other than the C.B. may be faulty: Check and take corrective action, referring to the service manual. Do not replace the C.B. without checking.

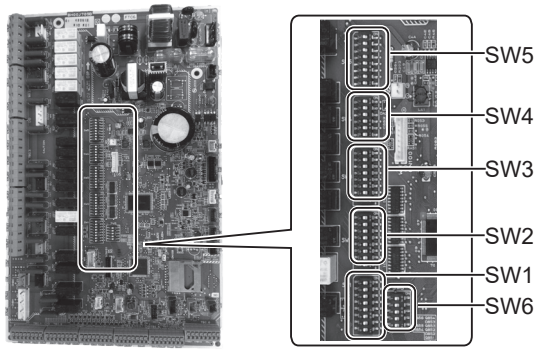
Insulation resistance of the compressor

⚠ Caution
Insulation resistance of the compressor may be around 1 MΩ on the condition that the appliance has been left with the main power turned off for a long time or right after the installation completed.
In case the circuit breaker works, check the insulation resistance after 12 hours from turning on the main power.

7.3. DIP Switch Function(FTC)

Located on the FTC printed circuit board are 6 sets of small white switches known as DIP switches. The DIP switch number is printed on the circuit board next to the relevant switches. The word ON is printed on the circuit board and on the DIP switch block itself. To move the switch you will need to use a pin or the corner of a thin metal ruler or similar.

DIP switch settings are listed below in Table 7.3.1.
Only an authorised installer can change DIP switch setting under one's own responsibility according to the installation condition. Make sure to turn off heat pump unit power supplies before changing the switch settings.



<Figure 7.3.1>

DIP switch		Function	OFF	ON	Default settings
SW1	SW1-1	Boiler	WITHOUT Boiler	WITH Boiler	OFF
	SW1-2	Heat pump maximum outlet water temperature	55ºC	60ºC	ON
	SW1-3	DHW tank	WITHOUT DHW tank	WITH DHW tank	ON
	SW1-4	Immersion heater	WITHOUT Immersion heater	WITH Immersion heater	ON
	SW1-5	Booster heater	WITHOUT Booster heater	WITH Booster heater	OFF
	SW1-6	Booster heater function	For heating only	For heating and DHW	OFF
	SW1-7	—	—	—	OFF
	SW1-8	Wireless remote controller	WITHOUT Wireless remote controller	WITH Wireless remote controller	OFF
SW2	SW2-1	Room thermostat1 input (IN1) logic change	Zone1 operation stop at thermostat short	Zone1 operation stop at thermostat open	OFF
	SW2-2	Flow switch1 input (IN2) logic change	Failure detection at short	Failure detection at open	OFF
	SW2-3	Booster heater capacity restriction	Inactive	Active	OFF
	SW2-4	—	—	—	OFF
	SW2-5	Automatic switch to backup heat source operation (When compressor stops by error)	Inactive	Active *1	OFF
	SW2-6	Mixing tank	WITHOUT Mixing tank	WITH Mixing tank	OFF
	SW2-7	2-zone temperature control	Inactive	Active *4	OFF
	SW2-8	—	—	—	ON
SW3	SW3-1	Room thermostat 2 input (IN6) logic change	Zone2 operation stop at thermostat short	Zone2 operation stop at thermostat open	OFF
	SW3-2	Flow switch 2,3 input (IN3,7) logic change	Failure detection at short	Failure detection at open	OFF
	SW3-3	—	—	—	ON
	SW3-4	Electric energy meter	WITHOUT Electric energy meter	WITH Electric energy meter	OFF
	SW3-5	—	—	—	OFF
	SW3-6	2-zone valve ON/OFF control	Inactive	Active	OFF
	SW3-7	—	—	—	ON
	SW3-8	Heat meter	WITHOUT Heat meter	WITH Heat meter	OFF
SW4	SW4-1	—	—	—	OFF
	SW4-2	—	—	—	OFF
	SW4-3	—	—	—	OFF
	SW4-4	Water circuit only operation (during installation work) *2	Inactive	Active	OFF
	SW4-5	Emergency mode (Heater only operation)	Normal	Emergency mode (Heater only operation)	OFF *3
	SW4-6	Emergency mode (Boiler operation)	Normal	Emergency mode (Boiler operation)	OFF *3
SW5	SW5-1	—	—	—	OFF
	SW5-2	Advanced auto adaptation	Inactive	Active	ON
	SW5-3	Capacity code	—	—	ON
	SW5-4		—	—	OFF
	SW5-5		—	—	OFF
	SW5-6		—	—	ON
	SW5-7		—	—	OFF
	SW5-8	—	—	—	OFF
SW6	SW6-1	—	—	—	OFF
	SW6-2	—	—	—	OFF
	SW6-3	Pressure sensor	Inactive	Active	ON
	SW6-4	Analog output signal (0-10V)	Inactive	Active	OFF
	SW6-5	Model select	Air to Water	Water to Water	ON

<Table 7.3.1>

Note: *1. External output (OUT11) will be available. For safety reasons, this function is not available for certain errors. (In that case, system operation must be stopped and only the water circulation pump keeps running.)
***2. Space heating and DHW can be operated only in water circuit, like an electric boiler. (Refer to "7.4.5 Water circuit only operation".)**
***3. If emergency mode is no longer required, return the switch to OFF position.**
***4. Active only when SW3-6 is set to OFF.**

7.4. Field wiring

7.4.1 Electrical Connection

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

Breaker abbreviation	Meaning
ECB2	Earth leakage circuit breaker for immersion heater
TB1	Terminal block 1
TB2	Terminal block 2

Connections should be made to the terminals indicated in the figures.

Immersion heater should be connected independently from one another to dedicated power supplies.

Ⓐ Locally supplied wiring should be inserted through the inlets situated on the top of the heat pump unit. (Refer to <Table 7.1.1>.)

Ⓑ Wiring should be fed down the back right hand side of the control and electrical box.

Ⓒ The wires should be inserted individually through the cable inlets as below.

Ⓓ Connect the power cable for the immersion heater to ECB2.

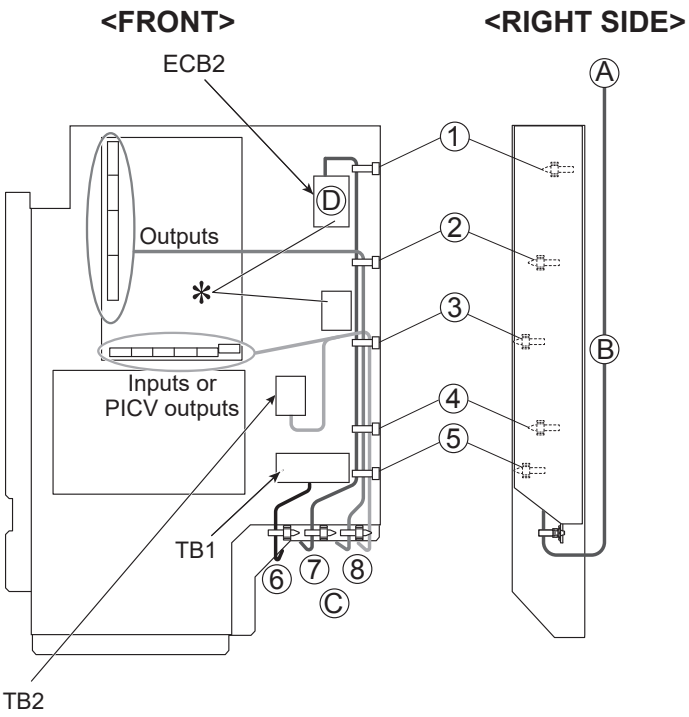
- Avoid contact between wiring and parts (✻).
- Make sure that ECB2 is ON.
- When connecting PICV, connect the terminal and PICV

Ⓔ The wires should be fixed with the cable straps as below

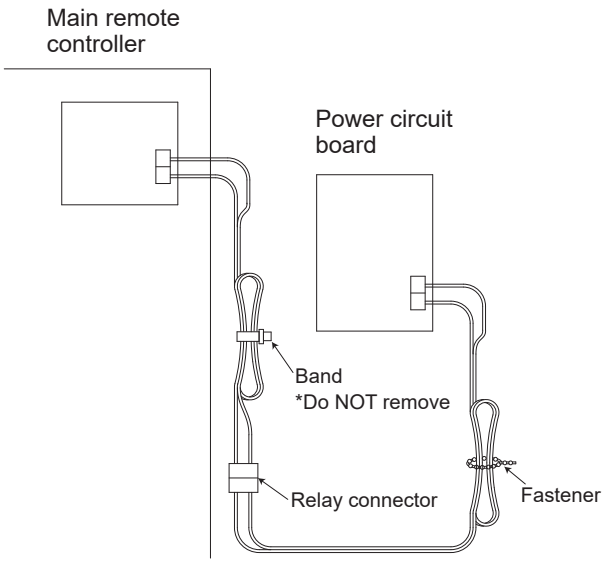
- Immersion heater cables should use the cable strap ①, ⑦.
- Output cables should use the cable strap ②, ④, ⑧.
- Input cables, PICV power cables, and PICV output cables should use the cable strap ③, ⑤.
- Power cables should use the cable strap ⑥.

Ⓕ On completion of wiring ensure main remote controller cable is connected to the relay connector.

* Before connecting the main remote controller cable, remove the fastener bundling the cable between the power circuit board and the relay connector.
Caution: Do NOT remove the band bundling the cable between the main remote controller and the relay connector, or the heat pump unit may malfunction due to electrical noise of the power circuit board. (See Figure 7.4.2.)

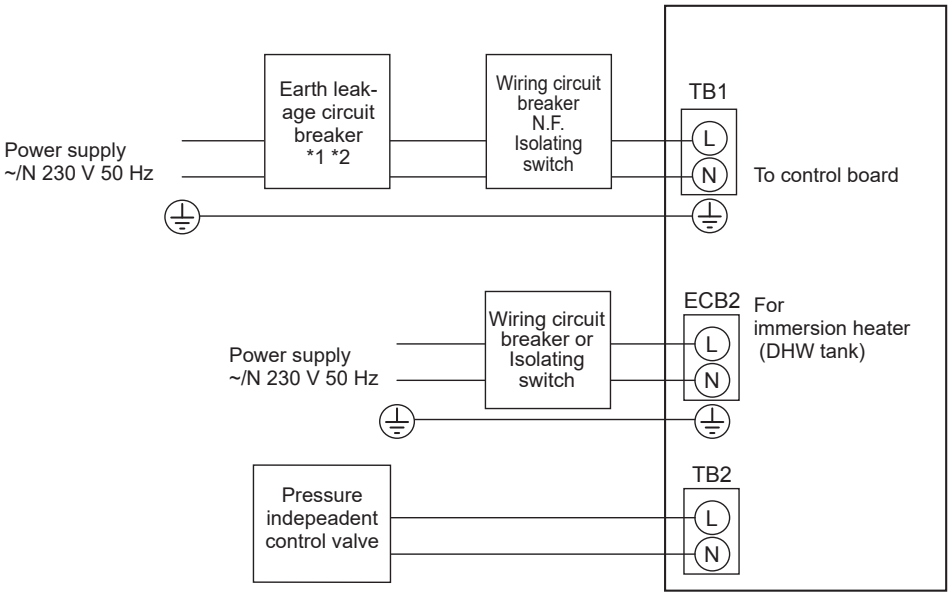


<Figure 7.4.1>



<Figure 7.4.2>

Affix label A that is included with the manuals near each wiring diagram for heat pump units.



<Figure 7.4.3>
Electrical connections 1 phase

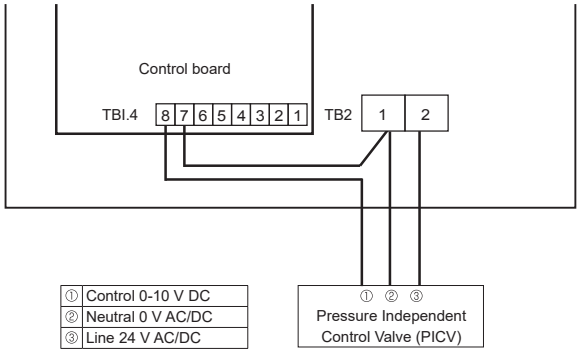
Description	Power supply	Capacity	Breaker	Wiring *4
Immersion heater (DHW tank)	~/N 230 V 50 Hz	3 kW	16 A *2	2.5 mm²

Water to water unit power supply			~/N 230 V 50 Hz
Water to water unit circuit breaker capacity		*2	16 A
Wiring No. × size (mm²)	Water to water unit power supply, earth	*4	3 × Min. 1.5
Circuit rating	Water to water unit L, N	*3	230 V AC

Description	Power supply	Capacity	Wiring specification
Pressure independent control value (PICV) *5	~/N 24 V 50 Hz	500 mA	Use sheathed vinyl coated cord or cable. Wire type: CV, CVS or equivalent Wire size: Stranded wire 0.13 mm² to 0.52 mm² Solid wire: ø0.4 mm to ø0.8 mm

*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.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.
*3.The values given in the table above are not always measured against the ground value.
*4.Use wires in conformity with design 60245 IEC 57.
*5.External wiring length to PICV is less than 2 m.

Note: 1.Wiring size must comply with the applicable local and national codes.
2.Install an earth longer than other cables.
3.Please keep enough output capacity of power supply for each heater. Insufficient power supply capacity might cause chattering.
4.Stranded wire should be processed with insulation-covered bar terminal (DIN46228-4 standard compatible type).



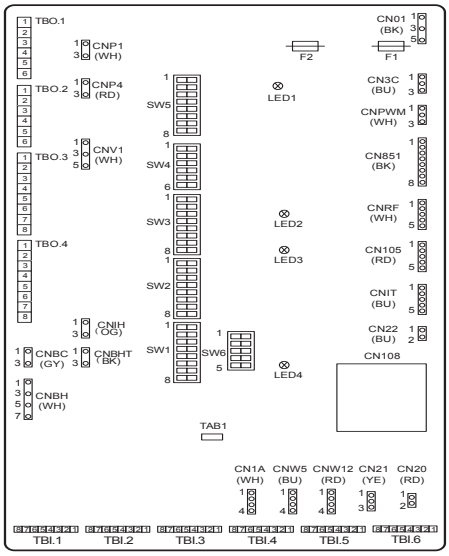
<Figure 7.4.4>

Breaker abbreviation	Meaning
TB2	Terminal block 2

Connections should be made to the terminals indicated in Figure 7.4.4.

If connecting the PICV, attend to the following points.
- External wiring length to PICV is less than 2 m.
- Tighten the TBI 4.7 pin wiring and the PICV (0 V AC/DC) wiring together to TB2.

7.4.2 Connecting inputs/outputs



<Figure 7.4.5>

Wiring specification and local supply parts

Item	Name	Model and specifications
Signal input function	Signal input wire	Use sheathed vinyl coated cord or cable. Max. 30 m Wire type: CV, CVS or equivalent Wire size: Stranded wire 0.13 mm² to 0.52 mm² Solid wire: ø0.4 mm to ø0.8 mm
	Switch	Non-voltage “a” contact signals Remote switch: minimum applicable load 12V DC, 1mA

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

■ Signal inputs

Name	Terminal block	Connector	Item	OFF (Open)	ON (Short)
IN1	TBI.1 7-8	—	Room thermostat 1 input *1	Refer to SW2-1 in <7.3.1 DIP Switch Functions>.	
IN2	TBI.1 5-6	—	Flow switch 1 input	Refer to SW2-2 in <7.3.1 DIP Switch Functions>.	
IN3	TBI.1 3-4	—	Flow switch 2 input (Zone1)	Refer to SW3-2 in <7.3.1 DIP Switch Functions>.	
IN4	TBI.1 1-2	—	Demand control input	Normal	Heat source OFF/ Boiler operation *3
IN5	TBI.2 7-8	—	Outdoor thermostat input *2	Standard operation	Heater operation/ Boiler operation *3
IN6	TBI.2 5-6	—	Room thermostat 2 input *1	Refer to SW3-1 in <7.3.1 DIP Switch Functions>.	
IN7	TBI.2 3-4	—	Flow switch 3 input (Zone2)	Refer to SW3-2 in <7.3.1 DIP Switch Functions>.	
IN8	TBI.3 7-8	—	Electric energy meter 1	*4	
IN9	TBI.3 5-6	—	Electric energy meter 2		
IN10	TBI.2 1-2	—	Heat meter		
IN11	TBI.3 3-4	—	Smart grid ready input	*5	
IN12	TBI.3 1-2	—			
INA1	TBI.4 1-3	CN1A	Flow sensor	—	—

*1. Set the ON/OFF cycle time of the room thermostat for 10 minutes or more; otherwise the compressor may be damaged.
*2. If using outdoor thermostat for controlling operation of heaters, the lifetime of the heaters and related parts may be reduced.
*3. To turn on the boiler operation, use the main remote controller to select “Boiler” in “External input setting“ screen in the service menu.
*4. Connectable electric energy meter and heat meter

- Pulse type Voltage free contact for 12VDC detection by FTC (TBI.2 1pin ,TBI.3 5 and 7 pins have a positive voltage.)
- Pulse duration Minimum ON time: 40ms
  Minimum OFF time: 100ms
- Possible unit of pulse 0.1 pulse/kWh 1 pulse/kWh 10 pulse/kWh
  100 pulse/kWh 1000 pulse/kWh

Those values can be set by the main remote controller. (Refer to the menu tree in "Main remote controller".)
*5. As for the SG ready, refer to "Smart grid ready" in 7.7 System setup.

■ Thermistor inputs

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

Ensure to wire thermistor wirings away from the power line and/or OUT1 to 15 wirings.

***1. The maximum length of the thermistor wiring is 30 m. When the wires are wired to adjacent terminals, use ring terminals and insulate the wires.**

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

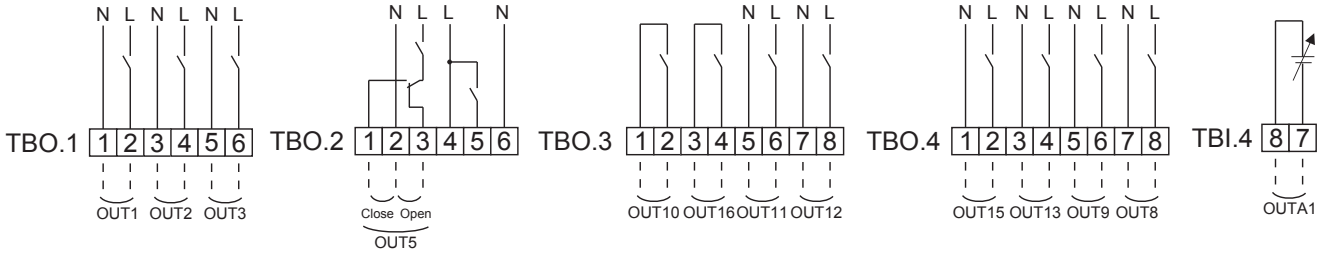
1) Connect the wirings by soldering.

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

■ Outputs

Name	Terminal block	Connector	Item	OFF	ON	Signal/Max current	Max. total current
OUT1	TBO.1 1-2	CNP1	Water circulation pump 1 output (Space heating & DHW)	OFF	ON	230V AC 0.6A Max.	3.0A
OUT2	TBO.1 3-4	—	Water circulation pump 2 output (Space heating for Zone1)	OFF	ON	230V AC 1.0A Max.	
OUT3	TBO.1 5-6	—	Water circulation pump 3 output (Space heating for Zone2) *1 2-way valve 2b output *2	OFF	ON	230V AC 1.0A Max.	
OUT14	—	CNP4	Water circulation pump 4 output (DHW)	OFF	ON	230V AC 0.4A Max.	
OUT4	—	CN851	3-way valve output	Heating	DHW	—	1.3A
OUT5	TBO.2 1-2 TBO.2 2-3	—	Mixing valve output *1	Stop	Close Open	230V AC 0.1A Max.	
OUT6	—	—	—	—	—	—	
OUT7	—	—	—	—	—	—	
OUT8	TBO.4 7-8	—	—	—	—	—	
OUT9	TBO.4 5-6	CNIH	Immersion heater output	—	—	230V AC 0.1A Max. (Relay)	
OUT11	TBO.3 5-6	—	Error output	Normal	Error	230V AC 0.5A Max.	
OUT12	TBO.3 7-8	—	—	—	—	—	
OUT13	TBO.4 3-4	—	2-way valve 2a output *2	OFF	ON	230V AC 0.1A Max.	
OUT15	TBO.4 1-2	—	Comp ON signal	OFF	ON	230V AC 0.5A Max.	
OUT10	TBO.3 1-2	—	Boiler output	OFF	ON	non-voltage contact ·220-240V AC (30V DC) 0.5A or less ·10mA 5V DC or more	—
OUT16	TBO.3 3-4	—	Heating thermo ON signal	OFF	ON		
OUTA1	TBI.4 7-8	—	Analog output (PICV Output)	OFF	ON	0-10V DC 5mA max.	—

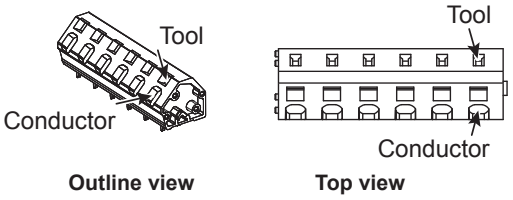
Do not connect to the terminals that are indicated as "—" in the "Terminal block" field.
***1 For 2-zone temperature control.**
***2 For 2-zone valve ON/OFF control.**



Wiring specification and local supply parts

Item	Name	Model and specifications
External output function	Outputs wire	Use sheathed vinyl coated cord or cable. Max. 30 m Wire type: CV, CVS or equivalent Wire size: Stranded wire: 0.25 mm² to 1.5 mm² Solid wire: ø0.57 mm to ø1.2 mm

How to use TBO.1 to 4



Connect them using either way as shown above.

<Figure 7.4.6>

Note:
1. Do not connect multiple water circulation pumps directly to each output (OUT1, OUT2, and OUT3). In such a case, connect them via (a) relay(s).
2. Do not connect water circulation pumps to both TBO.1 1-2 and CNP1 at the same time.
3. Connect an appropriate surge absorber to OUT10 (TBO.3 1-2) depending on the load at site.
4. Stranded wire should be processed with insulation-covered bar terminal (DIN46228-4 standard compatible type).
5. Use the same thing as the Signal input wire for OUTA1 wiring.

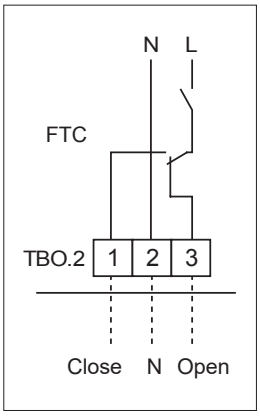
7.4.3 Wiring for 2-zone temperature control

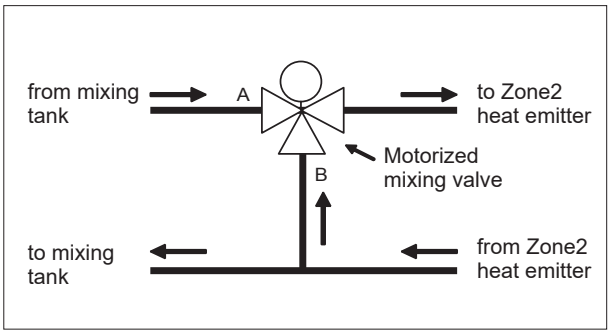
Connect the pipe work and locally supplied parts according to the relevant circuit diagram shown “7.5.3 Local system 1”.

<Mixing valve>
Connect the signal line to open Port A (hot water inlet port) to TBO. 2-3 (Open), the signal line to open Port B (cold water inlet port) to TBO. 2-1 (Close) , and the neutral terminal wire to TBO. 2-2 (N).

<Thermistor>
- Do not install the thermistors on the mixing tank.
- Install the Zone2 flow temp. thermistor (THW8) near the mixing valve.
- The maximum length of the thermistor wiring is 30 m.
- The length of the optional thermistors are 5 m. If you need to splice and extend the wirings, following points must be carried out.
  1) Connect the wirings by soldering.
  2) Insulate each connecting point against dust and water.

Note:
Do not install the thermistors on the mixing tank. This could affect correct monitoring of flow and return temperatures through each zone.
Install the Zone2 flow temp. thermistor (THW8) near the mixing valve.

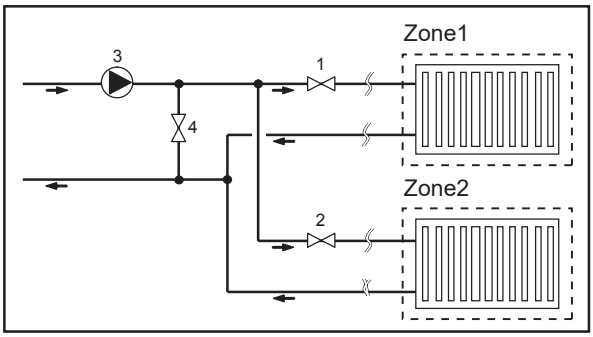




7.4.4 2-zone valve ON/OFF control

Opening /closing 2-way valve provides a simple 2-Zone control.
Flow temperature is common for Zone1 and 2.

1. Pipe work



1. Zone1 2-way valve 2a (local supply)
2. Zone2 2-way valve 2b (local supply)
3. Water circulation pump 2 (local supply) *1
4. By-pass valve (local supply) *2

***1 Install according to system in the field.**
***2 For safety protection, it is recommended to install a auto-operational (eg. mechanical spring ie. not manual valve) by-pass valve.**

Note:
Freeze stat function is deactivated whilst this control is ON. Use anti-freeze solution to avoid freezing, if necessary.

2. DIP switch
Turn DIP switch 3-6 ON.

3. 2-way valve 2a (for Zone1) / 2-way valve 2b (for Zone2)
Electrically wire 2-way valve 2a and 2b to the appropriate external output terminals. (Refer to "External outputs" in 7.4.2)

4. Room thermostat connection

Heating operation mode	Zone1	Zone2
Room temp. control (Auto adaptation) *3	● Wireless remote controller (option) ● Room temperature thermistor (option) ● Main remote controller (remote position)	● Wireless remote controller (option)
Compensation curve or flow temp. control	● Wireless remote controller (option) *4 ● Room temperature thermostat (local supply)	● Wireless remote controller (option) *4 ● Room temperature thermostat (local supply)

***3 Ensure to install the room thermostat for Zone1 in main room since the Room temp. control for Zone1 is prioritized.**
***4 The wireless remote controller can be used as a thermostat.**

7.4.5 Water circuit only operation (Indoor unit only operation) (during installation work)

During installation work, once the primary and sanitary circuits are fully charged with water it may be flexible to engaged the electric heater to provide DHW (For UK only). *

1. To start operation

- Check if the power supply is OFF, and turn DIP switch 4-4 and 4-5 (on FTC) ON.
- Turn ON the power supply.

2. To end operation*1

- Turn OFF the power supply.
- Turn DIP switch 4-4 and 4-5 (on FTC) OFF.

*1 When the water circuit only operation is ended, ensure to check over the settings after ambient loop is connected and fully charged.

Note:

Prolonged running of this operation may affect the life of the electric heater.

*If booster heater equipped, the function is activated.

7.4.6 Using SD memory card

The heat pump unit is equipped with an SD memory card interface in FTC.
Using an SD memory card can simplify main remote controller settings and can store operating logs. *1

<Handling precautions>

(1) Use an SD memory card that complies with the SD standards. Check that the SD memory card has a logo on it of those shown to the right.
(2) SD memory cards to the SD standards include SD, SDHC, miniSD, micro SD, and microSDHC memory cards. The capacities are available up to 32 GB. Choose that with a maximum allowable temperature of 55ºC.
(3) When the SD memory card is a miniSD, miniSDHC, microSD, or micro SDHC memory card, use an SD memory card converter adapter.
(4) Before writing to the SD memory card, release the write-protect switch.

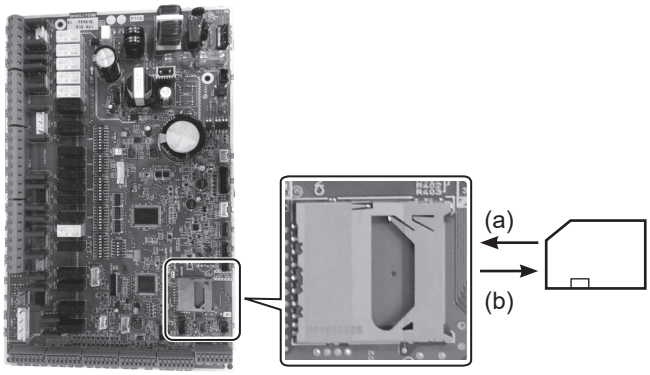
(5) Before inserting or ejecting an SD memory card, make sure to power off the system. If an SD memory card is inserted or ejected with the system powered on, the stored data could be corrupted or the SD memory card be damaged.
*An SD memory card is live for a short duration after the system is powered off. Before insertion or ejection wait until the LED lamps on the FTC control board are all off.
(6) The read and write operations have been verified using the following SD memory cards, however, these operations are not always guaranteed as the specifications of these SD memory cards could change.

Manufacturer	Model	Tested in
Verbatim	#44015	Mar. 2012
SanDisk	SDSDB-002G-B35	Oct. 2011
Panasonic	RP-SDP04GE1K	Oct. 2011
Arvato	2GB PS8032 TSB 24nm MLC	Jun. 2012
Arvato	2GB PS8035 TSB A19nm MLC	Jul. 2014
SanDisk	SDSDUN-008G-G46	Oct. 2016
Verbatim	#43961	Oct. 2016
Verbatim	#44018	Oct. 2016
VANTASTEK	VSDHC08	Sep. 2017
RiTEK	RiDATA 8GB SDHC	Aug. 2021

Before using a new SD memory card (including the card that comes with the unit), always check that the SD memory card can be safely read and written to by the FTC controller.
<How to check read and write operations>
a) Check for correct wiring of power supply to the system. For more details, refer to section 7.4.1. (Do not power on the system at this point.)
b) Insert an SD memory card.
c) Power on the system.
d) The LED4 lamp lights if the read and write operations are successfully completed. If the LED4 lamp continues blinking or does not light, the SD memory card cannot be read or written to by the FTC controller.

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

(a) For insertion, push on the SD memory card until it clicks into place.
(b) For ejection, push on the SD memory card until it clicks.
Note: To avoid cutting fingers, do not touch sharp edges of the SD memory card connector (CN108) on the FTC control board.



Logos

Capacities
2 GB to 32 GB *2
SD speed classes
All

• The SD Logo is a trademark of SD-3C, LLC.
The miniSD logo is a trademark of SD-3C, LLC.
The microSD logo is a trademark of SD-3C, LLC.

*1 To edit main remote controller settings or to check operating data, an ecodan service tool (for use with PC) is required.
*2 A 2-GB SD memory card stores up to 30 days of operation logs.

7.5. Water circuit diagrams

7.5.1 Component Parts

■ Component Parts

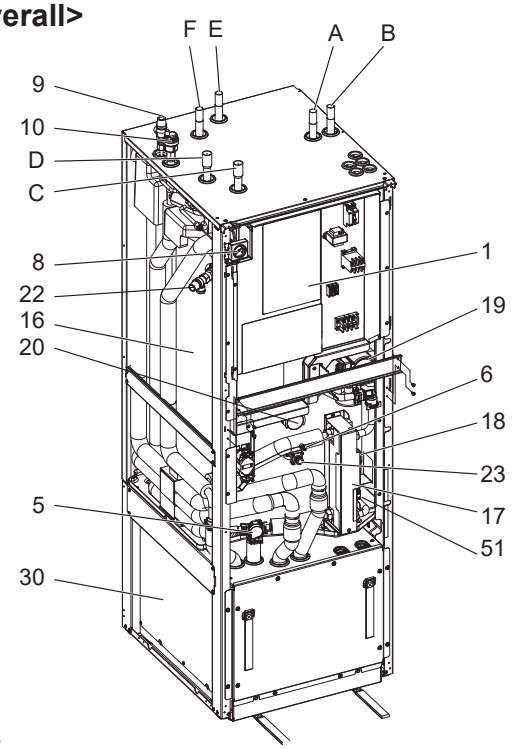
No.	Part name
A	DHW outlet pipe
B	Cold water inlet pipe
C	Water pipe (Space heating return connection (to heat pump))
D	Water pipe (Space heating flow connection (from heat pump))
E	Water/Brine pipe (Ambient loop return connection (to heat pump))
F	Water/Brine pipe (Ambient loop flow connection (from heat pump))
1	Control and electrical box
2	Main remote controller
3	Plate heat exchanger (Refrigerant - Primary circuit)
4	Low-pressure sensor
5	3-way valve
6	Manual air vent
7	Drain cock (Primary circuit)
8	Manometer
9	Pressure relief valve (3 bar) (Primary circuit)
10	Automatic air vent
11	Expansion vessel (Primary circuit) (Local supply)
12	Flow sensor
13	Strainer valve
14	Water circulation pump 1 (Primary circuit)
15	Pump valve
16	DHW tank
17	Plate heat exchanger (Primary circuit (water) - Sanitary circuit (water))
18	Scale trap
19	Water circulation pump (Sanitary circuit)
20	Immersion heater
21	Magnetic filter (Ambient loop) (Local supply)
22	Temperature and pressure relief valve
23	Drain cock (DHW tank)
24	Pressure relief valve (10 bar) (Ambient loop) (Local supply)
25	Flow water temp. thermistor (THW1)
26	Return water temp. thermistor (THW2)
27	DHW tank water temp. thermistor (THW5A)
28	DHW tank water temp. thermistor (THW5B)
29	Refrigerant liquid temp. thermistor (TH2)
30	Module
31	Drain pipe (Local supply)
32	Expansion vessel (Sanitary circuit (water)) *1
33	Isolating valve (Local supply)
34	Magnetic filter (Local supply) (Recommended)
35	PICV (Pressure Independent Control Valve) (Local supply)
36	Compressor
37	High-pressure sensor
38	Linear expansion valve
39	Charge plug
40	Liquid temp. thermistor (TH3)
41	Discharge temp. thermistor (TH4)
42	Ambient temp. thermistor (TH7)
43	Heat sink temp. thermistor (TH8)
44	Plate heat exchanger (Water/Brine - Refrigerant)
45	Drain cock (Ambient loop)
46	Inlet control group *1
47	Flow switch
48	Water inlet temperature (Ambient loop) thermistor (TH32)
49	Water outlet temperature (Ambient loop) thermistor (TH34)
50	Muffler
51	Drain cock (Sanitary circuit)
52	Filling loop (Ball valves, check valves and flexible hose) *1
53	High-pressure switch
54	Compressor surface temperature (TH33)

<Table 7.5.1>

*1 Supplied with UK model ONLY.
Please refer to PAC-WK02UK-E Installation Manual for more information on accessories.

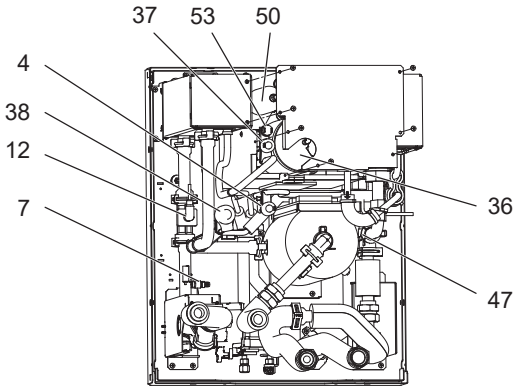
Note: For parts not shown on this page, please refer to 'Circuit diagram <Figure 7.5.2>'.

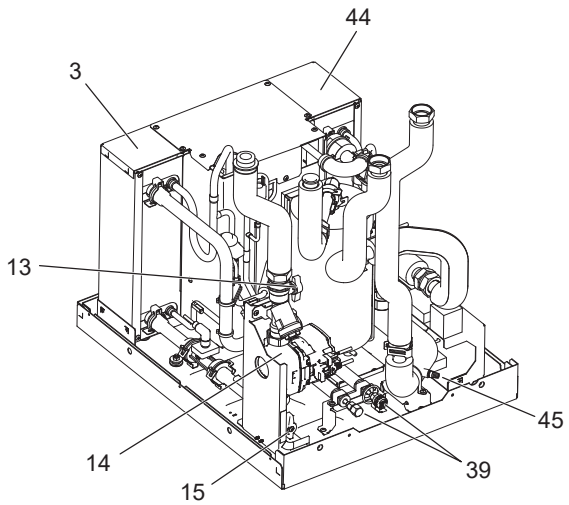
<Overall>



Note:
For installation, make sure to install a suitably sized primary-side expansion vessel. (See figure 7.5.2 and 7.6.4 for further guidance)

<Module>

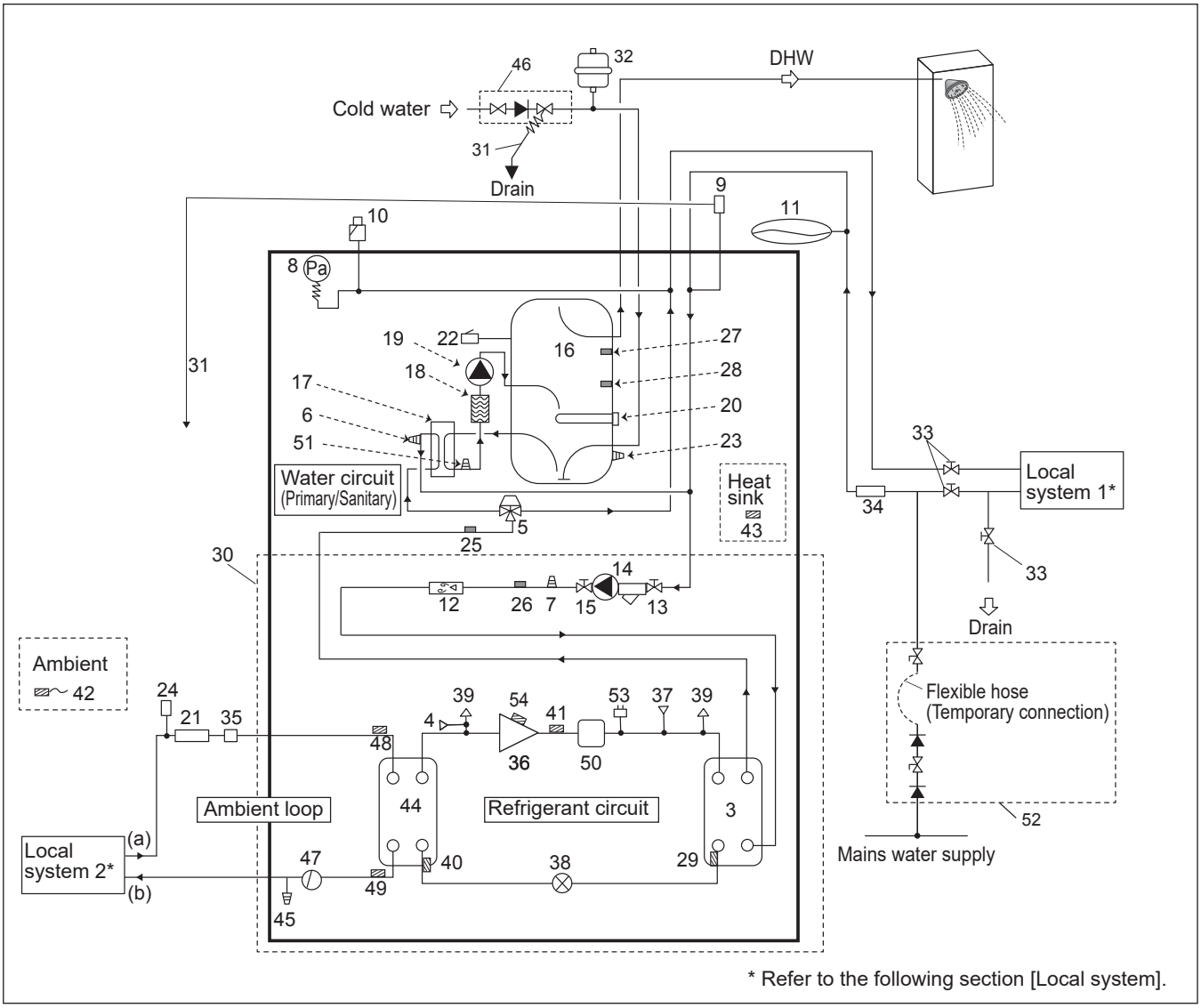




<Figure 7.5.1>

7.5.2 Circuit diagram

• Refer to <Table 7.5.1> for the part names.



<Figure 7.5.2>

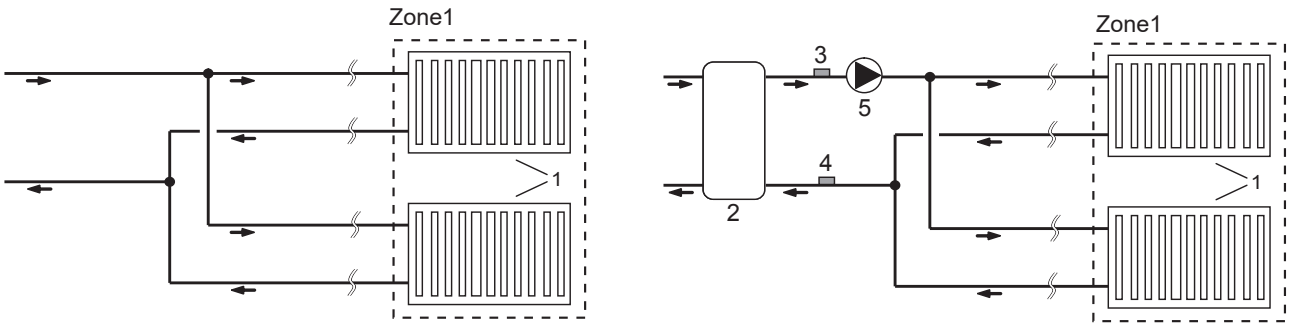
Note
- To enable draining of water circuit an isolating valve should be positioned on both the inlet and outlet pipework. No valve should be fitted between the expansion valve (part of item 46) and the heat pump unit (safety matter).
- For space heating (primary) circuit a suitable expansion vessel MUST be supplied and fitted by installer. (See figure 7.6.4) Be sure to install a magnetic filter (item 34) on the inlet pipework to the heat pump unit.
- Suitable drain pipework should be attached to the relief valves instructed to be connected to it in Figure 7.5.2 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 the pipework. Filling loop's flexible hose must be removed following the filling procedure. This flexible hose (Item 52) is included in PAC-WK02-E.
- Install the inlet control group (item 46) above the level of the T&P relief valve (item 22).
  This will ensure DHW tank will not require drain down to service/maintain the inlet control group.

Model name	EHWT17D-MHEDW
Maximum supply pressure to the pressure reducing valve	16 bar
Operating pressure (Sanitary side)	3.5 bar
Expansion vessel charge setting pressure (Sanitary side)	3.5 bar
Expansion valve setting pressure (Sanitary side)	6.0 bar
Immersion heater specification (Sanitary side) *	3000 W, 230 V
DHW tank capacity	170 L
Mass of the unit when full	345 kg
Maximum primary working pressure	2.5 bar
Maximum sanitary-side working pressure	5.5 bar
Maximum ambient loop working pressure	9.5 bar

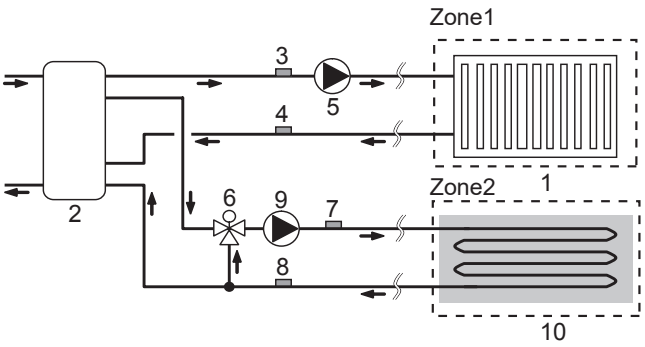
* EN60335/Type 3000W single phase 230V 50Hz, length 460 mm.
  Use only Mitsubishi Electric service parts as a direct replacement.

7.5.3 Local system 1

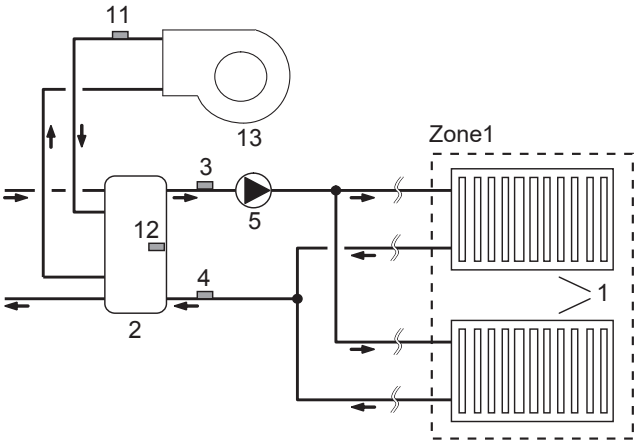
1-zone temperature control



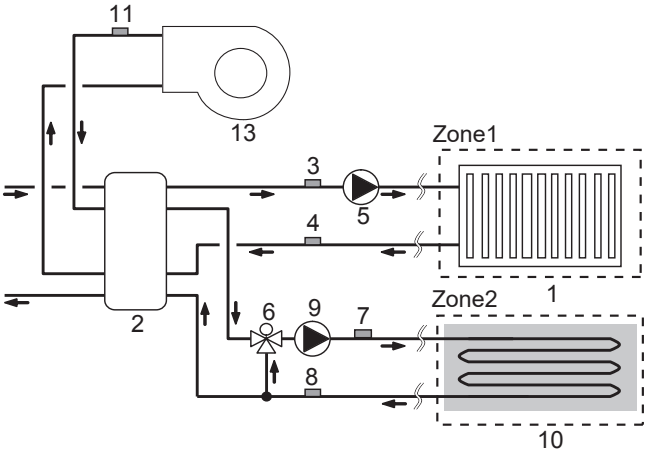
2-zone temperature control



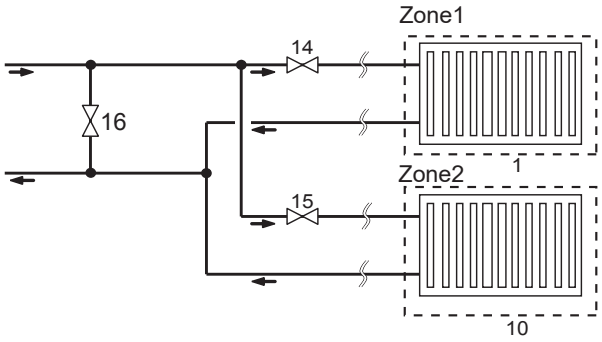
1-zone temperature control with boiler



2-zone temperature control with boiler

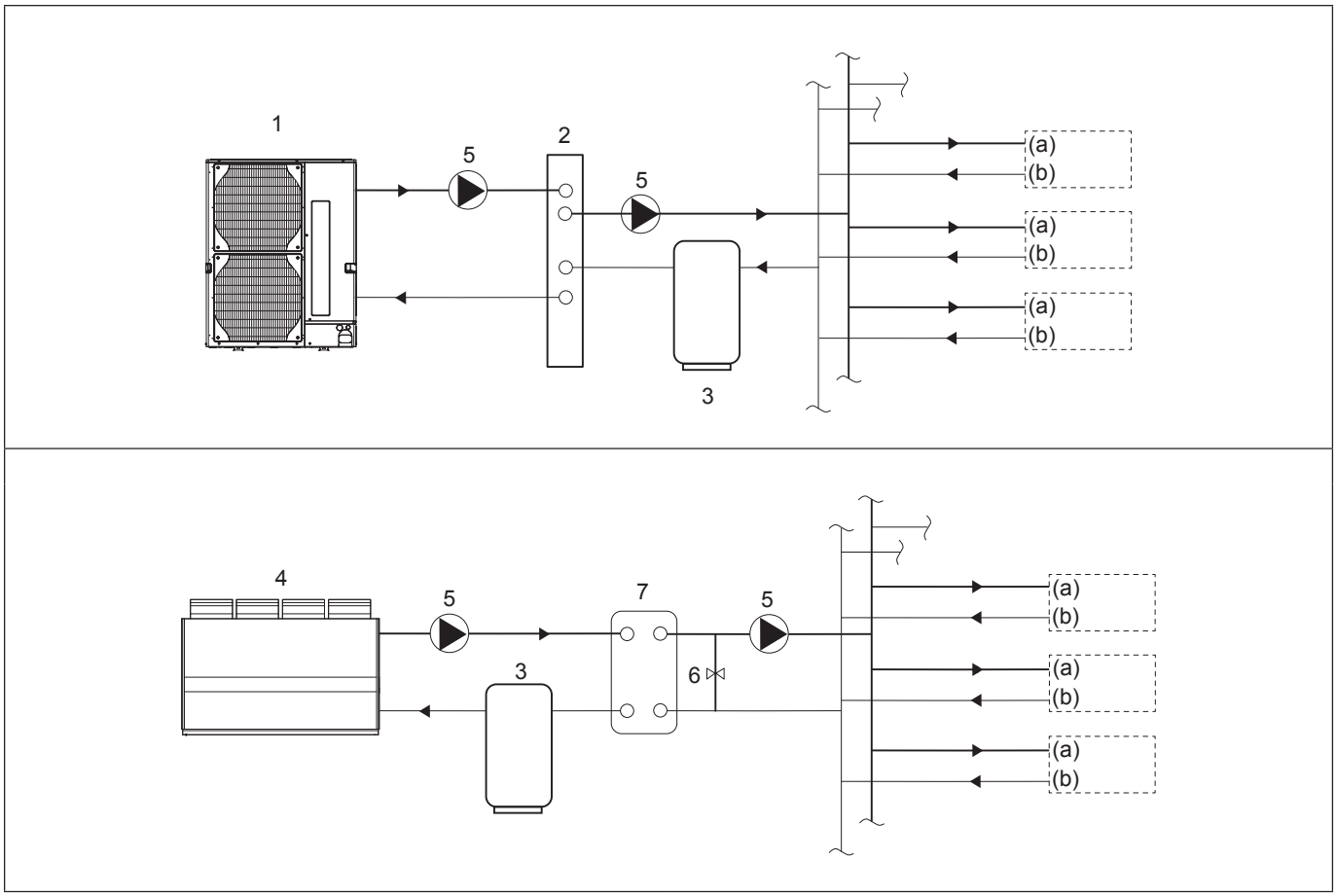


1-zone temperature control (2-zone valve ON/OFF control)



1. Zone1 heat emitters (e.g. radiator, fan coil unit) (local supply)
2. Mixing tank (local supply)
3. Zone1 flow water temp. thermistor (THW6) } Optional part : PAC-TH011-E
4. Zone1 return water temp. thermistor (THW7) }
5. Zone1 water circulation pump (local supply)
6. Motorized mixing valve (local supply)
7. Zone2 flow water temp. thermistor (THW8) } Optional part : PAC-TH011-E
8. Zone2 return water temp. thermistor (THW9) }
9. Zone2 water circulation pump (local supply)
10. Zone2 heat emitters (e.g. underfloor heating) (local supply)
11. Boiler flow water temp. thermistor (THWB1) } Optional part : PAC-TH012HT-E
12. Mixing tank thermistor (THW10) }
13. Boiler (local supply)
14. Zone1 2-way valve (local supply)
15. Zone2 2-way valve (local supply)
16. Bypass valve (local supply)

7.5.4 Local system 2



1. Air to Water Heat Pump
2. Header
3. Buffer Tank
4. Central plate Heat source / Heat pump
5. Pump
6. Valve
7. Heat exchanger

7.6. Installation

<Preparation before the installation and service>

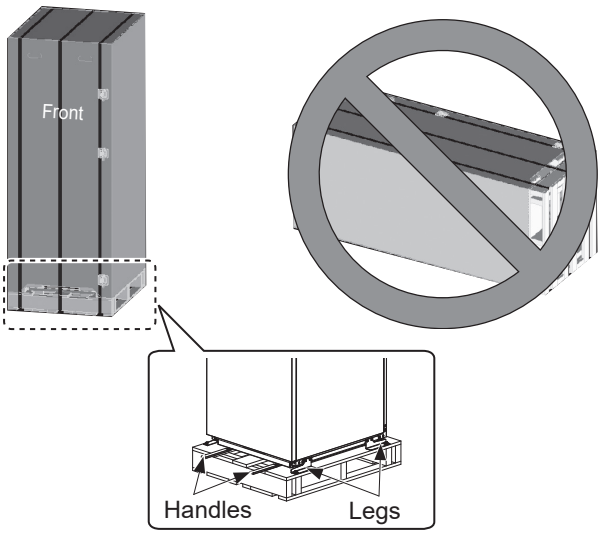
- Prepare the proper tools.
- Prepare the proper protection.
- Allow parts to cool before attempting any maintenance.
- Provide adequate ventilation.
- After stopping the operation of the system, turn off the power-supply breaker and remove the power plug.
- Discharge the capacitor before commencing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

<Precautions during service>

- Do not perform work involving electric parts with wet hands.
- Do not pour water or liquid into the electric parts.
- Do not touch the refrigerant.
- Do not touch the hot or cold surfaces in the refrigerant cycle.
- When the repair or the inspection of the circuit needs to be carried out without turning off the power, exercise great caution NOT to touch any LIVE parts.

7.6.1 Location

■ Transportation and Handling



<Figure 7.6.1>

The heat pump unit is delivered on a wooden pallet base with cardboard protection.

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

- The heat pump unit can be transported **ONLY** vertically. **The maximum allowable inclination is 45°.**

Module MUST be separated if it can only be transported/ carried horizontally.*

<see How to remove the module>. (during installation)

- The heat pump unit should ALWAYS be moved by a minimum of 2 people.
- When carrying the heat pump unit use the handles provided.
- Before using the handles, make sure they are securely attached.
- **Please remove fixing legs, wooden base and any other packaging once the unit is in installation location.**

* Module removal, carrying and reassembling are installer's responsibility.

■ Suitable Location

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

- The heat pump unit should be installed indoors in a frost free weather proof location.
- The heat pump unit should be positioned on a level surface capable of supporting 'it's **FILLED** weight. (Adjustable feet (accessory parts) can be used to ensure unit I level)
- When using the adjustable feet, ensure that the floor is strong enough.
- Care should be taken that minimum distances around and in front of the unit for service access are observed <Figure 7.6.2>.
- Secure the heat pump unit to prevent it being knocked over.
- Install the heat pump unit where it is not exposed to water/ excessive moisture.

■ Service access diagrams

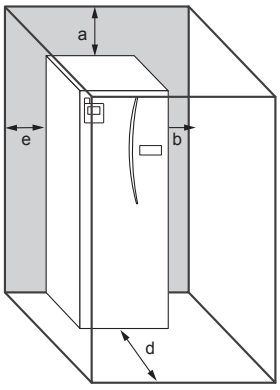
Service access	
Parameter	Dimension (mm)
a	300
b	150
c (distance behind unit not visible in Figure 7.6.2)	10
d	700**
e	150*

<Table 7.6.1>

* An additional space is required, when brine pipe connecting to the side.

** Including service space for Module removal.

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



<Figure 7.6.2>
Service access

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

■ Room thermostat

If fitting a new room thermostat for this system;
- Position it out of direct sunlight and draughts
- Position it away from internal heat sources
- Position it in a room without a TRV on the radiator/heat emitter.
- Position it on an internal wall

Note:
Do not position the thermostat excessively close to the external wall.
The thermostat may detect the temperature of the wall, which could affect appropriate control of the room temperature.
- Position it approx. 1.5 m from floor level

■ Ambient temperature thermistor (TH7)

Please install the ambient temperature thermistor (TH7) in a place where external influences such as wind and sunlight are minimized. Please install the ambient temperature thermistor (TH7) cable in a place where people cannot touch. Run the cable inside the wall or above the ceiling when installing the ambient temperature thermistor (TH7) cable. Use a fixable wiring cover to secure the wiring from the top of the unit to the wall or ceiling.

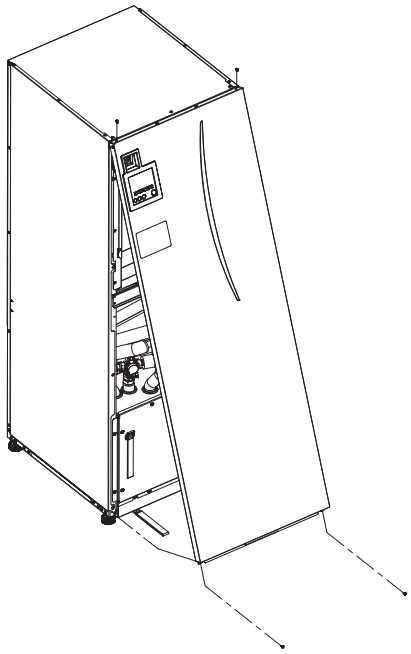
■ Repositioning

If you need to move the heat pump unit to a new position FULLY DRAIN the heat pump unit before moving to avoid damage to the unit. (See earlier instruction transportal handling.)

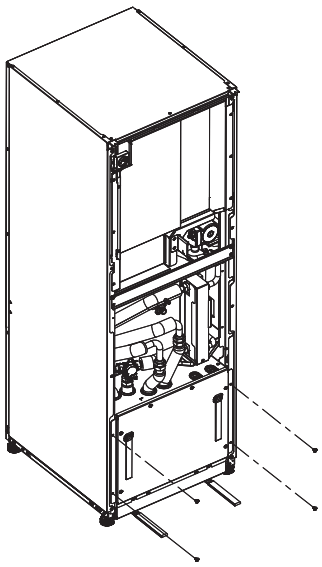
⚠ Warning
Refrigerant pipes connection shall be accessible for maintenance purposes.

■ How to remove the module

1. Remove the FRONT PANEL (four screws)



2. Remove the four screws that fix the MODULE FRONT and FRAME

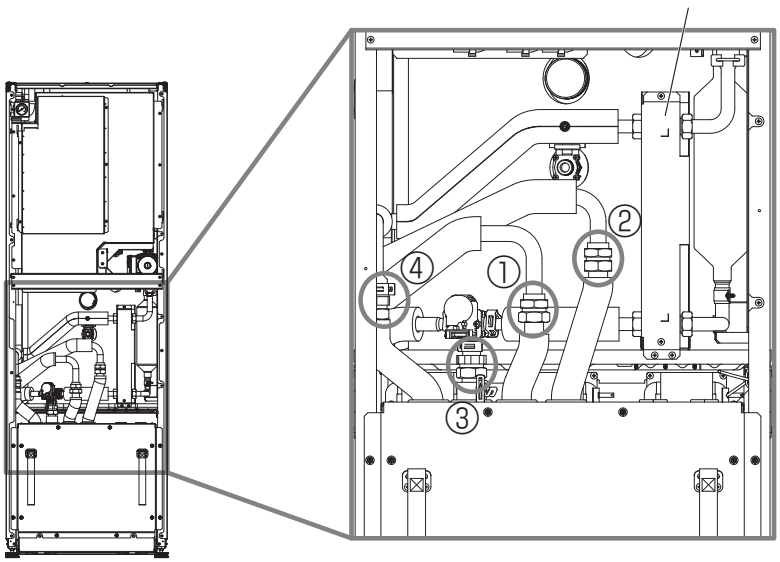


3. CYLINDER - MODULE

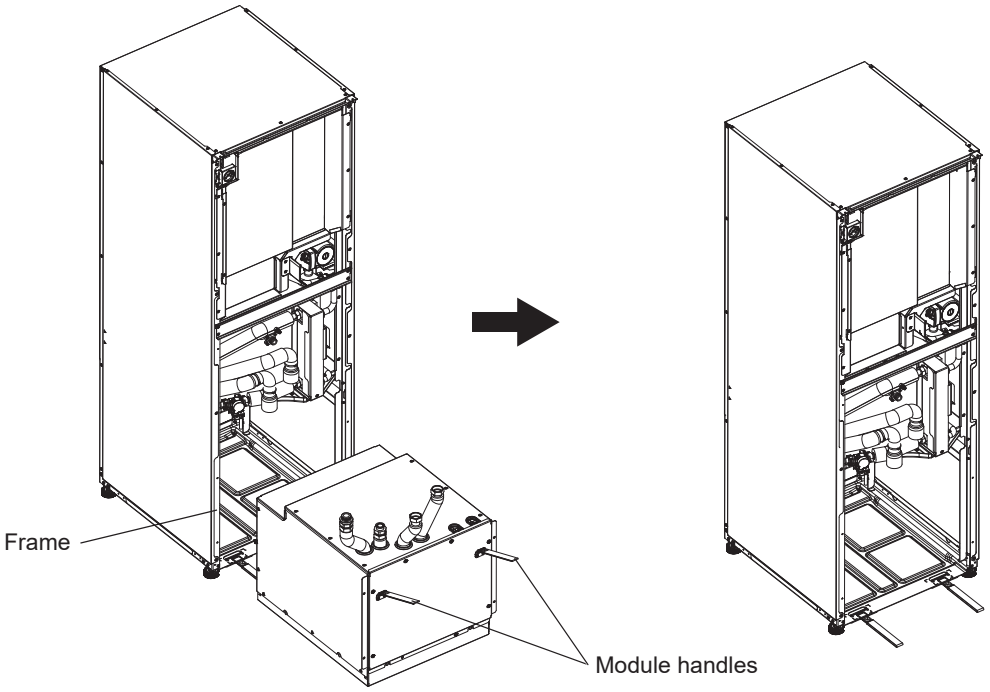
<WIRE>
Remove the 7 connectors from the MODULE BOX.
Remove the wires from the top of the MODULE BOX and the wire clamps on the Primary/Sanitary P-HEX.
・UNIT SIDE
Put them together under the CONT BOX
・MODULE SIDE
Put them together on the MODULE BOX

<PIPE>
Remove the following four points.
① Plate heat exchanger (Water/Brine - Refrigerant) IN
② Plate heat exchanger (Water/Brine - Refrigerant) OUT
③ 3 WAY VALVE - Primary flow (from MODULE)
④ Primary Water Pump-Water in (Return)

Primary/sanitary Plate heat exchanger
Water (Primary) - Water (Sanitary)

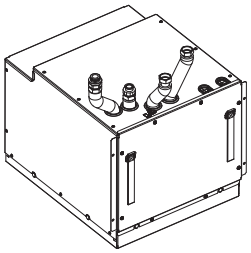


4. Pull the MODULE BOX out by using the MODULE HANDLES



5. After pulling MODULE BOX out

Fit the cap or plastic bag etc. (local supply) on flexible pipes.
Please bundle the wires during transportation and secure them with band etc. on the module.



* The module is then re-installed in reverse order.
When returning the Module unit assy to the unit, be careful not to get your hands caught between the unit and the Module unit assy. Hold the module unit assy with nylon bands (Module handles), NOT the corners of it (HAZARD).

7.6.2 Water/Ambient Loop Quality and System Preparation

<Water>

■ General

- The water in both primary and sanitary circuit should be clean and with pH value of 6.5-8.0
- The followings are the maximum values;
  Calcium: 100 mg/L, Ca hardness: 250 mg/L
  Chloride: 100 mg/L, Copper: 0.3 mg/L
- Other constituents should be to European Directive 98/83 EC standards.
- In known hard water areas, to prevent/minimise scaling, it is beneficial to restrict the routine stored water temperature (DHW max. temp.) to 55°C.

■ Anti-Freeze

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

Note:

1. Ethylene glycol is toxic and should NOT be used in the primary water circuit in case of any cross-contamination of the sanitary circuit.

2. For 2-zone valve ON/OFF control, propylene glycol should be used.

■ Installation (primary water circuit)

- Before installation heat pump unit, thoroughly cleanse pipework of building debris, solder etc using a suitable chemical cleansing agent.
- Flush the system to remove chemical cleanser.
- The responsible installer should decide if anti-freeze solution is necessary for each site's conditions. Corrosion inhibitor however should ALWAYS be used.

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

<Ambient loop>

■ General

- The water in both primary and sanitary circuit should be clean and with pH value of 6.5-8.0
- The followings are the maximum values;
  Calcium: 100 mg/L, Ca hardness: 250 mg/L
  Chloride: 100 mg/L, Copper: 0.3 mg/L
- Other constituents should be to European Directive 98/83 EC standards.
- **Installer MUST** fill water or the following antifreeze solution mix when filling the ambient loop.
- The water in Ambient loop should be clean and with pH value of 6.5-8.0.
  38 WT% propylene glycol
  29 WT% bioethanol
  25 WT% ethylene glycol
  Note: DO NOT use Inorganic brine.
- Fit the local supply particle filter on the incoming pipe.
- Use the heat pump unit ONLY in a closed system for ambient loop. Using the system in an open system will lead to excessive corrosion.

■ Installation (Ambient loop)

- Before installation of heat pump unit, thoroughly cleanse pipework of building debris, solder etc using a suitable chemical cleansing agent.
- Flush the system to remove chemical cleanser.

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

■ Amount of brine required in the ambient loop

- As a measure of the brine filling amount, please make approximation of 1 L/m of collector hose length.

■ How to access Internal Components and Control and Electrical Box

<A> Opening the front panel

1. Remove the two lower screws and two upper screws.
2. Slide front panel upwards to slightly and open carefully.
3. Disconnect the relay connector connecting main remote controller cable and the control board cable.

<B> Accessing the back of the control and electrical box

The control and electrical box has 8 holding screws and is hinged on the right hand side.

1. Remove the 4 screws fixing the metal plate (with a warning label) in front of the electrical box, then lift the plate to remove.
2. Remove the holding screws on the control and electrical box.
3. The control and electrical box can then be swung forward on the right hand hinges.

Note:

After servicing, re-secure all cables using straps provided. Reconnect main remote controller cable to its relay connector. Replace front panel and resecure screws.

7.6.3 Water Pipe Work

■ Hot Water Pipework

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

Connect the flow for the DHW to pipe A (Figure 7.5.1).
The function of the following safety components of the heat pump unit should be checked on installation for any abnormalities;

- Pressure relief valve (Primary circuit and Tank)
- Expansion vessel pre-charge (gas charge pressure)

The instruction on the following pages regarding safe discharge of hot water from Safety devices should be followed carefully.

- The pipework will become very hot, so should be insulated to prevent burns.
- When connecting pipework, ensure that no foreign objects such as debris etc. enter the pipe work.

■ Cold Water Pipework

Cold water to the suitable standard (see section 7.6.2) should be introduced to the system by connecting pipe B (Figure 7.5.1) using appropriate fittings.

■ Negative pressure prevention

To prevent negative pressure effecting DHW tank, installer should install appropriate pipework or use appropriate devices.

■ Pipework Connections

Connections to the heat pump unit should be made using the 22 mm or 28 mm compression as appropriate.
When connecting DHW pipes using compression fittings, insert copper liner for DHW pipe (accessory parts) into the pipes and tighten them from 0.75 to 1.25 turns.
Do not over-tighten compression fittings as this will lead to deformation of the olive ring and potential leaks.
Note:
<u>Before</u> brazing pipes in the field, protect pipes on the cylinder unit using wet towels etc as "heat shield".

■ Insulation of Pipework

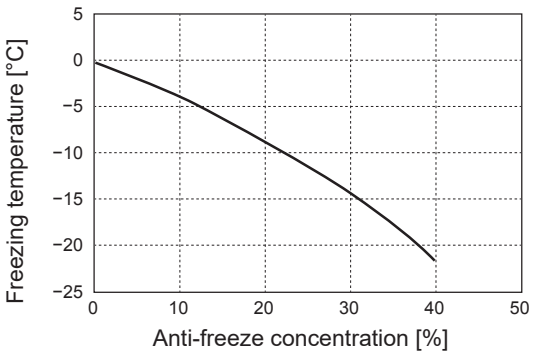
- All exposed water pipework should be insulated to prevent unnecessary heat loss and condensation. To prevent condensate entering the heat pump unit, the pipework and connections at the top of the heat pump unit should be carefully insulated.
- Cold and hot water pipework should not be run close together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

■ Filling the System (Primary Circuit)

1. Check and charge expansion vessel.
2. Check all connections including factory fitted ones are tight.
3. Insulate pipework.
4. Thoroughly clean and flush, system of all debris. (see section 7.6.2 for instruction.)
5. Fill heat pump unit with sanitary 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.

When connecting metal pipes of different materials insulate the joints to prevent a corrosive reaction taking place which will damage the pipework.

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



<Figure 7.6.3>

■ Sizing Expansion Vessels

Expansion vessel volume must fit the local system water volume.
To size an expansion vessel for the heating circuit the following formula and graph can be used. When the necessary expansion vessel volume exceeds the volume of an built-in expansion vessel, install an additional expansion vessel so that the sum of the volumes of the expansion vessels exceeds the necessary expansion vessel volume.
For installation of the heat pump unit, the installer MUST provide and install a suitable primary-side expansion vessel as the model **DOES NOT** come fitted with a primary-side expansion vessel.

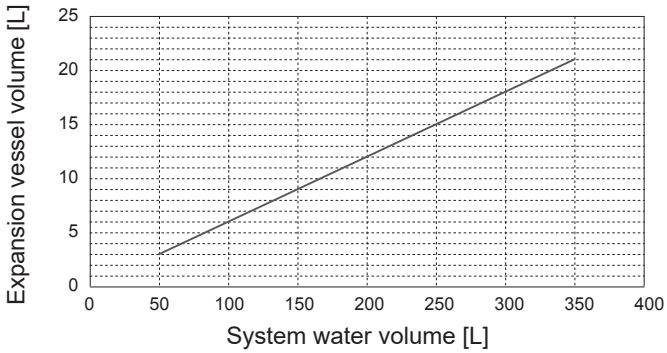
$$V = \frac{\varepsilon \times G}{1 - \frac{P_1 + 0.098}{P_2 + 0.098}}$$

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

Graph to the right is for the following values

ε : at 70 °C = 0.0229
P_1 : 0.1 MPa
P_2 : 0.3 MPa
*A 30% safety margin has been added.

Expansion vessel sizing



<Figure 7.6.4>

7.6.4 Water Circulation Pump Characteristics

1. Primary circuit
Pump speed can be selected by main remote controller setting (see <Figure 7.6.5>).
Adjust the pump speed setting so that the flow rate in the primary circuit is appropriate for the Table 7.6.2. It may be necessary to add an additional pump to the system depending on the length and lift of the primary circuit.

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

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

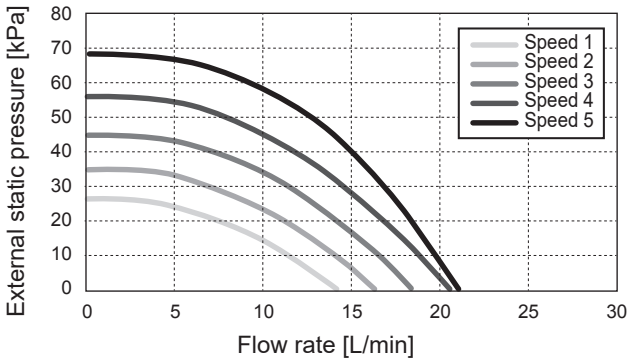
2. Sanitary circuit
Default setting: Speed 2
DHW circulation pump MUST be set to speed 2.

Water flow rate range [L/min]	7.1-27.7

<Table 7.6.2>

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

Water circulation pump characteristics



<Figure 7.6.5>

■ Immersion heater

When an immersion heater is fitted, do NOT energise the heater until the DHW tank is full of water. Also do NOT energise any immersion heater if any sterilisation chemicals remain in the DHW tank as this will cause premature failure of the heater.

7.6.5 Safety Device Connections

The expansion relief valve on the secondary hot water side, and the temperature and pressure (T&P) relief valve (*A), both need appropriate discharge pipework. There must be no valve fitted between the expansion relief valve and the tank.

*A EHWT17D-MHEDW is equipped with T & P relief valve on the tank (2). Other models are equipped with Pressure relief valve, fitted to the DHW pipework (3).

Note : 1. Do not secure the screws excessively when connecting the Discharge pipe, otherwise it may result in damage to the cylinder unit.

<For UK>

The right side panel has a plate (*B) so that connection can be made to the factory fitted temperature and pressure relief valve. If you wish to make the connection in a different position you will have to cut a hole in the side panel yourself. However it remains necessary that the drainage parameters outlined in the appropriate Building Regulations are complied with.

*B Unscrew the plate on the right-side panel, connect the Pressure relief valve to the discharge pipework, and refit the plate. Always replace the plate so that no gaps exist between the plate and side panel and the plate and drain pipe to avoid heat loss.
In accordance with Building Regulations a tundish must be fitted into the pipework within 500 mm of the safety device (also see Figure 7.6.7). Due to the distance between the two safety devices it may be necessary to fit each safety device with its own tundish before you run the pipework together to a safe discharge (see Figure 7.6.6).

Note : 2. Alternatively the discharges from the expansion relief valve and T&P relief valve may commonly discharge to a singular tundish, so long as this tundish is located within 500 mm of the T&P relief valve in UK. When connecting discharge pipes to the safety devices, beware not to strain the inlet connections.

Diagram part No.	Description	Connection size	Connection type
1	Expansion relief valve (part of inlet control group)	15 mm	Compression
2	T&P relief valve	15 mm /G 1/2	Compression/ Female
3	Pressure relief valve	G 1/2	Female

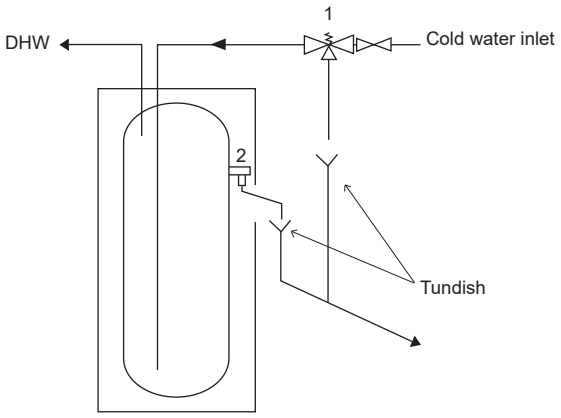
<Table 7.6.3>

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

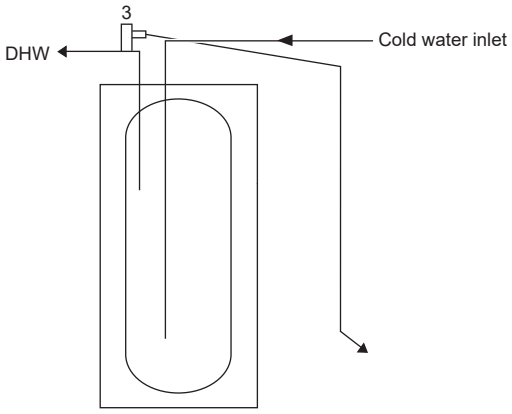
For UK use PAC-WK02UK-E kit, for other countries please see below;

- Any discharge pipework should be capable of withstanding discharge of hot water. Discharge pipework should be installed in a continuously downward direction. Discharge pipework must be left open to the environment.

<UK model>
EHWT17D-MHEDW



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



<Figure 7.6.6>

■ Piping diagram for 2-zone temperature control

Connect the pipe work and locally supplied parts according to the relevant circuit diagram shown in Section 3. Technical Information, of this manual.
For more details on wiring, refer to “7.4.3 Wiring for 2-zone temperature controls”.

Note: Do not install the thermistors on the mixing tank. This could affect correct monitoring of flow and return temperatures through each zone. Install the Zone2 flow temp. thermistor (THW8) near the mixing valve.

7.6.6 Safety Device Discharge Arrangements (G3)

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

1. Position the inlet control group so that discharge from both safety valves can be joined together via a 15 mm end feed Tee.
2. Connect the tundish and route the discharge pipe as shown in Figure 7.6.7.
3. The tundish should be fitted vertically and as close to the safety device as possible and within 500 mm of the device.
4. The tundish should be visible to occupants and positioned away from electrical devices.
5. The discharge pipe (D2) from the tundish should terminate in a safe place where there is no risk to persons in the vicinity of the discharge, be of metal construction and:

A) Be at least one pipe size larger than the nominal outlet size of the safety device unless its total equivalent hydraulic resistance exceeds that of a straight pipe 9 m long i.e. discharge pipes between 9 m and 18 m equivalent resistance length should be at least two sizes larger than the nominal outlet size of the safety device, between 18 and 27 m at least 3 sizes larger, and so on. Bends must be taken into account in calculating the flow resistance. Refer to Figure 7.6.7, Table 7.6.4 and the worked example. An alternative approach for sizing discharge pipes would be to follow BS 6700: 1987 specification for design installation, testing and maintenance of services supplying water for domestic use within buildings and their cartilages.

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

C) Be installed with a continuous fall.

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

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

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

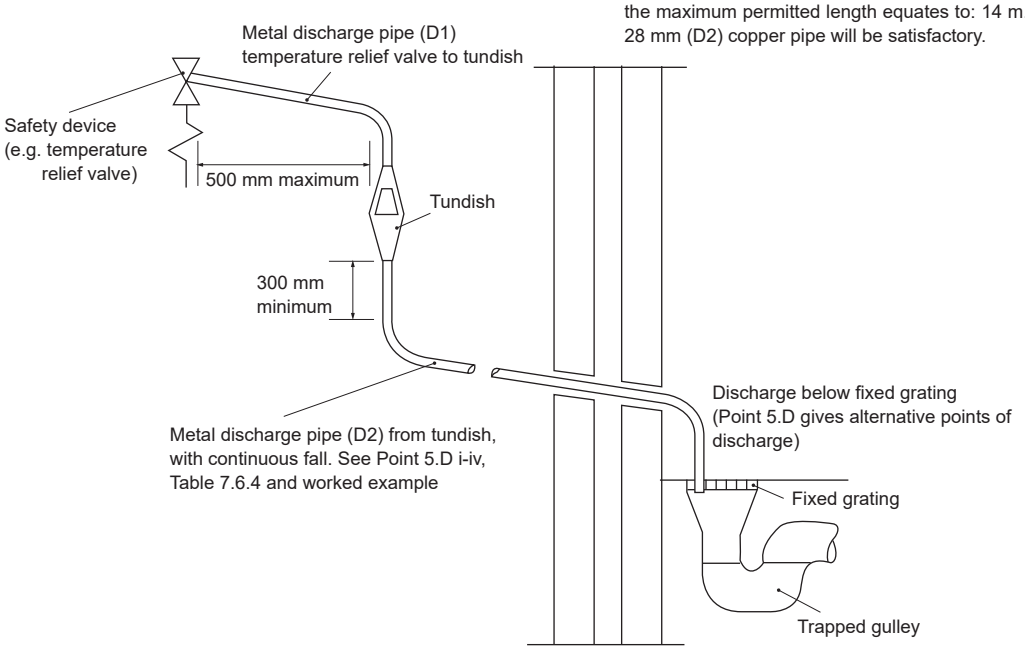
iii. Discharges at high level; e.g. into a metal hopper and metal down pipe with the end of the discharge pipe clearly visible (tundish visible or not) or onto a roof capable of withstanding high temperature discharges of water and 3 m from any plastic guttering system that would collect such discharges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

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

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

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

From Table 7.6.4: Maximum resistance allowed for a straight length of 22 mm copper discharge pipe (D2) from a G½ temperature relief valve is: 9.0 m subtract the resistance for 4 No. 22 mm elbows at 0.8 m each = 3.2 m. Therefore the maximum permitted length equates to: 5.8 m. 5.8 m is less than the actual length of 7 m, therefore calculate the next largest size. Maximum resistance allowed for a straight length of 28 mm pipe (D2) from a G½ temperature relief valve equates to: 18 m
Subtract the resistance for 4 No. 28 mm elbows at 1.0 m each = 4 m. Therefore the maximum permitted length equates to: 14 m. As the actual length is 7 m, a 28 mm (D2) copper pipe will be satisfactory.



<Figure 7.6.7>

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

<Table 7.6.4>

7.6.7 Ambient Loop Pipe Work

■ Pipework Connections

Connections to the heat pump unit should be made using the 22 mm compression as appropriate.
When connecting Ambient Loop pipes using compression fittings, insert copper liner for Ambient Loop pipe (accessory parts) into the pipes and tighten them from 0.75 to 1.25 turns.
Do not over-tighten compression fittings as this will lead to deformation of the olive ring and potential leaks.

Note:
To weld the pipes in the field, cool the pipes on the heat pump unit using wet towel etc.

■ Side Connections

It is possible to angle the ambient loop connections, for connection to the side instead of top connection.
To angle out the connection:

1. Remove left side panel.
2. Cut the pipes to the desired length and angle the pipes in the desired direction.
3. Make a hole on the panel.
4. Fit the panel
5. Connect the pipes
6. Please fill in the gap between panel and ambient loop pipes with insulation

Notes:

- **For side connection, the pipe diameter is 22.2 mm.**
- **Triangle marks on left side panel shows center of ambient loop pipes.**
- **Noise from heat pump can be significant.**

■ How to install PICV (Pressure Independent Control Valve)

PICV should be installed on the Ambient loop pipe in order to balance water or brine in Ambient loop.

■ Insulation of Pipework

- All exposed ambient loop pipework should be insulated to prevent unnecessary heat loss and condensation. To prevent condensate entering the heat pump unit, the pipework and connections at the top of the heat pump unit should be carefully insulated.
- Ambient loop inlet and outlet pipework should not be run close together where possible, to avoid unwanted heat transfer.
- Pipework between Local System2 and heat pump unit should be insulated with suitable pipe insulation material with a thermal conductivity of ≤ 0.04 W/m.K.

■ Filling the System (Ambient loop)

1. Check and charge expansion vessel.
   If expansion vessel is used, close the valve under the expansion vessel.
2. Check all connections including factory fitted ones are tight.
3. If you use filling pump, Connect the filling pump and return line on the ambient loop system's filler connector.
4. Insulate all exposed ambient loop pipework.
5. Thoroughly clean and flush, system of all debris. (see section 7.6.2 for instruction.)
6. Close the valve in the filler connector, open the valves on the filler connector.
7. Fill heat pump unit's ambient loop with suitable sanitary water or antifreeze solution mix.

When connecting metal pipes of different materials insulate the joints to prevent a corrosive reaction taking place which will damage the pipework.

8. Check for leakages. If leakage is found, retighten the nut onto the connections.
9. Pressurise system to atmospheric pressure. Top up with water as necessary.
10. Close the valves on the filler connector, Open the three way valve in the filler connector.
11. If expansion vessel is used, open the valve under the expansion vessel.

Ambient loop flow rate range [L/min]	7.2 - 24.0

If the water or brine flow rate is less than 7.2 L/min, the flow rate error will be activated.

■ Sizing Expansion Vessels

Expansion vessel volume must fit the local system water or brine volume. Refer to the 7.6.3 water pipe work for details

7.7 System Set Up

7.7.1 Main remote Controller Options

The heat pump unit comes factory fitted with a main remote controller. This incorporates a thermistor for temperature monitoring and a graphical user interface to enable set-up, view current status and input scheduling functions. The main remote controller is also used for servicing purposes. This facility is accessed via password protected service menus.
To provide the best efficiency Mitsubishi Electric recommends using automatic adaptation function based on room temperature. To use this function a room thermistor needs to be present in a main living area. This can be done in a number of ways the most convenient are detailed below.
Refer to heating section of this manual for instructions on how to set compensation curve, Flow temp. or Room temp. (Auto adaptation).
For instructions on how to set the thermistor input for the FTC please refer to Initial settings section.

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

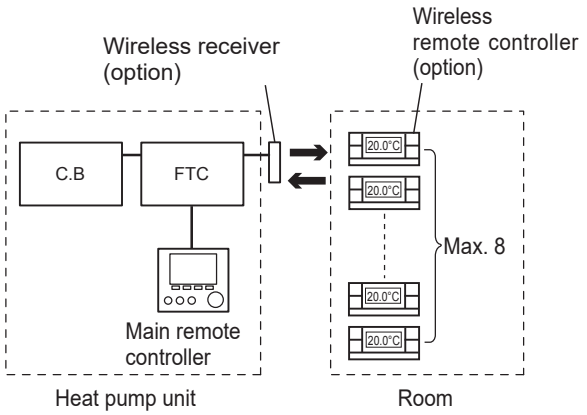
■ 1-zone temperature control

Control option A

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

If more than one wireless remote controller is used, the most recently requested temperature setting will commonly be applied to all rooms by the central control system regardless of which wireless remote controller was used. No hierarchy exists across these remote controllers.

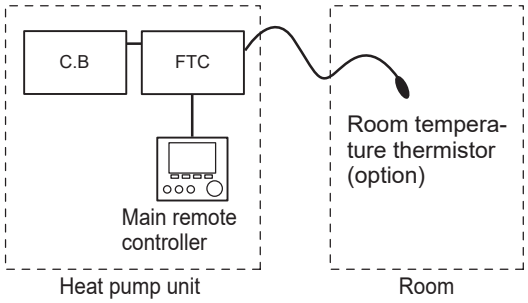
Wire the wireless receiver to FTC referring to the wireless remote controller instruction manual. **Turn DIP SW1-8 to ON.** Before operation configure the wireless remote controller to transmit and receive data referring to the wireless remote controller installation manual.



Control option B

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

Wire the thermistor to the TH1 connector on FTC.
The number of room temperature thermistors that can be connected to FTC is always one.



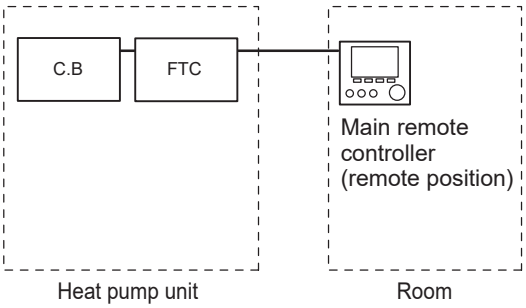
Control option C

This option features the main remote controller being removed from the heat pump unit and situated in a different room. A thermistor built in the main remote controller can be used for monitoring the room temperature for Auto Adaptation function whilst keeping all its features of the main remote controller available.

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

To use the sensor in the main remote controller the main remote controller should come off from the heat pump unit. Otherwise it will detect the temperature of the heat pump unit instead of room temperature. This will affect the output of the space heating.

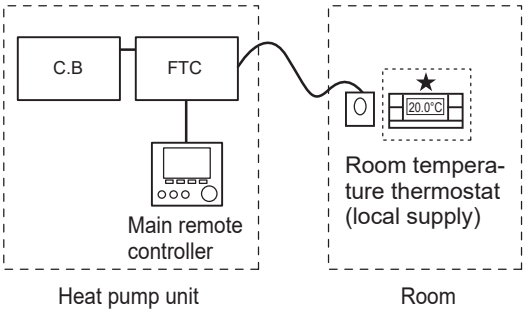
Note: Wiring for main remote controller cable shall be (5 cm or more) apart from power source wiring so that it is not influenced by electrical noise from power source wiring. (Do NOT insert main remote controller cable and power source wiring in the same conduit.)



Control option D

This option features the main remote controller and a locally supplied thermostat wired to FTC. The thermostat is used to set the maximum temperature for heating room. Any changes to DHW must be made using main remote controller mounted on the heat pump unit.
The thermostat is wired to IN1 in TBI.1 on FTC. The number of thermostats that can be connected to FTC is always one.

★ **The wireless remote controller can be also used as a thermostat.**



■ 2-zone temperature control

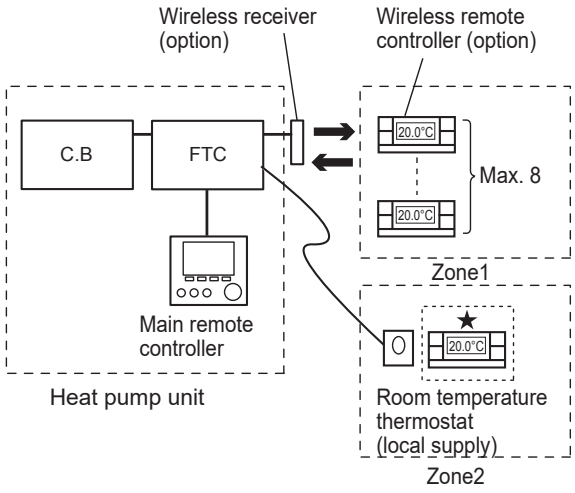
Control option A

This option features the main remote controller, the Mitsubishi Electric wireless remote controller and a locally supplied thermostat. The wireless remote controller is used to monitor the Zone1 room temperature and the thermostat is used to monitor the Zone2 room temperature.
The thermostat can be also allocated to Zone1 and the wireless remote controller to Zone2.

The wireless remote controller can be also used to make changes to the space heating settings, boost DHW and switch to holiday mode without having to use the main remote controller.

If more than one wireless remote controller is used, the last temperature setting adjustment/demand will be applied to ALL rooms in same zone.

Wire the wireless receiver to FTC referring to the wireless remote controller instruction manual. Turn DIP SW1-8 to ON. Before operation configure the wireless remote controller to transmit and receive data referring to the wireless remote controller installation manual.
The thermostat is used to set the maximum temperature for heating Zone2 room.
The thermostat is wired to IN6 on FTC. (If the thermostat is allocated to Zone1, it is wired to IN1 on TBI.1.) (Refer to 7.4.2.)

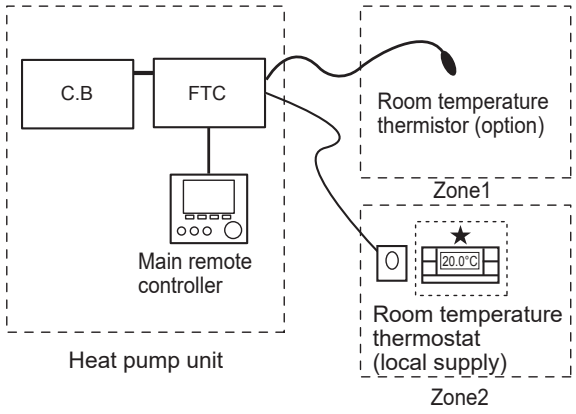


Zone1: Room temp. control (Auto adaptation)
Zone2: Compensation curve or flow temp. control

Control option B

This option features the main remote controller, the Mitsubishi Electric thermistor and a locally supplied thermostat that are wired to FTC. The thermistor is used to monitor the Zone1 room temperature and the thermostat is used to control the Zone2 room temperature.

The thermostat can be also allocated to Zone1 and the thermistor to Zone2.
The thermistor can not make any changes in control operation. Any changes to DHW must be made using the main remote controller mounted on the heat pump unit.
Wire the thermistor to the TH1 connector on FTC.
The number of room temperature thermistors that can be connected to FTC is always one.
The thermostat is used to set the maximum temperature for heating Zone2 room.
The thermostat is wired to IN6 on FTC. (If the thermostat is allocated to Zone1, wire it to IN1 on TBI.1.) (Refer to 7.4.2.)



Zone1: Room temp. control (Auto adaptation)
Zone2: Compensation curve or flow temp. control

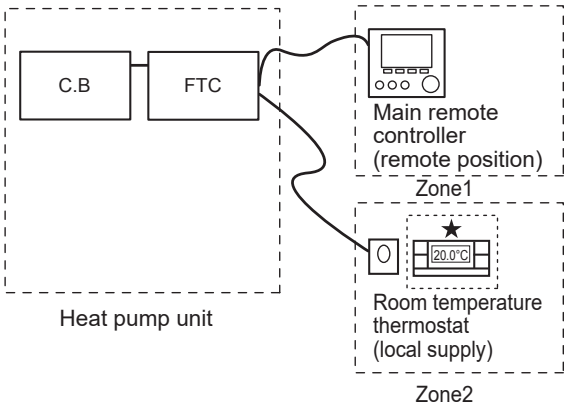
Control option C

This option features the main remote controller (with in-built thermistor) that is removed from the heat pump unit to monitor the Zone1 room temperature and a locally supplied thermostat to monitor the Zone2 room temperature.
The thermostat can be also allocated to Zone1 and the thermistor to Zone2.

A thermistor built into the main remote controller can be used for monitoring the room temperature for Auto Adaptation function whilst keeping all its features of the main remote controller available.
The main remote controller and FTC are connected by a 2-core, 0.3 mm², non-polar cable (local supply) with a maximum length of 500 m. To use the sensor in the main remote controller the main remote controller should be detached from the heat pump unit. Otherwise it will detect the temperature of the heat pump unit instead of room temperature. This will affect the output of the space heating.

The thermostat is used to set the maximum temperature for heating Zone2 room.
The thermostat is wired to IN6 on FTC. (If the thermostat is allocated to Zone1, wire it to external input IN1 on TBI.1.) (Refer to 7.4.2.)

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

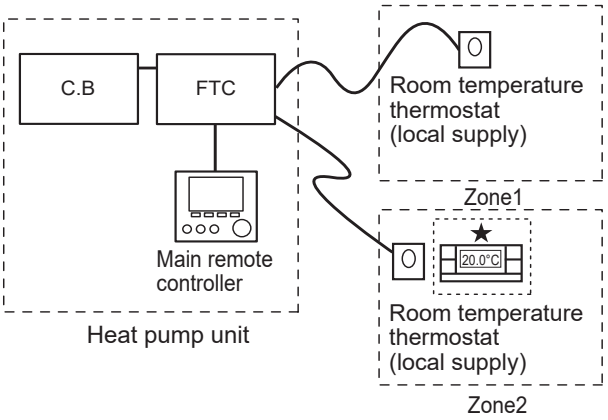


Zone1: Room temp. control (Auto adaptation)
Zone2: Compensation curve or flow temp. control

Control option D

This option features the locally supplied thermostats wired to FTC. The thermostats are individually allocated to Zone1 and Zone2. The thermostats are used to set each maximum temperature for heating Zone1 and Zone2 rooms. Any changes to DHW must be made using the main remote controller mounted on the heat pump unit.

The thermostat for Zone1 is wired to IN1 in TBI.1 on FTC.
The thermostat for Zone2 is wired to IN6 in TBI.1 on FTC.

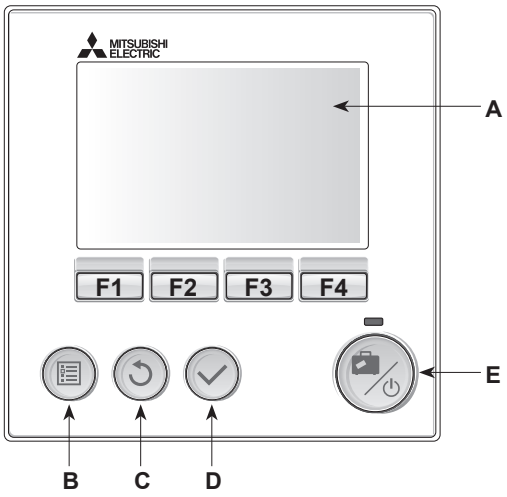


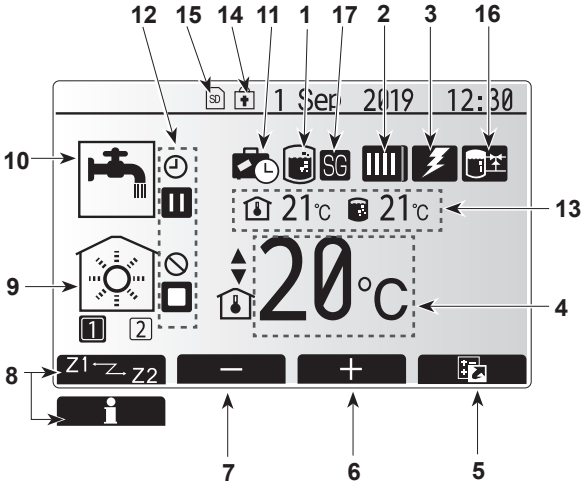
Zone1, Zone2: Compensation curve or flow temp. control

Note: For the options above, the sensor types can be exchanged between Zone1 and Zone2.
(e.g. Wireless remote controller in Zone1 and Room temp. thermostat in Zone2 can be changed to Room temp. thermostat and wireless remote controller, respectively).

★ **The wireless remote controller can be also used as a thermostat.**

7.7.2 Main remote controller





Main screen

<Main remote controller parts>

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

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

<Main screen icons>

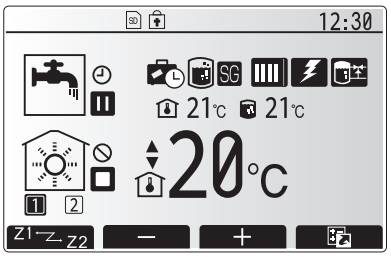
	Icon	Description	
1	Legionella prevention	When this icon is displayed 'Legionella prevention mode' is active.	
2	Heat pump		'Heat pump' is running.
			Emergency heating
			'Quiet mode' is activated.
3	Electric heater	When this icon is displayed the 'Electric heaters' (booster or immersion heater) are in use.	
4	Target temperature		Target flow temperature
			Target room temperature
			Compensation curve
5	OPTION	Pressing the function button below this icon will display the option screen.	
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 Zone1 or Zone2
10	DHW mode	Normal or Eco mode	
11	Holiday mode	When this icon is displayed 'Holiday mode' activated.	
12		Timer	
		Prohibited	
		Server control	
		Stand-by	
		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. (***2**)	
15		SD memory card is inserted. Normal operation.	
		SD memory card is inserted. Abnormal operation.	
16	Buffer tank control	When this icon is displayed, 'Buffer tank control' is active.	
17	Smart grid ready	When this icon is displayed, 'Smart grid ready' is active.	

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

■ General Operation

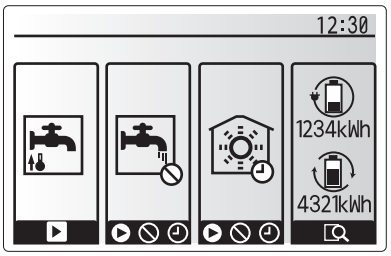
In general operation the screen displayed on the main remote controller will be shown as in the figure on the right.
This screen shows the target temperature, space heating mode, DHW mode, any additional heat sources being used, holiday mode, and the date and time.

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



Home screen

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



Option screen

The option screen allows quick setting of the following;
- Forced DHW — to turn ON/OFF press F1
- DHW operating mode — to change mode press F2
- Space heating operating mode — to change mode press F3
- Energy monitor
  Following accumulated energy values are displayed.
  : Consumed electrical energy in total (month-to-date)
  : Delivered heat energy in total (month-to-date)
  To monitor the energy values in each operation mode for [month-to-date/ last month/ the month before last/ year-to-date/ last year], press F4 to access to the Energy monitor menu.

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

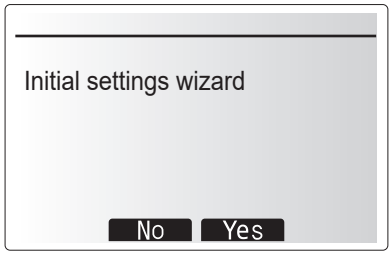
■ Initial settings wizard

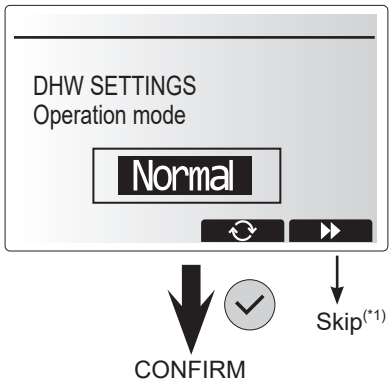
When the main remote controller is switched on for the first time, the screen automatically goes to Language setting screen, Date/Time setting screen and Main settings menu screen in order. Enter the desired number using the function keys and press CONFIRM.

Note:
<HEATER CAPACITY RESTRICTION>
This setting restricts the capacity of booster heater (if fitted). It is NOT possible to change the setting after starting up.
If you do not have any special requirements (such as building regulations) in your country, skip this setting (select "No").

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

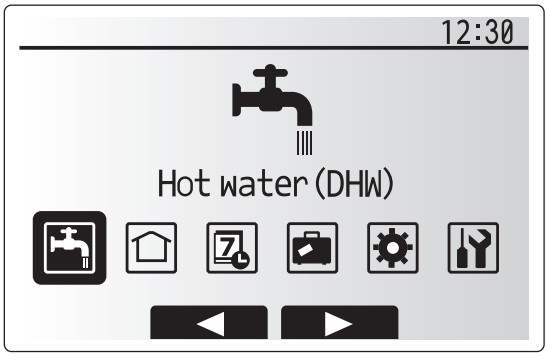
*1 The screen goes to the next setting screen. Changes have not been saved.





■ Main Settings Menu

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



Main menu

User Level – Short press

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

Installer Level – Long press

If the MENU button is pressed down for 3 seconds the main settings will be displayed with all functionality available.
The colour of ◄► buttons is inverted, as per right figure.

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

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

Initial Settings

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

Initial settings that can be edited are

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

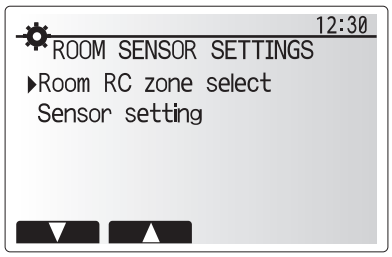
To return to the main settings menu press the BACK button.

Icon	Description
	Hot water (DHW)
	Heating
	Schedule timer
	Holiday mode
	Initial settings
	Service

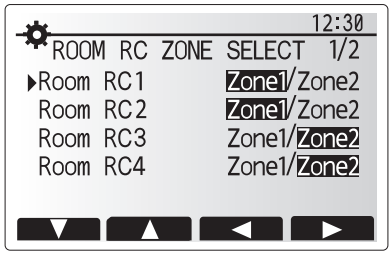
<Room sensor settings>

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

1. From the Initial settings menu select Room sensor settings.



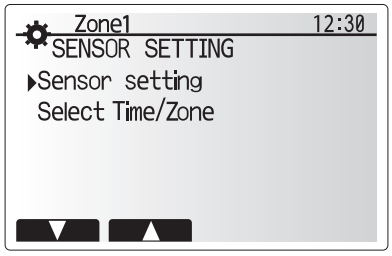
2. When 2-zone temperature control is active and wireless remote controllers are available, from Room RC zone select screen, select zone No. to assign to each remote controller.

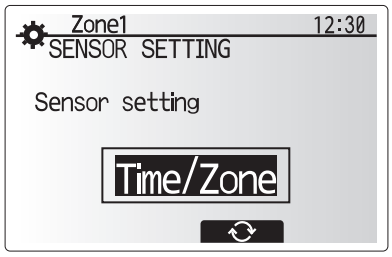


3. From Sensor setting screen, select a room sensor to be used for monitoring the room temperature from Zone1 and Zone2 separately.

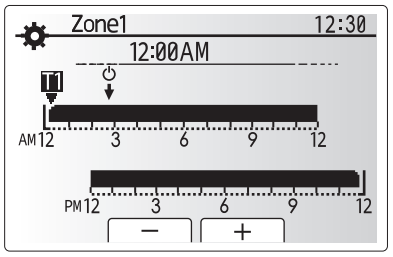
Control option ("Remote Controller Options"	Corresponding initial settings room sensor	
	Zone1	Zone2
A	Room RC1-8 (one each for Zone1 and Zone2)	*
B	TH1	*
C	Main remote controller	*
D	*	*

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

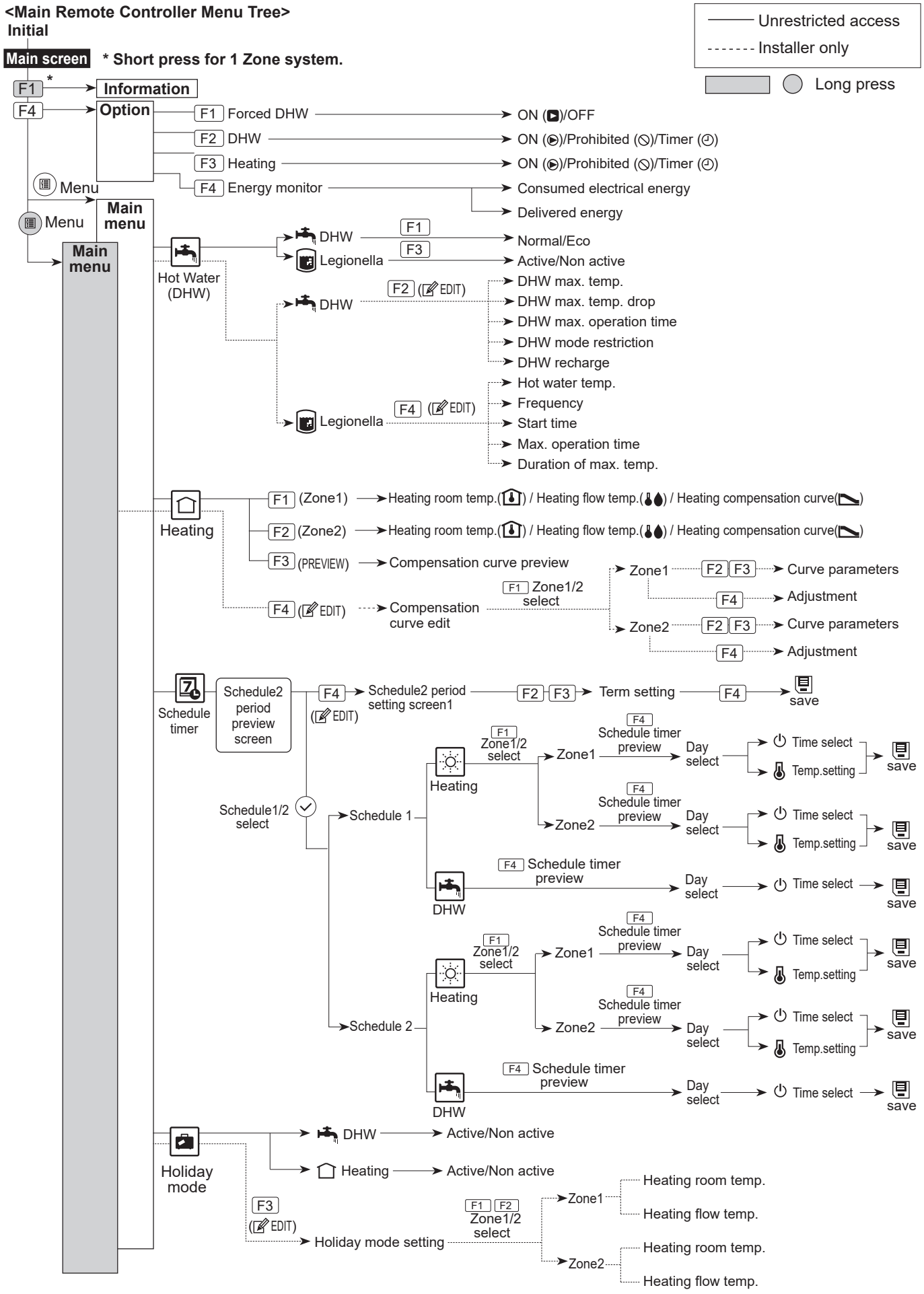




4. From Sensor setting screen, select Time/Zone to make it possible to use different room sensors according to the time schedule set in the Select Time/Zone menu. The room sensors can be switched up to 4 times within 24 hours.



Time/Zone schedule setting screen



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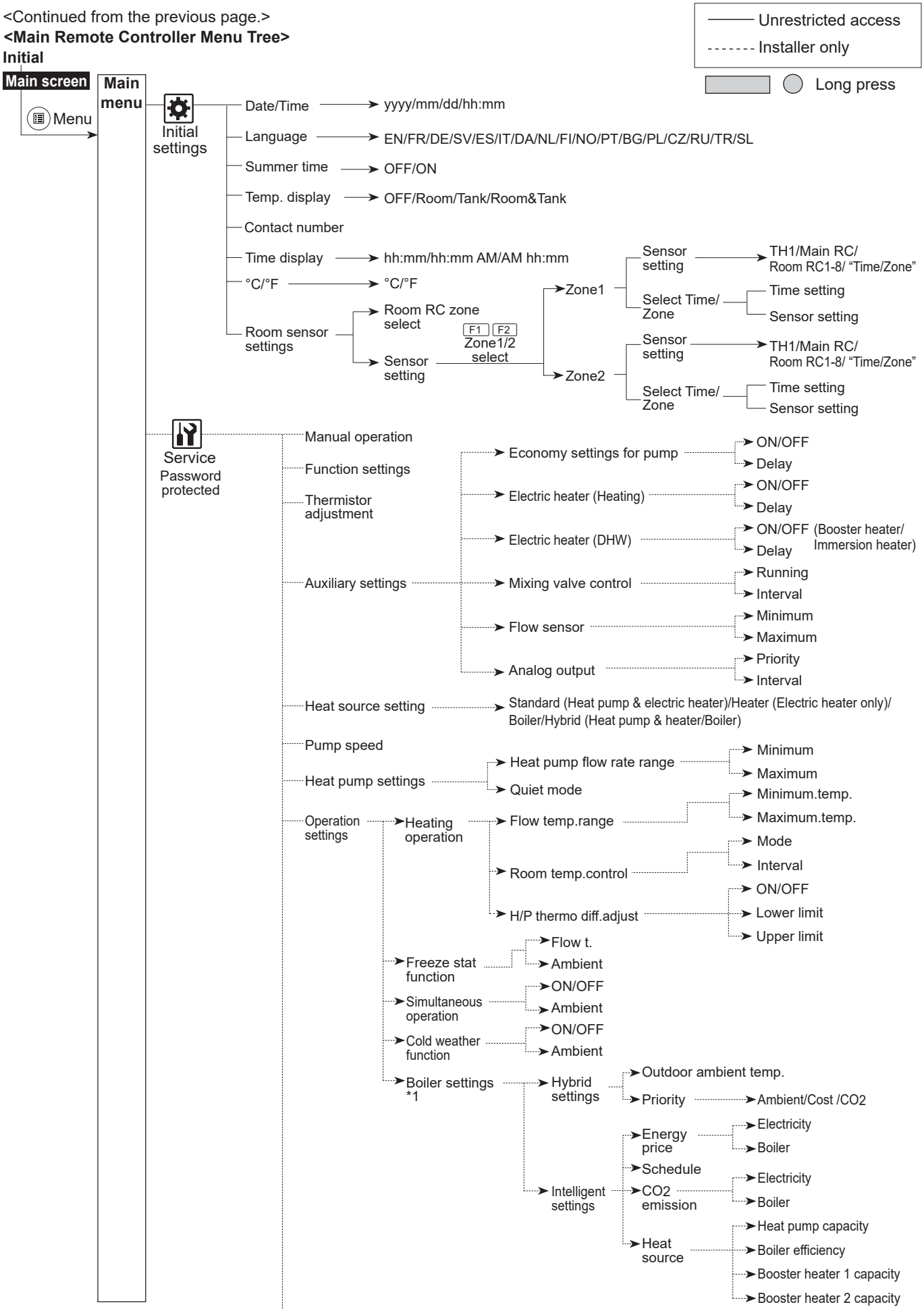
<Main Remote Controller Menu Tree>

Initial



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

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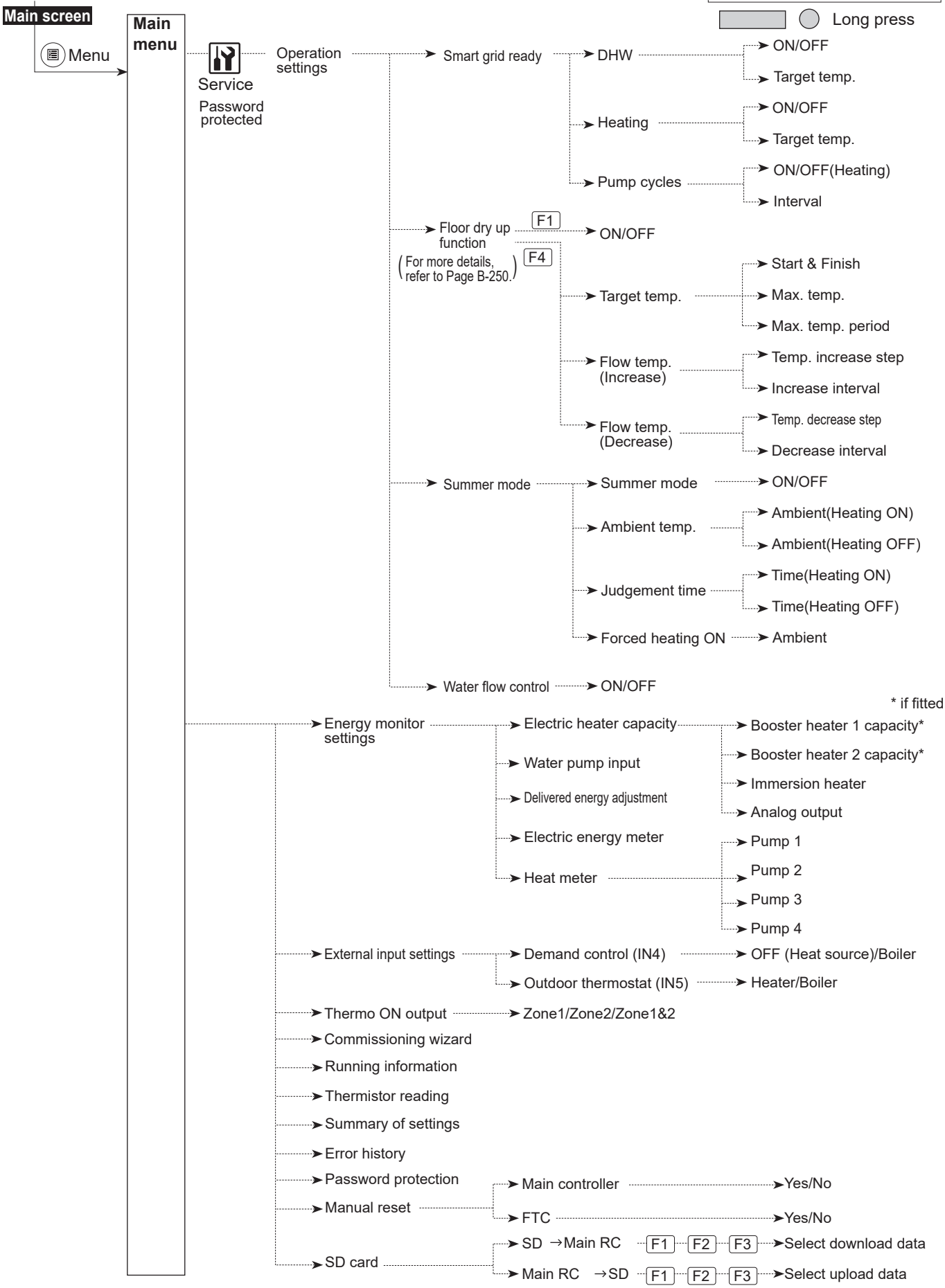
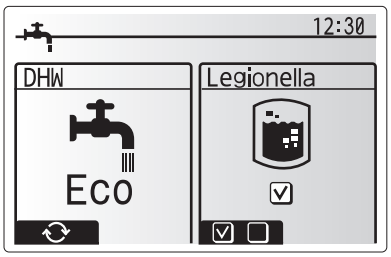
<Main Remote Controller Menu Tree>

Initial



Domestic Hot Water (DHW)/Legionella Prevention

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



<DHW mode settings>

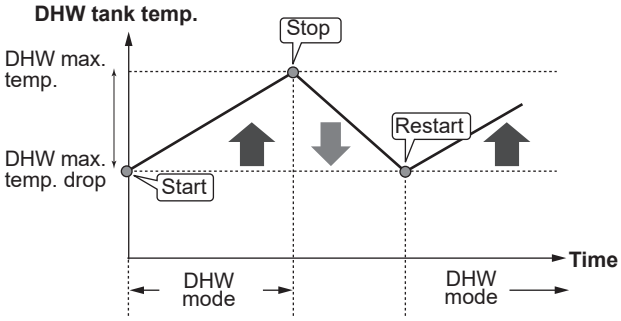
1. Highlight the hot water icon and press CONFIRM.
2. Use button F1 to switch between Normal and Eco heating modes.
3. To edit the mode, press down the MENU button for 3 seconds, then select "hot water".
4. Press F2 key to display the HOT WATER (DHW) SETTING menu.
5. Use F2 and F3 keys to scroll through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

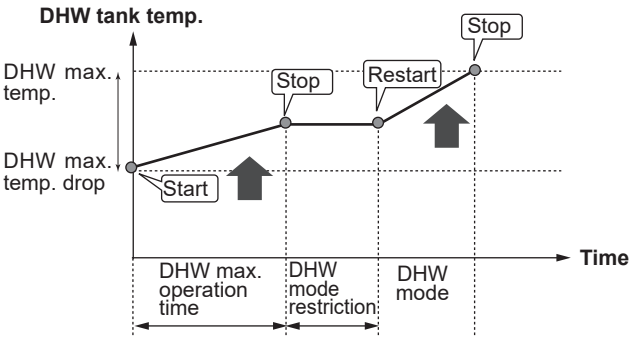
Menu subtitle	Function	Range	Unit	Default value
DHW max. temp.	Desired temperature of stored hot water	40 - 60	°C	50
DHW max. temp. drop	Difference in temperature between DHW max. temp. and the temperature at which DHW mode restarts	5 - 30	°C	10
DHW max. operation time	Max. time allowed for stored water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

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

Explanation of DHW operation

- When the DHW tank temperature drops from "DHW max. temp." by more than the "DHW max. temp. drop" (set by installer), DHW mode operates and the flow from the primary heating circuit is diverted to heat the water in the DHW tank.
- When the temperature of the stored water reaches the 'DHW max. temp.' set by the installer or if the 'DHW max. operation time' set by the installer is exceeded DHW mode ceases to operate.
- Whilst DHW mode is in operation primary hot water is not directed to the space heating circuit.
- Directly after DHW max. operation time 'DHW mode restriction' will routinely operate. The duration of this feature is set by the installer and during its operation, DHW mode can not (normally) be reactivated, allowing time for the system to deliver primary hot water to the space heating if required. However, if at this time there is no current demand for space heating, the system will automatically resume DHW mode. This will continue until it receives a demand for space heating.
- After the 'DHW mode restriction' operation the DHW mode can operate again and DHW tank heating will continue according to system demand.





<Eco mode>

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

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

<DHW recharge>

Select the amount of DHW. If you need much hot water, select LARGE.

Return to the DHW/legionella prevention menu.

Note:

However, Large mode raises boiling-up frequency, resulting in increase in power consumption.

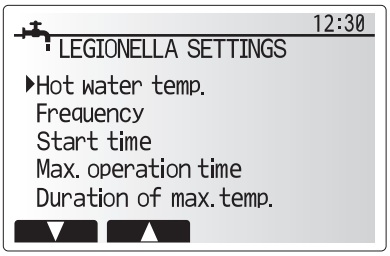
Forced DHW

The forced DHW function is used to force the system to operate in DHW mode. In normal operation the water in the DHW tank will be heated either to the target temperature or for the maximum DHW time, whichever occurs first. However should there be a high demand for hot water 'Forced DHW' function can be used to prevent the system from routinely switching to space heating and continue to provide DHW tank heating.

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

Legionella Prevention Mode settings (LP mode)

1. Use button F3 to choose legionella mode active YES/NO.
2. To edit the legionella function, press down the MENU button for 3 seconds and select “hot water”, then press F4 key.
3. Use F1 and F2 keys to scroll through the menu selecting each subtitle in turn by pressing CONFIRM. See the table below for description of each setting.
4. Enter the desired number using the function keys and press CONFIRM.



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

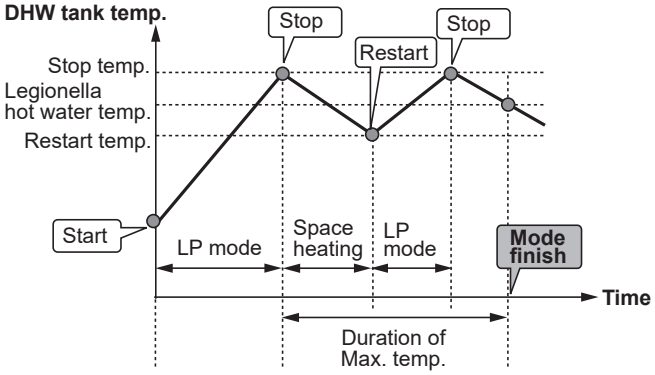
Menu subtitle	Function	Range	Unit	Default value
Hot water temp.	Desired temp of stored hot water	60–70	°C	65
Frequency	Time between LP mode DHW tank heat ups	1–30	day	15
Start time	Time when LP mode will begin	0:00–23:00	-	03:00
Max. operation time	Maximum time allowed for LP mode DHW tank heat	1–5	hour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

If you wish to make changes contact installer.

Explanation of Legionella Prevention Mode operation

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

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

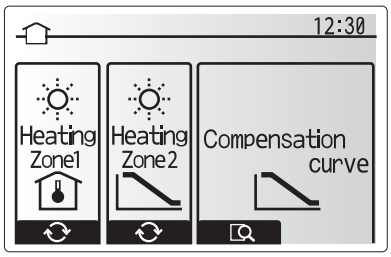


(LP mode: Legionella Prevention mode)

Heating

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

There are 3 heating modes
- Heating room temp. (Auto adaptation) ( )
- Heating flow temp. ( )
- Heating compensation curve ( )



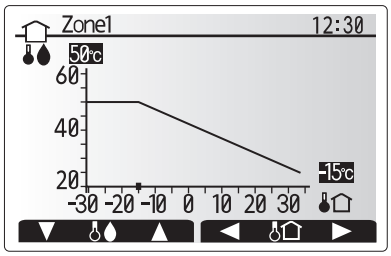
<Room temp. (Auto adaptation) mode>
In room temp. (Auto adaptation) mode the controller uses temperature sensors around the heating system to monitor space and flow temperatures. This data is regularly updated and compared to previous data by the controller to predict changes in room temperature and adjust the temperature of water flowing to the space heating circuit accordingly. By monitoring not only the outdoor ambient, but the room and heating circuit water temperatures, the heating is more consistent and sudden spikes in required heat output are reduced. This results in a lower overall flow temperature being required.

<Flow temp. mode>
The temperature of the water flowing to the heating circuit is set by the installer to best suit the space heating system design, and user's desired requirements.

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

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

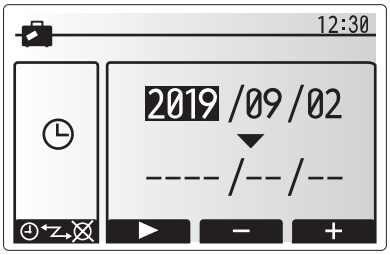
Your installer will set the parameters of the graph depending on local conditions and type of space heating used in your home. It should not be necessary for you to alter these settings. If however you find that over a reasonable operating period the space heating is not heating or is overheating your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



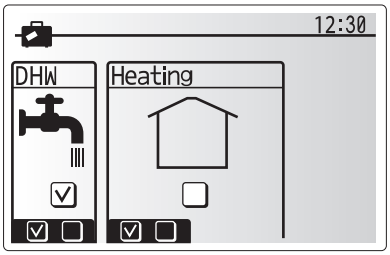
: Flow temp.
: Outdoor ambient temp.

Holiday Mode

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



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



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

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

<Editing holiday mode>

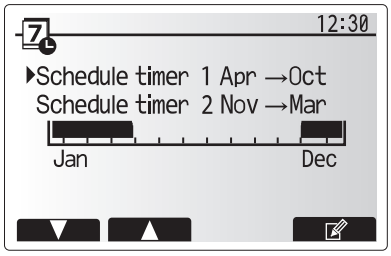
Refer to the menu tree in “Main remote controller” of Installation Manual.

Should you require the Holiday mode settings e.g. the flow temp. or the room temp. to be altered you should contact your installer.

Schedule timer

Scheduled timer can be set in two ways, for example; one for summer and the other for winter. (Refer to as “Schedule 1” and “Schedule 2” respectively.) Once the term (months) for the Schedule 2 is specified, rest of the term will be specified as Schedule 1. In each Schedule, an operational pattern of modes (Heating) can be set. If no operational pattern is set for Schedule2, only the pattern for Schedule 1 will be valid. If Schedule 2 is set to full-year (i.e. March to Feb.), only the operational pattern for Schedule 2 will be valid.

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



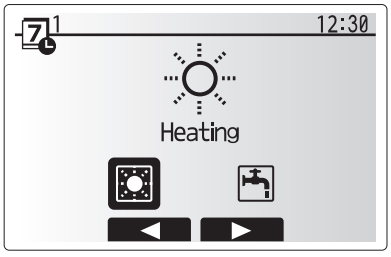
Schedule2 period preview screen

<Setting the Schedule period>

1. From the main settings menu use F2 and F3 to highlight the schedule icon then press CONFIRM.
2. The Schedule period preview screen is displayed.
3. To change the Schedule period, press F4. button.
4. The time bar edit screen is displayed.
5. Use F2/F3 button to point at a starting month of the Schedule2, then press CONFIRM.
6. Use F2/F3 button to point at an ending month of the Schedule2, then press CONFIRM.
7. Press F4 to save settings.

<Setting the Schedule timer>

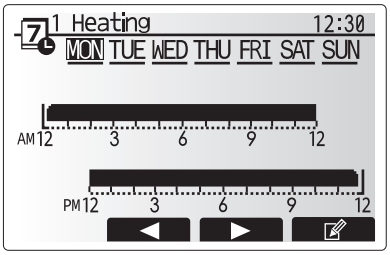
1. From the main settings menu use F2 and F3 to highlight the schedule icon then press CONFIRM.
2. From the schedule 2 period preview screen use F1 and F2 to scroll through the selecting each subtitle in turn by pressing CONFIRM.
3. The schedule timer sub menu will be displayed. The icons show the following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



Schedule1 mode select screen

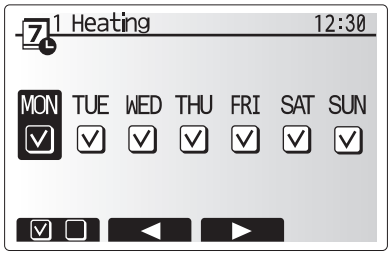
The preview screen allows you to view the current settings.
Days of the week are displayed across the top of the screen.
Where day appears underlined the settings are the same for all those days underlined.
Hours of the day and night are represented as a bar across the main part of the screen. Where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

5. In the preview menu screen press F4 button.



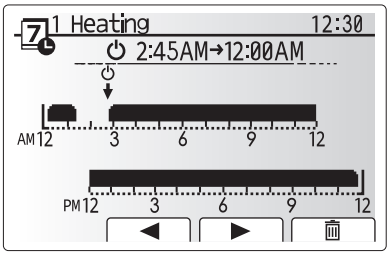
Preview screen

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



Day of week select screen

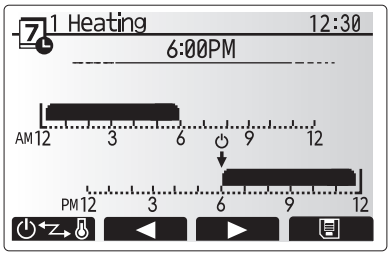
9. The time bar edit screen will be displayed.
10. Use buttons F2/F3 to move to the point at which you do not want the selected mode to be active press CONFIRM to start.
11. Use F3 button to set the required time of inactivity then press CONFIRM.
12. You can add up to 4 periods of inactivity within a 24 hour interval.



Time of period setting screen 1

13. Press F4 to save settings.

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



Time of period setting screen 2

Note:
- **The schedule timer for space heating is set in the same way.**
- **A small rubbish bin character is also displayed choosing this icon will delete the last unsaved action.**
- **It is necessary to use the SAVE function F4 button to save settings. CONFIRM does NOT act as SAVE for this menu.**

Service Menu

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

The factory default password is "0000".
Follow the procedure described in General Operation for the set up operation.

The service menu is navigated using the F1 and F2 buttons to scroll through the functions. The menu is split across two 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. Pump speed
7. Heat pump settings
8. Operation settings
9. Energy monitor settings
10. External input settings
11. Thermo ON output
12. Commissioning wizard
13. Running information
14. Thermistor reading
15. Summary of settings
16. Error history
17. Password protection
18. Manual reset
19. SD card

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

1. Manual operation
2. Auxiliary settings
3. Heat source setting
4. Operation settings
5. Energy monitor settings
6. External input settings
7. Password protection
8. Manual reset

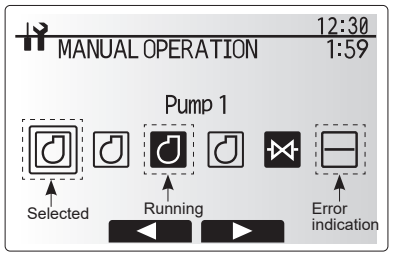
Information on the other functions can be found by consulting the service manual.

Many functions can not be set whilst the heat pump unit is running. The installer should turn off the unit before trying to set these functions. If the installer attempts to change the settings whilst the unit is running the main remote controller will display a reminder message prompting the installer to stop operation before continuing. By selecting “Yes” the unit will cease operation.

<Manual operation>

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

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



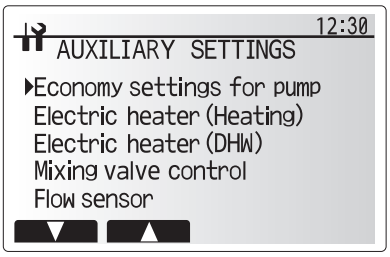
Manual operation menu screen

Manual operation and heat source setting 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.

<Auxiliary settings>

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

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



Auxiliary settings menu screen

*1. Decreasing "time before pump switched off" may increase the duration of stand-by in heating mode.
*2. Set the running time according to the specifications of the actuator of each mixing valve.
It is recommended to set the interval to 2 minutes that is a default value. With the interval set longer, it could take longer to warm up a room.
*3. Do not change the setting since it is set according to the specification of flow sensor attached to the heat pump unit.

<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.

<Operation settings>

Heating operation

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

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

Note:

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.

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

Freeze stat function

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

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

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 (if present) to provide space heating whilst only the immersion heater provides heating for DHW. This operation is only available if BOTH a DHW tank AND immersion heater are present on the system.*

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

Cold weather function

For extremely low outdoor ambient temperature conditions when the heat pump's capacity is restricted the provision of DHW is supported by the immersion heater,where fitted.
The support of both space heating and DHW can only be provided if the heat pump unit is also fitted with an electrical booster heater.

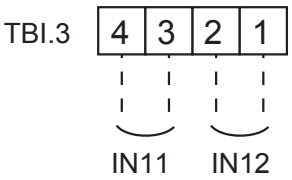
- Range of outdoor ambient temperature at which cold weather function starts is −30°C to −10°C (default −15°C).
- System shall automatically return to routine operation. This will happen when the outdoor temperature rises above the selected temp. for this specific mode of operation.

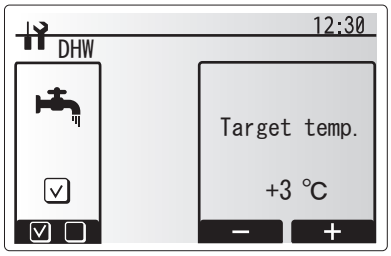
Note:
Electrical booster is only applicable to some modules.

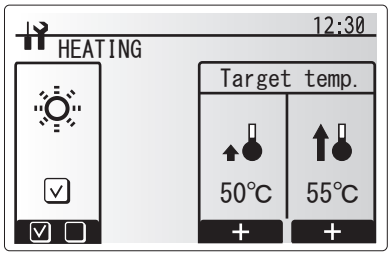
Smart grid ready

In DHW or heating operation, the commands in the table below can be used.

IN11	IN12	Meaning
OFF (open)	OFF (open)	Normal operation
ON (short)	OFF (open)	Switch-on recommendation
OFF (open)	ON (short)	Switch-off command
ON (short)	ON (short)	Switch-on command



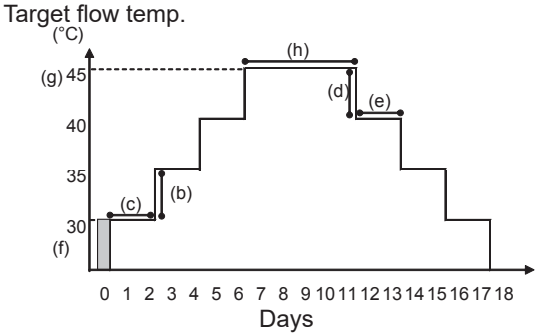




Floor dry up function

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

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



Disconnect wiring to external inputs of room thermostat, demand control, and outdoor thermostat, or the target flow temperature may not be maintained.

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

<Energy monitor settings>

1. General description

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

*1 Monthly and Year to date

*2 - DHW operation
- Space heating

Refer to the menu tree in "Main Settings Menu" for how to check the energy, and "7.3 DIP switch functions" for the details on DIP-SW setting.

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

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

(1) Calculation internally

Electricity consumption is calculated internally based on the energy consumption of refrigerant and brine circuit, electric heater, water pump(s) and other auxiliaries.*3

Delivered heat is calculated internally by multiplying delta T (Flow and Return temp.) and flow rate measured by the factory fitted sensors.

Set the electric heater capacity and water pump(s) input and specs of additional pump(s) supplied locally. (Refer to the menu tree in "Main Settings Menu")

	Booster heater1	Booster heater2	Immersion heater *1	Pump1 *2	Pump2	Pump3
EHGT17D-YM9ED	3 kW	6 kW	0 kW	***(factory fitted pump)	When additional pumps supplied locally are connected as Pump2/3, change setting according to specs of the pumps.	

*1 Change setting to 1 kW when connecting optional immersion heater "PAC-IH01V2-E".

*2 "***" displayed in the energy monitor setting mode means the factory fitted pump is connected as Pump 1 so that the input is automatically calculated.

When anti-freeze solution (propylene glycol) is used for primary water circuit, set the delivered energy adjustment if necessary.
For further detail of above, refer to the menu tree in "Main Settings Menu".

(2) Actual measurement by external meter (locally supplied)
FTC has external input terminals for 2 'Electric energy meters' and a 'Heat meter'.
If two 'Electric energy meters' are connected, the 2 recorded values will be combined at the FTC and shown on the main remote controller.
(e.g. Meter 1 for H/P power line, Meter 2 for heater power line)
Refer to the [Signal inputs] in section "7.2 Wiring diagrams" for more information on connectable electric energy meter and heat meter.

● Connectable electric energy meter and heat meter

- Pulse meter type: Voltage free contact for 12VDC detection by FTC (TBI.2 1pin, TBI.3 5 and 7 pins have a positive voltage.)
- Pulse duration: Minimum ON time: 40 ms; Minimum OFF time: 100 ms
- Possible unit of pulse: 0.1 pulse/kWh 1 pulse/kWh 10 pulse/kWh 100 pulse/kWh 1000 pulse/kWh

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

<External input settings>

Demand control (IN4)

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

Outdoor thermostat (IN5)

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

<Password protection>

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

Resetting the password

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

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

<Manual reset>

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

Password input screen

Password verify screen

7.7.3 DIP Switch Function

Located on the C.B. printed circuit board are 7 sets of small white switches known as DIP switches. The DIP switch number is printed on the circuit board next to the relevant switches. The word ON is printed on the circuit board and on the DIP switch block itself. To move the switch you will need to use a pin or the corner of a thin metal ruler or similar.

DIP switch settings are listed below in Table 7.7.1.
Only an authorised installer can change DIP switch setting under one's own responsibility according to the installation condition. Make sure to turn off heat pump unit power supplies before changing the switch settings.

DIP switch		Function	OFF	ON	Effective timing	Default settings
SW1	SW1-1	—	—	—	—	OFF
	SW1-2	Abnormal history clear	Normal	Clear	Always	OFF
SW4	SW4-1	—	—	—	—	OFF
	SW4-2	—	—	—	—	OFF
SW5	SW5-1	—	—	—	—	OFF
	SW5-2	Power failure automatic recovery*1	No auto recovery	Auto recovery	When power supply ON	ON
	SW5-3	—	—	—	—	OFF
	SW5-4	—	—	—	—	OFF
	SW5-5	—	—	—	—	OFF
	SW5-6	—	—	—	—	OFF
SW6	SW6-1	—	—	—	—	OFF
	SW6-2	—	—	—	—	OFF
	SW6-3	—	—	—	—	OFF
	SW6-4	Model select	Heat pump setting		—	OFF
	SW6-5					ON
	SW6-6					OFF
	SW6-7					ON
	SW6-8					OFF
SW7 *2	SW7-1	—	—	—	—	OFF
	SW7-2	—	—	—	—	OFF
	SW7-3	—	—	—	—	OFF
	SW7-4	—	—	—	—	OFF
	SW7-5	—	—	—	—	OFF
	SW7-6	—	—	—	—	OFF
SW8	SW8-1	—	—		—	OFF
	SW8-2	—	—	—	—	OFF
	SW8-3	—	—	—	—	OFF
SW9	SW9-1	—	—		Always	OFF
	SW9-2					OFF
	SW9-3					OFF
	SW9-4					OFF

<Table 7.7.1>

Note:

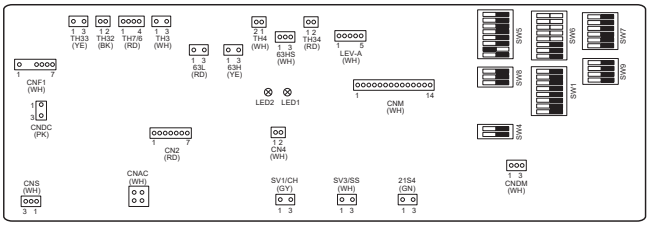
***1 "Power failure automatic recovery" can be set by either remote controller or this DIP SW. If one of them is set to ON, "Auto recovery" activates.**

***2 Please do not use SW7-3, 4 usually. Trouble might be caused by the usage condition.**

7.7.4 Connecting inputs/outputs

■ Inputs/Outputs

Name	Connector	Item
MC	TB-U/V/W	Motor for compressor (Mediate Power board)
63H	63H	High Pressure switch
63HS	63HS	High Pressure Sensor
FS	63L	Flow switch (Ambient loop)
TH3	TH3	Thermistor (Ref. liquid temp.)
TH4	TH4	Thermistor (Discharge temp.)
TH7	TH7/6	Thermistor (Outdoor temp.)
TH8	CN6	Thermistor (Heat sink temp.)
TH32	TH32	Thermistor (Ambient loop inlet temp.)
TH33	TH33	Thermistor (Comp. surface temp.)
TH34	TH34	Thermistor (Ambient loop outlet temp.)
LEV-A	LEV-A	Linear Expansion Valve
CNM	CNM	Connection for option



7.8 Service and Maintenance

The heat pump unit must be serviced once a year by a qualified individual. Servicing and maintenance of the outdoor unit should only be done by a Mitsubishi Electric trained technician with relevant qualifications and experience. Any electrical work should be done by a trades person with the appropriate electrical qualifica-tions. Any maintenance or 'DIY' fixes done by a non-accredited person could invalidate the Warranty and/or result in damage to the heat pump unit and injury to the per-son.

■ Basic Troubleshooting

No.	Fault symptom	Possible cause	Explanation - Solution
1	Main remote controller display is blank.	1. There is no power supply to main remote controller.	1. Check LED2 on FTC. (See "5. WIRING DIAGRAM".) (i) When LED2 is lit. Check for damage or contact failure of the main remote controller wiring. (ii) When LED2 is blinking. Refer to No. 5 below. (iii) When LED2 is not lit. Refer to No. 4 below.
		2. Power is supplied to main remote controller, however, the display on the main remote controller does not appear.	2. Check the following: • Disconnection between the main remote controller cable and the FTC control board • Failure of the main remote controller if "Please Wait" is not displayed. • Refer to No. 2 below if "Please Wait" is displayed.
2	"Please Wait" remains displayed on the main remote controller.	1. "Please Wait" is displayed for up to 6 minutes. 2. Communication failure between the main remote controller and FTC 3. Communication failure between FTC and controller circuit board	1. Normal operation 2, Main remote controller start up checks/procedure. 3. (i) If "0%" or "50–99%" is displayed below "Please Wait" there is a communication error between the main remote controller and the FTC control board. • Check wiring connections on the main remote controller. • Replace the main remote controller or the FTC control board. (ii) If "1–49%" is displayed there is a communication error between controller circuit board and FTC control board. • Check the wiring connections on the controller circuit board and the FTC control board. (Ensure the wiring connections between CN1 on the FTC control board and CNS on the controller circuit board) • Replace the controller circuit board and/or the FTC control board.
3	The main screen appears with a press of the "ON" button, but disappears in a second.	The main remote controller operations do not work for a while after the settings are changed in the service menu. This is because the system takes time to apply the changes.	Normal operation The FTC is applying updated settings made in the service menu. Normal operation will start shortly.
4	LED2 on FTC is off. (See "7.2 Wiring diagrams".)	When LED1 on FTC is also off. (See "7.2 Wiring diagrams".)	
		1. The controller circuit board unit is not supplied at the rated voltage.	1. Check the voltage across the terminals L and N or L3 and N on the controller circuit board (See "7.4 Field wiring".) • When the voltage is not 220 to 240 V AC, check wiring of the unit and of the breaker. • When the voltage is at 220 to 240 V AC, go to "2." below. • Check the N.F.board and TB1 cable.
		2. Faulty connector wiring	2. Check the voltage across the outdoor unit terminals S1 and S2. (See "7.4 Field wiring".) • Check the cable between the terminals and N.F. board • Check the cable between CNAC1 of the N.F.board and CNAC of the controller circuit board. • Check the cable between CN01 of the FTC board and CNS of the controller circuit board.
		3. FTC failure	3. Check the FTC control board. • Check the fuse on FTC control board. • Check for faulty wiring. • If no problem found with the wiring, the FTC control board is faulty.
		When LED1 on FTC is lit. Incorrect setting of refrigerant address. (None of the refrigerant address is set to "0".)	Set the refrigerant address to "0". (Set refrigerant address using SW1(3-6) on controller circuit board.)
5	LED2 on FTC is blinking. (See "7.2 Wiring diagrams".)	When LED1 is also blinking on FTC . Faulty wiring between FTC and controller circuit board	Check for faulty wiring between FTC and controller circuit board.
		When LED1 on FTC is lit. 1. Short-circuited wiring in main remote controller 2. Main remote controller failure	1., 2. Remove main remote controller wires and check LED2 on FTC. (See "7.2 Wiring diagrams".) • If LED2 is blinking check for short circuits in the main remote controller wiring. • If LED2 is lit, wire the main remote controller again and: - if LED2 is blinking, the main remote controller is faulty; - if LED2 is lit, faulty wiring of the main remote controller has been corrected.
6	LED4 on FTC is off. (See "7.2 Wiring diagrams".)	1. SD memory card is NOT inserted into the memory card slot with correct orientation. 2. Not an SD standards compliant memory card.	1. Correctly insert SD memory card in place until a click is heard. 2. Use an SD standards compliant memory card. (Refer to installation manual, "7.4.6 Using SD memory card".)
	LED4 on FTC is blinking. (See "7.2 Wiring diagrams".)	1. Full of data. 2. Write-protected. 3. NOT formatted. 4. Formatted in NTFS file system.	1. Move or delete data, or replace SD memory card with a new one. 2. Release the write-protect switch. 3. Refer to installation manual, "7.4.6 Using SD memory card". 4. FTC control board is Not compatible with NTFS file system. Use an SD memory card formatted in FAT file system.

No.	Fault symptom	Possible cause	Explanation - Solution
7	No water at hot tap.	1. Cold main off 2. Strainer (local supply) blocked.	1. Check and open stop cock. 2. Isolate water supply and clean strainer.
8	Cold water at tap.	1. Hot water run out. 2. Prohibit, schedule timer or holiday mode selected or demand control input (IN4) or smart grid ready (switch-off command). 3. Heat pump not working. 4. Booster heater cut-out tripped. 5. The earth leakage circuit breaker for booster heater breaker (ECB1) tripped. 6. The booster heater thermal cut-out has tripped and cannot be reset using the manual reset button. 7. Immersion heater cut-out tripped. 8. Immersion heater breaker (ECB2) tripped. 9. 3-way valve fault	1. Ensure DHW mode is operating and wait for DHW tank to re-heat. 2. Check settings and change as appropriate. 3. Check heat pump. 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 "7.5.1 Component parts" to find out its position. 5. Check the cause and reset if safe. 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. 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. 8. Check the cause and reset if safe. 9. Check plumbing/wiring to 3-way valve. (i) Manually override 3-way valve using the main remote controller. (Refer to <Manual operation> in "7.7 System setup") If the valve does not still function, go to (ii) below. (ii) Replace 3-way valve coil. If the valve does not still function, go to (iii) below. (iii) Replace 3-way valve. (Refer to Service manual.)
9	Water heating takes longer.	1. Heat pump not working. 2. Booster heater cut-out tripped. 3. Booster heater breaker (ECB1) tripped. 4. The booster heater thermal cut-out has tripped and cannot be reset using the manual reset button. 5. Immersion heater cut-out has been triggered. 6. Immersion heater breaker (ECB2) tripped. 7. Flow rate of the sanitary circuit may be reduced.	1. Check heat pump. 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 "7.5.1 Component parts" to find out its position. 3. Check the cause and reset if safe. 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. 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. 6. Check the cause and reset if safe. 7. Check the following items • Check for trapped air in water pump (sanitary circuit). • Check if the speed of water pump (sanitary circuit) is set to 2. • Check water pump (sanitary circuit) for malfunction. (Refer to Service manual.) • Replace plate heat exchanger (water - water) or scale trap, if there are a blockage which blocks the sanitary circuit.
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. 1. Water leakage in the pipes that connect to the DHW tank 2. Insulation material coming loose or off. 3. 3-way valve failure 4. Water pump (sanitary circuit) speed setting failure	1. Take the following measures. • Retighten the nuts holding the pipes onto the DHW tank. • Replace seal materials. • Replace the pipes. 2. Fix insulation. 3. Check plumbing/wiring to 3-way valve. (i) Manually override 3-way valve using the main remote controller. (Refer to <Manual operation> in "7.7 System setup".) If the valve does not still function, go to (ii) below. (ii) Replace 3-way valve motor. If the valve does not still function, go to (iii) below. (iii) Replace 3-way valve. (Refer to Service manual.) 4. Water pump (sanitary circuit) MUST be set to speed 2. When it set to speed 1, hot water would be mixed with cold water due to circulation.
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 2. Water circuit components reaching the end of life	1. Tighten connections as required. 2. Refer to PARTS CATALOG for expected part lifetimes and replace them as necessary.

No.	Fault symptom	Possible cause	Explanation - Solution
13	Heating system does not reach the target temperature.	1. Prohibit, schedule timer or holiday mode selected or demand control input (IN4) or smart grid ready (switch-off command). 2. Check settings and change as appropriate. 3. The temperature sensor is located in a room that has a different temperature relative to that of the rest of the house. 4. Heat pump not working. 5. Booster heater cut-out tripped. 6. Booster heater breaker (ECB1) tripped. 7. The booster heater thermal cut-out tripped and cannot be reset using the manual reset button. 8. Incorrectly sized heat emitter. 9. 3-way valve failure 10. Battery problem (wireless control only) 11. If a mixing tank is installed, the flow rate between the mixing tank and the unit is less than that between the mixing tank and the local system.	1. Check settings and change as appropriate. 2. Check the battery power and replace if flat. 3. Relocate the temperature sensor to a more suitable room. 4. Check heat pump. 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 "7.5.1 Component parts" for position.) 6. Check the cause of the trip and reset if safe. 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. 8. Check the heat emitter surface area is adequate Increase size if necessary. 9. Check plumbing/wiring to 3-way valve. (i) Manually override 3-way valve using the main remote controller. (Refer to <Manual operation> in "7.7 System setup".) If the 3-way valve does not function, go to (ii) below. (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. (iii) Replace 3-way valve. (Refer to Service manual.) 10. Check the battery power and replace if flat. 11. Increase the flow rate between the mixing tank and the unit decrease that between the mixing tank and the local system.
14	In 2-zone temperature control, only Zone2 does not reach the target temperature.	1. When Zone1 and Zone2 are both in heating mode, the hot water temperature in Zone2 does not exceed that in Zone1. 2. Faulty wiring of motorized mixing valve 3. Faulty installation of motorized mixing valve 4. Incorrect setting of Running time 5. Motorized mixing valve failure	1. Normal action no action necessary. 2. Refer to installation manual, "7.4.3 Wiring for 2-zone temperature control". 3. Check for correct installation. (Refer to the manual included with each motorized mixing valve.) 4. Check for correct setting of Running time. 5. Inspect the mixing valve. (Refer to the manual included with each motorized mixing valve.)
15	After DHW operation room temperature rises slightly.	At the end of the DHW mode operation the 3-way valve diverts hot water away from the DHW circuit into space heating circuit. This is done to prevent the unit components from overheating. The amount of hot water directed into the space heating circuit varies according to the type of the system and of the pipe run between the plate heat exchanger and the unit.	Normal operation no action necessary.
16	The room temperature rises during DHW operation.	3-way valve failure	Check the 3-way valve. (i) Manually override 3-way valve using the main remote controller. (Refer to <Manual operation> in "7.7 System setup".) If the 3-way valve does not function, go to (ii) below. (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. (iii) Replace 3-way valve. (Refer to Service manual.)
17	Water discharges from pressure relief valve. (Primary circuit)	1. If continual – pressure relief valve could bite foreign objects and the valve seat may be damaged. 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. 2. Check pressure in expansion vessel. Recharge to 1 bar if necessary. If bladder perished replace expansion vessel with a new one.
18	Water discharges from pressure relief valve. (Sanitary circuit)	1. If continual – field supplied pressure reducing valve not working. 2. If continual – pressure relief valve could bite foreign objects and the valve seat may be damaged. 3. If intermittent – expansion vessel charge may have reduced/bladder perished. 4. DHW tank may have subjected to backflow.	1. Check function of pressure reducing valve and replace if necessary. 2. Turn the handle on the pressure relief valve several turns. If leakage persists, replace the pressure relief valve with a new one. 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 pre-charge. 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.
19	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.

<table>
<tr><th>No.</th><th>Fault symptom</th><th>Possible cause</th><th>Explanation - Solution</th></tr>
<tr><td>20</td><td>Noise during hot water draw off typically worse in the morning.</td><td>1. Loose airing cupboard pipework.
2. Heaters switching on/off.</td><td>1. Install extra pipe fastening clips.
2. Normal operation no action necessary.</td></tr>
<tr><td>21</td><td>Mechanical noise heard coming from the unit.</td><td>1. Heaters switching on/off.
2. 3-way valve changing position between DHW and heating mode.
3. Heat pump unit (compressor) running</td><td>Normal operation no action necessary.</td></tr>
<tr><td>22</td><td>Water circulation pump runs for a short time unexpectedly.</td><td>Water circulation pump jam prevention mechanism (routine) to inhibit the build-up of scale.</td><td>Normal operation no action necessary.</td></tr>
<tr><td>23</td><td>Milky/Cloudy water (Sanitary circuit)</td><td>Oxygenated water</td><td>Water from any pressurised system will release oxygen bubbles when water is running. The bubbles will settle out.</td></tr>
<tr><td>24</td><td>Heating mode has been on standby for a long time (does not start operation smoothly.)</td><td>The time of “Delay” set in “Economy settings for pump” is too short. (Go to “Service menu” → “Auxiliary settings” → “Economy settings for pump”).</td><td>Increase the time of “Delay” in “Economy settings for pump” .</td></tr>
<tr><td>25</td><td>The heat pump unit that was running in the heating mode before power failure is running in the DHW mode after power recovery.</td><td>The heat pump unit is designed to run in an operation mode with a higher priority (i.e. DHW mode in this case) at power recovery.</td><td>• Normal operation.
• 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).</td></tr>
<tr><td rowspan="4">26</td><td rowspan="4">The energy monitor value seems not correct.

Note:
There could be some discrepancies between the actual and the calculated values.
If you seek for accuracy, please make sure to connect power meter(s) and heat meter to FTC board. Both should be locally supplied.</td><td>1. Incorrect setting of the energy monitor</td><td>1. Check the setting by following the procedure below.
(1) Check if the DIP switch on FTC board is set as the table below.
Consumed electric energy
<table><tr><td>SW3-4</td><td>Electric energy meter (Local supply)</td></tr><tr><td>OFF</td><td>Without</td></tr><tr><td>ON</td><td>With</td></tr></table>
Delivered heat energy
<table><tr><td>SW3-8</td><td>Heat meter (Local supply)</td></tr><tr><td>OFF</td><td>Without</td></tr><tr><td>ON</td><td>With</td></tr></table>
(2) In the case external electric energy meter and/or heat meter is not used, check if the setting for electric heater and water pump(s) input is correct by referring to <Energy monitor setting> in "6.7 System setup".
(3) In the case external electric energy meter and/or heat meter is used, check if the unit of output pulse on external meter matches with the one set at the main remote controller by referring to <Energy monitor setting> in "6.7 System setup".</td></tr>
<tr><td>2. Non-connectable type of external meter (local supply) is connected.</td><td>2. Check if the external meter (local supply) is connectable type by referring to <Energy monitor setting>" in "6.7 System setup".</td></tr>
<tr><td>3. External meter (local supply) failure</td><td>3. Check if signal is sent to IN8 to IN10 properly. (Refer to section 7.2 Wiring diagrams)
Replace the external heat meter if defective.</td></tr>
<tr><td>4. FTC board failure</td><td>4. Check the FTC control board.
• Check for faulty wiring.
• If no problem found with the wiring, the FTC control board is faulty. Replace the board.</td></tr>
<tr><td>27</td><td>Heat pump is forced to turn ON and OFF.</td><td>Smart grid ready input (IN11 and IN12) is used, and switch-on and off commands are input.</td><td>Normal operation no action necessary.</td></tr>
</table>

■ Error Codes (FTC)

Code	Error	Action
L3	Circulation water temperature overheat protection	Flow rate may be reduced. Check for; • Water leakage • Strainer blockage • Water circulation pump function (Error code may display during filling of primary circuit, complete filling and reset error code.)
L4	DHW tank water temperature overheat protection	Check the immersion heater and it's contactor.
L5	FTC temperature thermistor (THW1, THW2, THW5A, THW5B, THW6, THW7, THW8, THW9) failure	Check resistance across the thermistor.
L6	Circulation water freeze protection	See Action for L3.
L8	Heating operation error	Check and re-attach any thermistors that have become dislodged.
L9	Low primary circuit flow rate detected by flow sensor or flow switch (flow switches 1, 2, 3)	See Action for L3. If the flow sensor or flow switch itself does not work, replace it. **Caution: The pump valves may be hot, please take care.**
LC	Boiler circulation water temperature overheat protection	Check if the setting temperature of the Boiler for heating exceeds the restriction. (See the manual of the thermistors "PAC-TH012HT-E")
		Flow rate of the heating circuit from the boiler may be reduced. Check for • water leakage, • strainer blockage • water circulation pump function.
LD	Boiler temperature thermistor (THWB1) failure	Check resistance across the thermistor.
LE	Boiler operation error	See Action for L8. Check the status of the boiler.
LF	Flow sensor failure	Check flow sensor cable for damage or loose connections.
LH	Boiler circulation water freeze protection	Flow rate of the heating circuit from the boiler may be reduced. Check for • water leakage • strainer blockage • water circulation pump function.
LJ	DHW operation error (type of external plate HEX)	• Check for disconnection of DHW tank water temp. thermistor (THW5B). • Flow rate of the sanitary circuit may be reduced. • Check for water circulation pump function.
LL	Setting errors of DIP switches on FTC control board	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). 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).
LP	Out of water flow rate range	Check the installation Table 6.6.2 Check remote controller settings (Service menu / heat pump flow rate range) See Action for L3.
J0	Communication failure between FTC and wireless receiver	Check connection cable for damage or loose connections.
P1	Thermistor (Room temp.) (TH1) failure	Check resistance across the thermistor.
P2	Thermistor (Ref. liquid temp.) (TH2) failure	Check resistance across the thermistor.
P6	Anti-freeze protection of plate heat exchanger	See Action for L3. Check for correct amount of refrigerant.
J1 - J8	Communication failure between wireless receiver and wireless remote controller	Check wireless remote controller's battery is not flat. Check the pairing between wireless receiver to wireless remote controller. Test the wireless communication. (See the manual of wireless system)
E0 - E5	Communication failure between main remote controller and FTC	Check connection cable for damage or loose connections.
E6 - EF	Communication failure between FTC and C.B.	Check connection cable for damage or loose connections. Refer to service handbook.
E9	C.B. receives no signal from FTC.	Check connection cable for damage or loose connections. Refer to service handbook.
U*, F*	Refrigerant or brine circuit failure	Refer to Error Codes (C.B.) or service handbook.

Note: To cancel error codes please switch system off (Press button F4(RESET) on main remote controller, for 3 seconds).

■ **Error Codes (C.B.)**

Code	Error	Cause	Action
None	—	① No voltage is supplied to terminal block (TB1) of heat pump unit. a) Power supply breaker is turned off. b) Contact failure or disconnection of power supply terminal c) Open phase (L or N phase)	① Check following items. a) Power supply breaker b) Connection of power supply terminal block (TB1) c) Connection of power supply terminal block (TB1)
		② Electric power is not charged to power supply terminal of power circuit board. a) Contact failure of power supply terminal b) Open phase on the power circuit board	② Check following items. a) Connection of power supply terminal block (TB1) b) Connection of terminal on power circuit board Check connection of the connector LI or NI.
		③ Electric power is not supplied to C.B. a) Disconnection of connector (CNDC)	③ Check connection of the connector (CNDC) on the C.B. Check connection of the connector, CNDC on the noise filter.
		④ Disconnection of reactor (ACL)	④ Check connection of reactor. (ACL)
		⑤ Disconnection of noise filter circuit board or parts failure in noise filter circuit board	⑤ a) Check connection of noise filter circuit board. b) Replace noise filter circuit board.
		⑥ Defective power circuit board	⑥ Replace power circuit board.
		⑦ Defective C.B.	⑦ Replace C.B. (When items above are checked but the units cannot be repaired).
		⑧ Brine pump manual operation	⑧ Check DIP SW6-3 and turn it OFF.
		⑨ Disconnection of wire between UNIT SIDE and MODULE SIDE.	⑨ Refer to 'How to remove the module'. Check connection of the wire between UNIT SIDE and MODULE SIDE.
F5 (5201)	**63H connector open** Abnormal if 63H connector circuit is open for 3 minutes continuously after power supply. 63H: High pressure switch	① Disconnection or contact failure of 63H connector on C.B.	① Check connection of 63H connector on C.B.
		② Disconnection or contact failure of 63H	② Check the 63H side of connecting wire.
		③ 63H is working due to defective parts.	③ Check continuity by tester. Replace the parts if the parts are defective.
		④ Defective C.B.	④ Replace C.B.
U1 (1302)	**High pressure (High pressure switch 63H operated)** Abnormal if high pressure switch 63H operated (4.15 MPa) during compressor operation. 63H: High pressure switch	① Clogged or broken pipe	① Check piping and repair defect.
		② Locked brine pump	②-⑤ Check heat pump unit and repair defect.
		③ Malfunction of brine pump	
		④ Short cycle of refrigerant or brine circuit	
		⑤ Dirt of brine circuit heat exchanger	
		⑥ Decreased brine flow rate	⑥ Check the brine flow rate.
		⑦ Disconnection or contact failure of connector (63H) on C.B.	⑦-⑨ Turn the power off and check F5 is displayed when the power is turned again.
		⑧ Disconnection or contact failure of 63H connection	
		⑨ Defective C.B.	
		⑩ Defective action of linear expansion valve	⑩ Check linear expansion valve.
		⑪ Malfunction of brine pump driving circuit	⑪ Replace C.B.

Code	Error	Cause	Action
U2 (1102)	**High discharge temperature** (1) Abnormal if TH4 exceeds 125°C or 110°C continuously for 5 minutes. (2) Abnormal if discharge superheat (Heating: TH4−T63HS) exceeds 70°C continuously for 10 minutes. TH4: Thermistor <Discharge> **High comp. surface temperature** Abnormal if TH33 exceeds 125°C. In the case of high comp. surface temperature error, compressor does not restart unless the thermistor (TH33) becomes less than 95°C. TH33: Thermistor <Comp. surface>	① Overheated compressor operation caused by shortage of refrigerant ② Defective thermistor ③ Defective C.B. ④ Defective action of linear expansion valve ⑤ Clogging with foreign objects in refrigerant circuit Note: Clogging occur in the parts which become below freezing point when water enters in refrigerant circuit. ⑥ In the case of the unit does not restart: Detection temp. of thermistor (TH33) ≥ 95°C	① Check intake superheat. Check leakage of refrigerant. Charge additional refrigerant. ②③ Turn the power off and check if U3 is displayed when the power is turned on again. When U3 is displayed, refer to 'Judgment and action' for U3. ④ Check linear expansion valve. ⑤ After recovering refrigerant, remove water from entire refrigerant circuit under vacuum more than 1 hour.
U3 (5104)	**Open/short circuit of heat pump unit temperature thermistor (TH4, TH33)** Abnormal if open (3°C or less) or short (217°C or more) is detected during compressor operation. (Detection is inoperative for 10 minutes of compressor starting process and for 10 minutes after and during defrosting.) TH4: Thermistor <Discharge> TH33: Thermistor <Comp. surface>	① Disconnection or contact failure of connectors (TH4, TH33) on the C.B. ② Defective thermistor ③ Defective C.B.	① Check connection of connector (TH4, TH33) on the C.B. Check breaking of the lead wire for TH4, TH33. ② Check resistance value of TH4, TH33 or temperature by microprocessor. ③ Replace C.B.
U4 (TH3: 5105) (TH7: 5106) (TH8: 5110) (TH32: 5132) (TH34: 5134)	**Open/short of heat pump unit thermistors (TH3, TH32, TH34, TH7 and TH8)** Abnormal if open or short is detected during compressor operation. Open detection of TH3, TH32 and TH34 is inoperative for 10 seconds to 10 minutes after compressor starting. Note: Check which unit has abnormality in its thermistor by switching the mode of SW2. (PAC-SK52ST)	① Disconnection or contact failure of connectors C.B.: TH3, TH32, TH34, TH7 Power board: CN6 ② Defective thermistor ③ Defective C.B.	① Check connection of connector (TH3, TH32, TH34 TH7) on the C.B. Check connection of connector (CN6) on the power board. Check breaking of the lead wire for TH3, TH32, TH34, TH7, TH8. ② Check resistance value of TH3, TH32, TH34,TH7,TH8 or check temperature by microprocessor. ③ Replace C.B. Note: Emergency operation is available in case of abnormalities of TH3 and TH7.
U5 (4230)	**Temperature of heat sink** Abnormal if TH8 detects temperature indicated 95°C. TH8: Thermistor <Heat sink>	① Rise of ambient temperature ② Defective thermistor ③ Defective input circuit of power circuit board ④ Failure of brine pump drive circuit	① Check if there is something which causes temperature rise around unit. (Upper limit of ambient temperature is 35°C.) Turn off power, and on again to check if U5 is displayed within 30 minutes. If U4 is displayed instead of U5, follow the action to be taken for U4. ② Check resistance value of TH8 or temperature by microprocessor. ③ Replace power circuit board. ④ Replace C.B.
U6 (4250)	**Power module** Check abnormality by driving power module in case overcurrent is detected. (UF or UP error condition)	① Decrease of power supply voltage ② Looseness, disconnection or converse of compressor wiring connection ③ Defective compressor ④ Defective C.B.	① Check facility of power supply. ② Correct the wiring (U•V•W phase) to compressor. ③ Check compressor ④ Replace C.B.

Code	Error	Cause	Action
U7 (1502)	**Too low superheat due to low discharge temperature** Abnormal if discharge superheat is continuously detected less than or equal to −15°C for 3 minutes even though linear expansion valve has minimum open pulse after compressor starts operating for 10 minutes.	① Disconnection or loose connection of discharge temperature thermistor (TH4) ② Defective holder of discharge temperature thermistor ③ Disconnection or loose connection of linear expansion valve's coil ④ Disconnection or loose connection of linear expansion valve's connector ⑤ Defective linear expansion valve	①② Check the installation conditions of discharge temperature thermistor (TH4). ③ Check the coil of linear expansion valve. ④ Check the connection or contact of LEV-A on C.B. ⑤ Check linear expansion valve.
U8 (4400)	**Brine pump** Abnormal if rotational frequency of the brine pump is not detected during DC brine pump operation. Brine pump rotational frequency is abnormal if 500 rpm or below or 5000 rpm or more detected continuously for 1 minute.	① Failure in the operation of the DC brine pump ② Failure in the C.B.	① Check or replace the DC brine pump. ② Check the voltage of the C.B. during operation. ③ Replace the C.B. (When the failure is still indicated even after performing the action ① above.)
U9 (4220)	**Abnormal voltage error** See service handbook.	See service handbook.	See service handbook.
UE (1302)	**Abnormal pressure of 63HS** Abnormal if 63HS detects 0.1 MPa or less. Detection is inoperative for 3 minutes after compressor starting and 3 minutes after and during defrosting. 63HS: High pressure sensor	① Disconnection or contact failure of connector (63HS) on the C.B. ② Defective pressure sensor ③ Defective C.B.	① Check connection of connector (63HS) on the C.B. Check breaking of the lead wire for 63HS. ② Check pressure by microprocessor. (Pressure sensor/ 63HS) ③ Replace C.B.
UL (1300)	**Low pressure** Abnormal if TH33-TH4 exceeds 20°C and TH33 exceeds 80°C during compressor operation.	① Defective linear expansion valve. ② Defective C.B.	① Check linear expansion valve. ② Replace C.B.
UF (4100)	**Compressor overcurrent interruption (When compressor locked)** Abnormal if overcurrent of DC bus or compressor is detected within 30 seconds after compressor starts operating.	① Decrease of power supply voltage ② Looseness, disconnection or converse of compressor wiring connection ③ Defective compressor ④ Defective power board	① Check facility of power supply. ② Correct the wiring (U•V•W phase) to compressor. ③ Check compressor. ④ Replace power circuit board.
UH (5300)	**Current sensor error or input current error** • Abnormal if current sensor detects –1.0A to 1.0A during compressor operation. (This error is ignored in case of test run mode.) • Abnormal if 40A of input current is detected or 37A or more of input current is detected for 10 seconds continuously.	① Disconnection of compressor wiring ② Defective circuit of current sensor on power circuit board ③ Decrease of power supply voltage ④ Leakage or shortage of refrigerant	① Correct the wiring (U•V•W phase) to compressor. ② Replace power circuit board. ③ Check the facility of power supply. ④ Check leakage of refrigerant.
UA (2511)	**Low brine flow rate (flow switch operated)** Abnormal if flow switch is operated (under 5.5L/min) during compressor operation.	① Valve or PICV of ambient loop circuit is closed during operation. ② Disconnection or loose connection of connector (63L) on C.B. ③ Disconnection or loose connection of 63L ④ Defective C.B. ⑤ Misconnection of Water/Brine pipe.	① Check valve or PICV. Active SW6-4 on FTC, if TBI.4 7-8 is connected. ②-④ Turn the power off and on again to check if F3 is displayed on restarting. If F3 is displayed, follow the F3 processingdirection. ⑤ Check Water/Brine pipe connection.
UP (4210)	**Compressor overcurrent interruption** Abnormal if overcurrent DC bus or compressor is detected after compressor starts operating for 30 seconds.	See service handbook.	See service handbook.

■ Annual Maintenance

It is essential that the heat pump is serviced at least once a year by a qualified individual. Any required parts should be purchased from Mitsubishi Electric. NEVER bypass safety devices or operate the unit without them being fully operational. For more details, refer to service handbook.

Note:
Within the first couple of months of installation, remove and clean the heat pump unit's strainer plus any additional filter items that are fitted external to the heat pump unit. This is especially important when installing on an old/existing pipe work 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 only by a competent person with relevant training and qualifications.

Parts which require regular replacement

Parts	Replace every	Possible failures
Pressure relief valve (PRV) Manometer	6 years	Water leakage

Parts which require regular inspection

Parts	Check every	Possible failures
Pressure relief valve (3 bar)	1 year (turning the knob manually)	PRV would be fixed and expansion vessel would burst
Immersion heater	2 years	Earth leakage causing circuit breaker to activate (Heater is always OFF)
Water circulation pump (Primary circuit)	20,000 hrs (3 years)	Water circulation pump failure

Parts which must NOT be reused when servicing

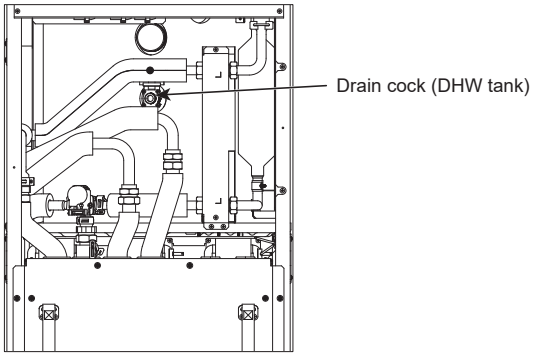
* O-ring
* Gasket

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).**

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

1. Firstly to eliminate any air in heat pump unit pipe works, engage the DHW pump circulator for 1-2 mins and expel any trapped air via nearest hot water tap so as unit becomes fully primed/water charged.
2. Before attempting to drain the heat pump unit isolate from the electrical supply to prevent the immersion and booster heaters burning out.
3. Isolate cold water feed to DHW tank.
4. Open a hot water tap to start draining without a vacuum.
5. Attach a hose to the DHW tank drain cocks. The hose should be able to withstand heat as the draining water could be very hot. The hose should drain to a place lower than the DHW tank bottom to encourage siphoning.
6. When the DHW tank is drained close drain cock and the hot water tap.
7. Attach hose to water circuit drain cocks (No. 7 on Figure 7.5.1). The hose should be able to withstand heat as the draining 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.
8. Water remains in the strainer still after the heat pump unit was drained.
   Drain the strainer by removing the strainer cover.



<Figure 7.8.1>

■ Engineers Forms

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

Commissioning/Field settings record sheet

Main remote controller screen				Parameters	Default setting	Field setting	Notes
Main			Zone1 heating room temp.	10°C to 30°C	20°C		
			Zone2 heating room temp. *8	10°C to 30°C	20°C		
			Zone1 heating flow temp.	20°C to 60°C	45°C		
			Zone2 heating flow temp. *1	20°C to 60°C	35°C		
			Zone1 heating compensation curve	−9°C to +9°C	0°C		
			Zone2 heating compensation curve *1	−9°C to +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		
			Energy monitor	Consumed electrical energy/Delivered energy	—		
Setting	DHW		Operation mode	Normal/Eco	Eco		
			DHW max. temp.	40°C to 60°C	50°C		
			DHW ma. temp. drop	5°C to 30°C	10°C		
			DHW max. operation time	30 to 120 min	60 min		
			DHW mode restriction	30 to 120 min	30 min		
			DHW recharge	Standard/Large	Standard		
	Legionella prevention		Active	Yes/No	Yes		
			Hot water temp.	60°C to 70°C	65°C		
			Frequency	1 to 30 days	15 days		
			Start time	00:00 to 23:00	03:00		
			Max. operation time	1 to 5 hours	3 hours		
			Duration of maximum temp.	1 to 120 min	30 min		
	Heating		Zone1 operation mode	Heating room temp./ Heating flow temp./ Heating compensation curve	Room temp.		
			Zone2 operation mode *1	Heating room temp./ Heating flow temp./ Heating compensation curve	Compensation curve		
	Compensation curve	Hi flow temp. set point	Zone1 outdoor ambient temp.	−30°C to +33°C	−15°C		
			Zone1 flow temp.	20°C to 60°C	50°C		
			Zone2 outdoor ambient temp. *1	−30°C to +33°C	−15°C		
			Zone2 flow temp. *1	20°C to 60°C	40°C		
		Lo flow temp. set point	Zone1 outdoor ambient temp.	−28°C to +35°C	35°C		
			Zone1 flow temp.	20°C to 60°C	25°C		
			Zone2 outdoor ambient temp. *1	−28°C to +35°C	35°C		
			Zone2 flow temp.*1	20°C to 60°C	25°C		
		Adjust	Zone1 outdoor ambient temp.	−29°C to +34°C	—		
			Zone1 flow temp.	20°C to 60°C	—		
			Zone2 outdoor ambient temp. *1	−29°C to +34°C	—		
			Zone2 flow temp. *1	20°C to 60°C	—		
	Holiday		DHW	Active/Non active	Non active		
			Heating	Active/Non active	Active		
			Zone1 heating room temp.	10°C to 30°C	15°C		
			Zone2 heating room temp. *8	10°C to 30°C	15°C		
			Zone1 heating flow temp.	20°C to 60°C	35°C		
			Zone2 heating flow temp. *1	20°C to 60°C	25°C		
	Initial settings		Language	EN/FR/DE/SV/ES/IT/DA/NL/FI/NO/PT/BG/PL/CZ/RU/TR/SL	EN		
			°C/°F	°C/°F	°C		
			Summer time	On/Off	Off		
			Temp. display	Room/DHW tank/Room&DHW tank / Off	Off		
			Time display	hh:mm/hh:mm AM/AM hh:mm	hh:mm		
			Room sensor settings for Zone1	TH1/Main RC/Room RC1-8/"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		

■ Engineers Forms

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

Main remote controller screen								Parameters			Default setting	Field setting	Notes
Setting	Service menu	Thermistor adjustment	THW1					−10°C to +10°C			0°C		
			THW2					−10°C to +10°C			0°C		
			THW5A					−10°C to +10°C			0°C		
			THW5B					−10°C to +10°C			0°C		
			THW6					−10°C to +10°C			0°C		
			THW7					−10°C to +10°C			0°C		
			THW8					−10°C to +10°C			0°C		
			THW9					−10°C to +10°C			0°C		
			THW10					−10°C to +10°C			0°C		
			THWB1					−10°C to +10°C			0°C		
		Auxiliary settings	Economy settings for pump.					On/Off *2			On		
								Delay (3 to 60 min)			10 min		
			Electric heater (Heating) *12					Space heating: On (used)/Off (not used)			On		
								Electric heater delay timer (5 to 180 min)			30 min		
			Electric heater (DHW)					Booster heater	DHW: On (used)/Off (not used)		On		
								Immersion heater	DHW: On (used)/Off (not used) *12		On		
								Electric heater delay timer (15 to 30 min)			15 min		
			Mixing valve control					Running (10 to 240 sec)			120 sec		
								Interval (1 to 30 min)			2 min		
			Flow sensor *10					Minimum (0 to 100L/min)			5 L/min		
								Maximum (0 to 100L/min)			100 L/min		
			Analog output					Interval (1 to 30 min)			5 min		
								Priority (Normal/High)			Normal		
		Pump speed	DHW					Pump speed (1 to 5)			5		
			Heating					Pump speed (1 to 5)			5		
		Heat source setting						Standard/Heater/Boiler/Hybrid *3			Standard		
		Heat pump settings	Heat pump flow rate range					Minimum (0 to 100L/min)			5 L/min		
								Maximum (0 to 100L/min)			100 L/min		
			Quiet mode					Day (Mon to Sun)			—		
								Time			0:00 to 23:45		
								Quiet level (Normal/Level1/Level2)			Normal		
		Operation settings	Heating operation *4	Flow temp. range *6				Minimum.temp. (20 to 45°C)			30°C		
								Maximum.temp. (35 to 60°C)			50°C		
				Room temp. control *9				Mode (Normal/Fast)			Normal		
								Interval (10 to 60 min)			10 min		
				Heat pump thermo diff. adjust				On/Off *2			On		
								Lower limit (−9 to −1°C)			-5°C		
								Upper limit (+3 to +5°C)			5°C		
			Freeze stat function *7					Outdoor ambient temp. (3 to 20°C) / **			5°C		
			Simultaneous operation (DHW/Heating)					On/Off *2			Off		
								Outdoor ambient temp. (−30 to +10°C)			−15°C		
			Cold weather function					On/Off *2			Off		
								Outdoor ambient temp. (−30 to −10°C)			−15°C		
			Boiler operation					Hybrid settings	Outdoor ambient temp. (−30 to +10°C)		−15°C		
									Priority mode (Ambient/Cost/CO_2)		Ambient		
								Intelligent settings	Energy price *5	Electricity (0.001 to 999 */kWh)	0.5 */kWh		
										Boiler (0.001 to 999 */kWh)	0.5 */kWh		
									CO_2 emission	Electricity (0.001 to 999 kg -CO2/kWh)	0.5 kg -CO2/kWh		
										Boiler (0.001 to 999 kg -CO2/kWh)	0.5 kg -CO2/kWh		
									Heat source	Heat pump capacity (1 to 40 kW)	11.2 kW		
										Boiler efficiency (25 to 150%)	80%		
										Booster heater 1 capacity (0 to 30 kW)	2 kW		
										Booster heater 2 capacity (0 to 30 kW)	4 kW		

■ Engineers Forms

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

Main remote controller screen						Parameters	Default setting	Field setting	Notes
Setting	Service menu	Operation settings	Smart grid ready	DHW	On/Off		Off		
					Target temp (+1 to +20°C) / -- (Non active)		--		
				Heating	On/Off		Off		
					Target temp.	Switch-on recommendation (20 to 60°C)	50°C		
						Switch-on command (20 to 60°C)	55°C		
				Pump cycles	Heating (On/Off)		On		
					Interval (10 to 120 min)		10 min		
			Floor dry up function		On/Off *2		Off		
					Target temp.	Start&Finish (20 to 60°C)	30°C		
						Max. temp. (20 to 60°C)	45°C		
						Max. temp. period (1 to 20 days)	5 days		
					Flow temp. (Increase)	Temp. increase step (+1 to +10°C)	+5°C		
						Increase interval (1 to 7 days)	2 days		
					Flow temp. (Decrease)	Temp. decrease step (−1 to −10°C)	−5°C		
						Decrease interval (1 to 7 days)	2 days		
			Summer mode		On/Off		Off		
					Outdoor ambient temp.	Heating ON (4 to 19°C)	10°C		
						Heating OFF (5 to 20°C)	15°C		
					Judgement time	Heating ON (1 to 48 hours)	6 hours		
						Heating OFF (1 to 48 hours)	6 hours		
					Forced heating ON (−30 to 10°C)		5 °C		
			Water flow control		On/Off		Off		
		Energy monitor settings		Electric heater capacity	Booster heater 1 capacity	0 to 30kW *12	2kW		
					Booster heater 2 capacity	0 to 30kW *12	4kW		
					Immersion heater capacity	0 to 30kW	0kW		
					Analog output	0 to 30kW	0kW		
				Delivered energy adjustment		−50 to +50%	0%		
				Water pump input	Pump 1	0 to 200W or ***(factory fitted pump)	***		
					Pump 2	0 to 200W	0W		
					Pump 3	0 to 200W	0W		
					Pump 4	0 to 200W	72W		
				Electric energy meter		0.1/1/10/100/1000 pulse/kWh	1000 pulse/kWh		
				Heat meter		0.1/1/10/100/1000 pulse/kWh	1000 pulse/kWh		
		External input settings		Demand control (IN4)		Heat source OFF/Boiler operation	Boiler operation		
				Outdoor thermostat (IN5)		Heater operation/Boiler operation	Boiler operation		
		Thermo ON output				Zone1/Zone2/Zone1&2	Zone1&2		

*1 The settings related to Zone2 can be switched only when 2 zone temperature control is enabled (when DIP SW2-6 and SW 2-7 (FTC) are ON).
*2 On: the function is active; Off: the function is inactive.
*3 When DIP SW1-1 (FTC) is set to OFF “WITHOUT Boiler” or SW2-6 (FTC) is set to OFF “WITHOUT Mixing tank”, neither Boiler nor Hybrid can be selected.
*4 Valid only when operating in Room temp. control mode.
5 “” of “*/kWh” represents currency unit (e.g. € or £ or the like)
*6 Valid only when operating in Heating room temperature.
*7 If asterisk (**) is chosen freeze stat function is deactivated. (i.e. primary water freeze risk)
*8 The settings related to Zone2 can be switched only when 2-zone temperature control or 2-Zone valve ON/OFF control is active.
*9 When DIP SW5-2 (FTC) is set to OFF, the function is active.
*10 Do not change the setting since it is set according to the specification of flow sensor attached to the heat pump unit.
*11 The default setting is 1 pulse/kWh depend on the connected indoor unit.
*12 If booster heater equipped, the function is activated.

7.9. Supplementary information

■ Back-up operation of boiler

Heating operation is backed up by boiler.
For more details, refer to the installation manual of PAC-TH012HT-E.

<Installation & System set up>

1. Set DIP-SW 1-1 (FTC) to ON "With boiler" and SW2-6 (FTC) to ON “With Mixing tank”.
2. Install the thermistors THWB1[*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 temperature thermostats. [*3]

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

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

<Main remote controller settings>

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

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

■ Product fiche of temperature control

(a) Supplier's name: MITSUBISHI ELECTRIC CORPORATION
(b) Supplier's model identifier: PAR-WT50R-E and PAR-WR51R-E
(c) The class of the temperature control: VI
(d) The contribution of the temperature control to seasonal space heating energy efficiency: 4%

MEMO

Contents

1 Optional parts list

■ Packaged model

<Indoor unit (Cylinder unit)>

Parts name	Model name	Specification	Cylinder unit							
			EHPT17X-VM2D	EHPT17X-VM6D	EHPT17X-YM9D	ERPT17X-VM2D	EHPT20X-MED	EHPT20X-VM6D	EHPT20X-YM9D	EHPT20X-YM9ED
Wireless remote controller	PAR-WT50R-E		×	×	×	×	×	×	×	×
Wireless receiver	PAR-WR51R-E		×	×	×	×	×	×	×	×
Thermistors	PAC-SE41TS-E	For room temp.	×	×	×	×	×	×	×	×
	PAC-TH011-E	For zone (flow and return temp.)	×	×	×	×	×	×	×	×
	PAC-TH012HT-E	For boiler and buffer (5 m)	×	×	×	×	×	×	×	×
	PAC-TH012HTL-E	For boiler and buffer (30 m)	×	×	×	×	×	×	×	×
Immersion heater	PAC-IH01V2-E	1Ph 1kW	×	×	×	×	×	×	×	×
	PAC-IH03V2-E	1Ph 3kW	×	×	×	×	×	×	×	×
EHPT accessories for UK	PAC-WK02UK-E		-	-	-	-	-	-	-	-
Wi-Fi interface	MAC-587IF-E		×	×	×	×	×	×	×	×
2 zone kit	PAC-TZ02-E		×	×	×	×	×	×	×	×
Expansion vessel kit	PAC-EVP12-E1	12L	-	-	-	-	×	-	-	×

<Indoor unit (Cylinder unit)>

Parts name	Model name	Specification	Cylinder unit							
			EHPT20X-TM9D	ERPT20X-MD	ERPT20X-VM2D	ERPT20X-VM6D	EHPT30X-MED	EHPT30X-YM9ED	ERPT30X-VM2ED	EHPT20X-MHEDW
Wireless remote controller	PAR-WT50R-E		×	×	×	×	×	×	×	×
Wireless receiver	PAR-WR51R-E		×	×	×	×	×	×	×	×
Thermistors	PAC-SE41TS-E	For room temp.	×	×	×	×	×	×	×	×
	PAC-TH011-E	For zone (flow and return temp.)	×	×	×	×	×	×	×	×
	PAC-TH012HT-E	For boiler and buffer (5 m)	×	×	×	×	×	×	×	×
	PAC-TH012HTL-E	For boiler and buffer (30 m)	×	×	×	×	×	×	×	×
Immersion heater	PAC-IH01V2-E	1Ph 1kW	×	×	×	×	×	×	×	-
	PAC-IH03V2-E	1Ph 3kW	×	×	×	×	×	×	×	-
EHPT accessories for UK	PAC-WK02UK-E		-	-	-	-	-	-	-	×
Wi-Fi interface	MAC-587IF-E		×	×	×	×	×	×	×	×
2 zone kit	PAC-TZ02-E		×	×	×	×	×	×	×	×
Expansion vessel kit	PAC-EVP12-E1	12L	-	-	-	-	×	×	×	×

<Indoor unit (Hydrobox)>

Parts name	Model name	Specification	Hydrobox				
			EHPX-MED	EHPX-VM2D	EHPX-VM6D	EHPX-YM9D	EHPX-YM9ED
Wireless remote controller	PAR-WT50R-E		×	×	×	×	×
Wireless receiver	PAR-WR51R-E		×	×	×	×	×
Thermistors	PAC-SE41TS-E	For room temp.	×	×	×	×	×
	PAC-TH011-E	For zone (flow and return temp.)	×	×	×	×	×
	PAC-TH011TK2-E	For tank temp. (5 m)	×	×	×	×	×
	PAC-TH011TKL2-E	For tank temp. (30 m)	×	×	×	×	×
	PAC-TH012HT-E	For boiler and buffer (5 m)	×	×	×	×	×
	PAC-TH012HTL-E	For boiler and buffer (30 m)	×	×	×	×	×
Wi-Fi interface	MAC-587IF-E		×	×	×	×	×
2 zone kit	PAC-TZ02-E		×	×	×	×	×
Expansion vessel kit	PAC-EVP12-E1	12L	-	-	-	-	×

<Outdoor unit>

Parts name	Model name	Power Inverter				
		PUZ-WM50VHA(-BS)	PUZ-WM60VAA(-BS)	PUZ-WM85V/ YAA(-BS)	PUZ-WM112V/ YAA(-BS)	PUZ-HWM140V/ YHA(-BS)
Connector for Drain Hose Heater Signal Output	PAC-SE60RA-E	×	×	×	×	×
	PAC-SE61RA-E	-	-	-	-	-
Air discharge Guide	MAC-886SG-E	-	-	-	-	-
	PAC-SJ07SG-E	-	-	-	-	-
	PAC-SG59SG-E	×	-	-	-	×
	PAC-SH96SG-E	-	×*2	×*2	×*2	-
Air Protection Guide	PAC-SJ06AG-E	-	-	-	-	-
	PAC-SH63AG-E	×	-	-	-	×
	PAC-SH95AG-E	-	×*2	×*2	×*2	-
Attachment	PAC-SJ82AT-E	-	×	×	×	-
Drain Socket	PAC-SG61DS-E	×	×	×	×	-
	PAC-SJ08DS-E	-	-	-	-	-
Centralized Drain Pan*1	PAC-SG63DP-E	-	-	-	-	-
	PAC-SG64DP-E	×	-	-	-	-
	PAC-SH97DP-E	-	-	-	-	-
	PAC-SJ83DP-E	-	×	×	×	-
Control/Service Tool	PAC-SK52ST	×	×	×	×	×
Defrost Heater	MAC-642BH-U1	-	-	-	-	-

*1 Cannot be used for cold climate.
*2 Attachment (PAC-SJ82AT-E) is necessary for the Air Guide.

<Interface/Flow temperature control>

Parts name	Model name	Specification	Power Inverter				
			PUZ-WM50VHA(-BS)	PUZ-WM60VAA(-BS)	PUZ-WM85V/ YAA(-BS)	PUZ-WM112V/ YAA(-BS)	PUZ-HWM140V/ YHA(-BS)
Flow Temperature Controller	PAC-IF033B-E	1 PC Board w/ Case	×*3	×*3	×*3	×*3	×*3
System controllers	PAC-IF072B-E	1 PC Board w/ Case	×*3	×*3	×*3	×*3	×*3
	PAC-SIF051B-E	1 PC Board w/ Case	-	-	-	-	-
Flow sensor	PAC-FS01-E	1 PC Flow sensor	×	×	×	×	×
Thermistor	PAC-TH011-E		×	×	×	×	×

*3 Flow sensor (PAC-FS01-E) is required.

CONTENTS

Parts name	Model name	Contents	Q'ty
Air discharge guide	MAC-886SG-E	Air discharge guide	1
		Screw	4
	PAC-SJ07SG-E	Air discharge guide	1
		Support (For right and left)	2
		Attachment screw(5×10)	4
		Attachment screw(4×10)	4
	PAC-SG59SG-E	Air discharge guide	1
		Attachment screw(5×35)	4
		Spacer	4
	PAC-SH96SG-E	Air discharge guide	1
		Support	1
		Screw(5×15)	12
		Washer	12
		Spring washer	12
Air protection guide	PAC-SJ06AG-E	Air protect guide	1
		Mounting screw (4×16)	4
		Washer (for screw 4×16)	4
		Spring washer	4
	PAC-SH63AG-E	Air guide	1
		Mounting screw (5×15)	4
		Washer	4
		Spring washer	4
	PAC-SH95AG-E	Air guide	1
		Mounting screw (5×15)	6
		Washer	6
		Spring washer	6
Drain socket	PAC-SG61DS-E	Drain socket	1
		Drain cap (φ33)	5
		Heat insulator	3
		Band	8
	PAC-SJ08DS-E	Drain socket	1
Centralized drain pan	PAC-SG63DP-E	Centralized drain pan	1
	PAC-SG64DP-E	Centralized drain pan	1
	PAC-SH97DP-E	Centralized drain pan	1
	PAC-SJ83DP-E	Centralized drain pan	1
Control/Service tool	PAC-SK52ST	Control/Service Tool	1
Defrost Heater	MAC-642BH-U1	Defrost heater (with 2-pin lead assembly)	1
		Heater support	1
		Cable tie	1
		Cable clamp	1
		Self drilling screw	2
		Wiring diagram	1
		Insulation	1
		3-pin lead assembly	1
Capacity step control interface	PAC-IF011B-E	PC Board	1
		Case	1
		Thermistor	2
Flow temperature controller	PAC-IF033B-E	PC Board	1
		Case	1
		Thermistor	3
		Remote controller	1
		Remote controller cable (5m)	1
System controllers	PAC-IF072B-E	PC Board	1
		Case	1
		Flow/Return water temp. thermistor	1
		Remote controller	1
		Remote controller cable (10m)	1
		SD memory card	1
	PAC-SIF051B-E	PC Board	1
		Case	1
		Thermistor	1
		Flow/Return water temp thermistor	1
		Remote controller cable (10m)	1
		SD memory card	1
Thermistors	PAC-TH011-E	For zone (flow and return temp.)	20[1)]
	PAC-TH011TK2-E	For tank temp. (5m)	10[2)]
	PAC-TH011TKL2-E	For tank temp. (30m)	5[3)]
	PAC-TH012HT-E	For boiler and buffer (5m)	10[2)]
	PAC-TH012HTL-E	For boiler and buffer (30m)	5[3)]
2 zone kit	PAC-TZ02-E	2 zone kit	1
		Flexible hose	2
		Conversion joint	2
		Gasket	4
Attachment	PAC-SJ82AT-E	Attachment	2
		Mounting screw 5×15	8
		Washer	8
		Spring washer	8

1 Optional parts list

Parts name	Model name	Contents	Q'ty
Wi-Fi interface	MAC-587IF-E	Interface unit (with connecting cable)	1
		Fixing screw 3.5×16 mm	2
		Fixing screw 4×16 mm	1
		Mounting cord clamp	1
		Fastener (for bundling the wires)	1
		Holder	1
		Clip	1
Pressure sensor	PAC-PS01-E	Pressure sensor	20
Flow sensor	PAC-FS01-E	Flow sensor body	1
		Flow sensor cable	1
		O-ring	2
Expansion vessel kit	PAC-EVP12-E1	Expansion vessel 12L	1
		5 bar pressure relief valve	1

Notes:
1) Two thermistors per package; 10 packages per carton
2) One thermistors per package; 10 packages per carton
3) One thermistors per package; 5 packages per carton

1 Optional parts list

■ Split model

<Indoor unit (Cylinder unit)>

Parts name	Model name	Specification	Cylinder unit							
			EHST17D-VM2D	ERST17D-VM2D	ERST17D-VM2BD	ERST17D-VM6BD	ERST17D-YM9BD	EHST20D-MED	EHST20D-VM2D	EHST20D-VM6D
Wireless remote controller	PAR-WT50R-E		×	×	×	×	×	×	×	×
Wireless receiver	PAR-WR51R-E		×	×	×	×	×	×	×	×
Thermistors	PAC-SE41TS-E	For room temp.	×	×	×	×	×	×	×	×
	PAC-TH011-E	For zone (flow and return temp.)	×	×	×	×	×	×	×	×
	PAC-TH011TK2-E	For tank temp. (5 m)	—	—	—	—	—	—	—	—
	PAC-TH011TKL2-E	For tank temp. (30 m)	—	—	—	—	—	—	—	—
	PAC-TH012HT-E	For boiler and buffer (5 m)	×	×	×	×	×	×	×	×
	PAC-TH012HTL-E	For boiler and buffer (30 m)	×	×	×	×	×	×	×	×
Immersion heater	PAC-IH01V2-E	1Ph 1kW	×	×	×	×	×	×	×	×
	PAC-IH03V2-E	1Ph 3kW	×	×	×	×	×	×	×	×
Joint pipe	PAC-SG72RJ-E	For PUHZ-SW75 ϕ6.35→ϕ9.52	×	×	×	×	×	×	×	×
	PAC-SG73RJ-E	For PUHZ-SW200YKA/ SHW230YKA2(-BS) ϕ9.52→ϕ12.7	—	—	—	—	—	—	—	—
	PAC-SG74RJ-E	For PUHZ-SW75 ϕ12.7→ϕ15.88	×	×	×	×	×	×	×	×
Wi-Fi interface	MAC-587IF-E		×	×	×	×	×	×	×	×
2 zone kit	PAC-TZ02-E		×	×	×	×	×	×	×	×
Expansion vessel kit	PAC-EVP12-E1	12L	—	—	—	—	—	×	—	—

<Indoor unit (Cylinder unit)>

Parts name	Model name	Specification	Cylinder unit		
			EHST20D-YM9D	EHST20D-YM9ED	EHST20D-TM9D
Wireless remote controller	PAR-WT50R-E		×	×	×
Wireless receiver	PAR-WR51R-E		×	×	×
Thermistors	PAC-SE41TS-E	For room temp.	×	×	×
	PAC-TH011-E	For zone (flow and return temp.)	×	×	×
	PAC-TH011TK2-E	For tank temp. (5 m)	—	—	—
	PAC-TH011TKL2-E	For tank temp. (30 m)	—	—	—
	PAC-TH012HT-E	For boiler and buffer (5 m)	×	×	×
	PAC-TH012HTL-E	For boiler and buffer (30 m)	×	×	×
Immersion heater	PAC-IH01V2-E	1Ph 1kW	×	×	×
	PAC-IH03V2-E	1Ph 3kW	×	×	×
Joint pipe	PAC-SG72RJ-E	For PUHZ-SW75 ϕ6.35→ϕ9.52	×	×	×
	PAC-SG73RJ-E	For PUHZ-SW200YKA/ SHW230YKA2(-BS) ϕ9.52→ϕ12.7	—	—	—
	PAC-SG74RJ-E	For PUHZ-SW75 ϕ12.7→ϕ15.88	×	×	×
Wi-Fi interface	MAC-587IF-E		×	×	×
2 zone kit	PAC-TZ02-E		×	×	×
Expansion vessel kit	PAC-EVP12-E1	12L	—	×	—

1 Optional parts list

Parts name	Model name	Specification	Cylinder unit					
			ERST20D-VM2D	EHST30D-MED	EHST30D-VM6ED	EHST30D-YM9ED	EHST30D-TM9ED	ERST30D-VM2ED
Wireless remote controller	PAR-WT50R-E		×	×	×	×	×	×
Wireless receiver	PAR-WR51R-E		×	×	×	×	×	×
Thermistors	PAC-SE41TS-E	For room temp.	×	×	×	×	×	×
	PAC-TH011-E	For zone (flow and return temp.)	×	×	×	×	×	×
	PAC-TH011TK2-E	For tank temp. (5 m)	—	—	—	—	—	—
	PAC-TH011TKL2-E	For tank temp. (30 m)	—	—	—	—	—	—
	PAC-TH012HT-E	For boiler and buffer (5 m)	×	×	×	×	×	×
	PAC-TH012HTL-E	For boiler and buffer (30 m)	×	×	×	×	×	×
Immersion heater	PAC-IH01V2-E	1Ph 1kW	×	×	×	×	×	×
	PAC-IH03V2-E	1Ph 3kW	×	×	×	×	×	×
Joint pipe	PAC-SG72RJ-E	For PUHZ-SW75 ϕ6.35→ϕ9.52	×	×	×	×	×	×
	PAC-SG73RJ-E	For PUHZ-SW200YKA/SHW230YKA2(-BS) ϕ9.52→ϕ12.7	—	—	—	—	—	—
	PAC-SG74RJ-E	For PUHZ-SW75 ϕ12.7→ϕ15.88	×	×	×	×	×	×
Wi-Fi interface	MAC-587IF-E		×	×	×	×	×	×
2 zone kit	PAC-TZ02-E		×	×	×	×	×	×
Expansion vessel kit	PAC-EVP12-E1	12L	—	×	×	×	×	×

<Indoor unit (Hydrobox)>

Parts name	Model name	Specification	Hydrobox							
			EHSD-MED	EHSD-VM2D	EHSD-VM6D	EHSD-YM9D	EHSD-YM9ED	EHSD-TM9D	ERSD-MED	ERSD-VM2D
Wireless remote controller	PAR-WT50R-E		×	×	×	×	×	×	×	×
Wireless receiver	PAR-WR51R-E		×	×	×	×	×	×	×	×
Thermistors	PAC-SE41TS-E	For room temp.	×	×	×	×	×	×	×	×
	PAC-TH011-E	For zone (flow and return temp.)	×	×	×	×	×	×	×	×
	PAC-TH011TK2-E	For tank temp. (5 m)	×	×	×	×	×	×	×	×
	PAC-TH011TKL2-E	For tank temp. (30 m)	×	×	×	×	×	×	×	×
	PAC-TH012HT-E	For boiler and buffer (5 m)	×	×	×	×	×	×	×	×
	PAC-TH012HTL-E	For boiler and buffer (30 m)	×	×	×	×	×	×	×	×
Joint pipe	PAC-SG72RJ-E	For PUHZ-SW75 ϕ6.35→ϕ9.52	×	×	×	×	×	×	×	×
	PAC-SG73RJ-E	For PUHZ-SW200YKA/ SHW230YKA2(-BS) ϕ9.52→ϕ12.7	—	—	—	—	—	—	—	—
	PAC-SG74RJ-E	For PUHZ-SW75 ϕ12.7→ϕ15.88	×	×	×	×	×	×	×	×
Wi-Fi interface	MAC-587IF-E		×	×	×	×	×	×	×	×
2 zone kit	PAC-TZ02-E		×	×	×	×	×	×	×	×
Expansion vessel kit	PAC-EVP12-E1	12L	×	—	—	—	×	—	×	—

<Indoor unit (GSHP)>

Parts name	Model name	Specification	GSHP
			EHGT17D-YM9ED
Wireless remote controller	PAR-WT50R-E		×
Wireless receiver	PAR-WR51R-E		×
Thermistors	PAC-SE41TS-E	For room temp.	×
	PAC-TH011-E	For zone (flow and return temp.)	×
	PAC-TH011TK2-E	For tank temp. (5 m)	×
	PAC-TH011TKL2-E	For tank temp. (30 m)	×
	PAC-TH012HT-E	For boiler and buffer (5 m)	×
	PAC-TH012HTL-E	For boiler and buffer (30 m)	×
Immersion heater	PAC-IH01V2-E	1Ph 1W	×
Wi-Fi interface	MAC-587IF-E		×
2 zone kit	PAC-TZ02-E		×
Expansion vessel kit	PAC-EVP12-E1	12L	×

<Indoor unit (WTW)>

Parts name	Model name	Specification	WTW
			EHWT17D-MHEDW
Wireless remote controller	PAR-WT50R-E		×
Wireless receiver	PAR-WR51R-E		×
Thermistors	PAC-SE41TS-E	For room temp.	×
	PAC-TH011-E	For zone (flow and return temp.)	×
	PAC-TH011TK2-E	For tank temp. (5 m)	×
	PAC-TH011TKL2-E	For tank temp. (30 m)	×
	PAC-TH012HT-E	For boiler and buffer (5 m)	×
	PAC-TH012HTL-E	For boiler and buffer (30 m)	×
Wi-Fi interface	MAC-587IF-E		×
2 zone kit	PAC-TZ02-E		×
Expansion vessel kit	PAC-EVP12-E1	12L	×
EHPT accessories for UK	PAC-WK02UK-E		×

<Outdoor unit>

Parts name	Model name	Eco Inverter			Power Inverter			
		SUZ-SWM40VA	SUZ-SWM60VA	SUZ-SWM80VA	PUD-SWM60VAA	PUD-SWM80VAA PUD-SWM80YAA	PUD-SWM100VAA PUD-SWM100YAA	PUD-SWM120VAA PUD-SWM120YAA
Connector for Drain Hose Heater Signal Output	PAC-SE60RA-E	—	—	—	×	×	×	×
	PAC-SE61RA-E	—	—	—	—	—	—	—
Air discharge Guide	MAC-886SG-E	×	×	×	—	—	—	—
	PAC-SJ07SG-E	—	—	—	—	—	—	—
	PAC-SG59SG-E	—	—	—	—	—	—	—
	PAC-SH96SG-E	—	—	—	×*2	×*2	×*2	×*2
Air Protection Guide	PAC-SJ06AG-E	—	—	—	—	—	—	—
	PAC-SH63AG-E	—	—	—	—	—	—	—
	PAC-SH95AG-E	—	—	—	×*2	×*2	×*2	×*2
Attachment	PAC-SJ82AT-E	—	—	—	×	×	×	×
Drain Socket*1	PAC-SG61DS-E	—	—	—	×	×	×	×
	PAC-SJ08DS-E	—	—	—	—	—	—	—
Centralized Drain Pan*1	PAC-SG63DP-E	—	—	—	—	—	—	—
	PAC-SG64DP-E	—	—	—	—	—	—	—
	PAC-SH97DP-E	—	—	—	—	—	—	—
	PAC-SJ83DP-E	—	—	—	×	×	×	×
Control/Service Tool	PAC-SK52ST	—	—	—	×	×	×	×
Defrost Heater	MAC-642BH-U1	×	×	×	—	—	—	—

Parts name	Model name	ZUBADAN				
		PUD-SHWM60VAA	PUD-SHWM80VAA PUD-SHWM80YAA	PUD-SHWM100VAA PUD-SHWM100YAA	PUD-SHWM120VAA PUD-SHWM120YAA	PUD-SHWM140VAA PUD-SHWM140YAA
Connector for Drain Hose Heater Signal Output	PAC-SE60RA-E	×	×	×	×	×
	PAC-SE61RA-E	—	—	—	—	—
Air discharge Guide	MAC-886SG-E	—	—	—	—	—
	PAC-SJ07SG-E	—	—	—	—	—
	PAC-SG59SG-E	—	—	—	—	—
	PAC-SH96SG-E	×*2	×*2	×*2	×*2	×*2
Air Protection Guide	PAC-SJ06AG-E	—	—	—	—	—
	PAC-SH63AG-E	—	—	—	—	—
	PAC-SH95AG-E	×*2	×*2	×*2	×*2	×*2
Attachment	PAC-SJ82AT-E	×	×	×	×	×
Drain Socket*1	PAC-SG61DS-E	×	×	×	×	×
	PAC-SJ08DS-E	—	—	—	—	—
Centralized Drain Pan*1	PAC-SG63DP-E	—	—	—	—	—
	PAC-SG64DP-E	—	—	—	—	—
	PAC-SH97DP-E	—	—	—	—	—
	PAC-SJ83DP-E	×	×	×	×	×
Control/Service Tool	PAC-SK52ST	×	×	×	×	×
Defrost Heater	MAC-642BH-U1	—	—	—	—	—

*1 Cannot be used for cold climate.
*2 Attachment (PAC-SJ82AT-E) is necessary for the Air Guide.

<Interface/Flow temperature control>

Parts name	Model name	Specification	Eco Inverter			Power Inverter			
			SUZ-SWM40VA	SUZ-SWM60VA	SUZ-SWM80VA	PUD-SWM60VAA	PUD-SWM80VAA PUD-SWM80YAA	PUD-SWM100VAA PUD-SWM100YAA	PUD-SWM120VAA PUD-SWM120YAA
Flow Temperature Controller	PAC-IF033B-E	1 PC Board w/ Case	—	—	—	—	—	—	—
System controllers	PAC-IF071B-E	1 PC Board w/ Case	×*3	×*3	×*3	—	—	—	—
	PAC-SIF051B-E	1 PC Board w/ Case	—	—	—	—	—	—	—
Pressure sensor	PAC-PS01-E	20 PC Pressure sensor	×	×	×	—	—	—	—
Flow sensor	PAC-FS01-E	1 PC Flow sensor	×	×	×	—	—	—	—
Thermistor	PAC-TH011-E		×	×	×	—	—	—	—

*3 Pressure sensor (PAC-PS01-E) is required.

Parts name	Model name	Specification	ZUBADAN				
			PUD-SWM60VAA	PUD-SWM80VAA PUD-SWM80YAA	PUD-SWM100VAA PUD-SWM100YAA	PUD-SWM120VAA PUD-SWM120YAA	PUD-SHWM140VAA PUD-SHWM140YAA
Flow Temperature Controller	PAC-IF033B-E	1 PC Board w/ Case	—	—	—	—	—
System controllers	PAC-IF071B-E	1 PC Board w/ Case	—	—	—	—	—
	PAC-SIF051B-E	1 PC Board w/ Case	—	—	—	—	—
Pressure sensor	PAC-PS01-E	20 PC Pressure sensor	—	—	—	—	—
Flow sensor	PAC-FS01-E	1 PC Flow sensor	—	—	—	—	—
Thermistor	PAC-TH011-E		—	—	—	—	—

CONTENTS

Parts name	Model name	Contents	Q'ty
Drain socket	PAC-SG61DS-E	Drain socket	1
		Drain cap (φ33)	5
		Heat insulator	3
		Band	8
	PAC-SJ08DS-E	Drain socket	1
Centralized drain pan	PAC-SG63DP-E	Centralized drain pan	1
	PAC-SG64DP-E	Centralized drain pan	1
	PAC-SH97DP-E	Centralized drain pan	1
	PAC-SJ83DP-E	Centralized drain pan	1
Control/Service tool	PAC-SK52ST	Control/Service Tool	1
Defrost Heater	MAC-642BH-U1	Defrost heater (with 2-pin lead assembly)	1
		Heater support	1
		Cable tie	1
		Cable clamp	1
		Self drilling screw	2
		Wiring diagram	1
		Insulation	1
		3-pin lead assembly	1
Capacity step control interface	PAC-IF011B-E	PC Board	1
		Case	1
		Thermistor	2
Flow temperature controller	PAC-IF033B-E	PC Board	1
		Case	1
		Thermistor	3
		Remote controller	1
		Remote controller cable (5m)	1
System controllers	PAC-IF071B-E	PC Board	1
		Case	1
		Thermistor	1
		Flow/Return water temp. thermistor	1
		Remote controller	1
		Remote controller cable (10m)	1
		SD memory card	1
	PAC-SIF051B-E	PC Board	1
		Case	1
		Thermistor	1
		Flow/Return water temp thermistor	1
		Remote controller cable (10m)	1
		SD memory card	1
Thermistors	PAC-TH011-E	For zone (flow and return temp.)	20[1)]
	PAC-TH011TK2-E	For tank temp. (5m)	10[2)]
	PAC-TH011TKL2-E	For tank temp. (30m)	5[3)]
	PAC-TH012HT-E	For boiler and buffer (5m)	10[2)]
	PAC-TH012HTL-E	For boiler and buffer (30m)	5[3)]
2 zone kit	PAC-TZ02-E	2 zone kit	1
		Flexible hose	2
		Conversion joint	2
		Gasket	4
Attachment	PAC-SJ82AT-E	Attachment	2
		Mounting screw 5×15	8
		Washer	8
		Spring washer	8
Wi-Fi interface	MAC-587IF-E	Interface unit (with connecting cable)	1
		Fixing screw 3.5×16 mm	2
		Fixing screw 4×16 mm	1
		Mounting cord clamp	1
		Fastener (for bundling the wires)	1
		Holder	1
		Clip	1
Pressure sensor	PAC-PS01-E	Pressure sensor	20
Flow sensor	PAC-FS01-E	Flow sensor body	1
		Flow sensor cable	1
		O-ring	2
Expansion vessel kit	PAC-EVP12-E1	Expansion vessel 12L	1
		5 bar pressure relief valve	1

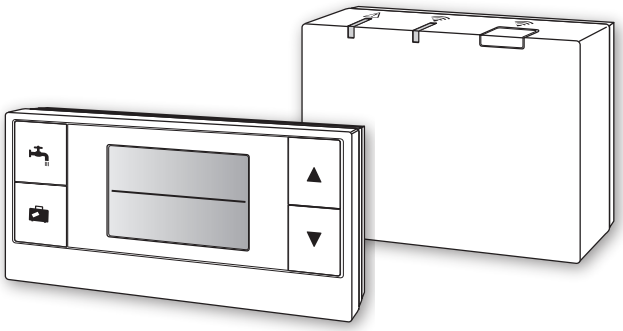
Notes:
1) Two thermistors per package; 10 packages per carton
2) One thermistors per package; 10 packages per carton
3) One thermistors per package; 5 packages per carton

MITSUBISHI ELECTRIC

ecodan

Wireless Remote Controller and Receiver

PAR-WT50R-E
PAR-WR51R-E



This manual explains installation of the PAR-WR51R-E wireless receiver and the PAR-WT50R-E wireless remote controller, and settings of these devices. Before installing the devices, read this manual thoroughly. After reading, be sure to hand this manual to the user.

1. Safety Precautions

- The precautions mentioned below are important to use the device safely. Be sure to understand and follow them.
- The following hazardous classification shows the likelihood and severity of hazards if a person does not follow the instructions contained on the following signs.

⚠ **Warning**	Indicates a hazardous situation which, if a person does not follow the instructions, could result in death or serious injury.
⚠ **Caution**	Indicates a potentially hazardous situation that, if a person does not follow the instructions, may result in bodily injury or property damage.

⚠ Warning	
►Installation	
Do not use the device in particular environments.	Do not use the device in particular environments where the following substances are present in large amounts: oil, vapour, organic solvent, corrosive gas (such as ammonia, sulphuric compounds, and acid or the like), or where acid or alkali solution, or particular sprays are used frequently. This could affect operating performance, or cause corrosion, which could result in electrical shock, breakdown, smoke generation, or fire.
Do not place the devices in an environment where flammable gas may occur, stay, flow in, or leak.	Build-up of flammable gas could result in fire or explosion.
The device must be installed by a dealer or an authorised technician according to the appropriate installation manual.	If the device is installed improperly, electric shock or fire could result.
Do not place the device in an environment that exposes it to large amounts of vapor or condensation.	Electric shock, fire, or breakdown could result.
►Wiring	
The wireless receiver's maximum voltage is 12V DC. Do not connect 230V AC power source to the wireless receiver.	Breakdown, ignition, or fire could result.
Connections must be made securely and without tension or external force on the terminals.	If connections are made improperly, breaking of wire, heat generation, or fire could result.
►Others	
Do not use sharp objects to press the buttons.	Electric shock or breakdown may result.
Do not touch or operate the device with wet hands.	Electric shock or breakdown may result.
Do not wash the device with water or solution or the like.	Electric shock or breakdown may result.
When installing or repairing the device, ask a dealer or a qualified technician.	If the device is not installed properly, electric shock, smoke generation, or fire could result from entry of dust or water.
Do not disassemble or modify.	

⚠ Caution	
Do not drop the device.	This could break the case or affect the device enough to make it inoperable.
Install the device in a place capable of bearing its own weight .	If the device is not installed securely or properly, the wireless receiver may fall.

■ Disposal

This symbol mark is for EU countries only.

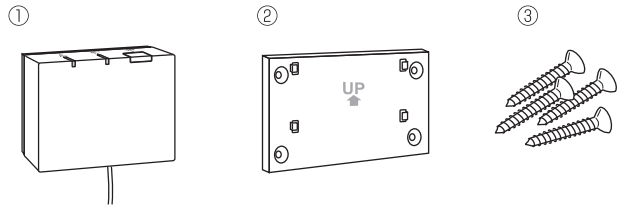
This symbol mark is according to the directive 2002/96/EC Article 10 Information for users and Annex IV, and/or to the directive 2006/66/EC Article 20 Information for end-users and Annex II.

Your MITSUBISHI ELECTRIC product is designed and manufactured with high quality materials and components which can be recycled and/or reused. This symbol means that electrical and electronic equipment, batteries and accumulators, at their end-of-life, should be disposed of separately from your household waste. If a chemical symbol is printed beneath the symbol, this chemical symbol means that the battery or accumulator contains a heavy metal at a certain concentration.
This will be indicated as follows: Hg: mercury (0.0005%), Cd; cadmium (0.002 %), Pb: lead (0.004%)
In the European Union there are separate collection systems for used electrical and electronic products, batteries and accumulators.
Please, dispose of this equipment, batteries and accumulators correctly at your local community waste collection/recycling centre.
Please, help us to conserve the environment we live in!

2. Accessories and Installation Tool

The following items are included in the box.

Part name	No.
① Wireless receiver <PAR-WR51R-E> (2 m long cable included)	1
② Bracket	1
③ Flat head screw (4.1 × 6)	4
④ Installation and setting manual	1



* Installing of the devices requires a Phillips-head screwdriver (No.2 6 mm).

3. Before using ATW wireless system

Following is the summary of the procedure for installing and setting the wireless system.

1. Devices and manuals required to set and install the wireless system

① PAR-WT50R-E wireless remote controller
② PAR-WR51R-E wireless receiver
③ ATW wireless system installation and setting manual (this manual)
④ Wireless remote controller operation manual (hereinafter abbreviated as OM)
⑤ Ecodan system installation manual (hereinafter abbreviated as IM)

2. Installing and setting procedure

① Power off the ecodan system.
② Install the wireless receiver on the ecodan system.
(See "4. Installing the Wireless Receiver" in this manual.)

When installing the wireless receiver, be sure to set the SW1-8 on the control board to ON. (See "5.1 DIP Switch Functions" in IM.)

③ Power on the ecodan system, and the LEDs will blink on the receiver for 3 seconds.
④ Place two AA alkaline batteries in the wireless remote controller.
(See "·Batteries" in "4. Before Operation" in OM.)
⑤ Perform pairing process between the wireless receiver and the remote controller.
(See "5. Pairing process" in this manual.)

The wireless receiver does not go through a pairing process unless the ecodan system is off. When the system is ON, be sure to turn it off before beginning the pairing process.

⑥ Test wireless communication between the wireless remote controller and the wireless receiver.
(See "6.4 Communication Test" in "6. Setting wireless remote controllers" in this manual.)
⑦ Position the wireless remote controller in an appropriate place.
(See "4. Before Operation" in OM.)
⑧ To set the wireless remote controller as a room sensor that monitors room temperature, see "Main remote controller Options" in IM.

⑨ Use the main controller to set the ecodan system to the room temp. ( ) mode.
When the flow temp. ( ) mode or the compensation curve ( ) mode is selected, the wireless remote controller will operate as a thermostat. (See “Main remote controller” in IM.)

When the remote controller set as a room sensor runs out of battery or gets a communication error during room temp. mode, the room temp. mode will automatically switch to the compensation curve mode.
The room temp. mode will be restored by battery replacement or solution of communication error.

Installation and setting of the wireless remote controller is complete. To set additional wireless remote controllers, repeat Step ④ to ⑦.

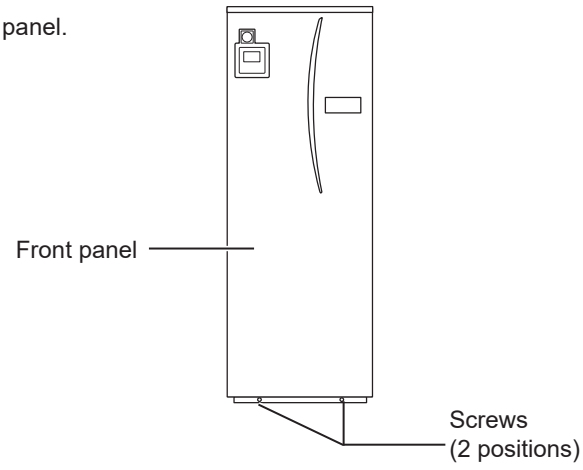
4. Installing Wireless Receiver

4.1 Connecting to Cylinder unit

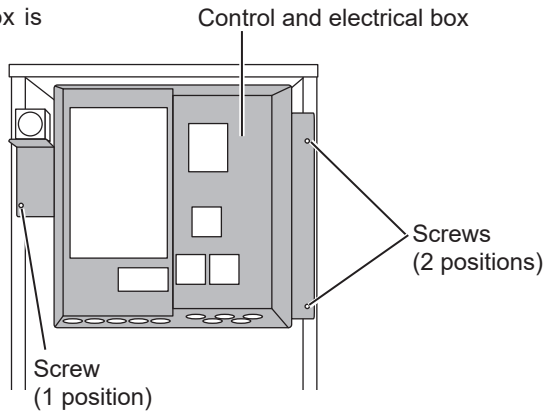
*** Before installation, be sure to turn off the main power supply.**

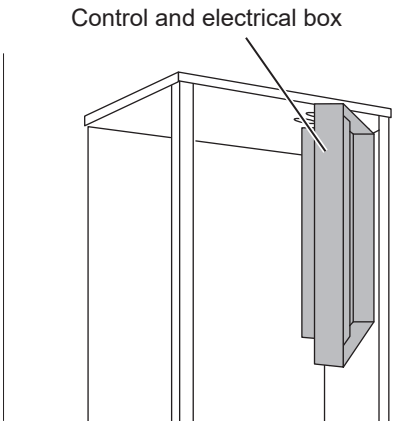
① Remove the two screws that hold the front panel, and remove the panel.

If the removed front panel is set aside away from the indoor unit, ensure the relay connector on Main remote controller is disconnected.



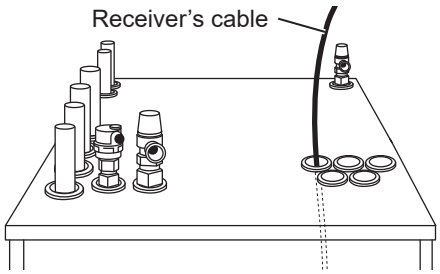
② Remove the screw and pull the control and electrical box so that the control and electrical box is swung toward you from left.



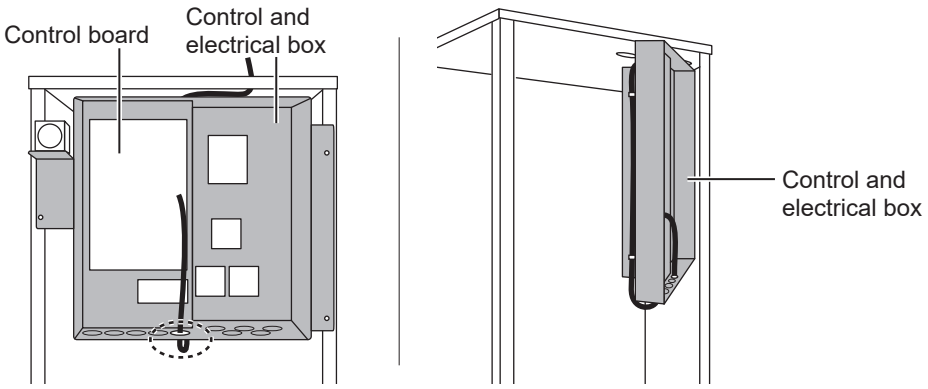


③ Run the receiver's cable into the cylinder unit through the inlet as shown on the figure.

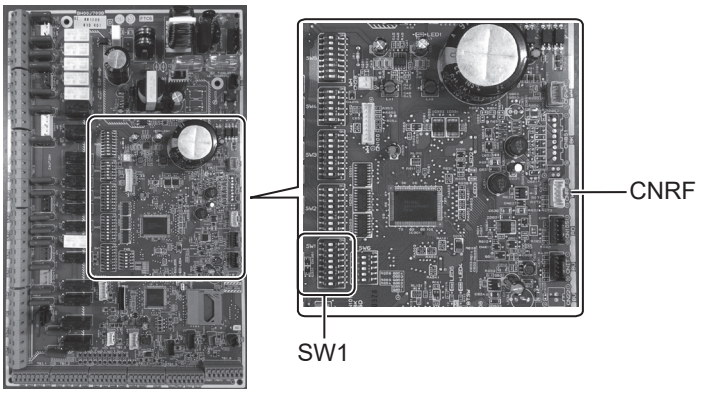
Do not run the receiver's cable through an inlet that a power cable goes through and do not bundle the cable together with a power cable.



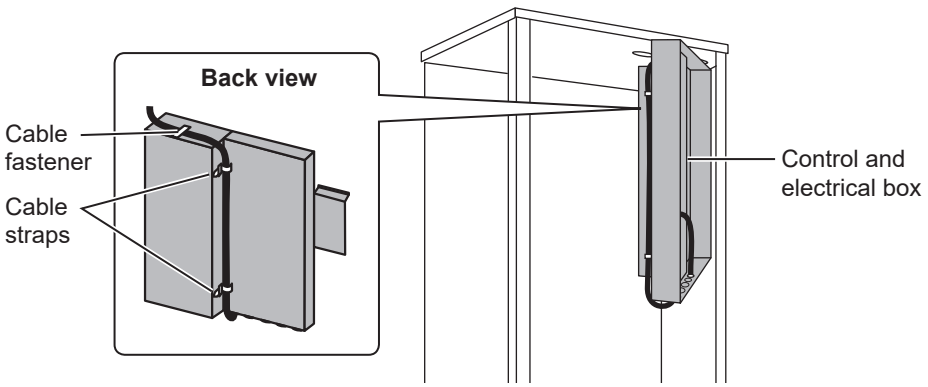
④ Route the cable out the back of the control and electrical box, and run the cable into the box through the shown inlet in the underside of the box.



⑤ Connect the cable connector to the CNRF terminal on the control board. Switch ON SW1-8.



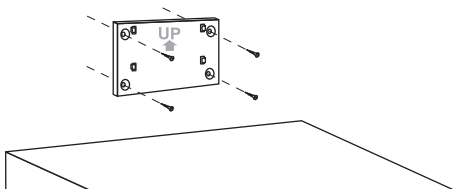
⑥ Remove excessive slack on the cable , then secure the cable with a cable fastener and 2 cable straps on the upper side and center on the back of control and electrical box.



⑦Place the control and electrical box back in the original position and reinstall the 3 screws.

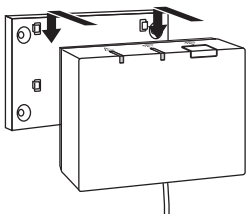
⑧ Check the maximum reach of the cable and install the bracket on the wall with screws.

Do not excessively pull the cable when checking the maximum reach.



<Notice>
- **Do not overtighten the screws.**
  ►The bracket may deform or break.
- **When installing the bracket, select an interference-free space.**
  ►Keep the installing area at least 10 cm away from metal or a wall box. If unable to do so, always place the room wireless remote controllers in locations where the communication test determines that the wireless remote controllers are fully capable of communication with the wireless receiver.
- **Do not install the bracket with screws on the exterior casing of the cylinder unit.**
  ►The internal parts may be damaged, which could result in breakdown of the indoor unit.
- **Do not install the bracket where the receiver could be exposed to moisture or leaked water from piping connections above.**
  ►The wireless receiver subjected to moisture or leaked water could cause electric shock, fire, or its breakdown.

⑨ Place the wireless receiver on the fixed bracket.
Hook the holes on the back of the wireless receiver onto the projections on the bracket, and fix the wireless receiver in place.



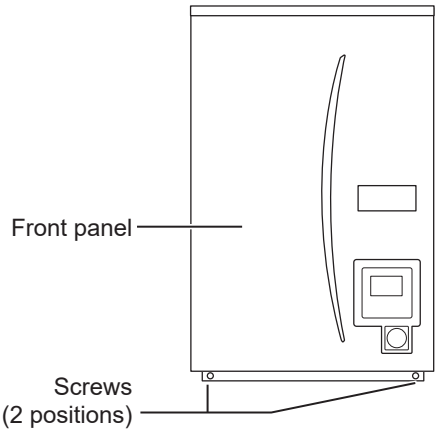
<Notice>
- **Do not place the wireless receiver inside the cylinder unit.**
  ►Both the wireless receiver and its wire may break due to heat inside the indoor unit.
- **Do not let the wireless receiver stand on top of the cylinder unit. Always fix the wireless receiver onto the bracket.**
  ►Wireless communication performance may be affected.
- **Do not pull the cable excessively.**
  ►Breakdown, ignition, or fire may result.
- **Do not have the wireless receiver suspended.**
  ►Breakdown, ignition, or fire may result.

⑩ Fix the front panel with screws.

4.2 Connecting to Hydrobox

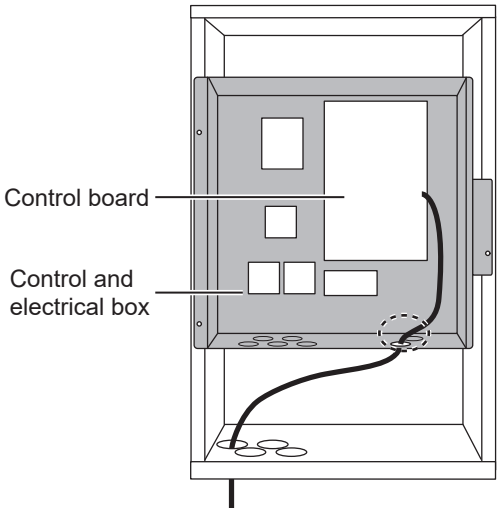
*** Before installation, be sure to turn off the main power supply.**

① Remove the two screws that hold the front panel, and remove the panel.

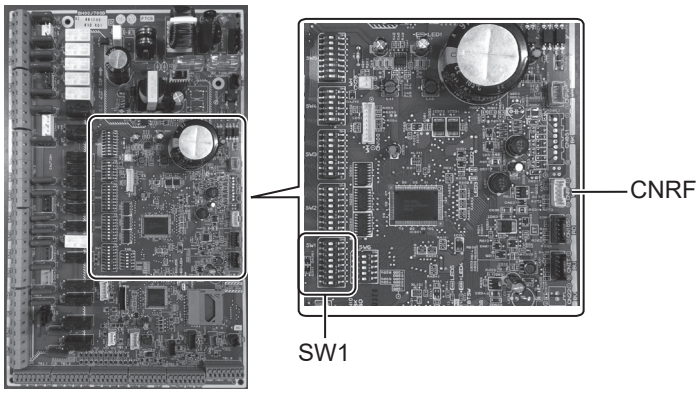


② Route the receiver's cable into the hydrobox through the leftmost inlet at the bottom of the unit. Then route into the control and electrical box through the shown inlet at the bottom of the control and electrical box.

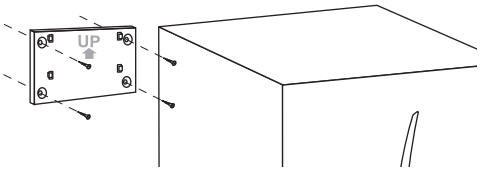
- **Do not bundle the receiver cable with a power cable.**
- **Do not run the cable through an inlet that a power cable goes through.**



③ Connect the cable connector to CNRF on the control board. Switch ON SW1-8.



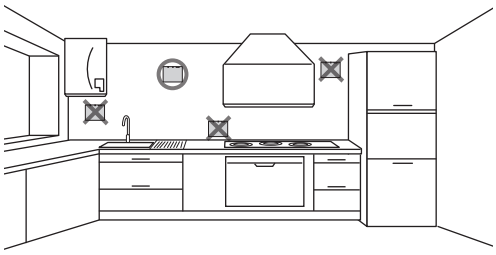
④ Check the maximum reach of the cable and install the bracket with screws.



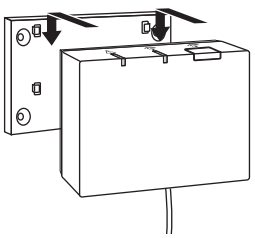
Do not excessively pull the cable when measuring the maximum reach.

<Notice>
- **Do not overtighten the screws.**
  ►The bracket may deform or break.
- **When installing the bracket, select an interference-free space.**
  ►Keep the installing area at least 10 cm away from metal or a wall box. If unable to do so, always place the room wireless remote controllers in locations where the communication test determines that the wireless remote controllers are fully capable of communication with the wireless receiver.
- **Do not install the bracket with screws on the exterior casing of the cylinder unit.**
  ►The internal parts may be damaged, which could result in breakdown of the indoor unit.
- **Do not install the bracket where the receiver could be exposed to moisture or leaked water from piping connections above.**
  ►The wireless receiver subjected to moisture could cause electric shock, fire, or its breakdown.

When installing the wireless receiver, observe the following.
- Keep the other electric or electronic devices (e.g. radio, induction heating cooker, microwave oven, refrigerator, and mobile phone or the like) at least 50 cm away from the wireless receiver.
- Place the wireless receiver in an interference-free area and keep the wireless receiver away from metal.



⑤ Place the wireless receiver on the fixed bracket.
Hook the holes on the back of the wireless receiver onto the projections on the bracket, and fix the wireless receiver.



<Notice>
- **Do not place the wireless receiver inside the hydrobox.**
  ►Both the wireless receiver and its wire may break due to heat inside the indoor unit.
- **Do not pull the cable excessively.**
  ►Breakdown, ignition, or fire may result.
- **Do not have the wireless receiver suspended.**
  ►Breakdown, ignition, or fire may result.

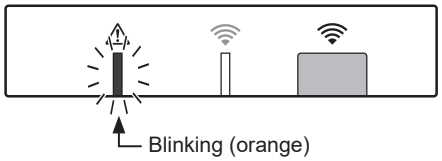
⑥ Hold the front panel with the screws.

5. Pairing process

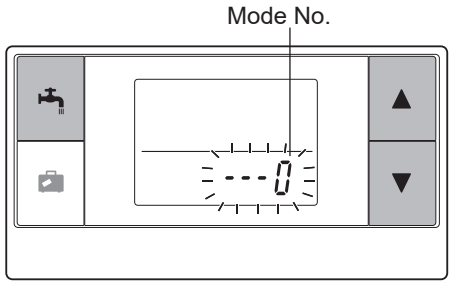
- **If the wireless remote controller is not paired, the indoor unit cannot be operated using the remote controller.**
- **Before using the wireless remote controllers, always ensure to go through a pairing process.**
- **Pairing is NOT possible unless the ecodan system is off. When the ecodan system is ON, be sure to turn it off before starting the pairing process.**
- **The wireless receiver is also needed for pairing, so please make sure to operate the wireless remote controller near the wireless receiver.**

① Hold down button on the wireless receiver for 3 seconds or more until orange ⚠ LED blinks.

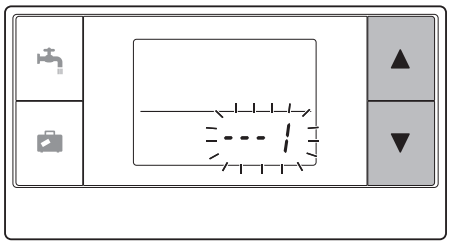
The pairing mode is cancelled by pressing button.



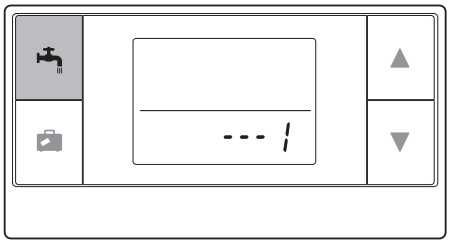
② Hold down ▲, ▼ and buttons simultaneously for at



③ Press ▲ or ▼ button to set the mode number to "1" and press button.



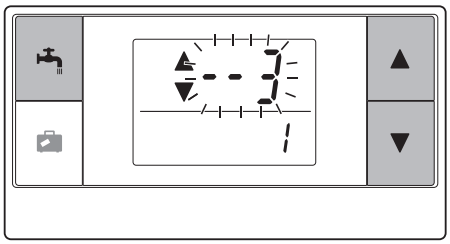
④ When button is pressed in the middle of setting, the screen returns to the previous indication.



When ⚠ appears on the display, do not perform pairing. The power may be turned off in the middle of pairing, which may lose the pairing information.

⑤ Press ▲ or ▼ button to select a pairing address, and press button to set the address.
" - " (no setting) is displayed initially. Choose a number from 1 to 8.

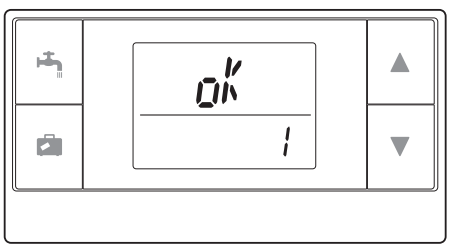
After pressing button, the wireless remote controller starts communication with the wireless receiver.

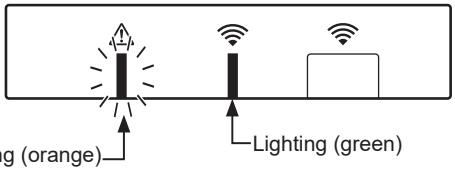


When using multiple wireless remote controllers in one ecodan system, be sure to set different address for each remote controller.

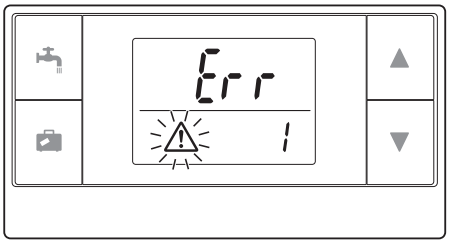
⑥ When the pairing process has been successfully performed, "oK" is shown on the remote controller and green LED steadily lights on the wireless receiver.

<Pairing is successful>



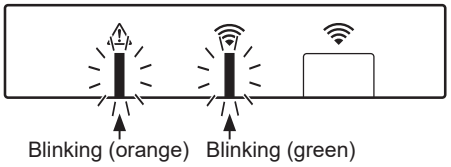


<Pairing is unsuccessful>



When "Err" appears on the remote controller and green LED on the wireless receiver blinks , correctly repeat the same process from step 5.

Even if the pairing process failed, the wireless receiver stays in the pairing mode for 5 minutes unless cancelled.



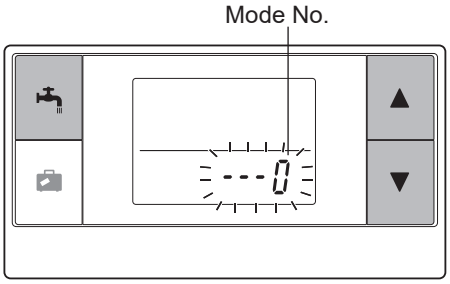
<<Main causes that prevent successful pairing>>

- **The wireless receiver does not enter the pairing mode.**
  ►Press button for 3 seconds or more until orange LED blinks.
  Make sure to turn off the ecodan system by main controller.
- **Pairing is attempted outside the transmission range of the wireless receiver.**
  ►Adjust the distance between the wireless receiver and remote controller, and so try again.
  If the distance is excessively short, pairing may fail. Keep the distance of about 50 cm.
- **The wireless remote controller has been already paired with the wireless receiver.**
  ►The pairing address assigned to a wireless remote controller cannot be changed by remote controller. Use the wireless receiver to reset pairing information. (Refer to "(3) Resetting pairing information" in "7.3. Wireless Receiver Functions".)

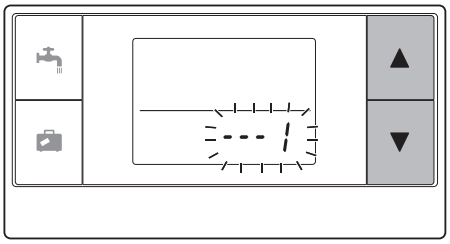
Even when power fails or when the batteries run down, the pairing information will be kept.

6. Setting wireless remote controllers

① Hold down ▲ , ▼ and buttons simultaneously for at least 3 seconds until the mode number blinks.

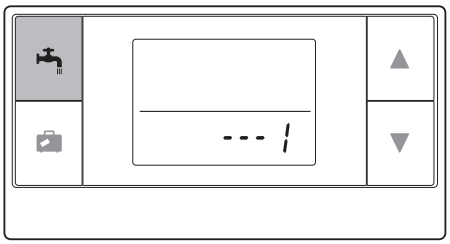


② Press ▲ or ▼ button to choose a mode number.



③ Confirm setting by pressing button.
The display stops blinking and lights steadily.

When button is pressed in the middle of setting, the screen returns to the previous indication.

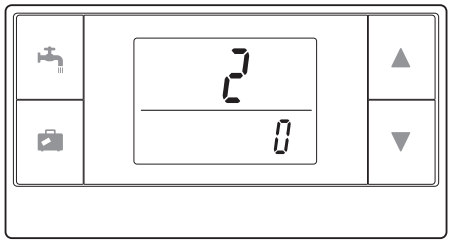


Mode No.	Names	Functions	Initial settings
0	Pairing address display	To view the own pairing address of the wireless remote controller.	
1	Pairing	To perform a pairing process with the wireless receiver.	
2	Temperature unit	To select °C or °F.	°C
3	Communication test	Communication test with the wireless receiver.	
4	Room temperature display	Actual room temperature display	OFF
5	Automatic zone no. display	To enable or disable automatic zone no. display.	OFF

6.1. Viewing Address Number (Mode No. 0)

Set the mode no. to “0”.

The display to the right shows that the address is set to “2”.



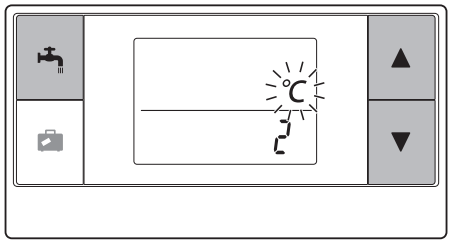
6.2. Pairing (Mode No. 1)

For details, refer to “6. Pairing process”.

6.3. Selecting the Temperature Unit (Mode No. 2)

Set the mode no. to “2”.
The temperature reading can be selected between Celsius (°C) or Fahrenheit (°F).

Press ▲ or ▼ button to select °C or °F and press button to confirm the selection.

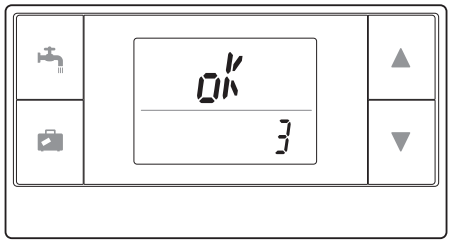


6.4. Communication Test (Mode No. 3)

Set the mode no. to “3”.
Communication test is performed between the wireless remote controller and the wireless receiver.

When the display shows "ok", this indicates that the communication between the remote controller and the receiver is established. If "Err" is shown, the wireless remote controller is not communicating with the wireless receiver.

Do not leave the wireless remote controller in a location where the communication test results in "Err".



Before conducting the communication test, ensure that the wireless remote controller goes through a pairing process.

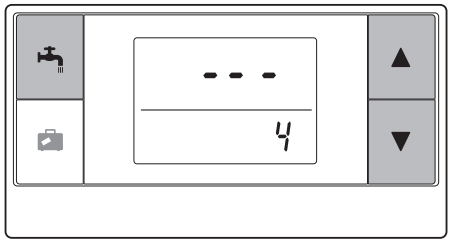
6.5. Displaying or Hiding Room Temperature (Mode No. 4)

Set the mode no. to “4”.
Select either displaying or hiding the room temperature.

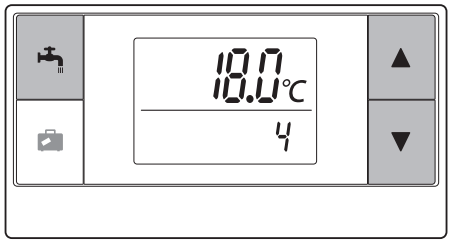
Press ▲ or ▼ button to select displaying or hiding the room temperature, and press button to save the setting.

Hiding :" - - - ".
Displaying :Actual room temperature is displayed

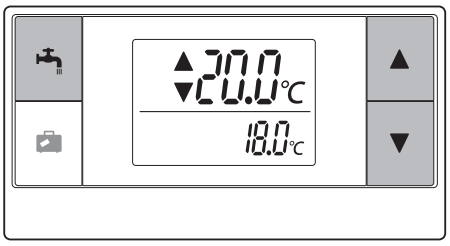
<When the actual room temperature is NOT displayed >



<When the actual room temperature is displayed >



When the indoor unit is operating, the room temperature display shows the actual room temperature (18°C) below and the set temperature (20°C) above as shown in the figure to the right. The measurable temperature range is from 0°C to 40°C.



If the measured room temperature is out of 0°C to 40°C range, the room temperature display blinks.

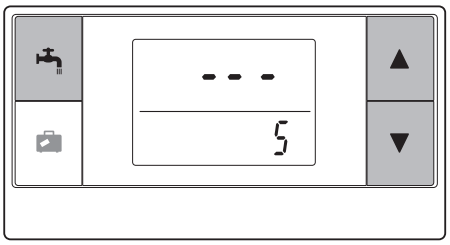
When the wireless remote controller is installed on a bracket, room temperature might not be accurate being affected by the wall temperature.
Perform a test run and place the remote controller where the room temperature can be correctly detected.

6.6. Automatic Zone No. Display (Mode No. 5)

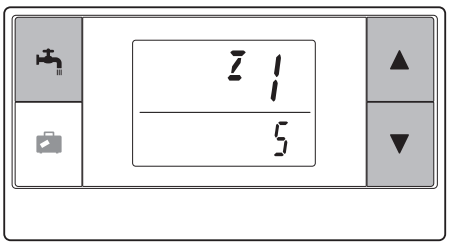
Set the mode no. to “5”.
When the automatic zone no. display is active, a zone number assigned to the remote controller is displayed for 3 seconds after temperature setting.
Press ▲ or ▼ button to select between " - - - " and Z1 or Z2, and press button to save setting.

Inactive :" - - - ".
Active :The zone no. (Z1 or Z2) assigned to the remote controller is shown.

<Inactive>



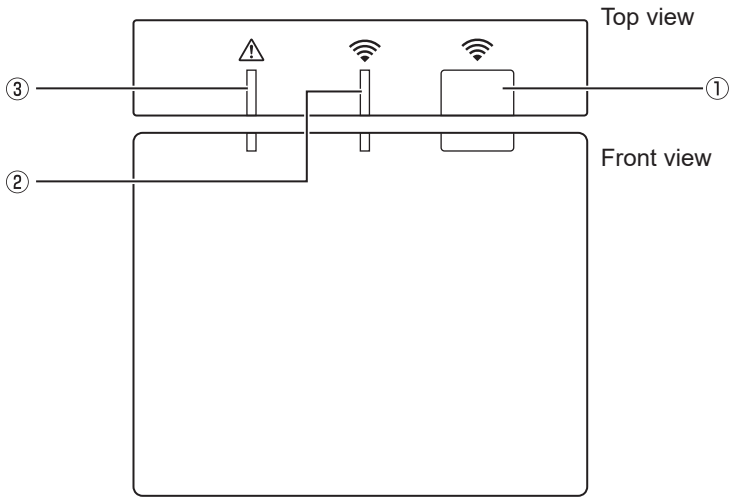
<Active>



7. Wireless Receiver Operation

The wireless receiver is powered by indoor unit. It communicates with the wireless remote controller(s), and transmits to the indoor unit the operation status and commands received from the wireless remote controller(s). The wireless receiver has two modes available: pairing mode and pairing reset mode.

7.1. Functions of Buttons and Displays



Number	Item	Description
①	Setting button	To switch operating mode.
②	Communication LED (green)	To indicate that the wireless receiver is communicating.
③	Operation LED (orange)	To show operating status of the wireless receiver.

The following table shows the operating and illuminating status of the LEDs.

Operation LED (orange)	Communication LED (green)	Description
Blinking	Blinking	Power is ON (for 3 seconds).
Off	Off	Normal mode: Not paired
Off	On	Normal mode: Paired
Off	Blinking	Normal mode: Communicating
Blinking	Off	Performing a pairing process
Blinking	On	Pairing: Successful
Blinking	Blinking	Pairing: Unsuccessful
On	On	Pairing information is cleared

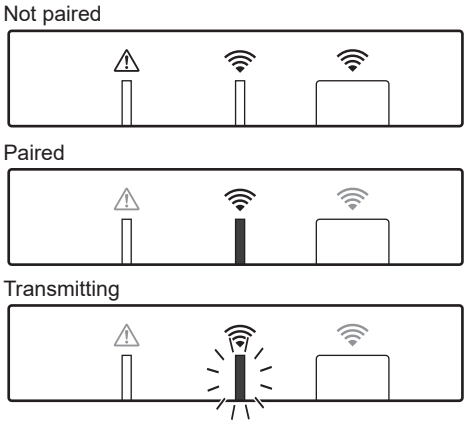
7.2. Turning on Power

When the wireless receiver is powered by indoor unit after installation, green LED and orange ⚠ LED blink for 3 seconds.

7.3. Wireless Receiver Functions

(1) Normal mode

When the wireless receiver is paired with a wireless remote controller, green LED comes on. When the wireless receiver is communicating with a wireless remote controller, green LED blinks.



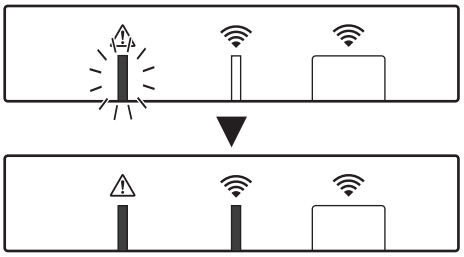
(2) Pairing mode

*For details, refer to “6. Pairing process” in this manual.

(3) Resetting pairing information

Once pairing information has been cleared, ALL the wireless remote controllers need go through a pairing process again.

Hold down button for 5 seconds or more until and ⚠ LED light while pairing mode is active. All the pairing information is cleared.

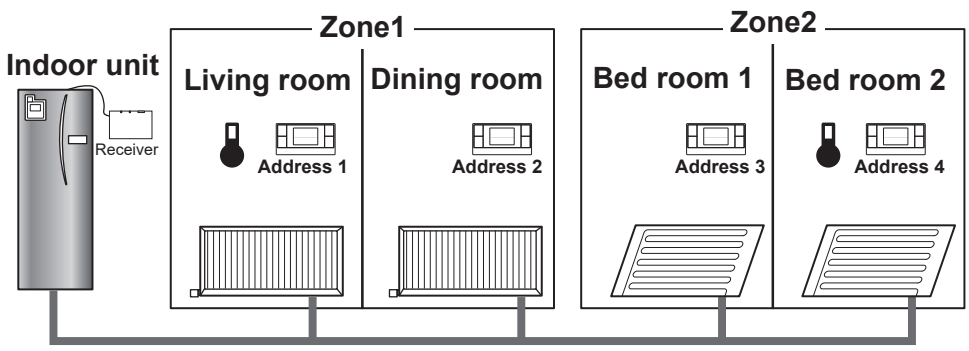


8. Q&A

Questions	Answers
How many wireless remote controllers are allowed to be paired?	Up to 8 controllers.
What should be noted about Pairing?	• The same address cannot be assigned to multiple remote controllers • If the same address is assigned to multiple controllers, the address can be assigned to only the last paired remote controller. • Once the remote controller is paired, its pairing address cannot be changed by remote controller. Use the wireless receiver to reset pairing information.
What causes a communication error between the wireless remote controller and wireless receiver?	Check the following possible causes. • The batteries on the wireless remote controller are running out. • The transmitted signal does not reach the wireless receiver. • The wireless remote controller is not paired.
What measures should be taken when the room temp. display indicates “1” with ⚠ ?	The indoor unit or outdoor unit has a failure. Refer to the indications on the main controller and take appropriate measures. Please also check installation and service manuals for the indoor unit.
What measures should be taken when the room temp. display indicates “2” with ⚠ ?	The thermistor inside the wireless remote controller has a failure. Check the resistance of the thermistor. (When the room temperature is between 0 and 40°C, the resistance must be between 5 and 28 kΩ.)
What measures should be taken when the room temp. display indicates “3” with ⚠ ?	A communication error occurs between the wireless remote controller and the wireless receiver. Check the following possible causes. • The signal that is transmitted by the wireless remote controller does not reach the wireless receiver. • The wireless remote controller is not paired.
What measures should be taken when the room temp. display indicates “4” with ⚠ ?	A communication error occurs between the wireless receiver and the indoor unit. Check the following possible causes. • The cable connecting between the wireless receiver and the indoor unit has severed. • The wireless receiver is not correctly connected to the indoor unit.
What measures should be taken when the room temp. display indicates “E” with ⚠ ?	Backup heater is running due to a failure of the indoor unit or the outdoor unit. Check the error code displayed on the main controller and take appropriate measures accordingly. The holiday mode is NOT available during backup heater only operation.

<<2-zone temperature control>>

- A thermistor is built in the remote controller (Room RC) or the main controller (Main RC), or TH1. The indoor unit refers to temperature monitored by a selected thermistor and controls temperature for each zone.
- For 2-zone temperature control, one room sensor can be selected for Zone1 and Zone2 separately. The room sensor is used for monitoring room temperature.
- The selection of room sensor can be fixed or changed according to time, using a schedule timer.
  Note: Room sensor can be selected by main controller only.



When 🌡 is shown on the remote controller, this indicates that the remote controller is used for monitoring the room temperature. In this example, the living room temperature monitored by remote controller 1 is regarded as the room temperature for Zone1. The bed room 2 temperature monitored by remote controller 4 is regarded as the room temperature for Zone2.

9. Specifications

Item	Description
Power source	12V DC (powered by indoor unit)
Operating temperature and humidity requirements	Temperature: 0 to 40°C Humidity 30 to 90%RH (No condensation)
Weight	150 g (excluding a cable)
Dimension (W×H×D)	100 mm × 80 mm × 30 mm

■ Product fiche of temperature control

(a) Supplier's name: MITSUBISHI ELECTRIC CORPORATION
(b) Supplier's model identifier: PAR-WT50R-E and PAR-WR51R-E
(c) The class of the temperature control: Ⅵ
(d) The contribution of the temperature control to seasonal space heating energy efficiency: 4%

MITSUBISHI ELECTRIC

ATW/BTW UNIT OPTIONAL PARTS IMMERSION HEATER (1Ph 1/3kW) PAC-IH01V2-E / PAC-IH03V2-E

INSTALLATION MANUAL

- Before starting installation, read the following description together with the installation manual included with the ATW/BTW unit.
- Please read carefully and observe fully the following safety precautions.

⚠ WARNING	Precaution that must be observed to prevent injuries or death.

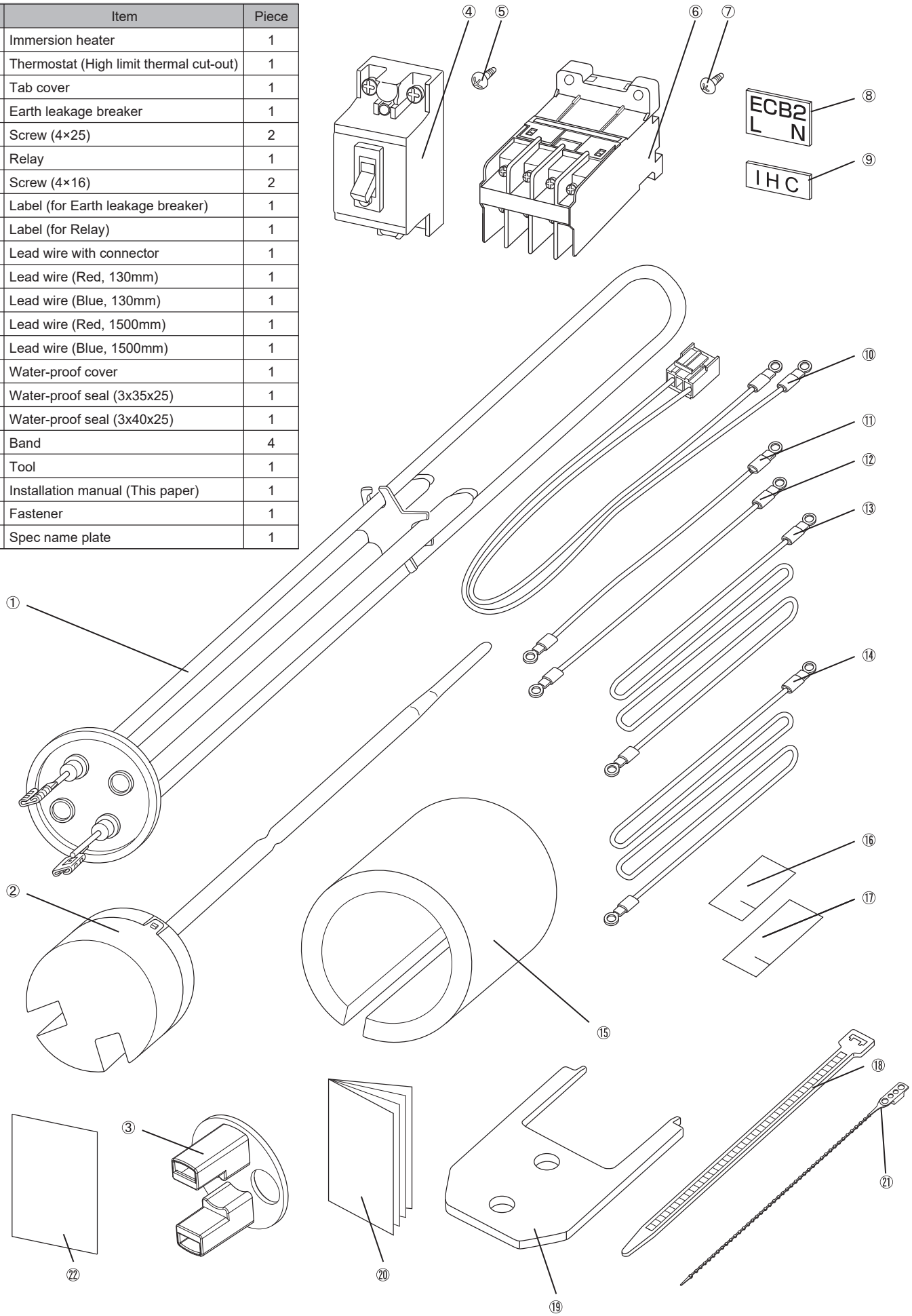
- After installation carry out a test run to ensure correct operation, then explain operation method and safety precautions to the end user.
  Tell your customers to keep this installation manual together with the operation manual, and when they give or sell this machine to any other person include this installation manual and operation manual with it.

⚠ WARNING

- If the ATW/BTW unit has already been connected to the power supply ensure circuit breaker is off before carrying out electrical work.
- If the immersion heater is installed incorrectly or modified after installation by the user, water leakage, electric shock or fire may result.
- All electrical work should be performed by a qualified technician according to local regulations and the instructions given in this manual.
- The immersion heater must be powered by a dedicated power supply and the correct voltage and correctly sized circuit breakers must be used.
- Connections must be made securely and without tension on the terminals.
  The included component parts of the PAC-IH01V2-E / PAC-IH03V2-E IMMERSION HEATER (1Ph 1/3kW) shall be used only for the purposes indicated in the installation manual.

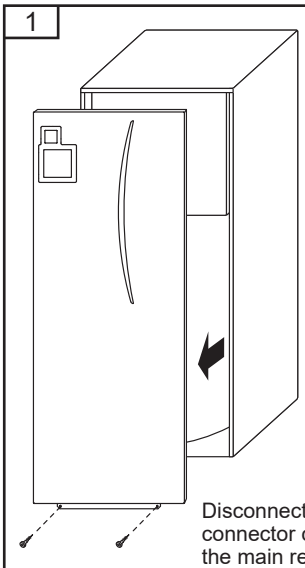
Contents

	Item	Piece
①	Immersion heater	1
②	Thermostat (High limit thermal cut-out)	1
③	Tab cover	1
④	Earth leakage breaker	1
⑤	Screw (4×25)	2
⑥	Relay	1
⑦	Screw (4×16)	2
⑧	Label (for Earth leakage breaker)	1
⑨	Label (for Relay)	1
⑩	Lead wire with connector	1
⑪	Lead wire (Red, 130mm)	1
⑫	Lead wire (Blue, 130mm)	1
⑬	Lead wire (Red, 1500mm)	1
⑭	Lead wire (Blue, 1500mm)	1
⑮	Water-proof cover	1
⑯	Water-proof seal (3x35x25)	1
⑰	Water-proof seal (3x40x25)	1
⑱	Band	4
⑲	Tool	1
⑳	Installation manual (This paper)	1
㉑	Fastener	1
㉒	Spec name plate	1



<ATW unit>

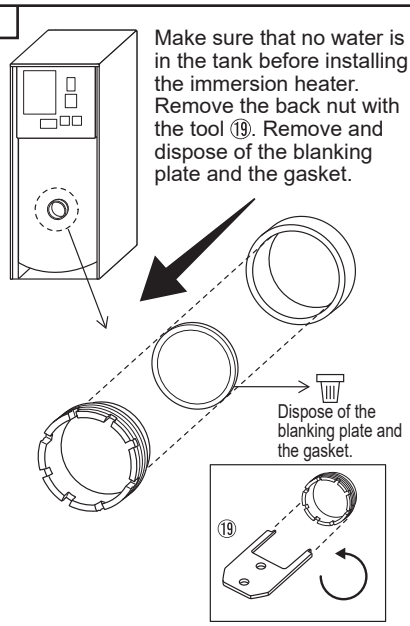
1



Refer to the installation manual of the ATW unit for the front panel removal.

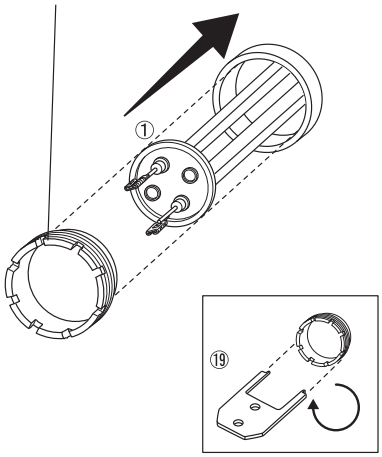
Disconnect the relay connector connecting from the main remote controller under the electrical box. Remove the front panel.

2



Make sure that no water is in the tank before installing the immersion heater. Remove the back nut with the tool ⑲. Remove and dispose of the blanking plate and the gasket.

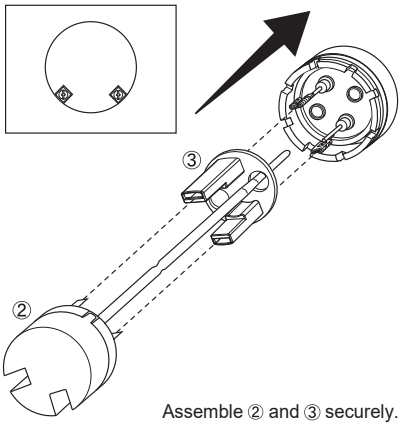
3



Adjust the position of the immersion heater so that the thermostat pockets are located at the upper right and lower left as shown in the figure. Fasten the back nut securely to prevent water leakage. (Recommended torque = 10 N•m)

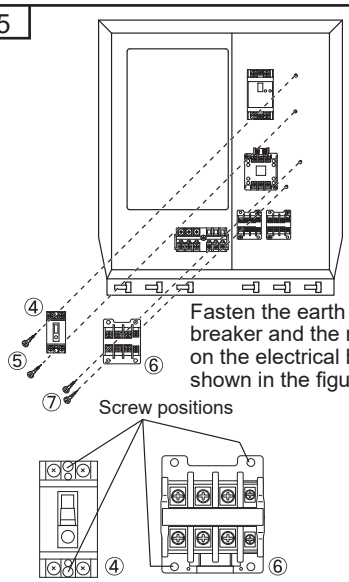
4

Attach the tab cover ③ to the immersion heater. Insert the thermostat into the upper right thermostat pocket.
Position the terminals on the thermostat head at the bottom as shown in the figure.



Assemble ② and ③ securely.

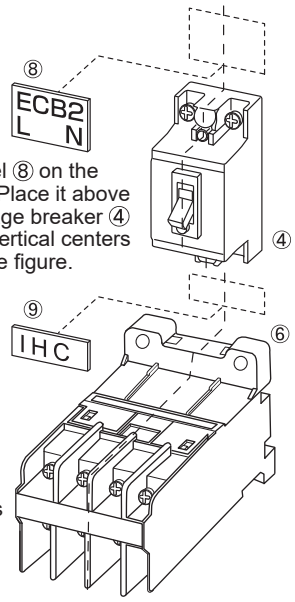
5



Fasten the earth leakage breaker and the relay on the electrical box as shown in the figure.

Recommended torque = 1.5 N•m

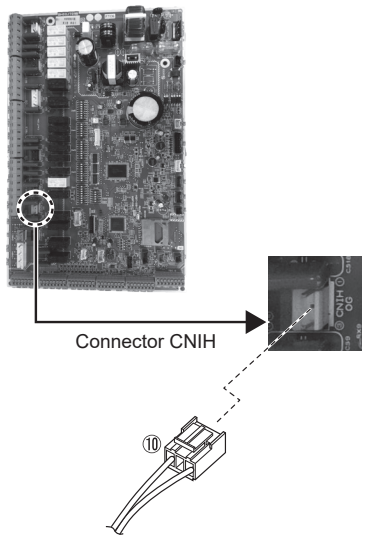
6



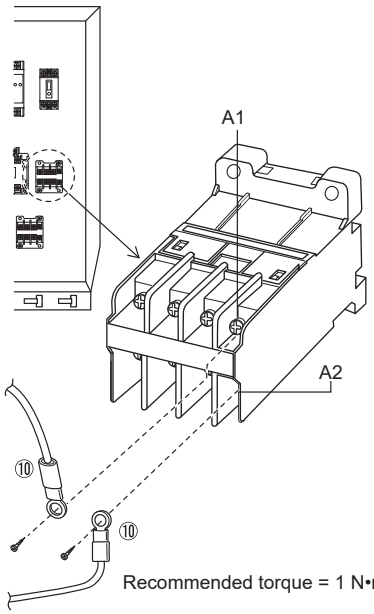
Attach the label ⑧ on the electrical box. Place it above the earth leakage breaker ④ and align the vertical centers as shown in the figure.

Attach the label ⑨ on the electrical box. Place it above the relay ⑥ and align the vertical centers as shown in the figure.

7

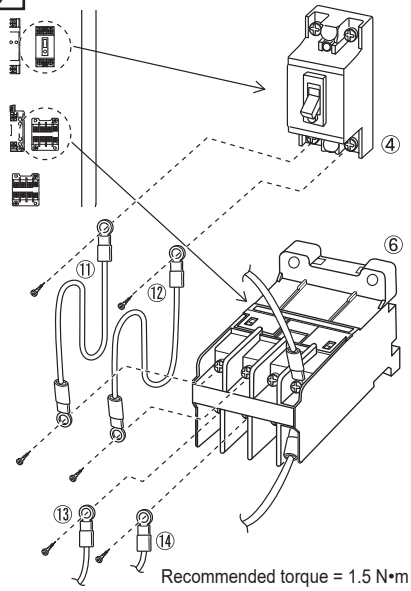


8



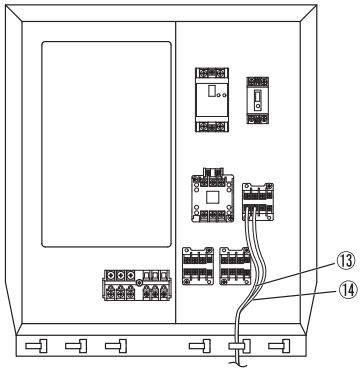
Recommended torque = 1 N•m

9



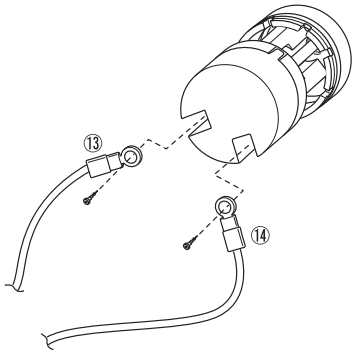
Recommended torque = 1.5 N•m

10



Do not bundle the lead wires ⑬ and ⑭ together with the low voltage wires, such as the main remote controller wires.

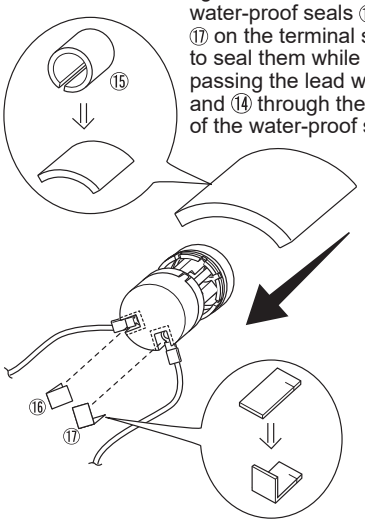
11



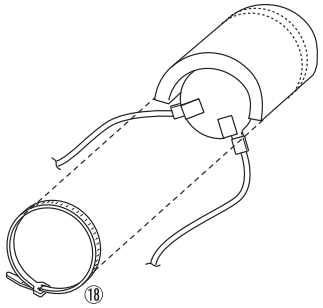
Recommended torque = 1.2 N•m

12

Attach the water-proof cover ⑮ as shown in the figure. Attach the water-proof seals ⑯ and ⑰ on the terminal screws to seal them while passing the lead wires ⑬ and ⑭ through the slits of the water-proof seals.

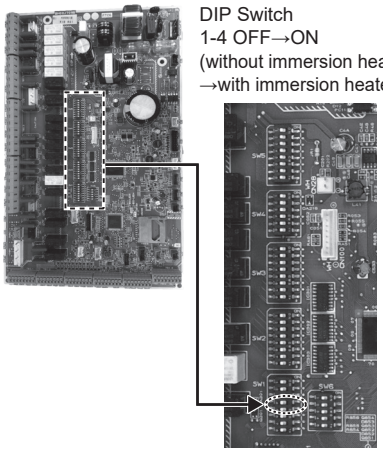


13



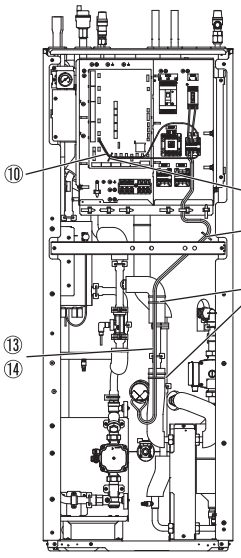
Fasten the water-proof cover ⑮ to the boss of the cylinder unit with the band ⑱.

14



DIP Switch
1-4 OFF→ON
(without immersion heater
→with immersion heater)

15



Fasten the lead wires with the bands ⑱ and the fastener ㉑ as shown in the figure.

㉑ ⑱ Fix it to the other wires.

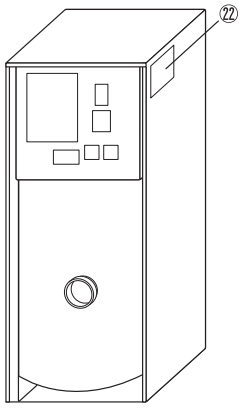
⑱ Fix it to the pipe covers.

16

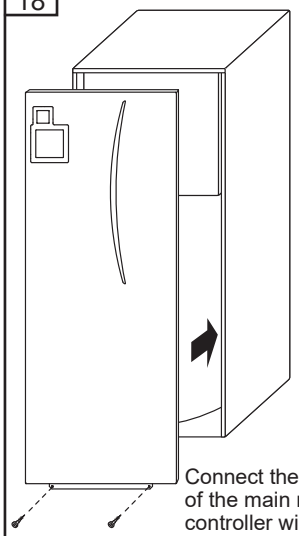
For details of wiring to the earth leakage breaker, refer to the installation manual and the wiring diagram of the ATW unit. Fill the tank with water and make sure that no water leaks around the immersion heater.

17

Attach the label ㉒. Do not cover or overlap the other labels.



18



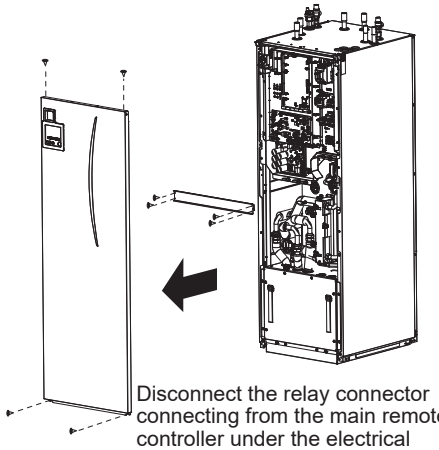
Refer to the installation manual of the ATW unit for the front panel installation.

Connect the relay connector of the main remote controller wires under the electrical box before installing the front panel.

<BTW unit>

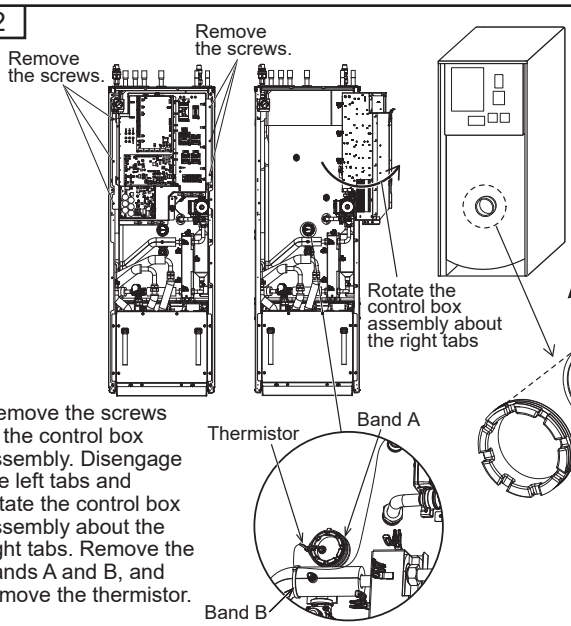
1

Refer to the installation manual of the BTW unit for the front panel removal.



Disconnect the relay connector connecting from the main remote controller under the electrical box. Remove the front panel and the frame.

2

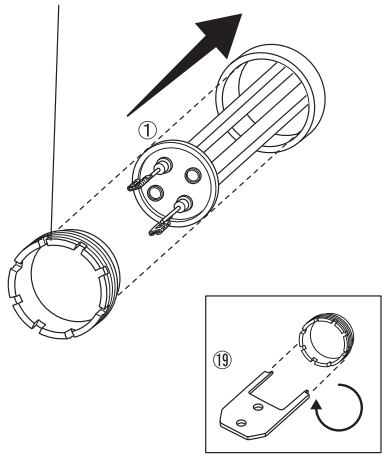


Make sure that no water is in the tank before installing the immersion heater. Remove the back nut with the tool ⑲. Remove and dispose of the single stat pocket and the gasket.

Remove the screws of the control box assembly. Disengage the left tabs and rotate the control box assembly about the right tabs. Remove the bands A and B, and remove the thermistor.

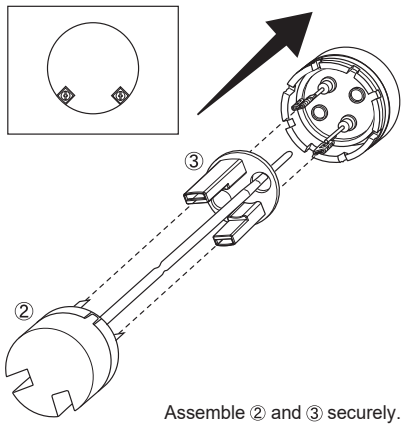
3

Adjust the position of the immersion heater so that the thermostat pockets are located at the upper right and lower left as shown in the figure. Fasten the back nut securely to prevent water leakage. (Recommended torque = 10 N•m)



4

Attach the tab cover ③ to the immersion heater. Insert the thermostat into the upper right thermostat pocket.
Position the terminals on the thermostat head at the bottom as shown in the figure.

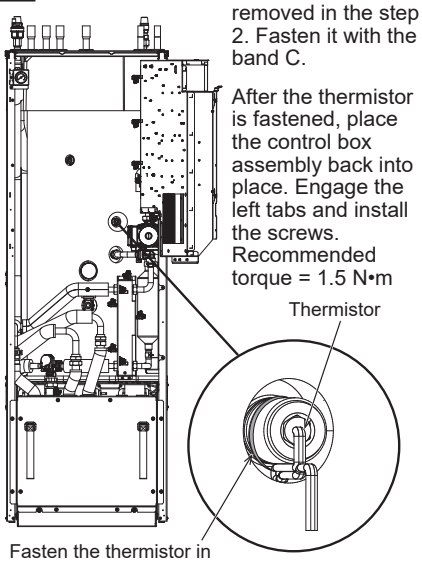


Assemble ② and ③ securely.

5

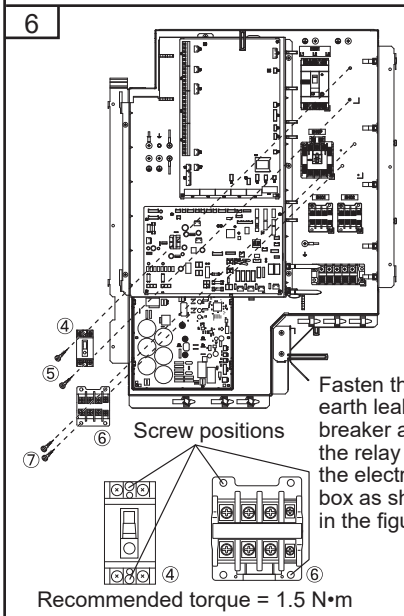
Mount the thermistor removed in the step 2. Fasten it with the band C.

After the thermistor is fastened, place the control box assembly back into place. Engage the left tabs and install the screws. Recommended torque = 1.5 N•m



Fasten the thermistor in the insertion opening with the band C.

6

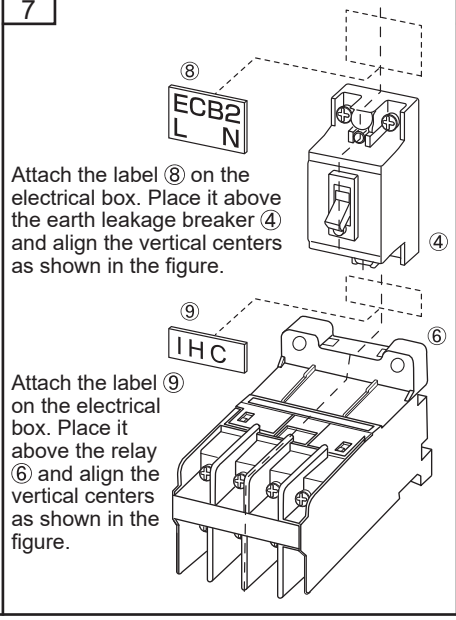


Screw positions

Fasten the earth leakage breaker and the relay on the electrical box as shown in the figure.

Recommended torque = 1.5 N•m

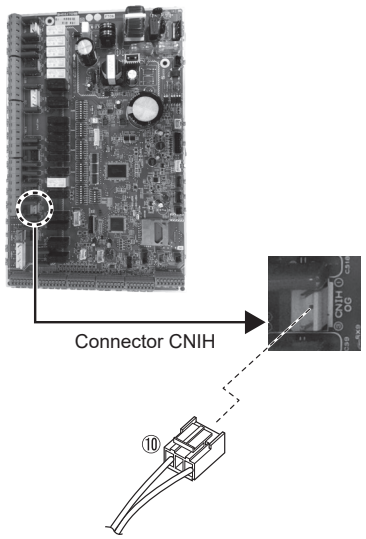
7



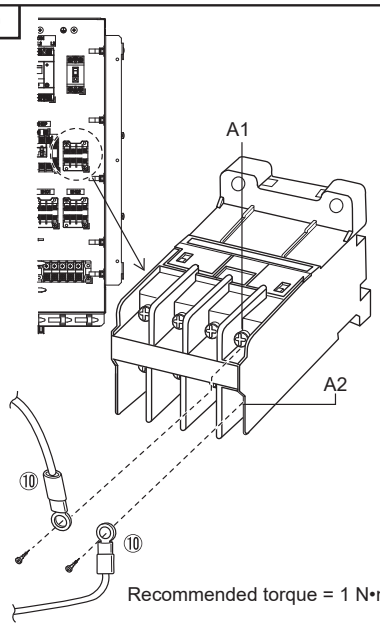
Attach the label ⑧ on the electrical box. Place it above the earth leakage breaker ④ and align the vertical centers as shown in the figure.

Attach the label ⑨ on the electrical box. Place it above the relay ⑥ and align the vertical centers as shown in the figure.

8

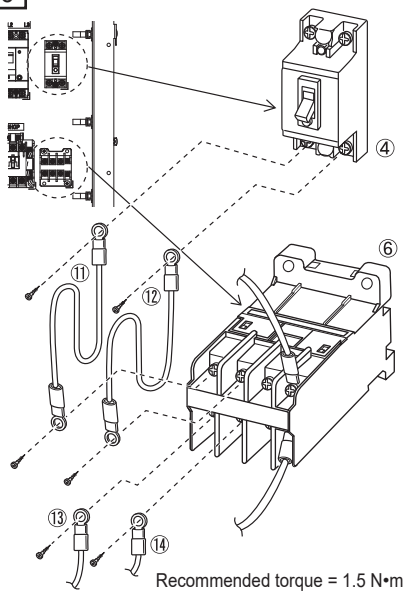


9



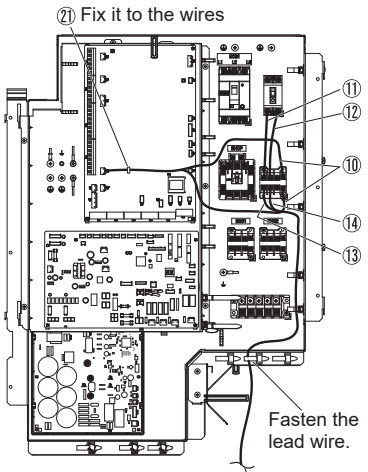
Recommended torque = 1 N•m

10

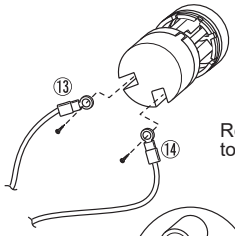


Recommended torque = 1.5 N•m

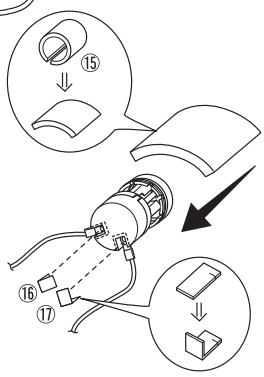
11



12

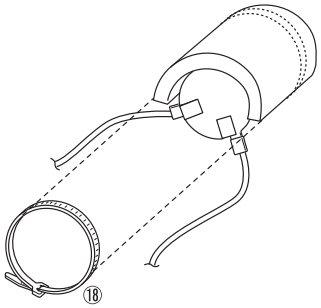


Recommended torque = 1.2 N•m



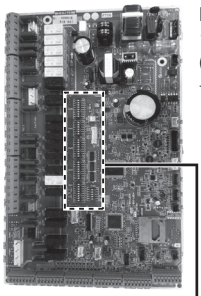
Attach the water-proof cover ⑮ as shown in the figure. Attach the water-proof seals ⑯ and ⑰ on the terminal screws to seal them while passing the lead wires ⑬ and ⑭ through the slits of the water-proof seals.

13

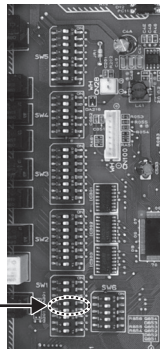


Fasten the water-proof cover ⑮ to the boss of the cylinder unit with the band ⑱.

14



DIP Switch
1-4 OFF→ON
(without immersion heater
→with immersion heater)

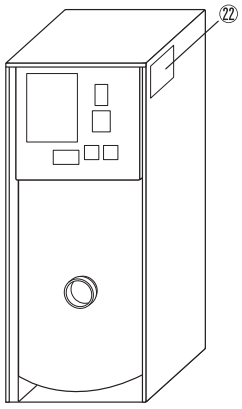


15

For details of wiring to the earth leakage breaker, refer to the installation manual and the wiring diagram of the BTW unit. Fill the tank with water and make sure that no water leaks around the immersion heater.

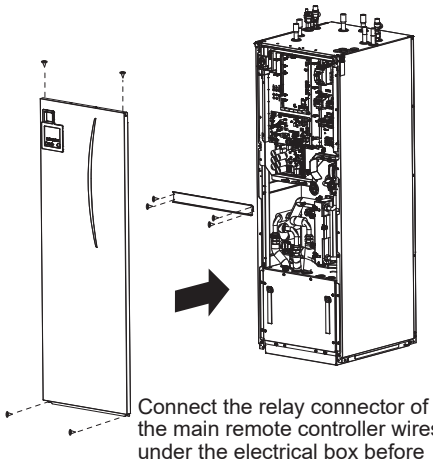
16

Attach the label ㉒. Do not cover or overlap the other labels.



17

Assemble in the reverse order of the step 1.
Recommended torque for the frame = 1.5 N•m
Recommended torque for the front panel = 3 N•m



Connect the relay connector of the main remote controller wires under the electrical box before installing the front panel.

Optional parts

MITSUBISHI ELECTRIC

CYLINDER UNIT OPTIONAL PARTS EHPT ACCESSORIES for UK PAC-WK02UK-E

INSTALLATION MANUAL

- Before starting installation, read the following description together with the installation manual included with the cylinder unit.
- Please read carefully and observe fully the following safety precautions.

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

- After installation carry out a test run to ensure correct operation, then explain operation method and safety precautions to the end user.
  Tell your customers to keep this installation manual together with the operation manual, and when they give or sell this machine to any other person include this installation manual and operation manual with it.

⚠ WARNING

- Before installing any accessories on the cylinder unit ensure the unit is isolated from the power supply.
- Connections must be made securely and without tension on the terminals.
  The included component parts of the PAC-WK01UK-E EHPT ACCESSORIES for UK shall be used only for the purposes indicated in the installation manual.

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

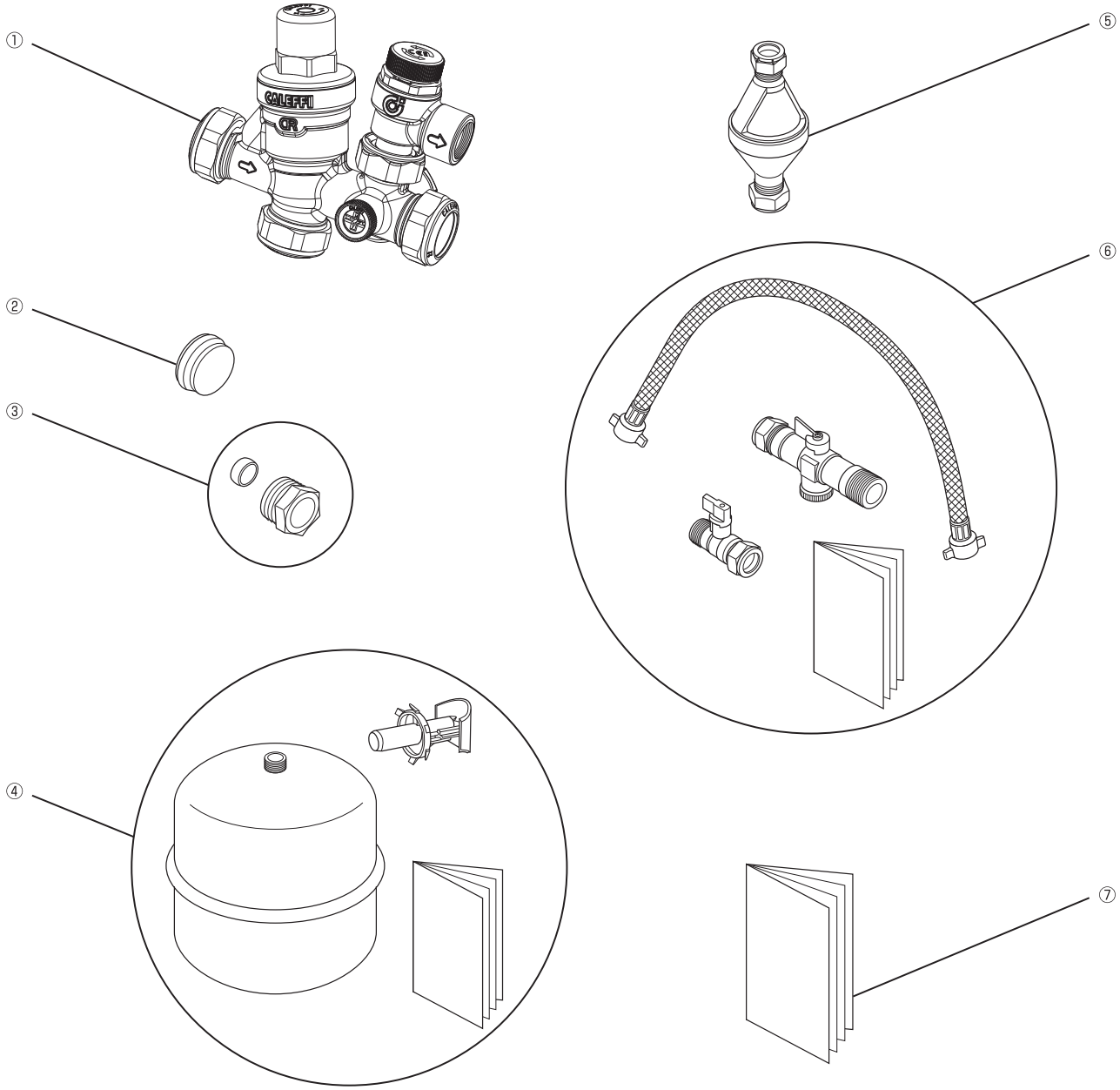
Part which requires regular replacement

Part	Replace every	Possible failures
Inlet control group (ICG)	6 years	Water leakage due to brass corrosion (Dezincification)

Contents

	Item	Piece(s)
①	Unvented inlet control group (Pressure reducing valve/strainer/check valves/ expansion relief valve).	1
②	Blanking cap (22mm)	1
③	Nipple & Olive (15mm)	1
④	Expansion vessel 18L (R3/4")	1
⑤	Tundish (15mm, 22mm)	2
⑥	Filling loop (15mm)	1
⑦	Installation manual	1

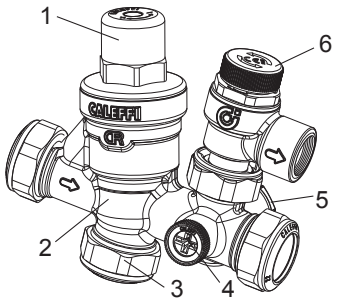
The parts ① to ⑤ are provided to meet the requirements for the UK Building Regulation G3.
The parts ② and ③ are accessory parts for the unvented inlet control group.
The pressure reducing valve is factory set at 3.5 bar and the expansion relief valve at 6.0 bar.
The gas charge pressure for the expansion vessel is 3.5 bar.



Installation

Carefully follow these instructions and ensure that the installation conforms to UK Building Regulation G3 and the Water Supply Regulations.

Unvented inlet control group (ICG)



Item	Component
1	Pressure reducing valve
2	Manifold block (Including check valve)
3	22mm balanced cold water take-off
4	Pressure gauge port
5	3/4" connection for exp.vessel
6	Expansion relief valve

It is recommended that isolating valves are installed upstream and downstream to facilitate any future maintenance.
For safety reasons, it is essential that no isolation valve is fitted between the ICG and the cold water inlet connection of the cylinder.
Install the pressure reducing valve with its embossed arrow pointing in the direction of flow.
Ensure the expansion relief valve is seated correctly into the main block/ casting and its nut is fully tightened to secure its position.
Ensure that the expansion relief valve discharge pipework has a continuous fall and terminates via a tundish and in such a position as not to cause injury.
The first 22mm connection (Item 3 above) can be used to provide an unbalanced cold water supply. It must never be used to connect the expansion vessel. If not used, use the blanking cap (22mm) supplied.
The small black plug is a connection prepared for a pressure gauge, which is available when specified.
On the opposite side of the manifold to the pressure gauge connection, there is a 3/4" plastic plugged connection that may be used for direct mounting to the expansion vessel if required.

Expansion vessel

Install the expansion vessel between the pressure reducing valve and the cylinder unit or by using the appropriate port of the ICG. (Ensure the expansion vessel is connected to an active section of the potable pipework and is NOT directly connected to any redundant “Dead-leg” section of pipework.)

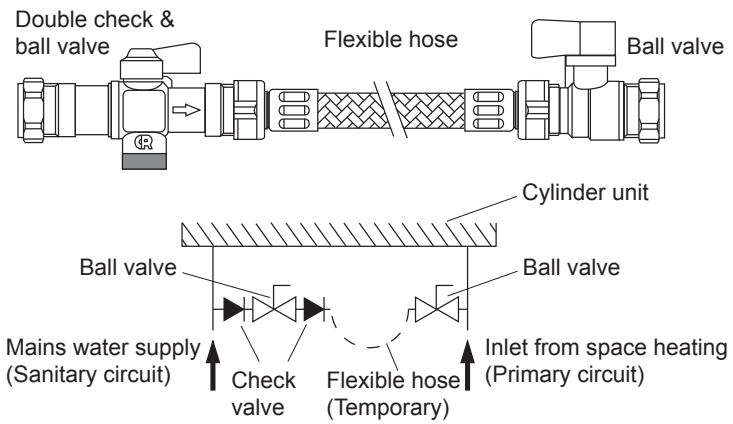
Note:
- When connecting the ICG to the expansion vessel using a field-supplied flexible hose, provide sufficient bending radius to prevent abnormal noise.
- For more details about the following instructions, refer to the installation manual provided with the potable expansion vessel, as well as this manual.
  - If the expansion vessel is installed separately to the ICG (ie. direct in-line) then the supplied flow diverter can be used.
  - ICG should always be installed on cold water supply to cylinder to comply with WRAS/Building Regulation G3.
  - The ICG. should be installed above the level of the T&P valve. This will avoid the requirement to drain cylinder when servicing the ICG in future.
  - Expansion vessel should be installed hanging from connecting pipework.
  - Expansion vessel should be fastened to a suitable surface (wall etc.) to prevent strain on pipe connection.
  - Gas inlet screw type of expansion vessel: 8V1

Tundish

Install the tundishes in accordance with the UK Building Regulation G3. For more details refer to the "Safety Device Discharge Arrangements" section in the installation manual for the cylinder unit .

Filling loop

Note: Refer to the installation manual provided with the filling loop as well.



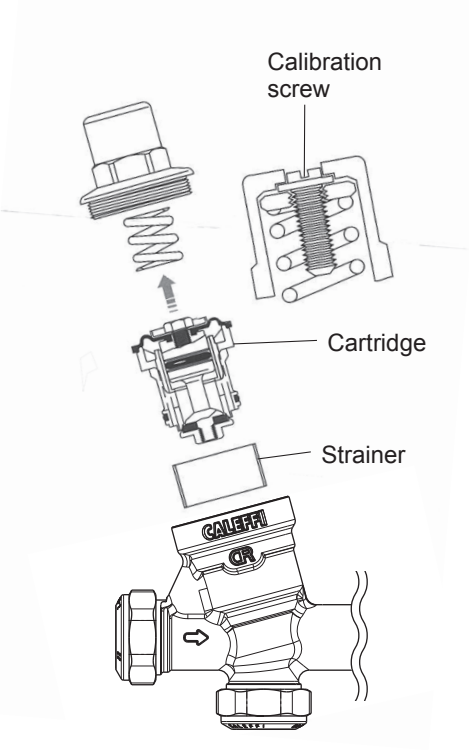
The procedure and recommendations specified in the cylinder unit installation manual for filling and pressurising the primary heating circuit of the cylinder unit must be followed.
The heating return pipe and the cold water supply pipe must be provided with tees with a short length of R250 (half hard) copper tube in the side port.
Fit the double check valve to the pipe from the mains supply pipe using the compression joint, which complies with BS EN 1252-2, ensuring that the flow through the valve is in the same direction as the arrow on the body.
Fit the ball valve to the pipe from the heating return using the compression joint.
Connect the flexible hose between the double check valve and ball valve and tighten the wing nuts to make water tight joints.
Open both ball valves and fill the system, when the pressure starts to increase on the cylinder unit pressure gauge partially close the ball valve on the double check valve to control the pressure to that specified by the cylinder unit installation manual.
Once filling and pressurisation have been completed, close both ball valves and remove the flexible hose.
If the flexible hose is removed it is recommended that caps (not supplied) are fitted to both valve connections to prevent any potential leakage.

Maintenance and service

Pressure reducing valve

Under normal circumstances the pressure reducing valve should not require any maintenance, but regular inspection and cleaning is recommended.
If the strainer or cartridge are damaged replace entire valve.

1. Isolate the water supply to the pressure reducing valve.
2. Unscrew anticlockwise the central calibration screw to decompress the spring.
3. Remove the plastic cover using a spanner on the hexagon faces.
4. Extract the cartridge with the aid of long nosed pliers to grip the head of the set screw.
5. Remove the strainer element.
   *If the strainer or cartridge are damaged replace item(s) accordingly.
6. Clean the strainer element and cartridge under clean running water.
7. Replace the strainer, cartridge and cover.
8. Turn on the water supply and check for leakage.
9. Re-calibrate the pressure reducing valve. (Rotate it clockwise to increase the outlet pressure and anticlockwise to reduce it.)



Expansion relief valve

Manually operate (rotate head anti-clockwise) the expansion relief valve to ensure free water flow through discharge port and connecting pipe.

Expansion vessel

The pre-charge gas pressure must be checked annually to make sure that the expansion vessel is in working order.
If water discharges through the expansion relief valve, it is possible that the expansion vessel's existing gas pre-charge pressure is too low.
Check this in the following manner:

1. Close the water supply.
2. Drain the sanitary circuit until the pressure is 0 bar.
3. Check the pre-charge.
4. Increase the gas pre-charge pressure with nitrogen/air to 3.5 bar.

Make sure that the pre-charge is not higher than the maximum working pressure.
If the expansion vessel cannot be pressurized, it is possible that the membrane has a leak.
If so, you must then replace the expansion vessel.

MITSUBISHI ELECTRIC

PARTS NAME : HIGH TEMP. THERMISTOR

PARTS No. : PAC-TH012HT-E

SALES MODEL CODE : 7H1THR7

MITSUBISHI ELECTRIC CORPORATION

INSTALLATION MANUAL

- Before starting installation, read the following description together with the installation manual included with the unit.
- Please read carefully and observe fully the following safety precautions.

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

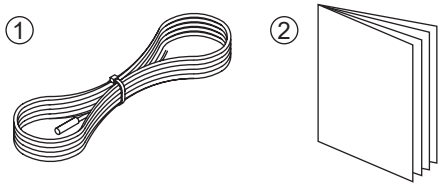
- After installation carry out a test run to ensure correct operation, then explain operation method and safety precautions to the end user. Tell your customers to keep this installation manual together with the operation manual, and when they give or sell this machine to any other person include this installation manual and operation manual with it.

⚠ WARNING

- Before installing any accessories on the unit ensure the unit is isolated from the power supply.
- Connections must be made securely and without tension on the terminals.
- All electrical work should be performed by a qualified technician according to local regulations and the instructions given in this manual.
- The flow temperature from boiler MUST NOT exceed 70 °C (*1).
- Before running Floor Dry-up function, disconnect IN4, IN5, IN11 and IN12 wirings. (*2)

  *1 When the temperature sensed by flow temp. thermistor or return temp. thermistor exceeds 80°C, FTC will detect it as overheat error.
  *2 High-temperature water produced by boiler operation could flow in and this could cause a big damage to the floor.
- Make sure to install the boiler that has overheat protection and output flow temperature control.

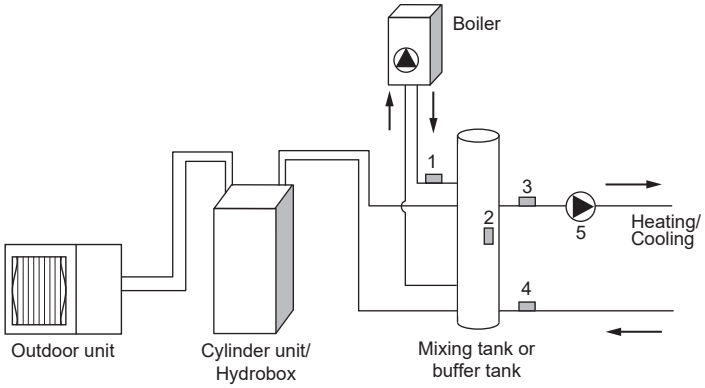
<Included items>



	Item	Piece
①	High temp. thermistor 5 m, color: black	1
②	Installation manual	1

■ Local system

The high temp. thermistor is used as the boiler flow temp. thermistor (THWB1) or the mixing tank temp. thermistor (THW10).



Number	Component
1	Boiler flow temp. thermistor (THWB1)
2	Mixing tank temp. thermistor (THW10)
3	Flow temp. thermistor (THW6) (option)
4	Return temp. thermistor (THW7) (option)
5	Circulation pump (local supply)

1. Boiler operation

FTC can control boiler only in space heating mode.
When boiler is running, the heating operation is regulated by the room thermostat connected to FTC.

IMPORTANT NOTE: Be sure to connect room thermostat to FTC.

1.1 Wiring for boiler control

<Thermistor inputs>

Name	Terminal block	Item	Optional part model
THW6	TBI.5 7-8	Thermistor (Zone1 flow water temp.) (Option)	PAC-TH011-E
THW7	TBI.5 5-6	Thermistor (Zone1 return water temp.) (Option)	
THWB1	TBI.6 7-8	Thermistor (Boiler flow water temp.)	PAC-TH012HT-E

<Outputs>
Connect OUT10 to boiler external input (Room thermostat).

Name	Terminal block	Item	OFF	ON	Signal/Max current
OUT10	TBO.3 1-2	Boiler output	OFF	ON	non-voltage contact • 220 - 240V AC (30V DC) 0.5 A or less • 10 mA 5V DC or more

Note: • OUT10 is separated by basic insulation from other external output signals in FTC.
• Connect the surge absorber according to the load at site.
• When the wires are wired to adjacent terminals, use ring terminals and insulate the wires.
• Do not splice the wiring to extend or shorten it, or this could affect correct monitoring of each temperature. If the wiring is too long, bundle it with a strap to adjust the length.

1.2 Dip switch setting

Set Dip SW1-1 and SW2-6 to ON .

Dip switch	Function	OFF	ON
SW1-1	Boiler	WITHOUT Boiler	WITH Boiler
SW2-6	Mixing tank	WITHOUT Mixing tank	WITH Mixing tank

1.3 Main controller setting

<Service menu> → “Heat source setting”
→ “Operation settings” → “Boiler operation”

Menu		Description
Heat source setting	Hybrid	Automatically switch "Heat pump" and "Boiler".
Hybrid settings	Outdoor ambient temp.	Set the ambient temperature to switch to Boiler operation.
	Priority mode	Set which one to prioritize (Ambient or Cost or CO_2).
	Outdoor ambient temp. rise	Difference in temperature to switch to Heat pump operation.
Intelligent settings	Energy price	Enter unit prices of electricity, and gas or oil (depending on boiler type) per 1 kWh.
	CO_2 emission	Enter CO_2 emission amount from electricity or boiler (gas or oil).
	Heat source	Enter outdoor unit capacity, electric heater capacity, and boiler efficiency.

2. Buffer tank control SG

Buffer tank control operates when heating (or cooling) function is active in the smart grid ready*.
* Refer to the installation manual of indoor unit.

2.1 Wiring for buffer tank control

<Thermistor inputs>

Name	Terminal block	Item	Optional part model
THW6	TBI.5 7-8	Thermistor (Zone1 flow water temp.) (Option)	PAC-TH011-E
THW7	TBI.5 5-6	Thermistor (Zone1 return water temp.) (Option)	
THW10	TBI.6 5-6	Thermistor (Mixing tank water temp.)	PAC-TH012HT-E

<Signal inputs>

Name	Terminal block	Item	OFF (open)	ON (short)
IN11	TBI.3 3-4	Smart grid ready input		
IN12	TBI.3 1-2			

IN11	IN12	Meaning
OFF (open)	OFF (open)	Normal operation
ON (short)	OFF (open)	Switch-on recommendation
OFF (open)	ON (short)	Switch-off command
ON (short)	ON (short)	Switch-on command

2.2 Dip switch setting

Set Dip SW2-6 to ON.

Dip switch	Function	OFF	ON
SW2-6	Mixing tank	WITHOUT Mixing tank	WITH Mixing tank

2.3 Main controller setting

<Service menu> → “Operation settings” → “Smart grid ready”

Name			Description
Heating	Target temp.		Target temp. of "Switch-on recommendation".
			Target temp. of "Switch-on command".
Cooling	Target temp.		Target temp. of "Switch-on recommendation".
			Target temp. of "Switch-on command".
Pump cycles	On/Off		When set to "On", the water circulation pump is operated intermittently according to the heat storage temp. of the buffer tank.
	Interval		Re-judgment of the pump on/off time.

MITSUBISHI ELECTRIC

PARTS NAME : HIGH TEMP. THERMISTOR

PARTS No. : PAC-TH012HTL-E

SALES MODEL CODE : 7H1THR8

MITSUBISHI ELECTRIC CORPORATION

INSTALLATION MANUAL

- Before starting installation, read the following description together with the installation manual included with the unit.
- Please read carefully and observe fully the following safety precautions.

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

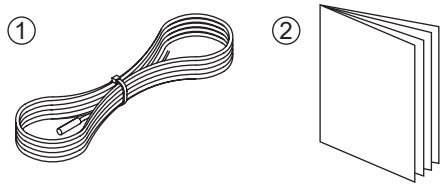
- After installation carry out a test run to ensure correct operation, then explain operation method and safety precautions to the end user. Tell your customers to keep this installation manual together with the operation manual, and when they give or sell this machine to any other person include this installation manual and operation manual with it.

⚠ WARNING

- Before installing any accessories on the unit ensure the unit is isolated from the power supply.
- Connections must be made securely and without tension on the terminals.
- All electrical work should be performed by a qualified technician according to local regulations and the instructions given in this manual.
- The flow temperature from boiler MUST NOT exceed 70 °C (*1).
- Before running Floor Dry-up function, disconnect IN4, IN5, IN11 and IN12 wirings. (*2)

  *1 When the temperature sensed by flow temp. thermistor or return temp. thermistor exceeds 80°C, FTC will detect it as overheat error.
  *2 High-temperature water produced by boiler operation could flow in and this could cause a big damage to the floor.
- Make sure to install the boiler that has overheat protection and output flow temperature control.

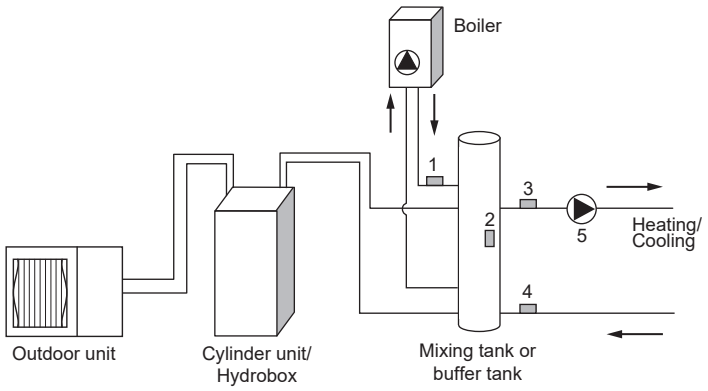
<Included items>



	Item	Piece
①	High temp. thermistor 30 m, color: black	1
②	Installation manual	1

■ Local system

The high temp. thermistor is used as the boiler flow temp. thermistor (THWB1) or the mixing tank temp. thermistor (THW10).



Number	Component
1	Boiler flow temp. thermistor (THWB1)
2	Mixing tank temp. thermistor (THW10)
3	Flow temp. thermistor (THW6) (option)
4	Return temp. thermistor (THW7) (option)
5	Circulation pump (local supply)

1. Boiler operation

FTC can control boiler only in space heating mode.
When boiler is running, the heating operation is regulated by the room thermostat connected to FTC.

IMPORTANT NOTE: Be sure to connect room thermostat to FTC.

1.1 Wiring for boiler control

<Thermistor inputs>

Name	Terminal block	Item	Optional part model
THW6	TBI.5 7-8	Thermistor (Zone1 flow water temp.) (Option)	PAC-TH011-E
THW7	TBI.5 5-6	Thermistor (Zone1 return water temp.) (Option)	
THWB1	TBI.6 7-8	Thermistor (Boiler flow water temp.)	PAC-TH012HTL-E

<Outputs>
Connect OUT10 to boiler external input (Room thermostat).

Name	Terminal block	Item	OFF	ON	Signal/Max current
OUT10	TBO.3 1-2	Boiler output	OFF	ON	non-voltage contact • 220 - 240V AC (30V DC) 0.5 A or less • 10 mA 5V DC or more

Note: • OUT10 is separated by basic insulation from other external output signals in FTC.
• Connect the surge absorber according to the load at site.
• When the wires are wired to adjacent terminals, use ring terminals and insulate the wires.
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1.2 Dip switch setting

Set Dip SW1-1 and SW2-6 to ON .

Dip switch	Function	OFF	ON
SW1-1	Boiler	WITHOUT Boiler	WITH Boiler
SW2-6	Mixing tank	WITHOUT Mixing tank	WITH Mixing tank

1.3 Main controller setting

<Service menu> → “Heat source setting”
→ “Operation settings” → “Boiler operation”

Menu		Description
Heat source setting	Hybrid	Automatically switch "Heat pump" and "Boiler".
Hybrid settings	Outdoor ambient temp.	Set the ambient temperature to switch to Boiler operation.
	Priority mode	Set which one to prioritize (Ambient or Cost or CO_2).
	Outdoor ambient temp. rise	Difference in temperature to switch to Heat pump operation.
Intelligent settings	Energy price	Enter unit prices of electricity, and gas or oil (depending on boiler type) per 1 kWh.
	CO_2 emission	Enter CO_2 emission amount from electricity or boiler (gas or oil).
	Heat source	Enter outdoor unit capacity, electric heater capacity, and boiler efficiency.

2. Buffer tank control SG

Buffer tank control operates when heating (or cooling) function is active in the smart grid ready*.
* Refer to the installation manual of indoor unit.

2.1 Wiring for buffer tank control

<Thermistor inputs>

Name	Terminal block	Item	Optional part model
THW6	TBI.5 7-8	Thermistor (Zone1 flow water temp.) (Option)	PAC-TH011-E
THW7	TBI.5 5-6	Thermistor (Zone1 return water temp.) (Option)	
THW10	TBI.6 5-6	Thermistor (Mixing tank water temp.)	PAC-TH012HTL-E

<Signal inputs>

Name	Terminal block	Item	OFF (open) / ON (short)
IN11	TBI.3 3-4	Smart grid ready input	
IN12	TBI.3 1-2		

IN11	IN12	Meaning
OFF (open)	OFF (open)	Normal operation
ON (short)	OFF (open)	Switch-on recommendation
OFF (open)	ON (short)	Switch-off command
ON (short)	ON (short)	Switch-on command

2.2 Dip switch setting

Set Dip SW2-6 to ON.

Dip switch	Function	OFF	ON
SW2-6	Mixing tank	WITHOUT Mixing tank	WITH Mixing tank

2.3 Main controller setting

<Service menu> → “Operation settings” → “Smart grid ready”

Name			Description
Heating	Target temp.		Target temp. of "Switch-on recommendation".
			Target temp. of "Switch-on command".
Cooling	Target temp.		Target temp. of "Switch-on recommendation".
			Target temp. of "Switch-on command".
Pump cycles	On/Off		When set to "On", the water circulation pump is operated intermittently according to the heat storage temp. of the buffer tank.
	Interval		Re-judgment of the pump on/off time.

MITSUBISHI ELECTRIC

ATW INDOOR UNIT OPTIONAL PARTS
2 ZONE KIT
PAC-TZ02-E

INSTALLATION MANUAL

- This 2 zone kit MUST be used with Cylinder unit or Hydrobox **except for E*SE models**.
- Before starting installation, read the following description together with the installation manual included with the Cylinder unit (Hydrobox).
- Please read carefully and observe fully the following safety precautions.

⚠ WARNING	Precaution that must be observed to prevent injuries or death.
⚠ CAUTION	Incorrect handling could lead to injury or damage to house and household articles.

- After installation, carry out a test run to ensure correct operation, then explain operation method and safety precautions to the end user.
  Tell your customers to keep this installation manual, and when they give or sell this machine to any other person include this installation manual with it.

⚠ WARNING

- If Cylinder unit (Hydrobox) has already been connected to the power supply, ensure circuit breaker is off before carrying out electrical work.
- If the 2 zone kit is installed incorrectly or modified after installation by the user, water may leak or 2 zone kit may fall from Cylinder unit or wall.
- All installation should be performed by a qualified technician according to local regulations and the instructions given in this manual.
- Connections must be made securely and without tension on the terminals.

⚠ CAUTION

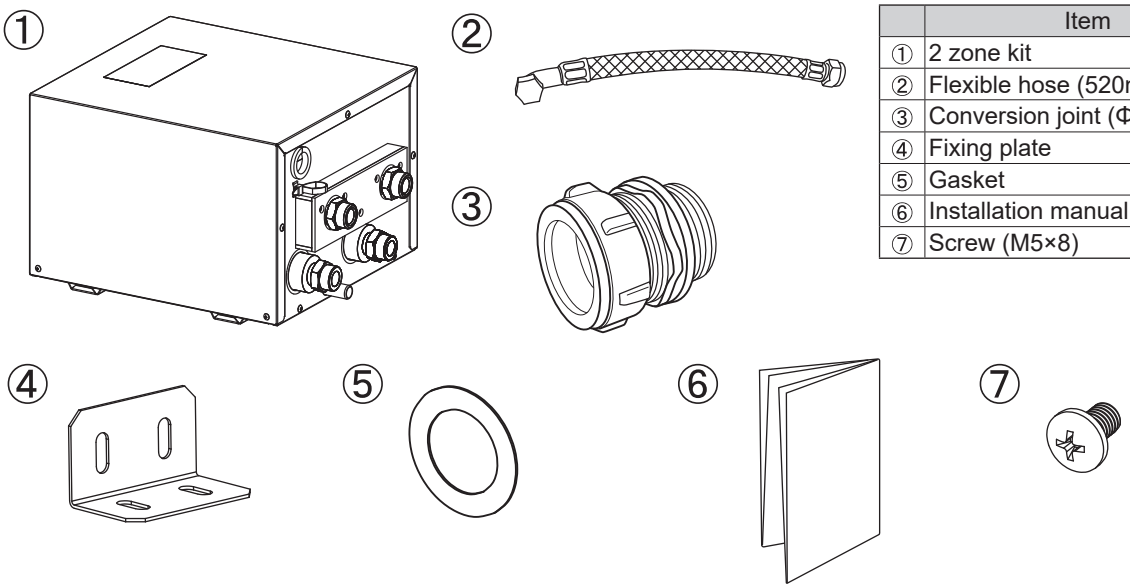
- The 2 zone kit must be installed by 2 or more people.
- All exposed water pipework should be insulated to prevent unnecessary heat loss and condensation.
- To also use the 2 zone kit in Cooling mode, securely apply heat-insulation to draining pipework. If heat-insulation is inadequate, condensation could occur on the surface of pipes and dew could drop on the floor or important goods.
- To prevent dirty water from draining onto the floor next to Cylinder unit or under Hydrobox, please connect appropriate discharge pipework from the 2 zone kit to its disposal location.
- Secure 2 zone kit to prevent it from falling.
- Do not hold piping or drain socket when moving the 2 zone kit.
- Avoid the connection of piping or drain socket from damage. Otherwise, it may cause water leakage.
- To prevent incorrect installation, please connect the flexible hose at the bend radius of 150 mm or more.
- The water flow rate between the Cylinder unit (Hydrobox) and the 2 zone kit must be greater than the total flow rate of Zone1 and Zone2. Otherwise, Zone1 and Zone2 may not be heated properly.

■ Disposal of the Unit

<Figure 1.1>

Note: This symbol mark is for EU countries only.
This symbol mark is according to the directive 2012/19/EU Article 14 Information for users and Annex IX, and/or to the directive 2006/66/EC Article 20 Information for end-users and Annex II.
Your Mitsubishi Electric heating system products have been manufactured with high quality materials and components which can be recycled and/or reused. The symbol in Figure 1.1 means that electrical and electronic equipment, batteries and accumulators at the end of their life, should be disposed of separately from your household waste.
If a chemical symbol is printed beneath the symbol (Figure 1.1), this chemical symbol means that the battery or accumulator contains a heavy metal at a certain concentration. This is indicated as follows;
Hg: mercury (0.0005%), Cd: cadmium (0.002%), Pb: lead (0.004%)
In the European Union there are separate collection systems for used electrical and electronic products, batteries and accumulators.
Please dispose of this equipment, batteries and accumulators correctly at your local community waste collection/recycling centre.
Contact your local Mitsubishi Electric dealer for country-specific details on disposal.
Please, help us to conserve the environment we live in.

Contents

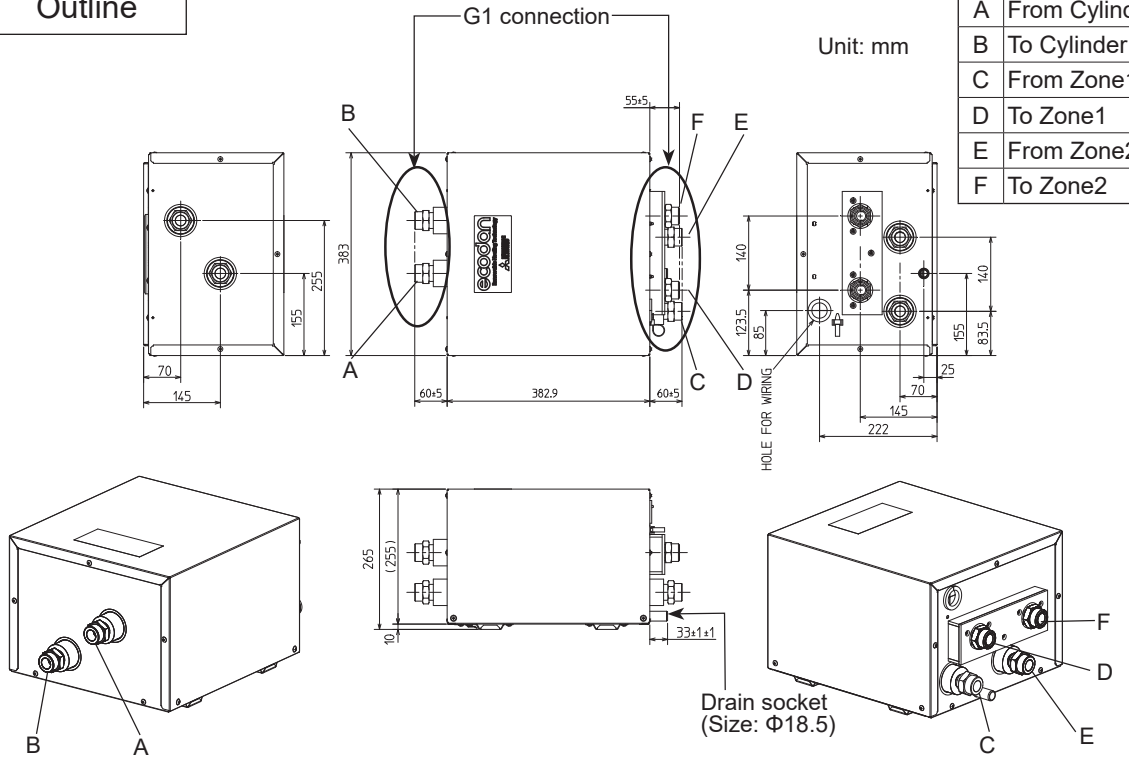


	Item	Q'ty
①	2 zone kit	1
②	Flexible hose (520mm)	2
③	Conversion joint (Φ28 → G1)	2
④	Fixing plate	2
⑤	Gasket	4
⑥	Installation manual	1
⑦	Screw (M5×8)	2

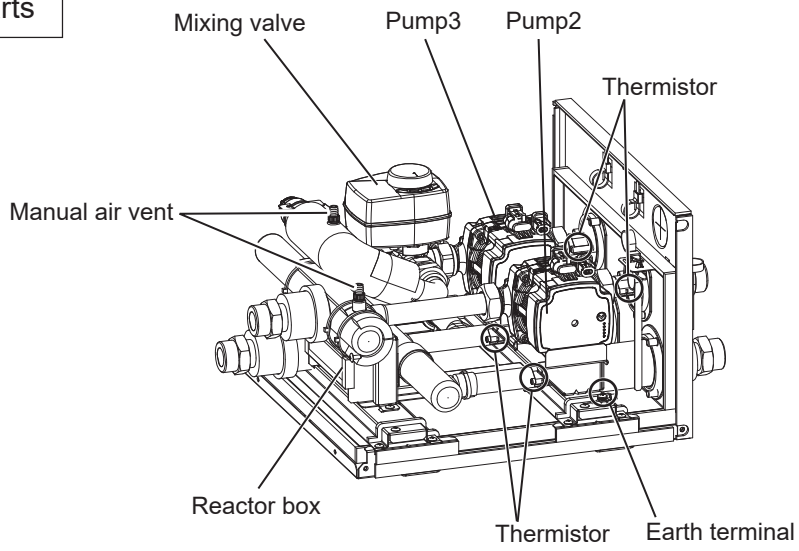
Outline

Unit: mm

A	From Cylinder unit (Hydrobox)
B	To Cylinder unit (Hydrobox)
C	From Zone1
D	To Zone1
E	From Zone2
F	To Zone2



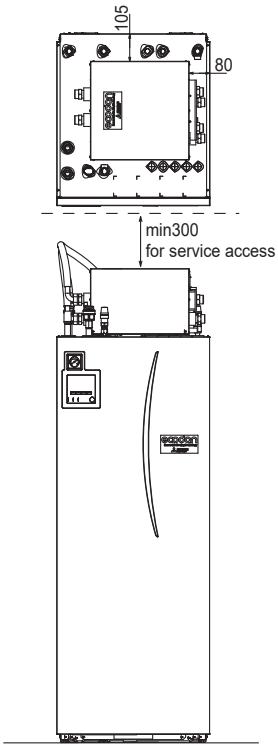
Component parts



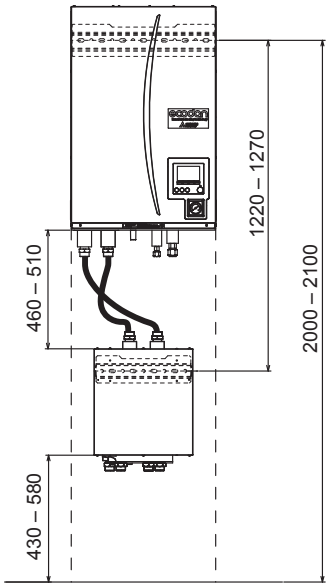
Installation position

Unit: mm

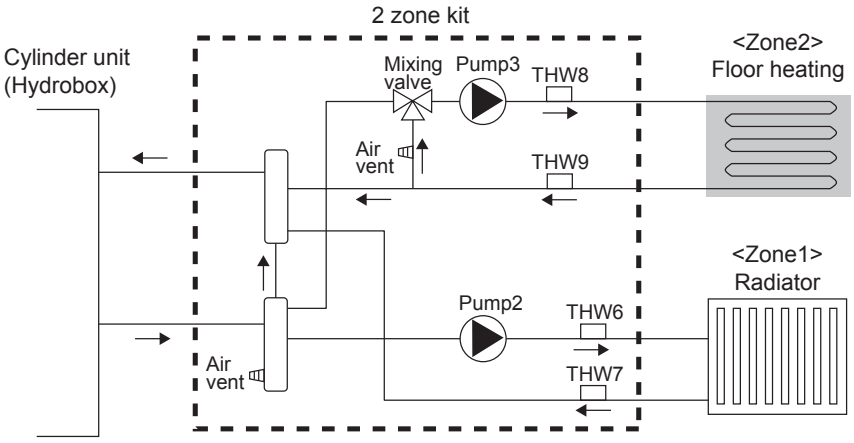
<Cylinder unit>



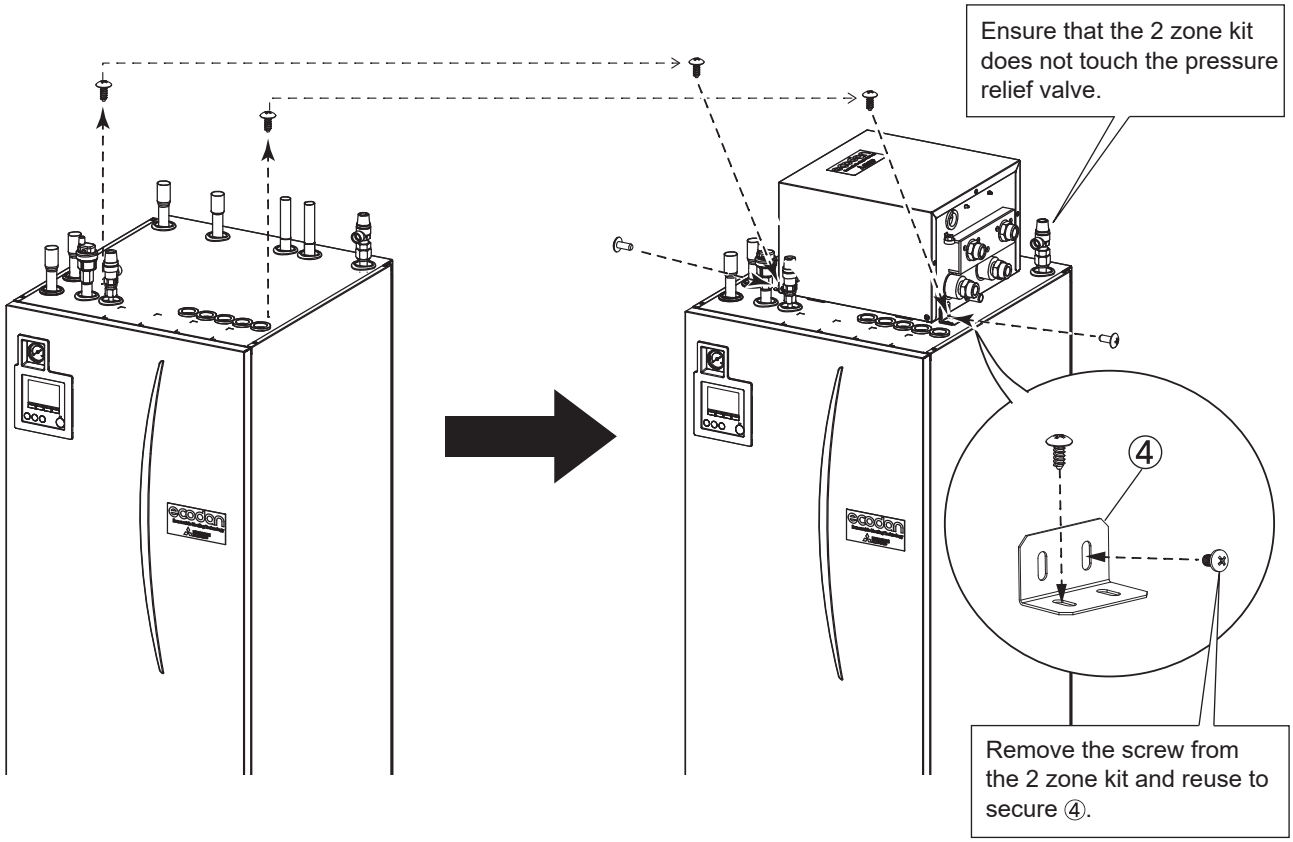
<Hydrobox>



Water circuit and system figure

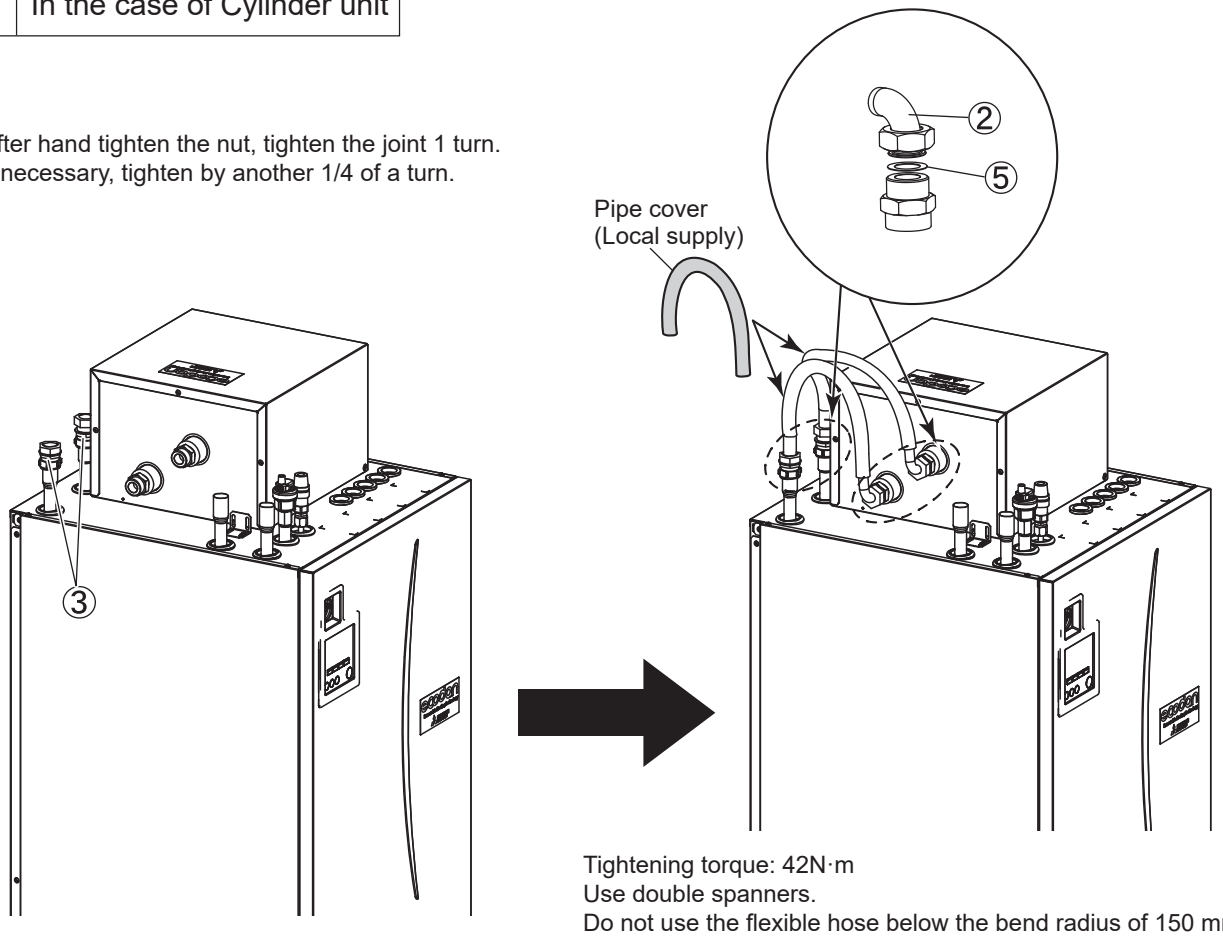


1 In the case of Cylinder unit



2 In the case of Cylinder unit

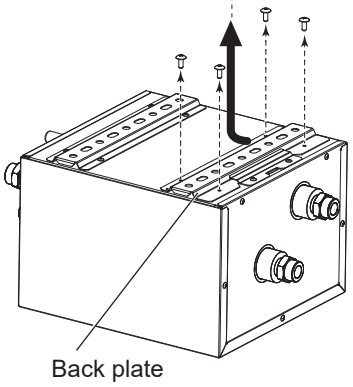
After hand tighten the nut, tighten the joint 1 turn.
If necessary, tighten by another 1/4 of a turn.



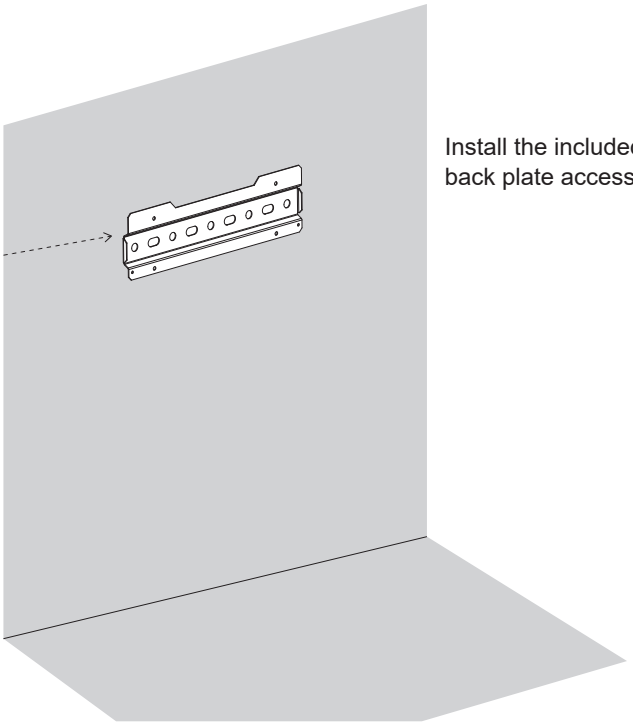
Tightening torque: 42N·m
Use double spanners.
Do not use the flexible hose below the bend radius of 150 mm.

1 In the case of Hydrobox

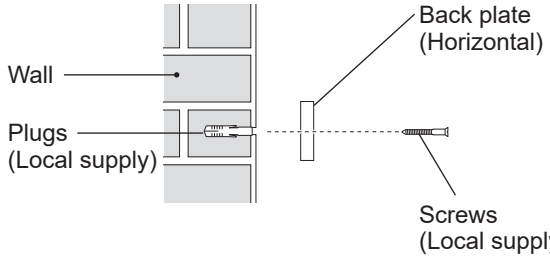
1.
Remove the back plate from the top of the 2-zone kit.



2.
Install the included back plate accessory.



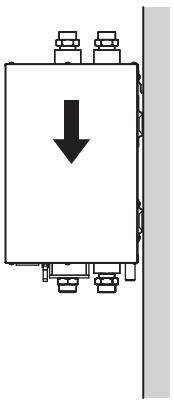
<Side view>



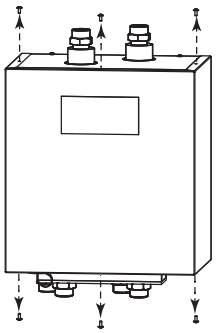
- Ensure that the notch is positioned at the TOP of the back plate. The back plate is provided with screw mounting holes that are round or oval. To prevent the 2-zone kit from falling off the wall, choose the appropriate number of holes or hole positions and horizontally secure the back plate to the appropriate wall location.

2 In the case of Hydrobox

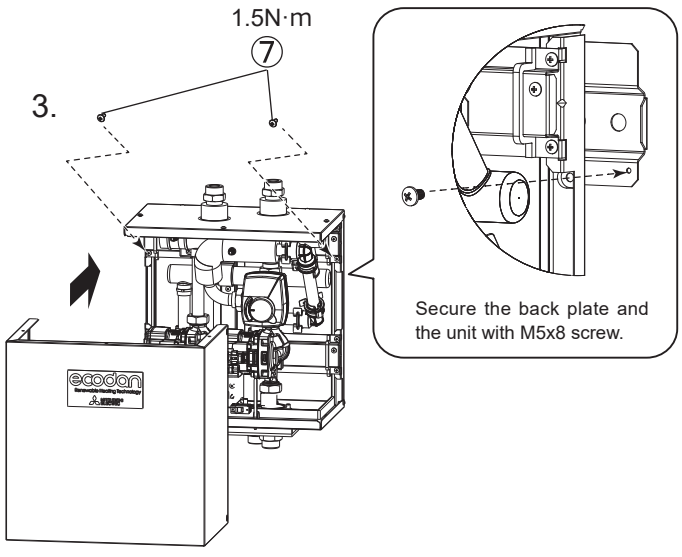
1.



2.

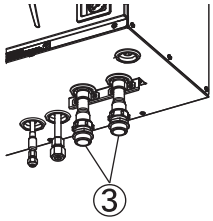


3.

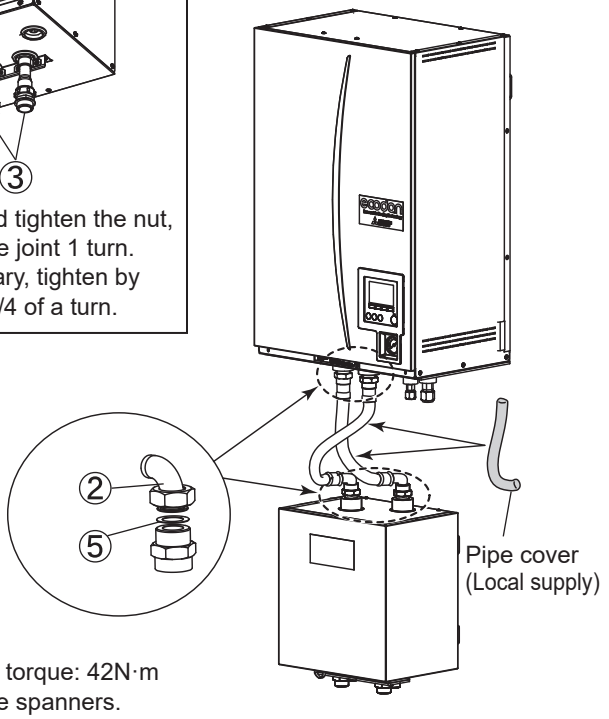


3 In the case of Hydrobox

Heating only model



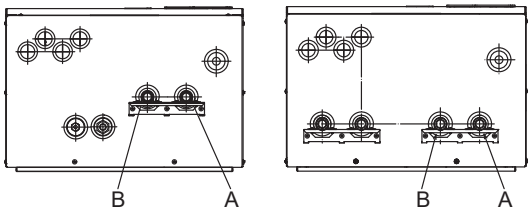
After hand tighten the nut, tighten the joint 1 turn.
If necessary, tighten by another 1/4 of a turn.



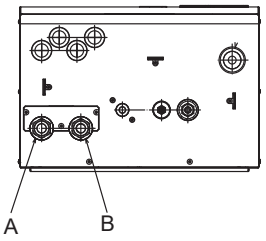
Tightening torque: 42N·m
Use double spanners.
Do not use the flexible hose below the bend radius of 150 mm.

<View from below>

Heating only model



Heating and cooling model

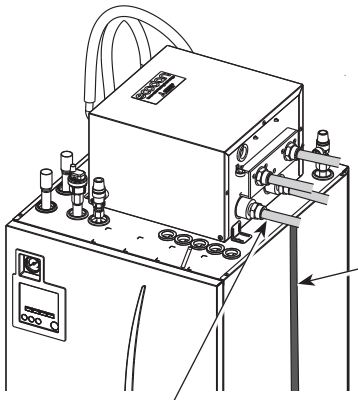


Letter	Pipe description
A	Space heating/Indirect DHW tank (primary) return connection
B	Space heating/Indirect DHW tank (primary) flow connection

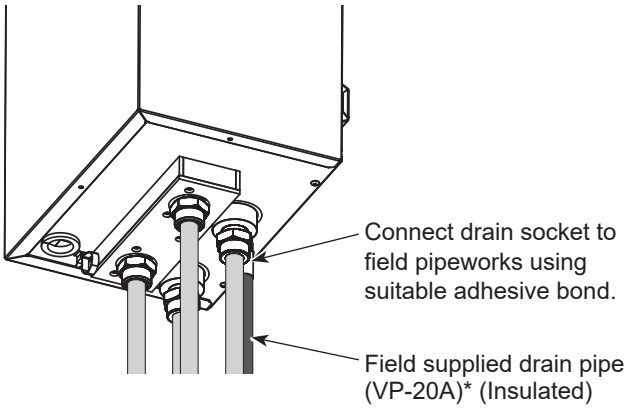
Drain piping

Connect the drain pipe only for Heating/Cooling models.

<Cylinder unit>



<Hydrobox>



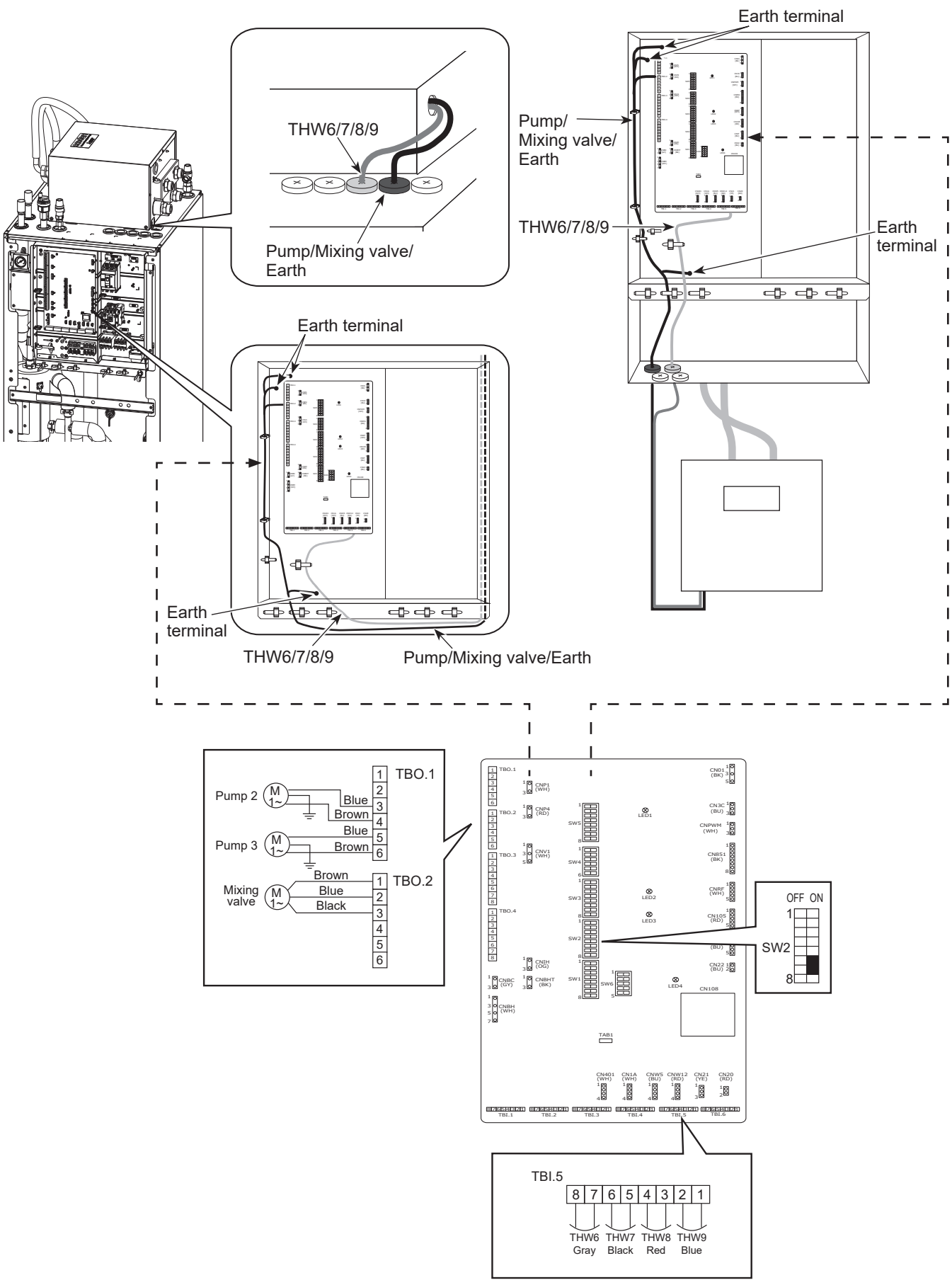
NOTE
- Please use PVC pipe for drain piping.
- Use only compatible adhesive/glue for pipe joint.
- For proper drain-off, install pipework with gradient/fall of min. 1/100.
- Install pipe to fall continuously without bowing.
- Do not install any air purge points on condensate drain pipe run.
- Condensate drain pipe must discharge to suitable and safe outlet location. It should not be directly connected to any sewer-connected pipework that may introduce sulphurous gases/smells to the building.

* “VP-20” is a PVC pipe with an outside diameter of 26 mm and an inside diameter of 20 mm.

Wiring

<Cylinder unit>

<Hydrobox>



DIP Switch settings of Cylinder unit (Hydrobox)

Setting the following DIP switches are necessary for 2 zone control. (See the installation manual of Cylinder unit (Hydrobox) for more information.)

DIP switch	Function	OFF	ON	Setting when using 2 zone kit
SW2-6	Mixing tank	WITHOUT Mixing tank	WITH Mixing tank	ON
SW2-7	2-zone temperature control	Inactive	Active *	ON

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

Specifications

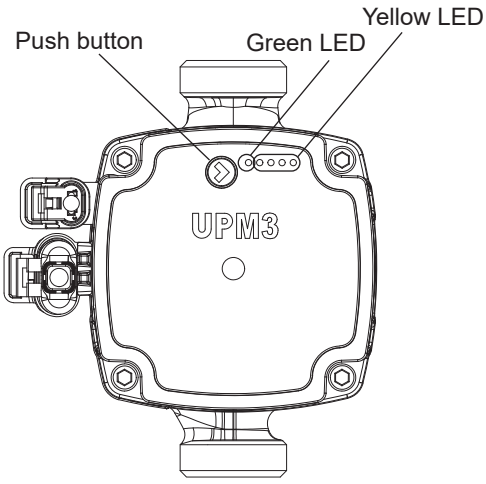
Model name	PAC-TZ02-E
Dimension	265mm × 383mm × 383mm
Weight	17kg
Power supply	230V/single phase/50Hz from Cylinder unit (Hydrobox)
Sound pressure level	28dB(A)
Sound power level	40dB(A)
Pump2, 3	Max. 52W/0.52A
	Max. head 7.0m *1
Mixing valve	5W
	Running time 90° 120s
Water flow rate range	Depend on outdoor unit

Note:

- Max. flow rate is 36.9L/min. If the flow rate exceeds 36.9L/min, pipes would be eroded.
- The water flow rate between the Cylinder unit (Hydrobox) and the 2 zone kit must be greater than the total flow rate of Zone1 and Zone2.

Pump performance view

Display	Performance in % of MAX consumption
One green LED	0
One green LED + one yellow LED	0-25
One green LED + two yellow LED	25-50
One green LED + three yellow LED	50-75
One green LED + four yellow LED	75-100



Pump key lock function

If you press the button for more than 10 seconds, you can toggle between enabling/disabling the key lock function.

Pump setting selection

You can check the setting by pressing the push button.
If you presS the button for 2 to 10 seconds, the user interface switches to “setting selection” if the user interface is unlocked.
You can change the settings as below table.

Mode	LED1 green	LED2 green	LED3 yellow	LED4 yellow	LED5 yellow
PP1	●		●		
PP2	●		●	●	
PP3	●		●	●	●
PP AA	●				
CP1		●	●		
CP2		●	●	●	
CP3		●	●	●	●
CP AA		●			
CC1			●		
CC2			●	●	
CC3			●	●	●

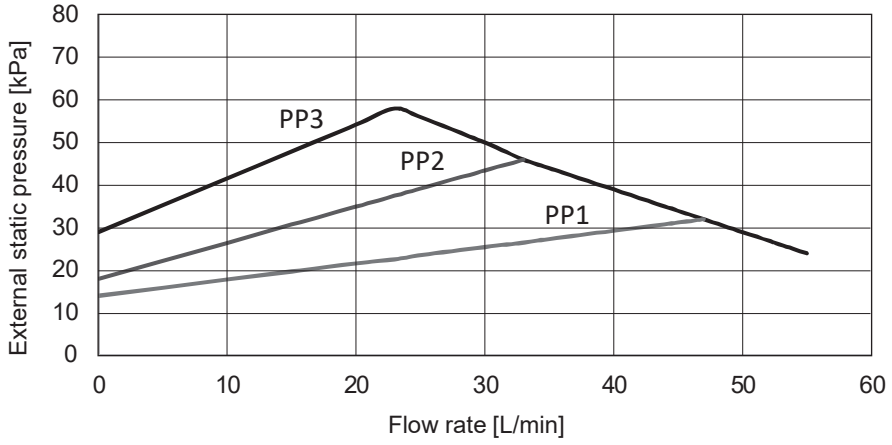
PP: Proportional Pressure

The head (pressure) is reduced at falling heat demand and increased at rising heat demand.

PP1: lowest proportional pressure curve
PP2: intermediate proportional pressure curve
PP3: highest proportional pressure curve
PP Auto Adapt: highest to lowest proportional pressure curve

The Auto Adapt function enables the circulator to adjust the pump performance automatically to the size of the system or the variations in load over time.

<Proportional Pressure>



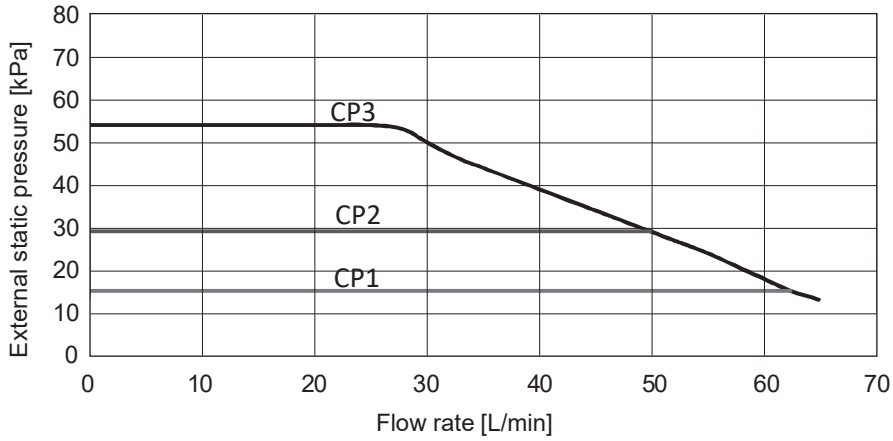
CP: Constant Pressure

The head (pressure) is kept constant, irrespective of the heat demand.

CP1: lowest constant pressure curve
CP2: intermediate constant pressure curve
CP3: highest constant pressure curve
CP Auto Adapt: highest to lowest constant pressure curve

The Auto Adapt function enables the circulator to adjust the pump performance automatically to the size of the system or the variations in load over time.

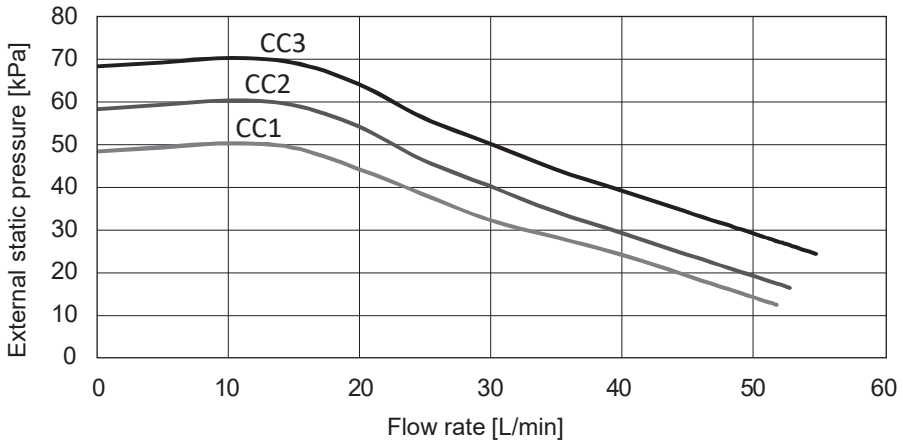
<Constant Pressure>



CC: Constant Curve

The circulator runs on a constant curve.

<Constant Curve>



MITSUBISHI ELECTRIC

PARTS NAME : PRESSURE SENSOR

PARTS No. : PAC-PS01-E

SALES MODEL CODE : 7H1PS01

MITSUBISHI ELECTRIC CORPORATION

INSTALLATION MANUAL

- Before starting installation, read the following description together with the installation manual included with the unit.
- Please read carefully and observe fully the following safety precautions.

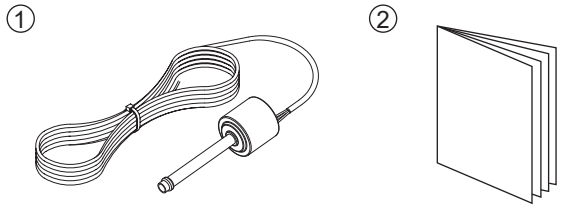
⚠ WARNING	Precautions that must be observed to prevent injuries or death.

- After installation carry out a test run to ensure correct operation, then explain operation method and safety precautions to the end user. Tell your customers to keep this installation manual together with the operation manual, and when they give or sell this machine to any other person include this installation manual and operation manual with it.

⚠ WARNING

- Before installing any accessories on the unit ensure the unit is isolated from the power supply.
- Connections must be made securely and without tension on the terminals.
- All electrical work should be performed by a qualified technician according to local regulations and the instructions given in this manual.
- Do not remodel this part.

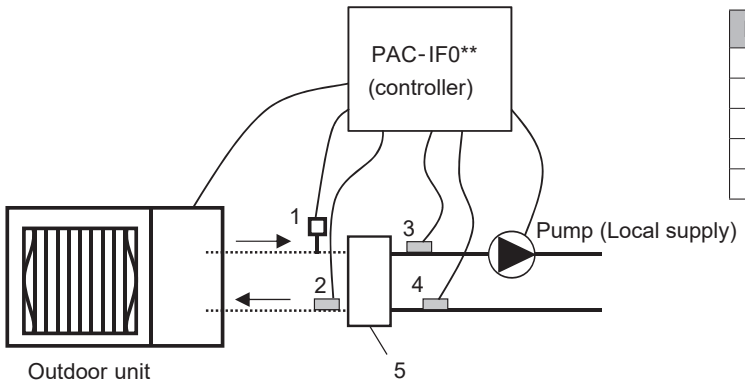
<Included items>



	Item	Piece
①	Pressure sensor 1.9 m	1
②	Installation manual (This paper)	1

■ Local system

Install the pressure sensor on the flow side of the refrigerant pipe.



Number	Component
1	Pressure sensor
2	Refrigerant liquid temp. thermistor (TH2)
3	Flow temp. thermistor (THW1)
4	Return temp. thermistor (THW2)
5	Plate heat exchanger (local supply)

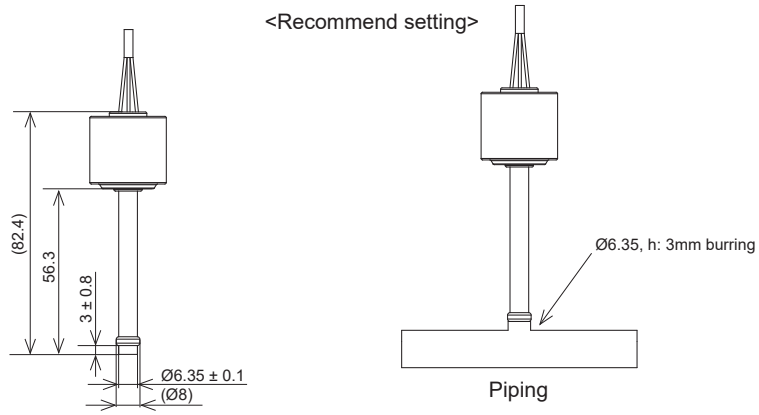
<Note>

Be sure to set this optional part when the combination of the below models are set.

▪ Outdoor unit: SUZ-SWM**VA ▪ Indoor unit: PAC-IF071B-E
PAC-IF033****-E

1. Pipe work

Install the pressure sensor following the Note below.



<Note>

- Install the sensor within 0.4 m from the plate heat exchanger.
- When brazing the pipe, keep the temperature around the cap at 100 °C or lower. Failure to do so could impair waterproof performance of the pressure sensor.
- When wiring, please do not touch the terminals while live, otherwise the pressure sensor could be damaged by static electricity.
- Please do not install the pressure sensor anywhere that may come into contact with water.
- Please do not apply any stress (e.g. bending stress, pulling stress, or impact shock) to the electric wire. Failure to do so could break or damage the electric wire.

2. Electrical work

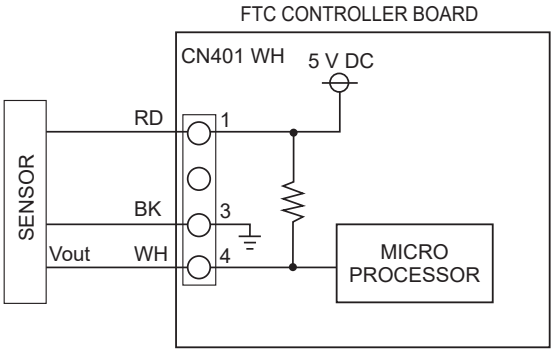
Model	Connector	Item
PAC-IF07*B-E	CN401	Pressure sensor
PAC-IF033****-E	CN401	Pressure sensor

3. Dip switch setting

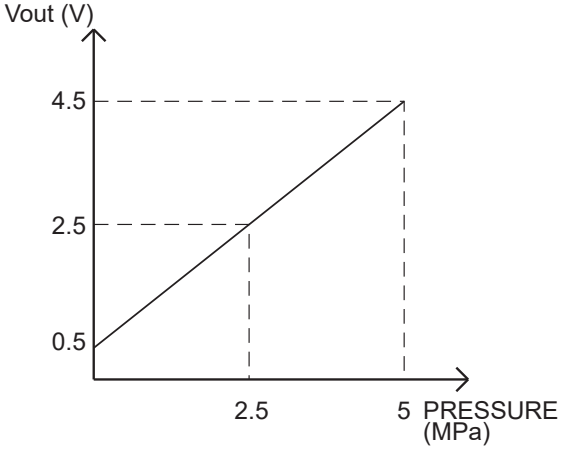
Model	Dip switch	Function	OFF	ON
PAC-IF071B-E	SW6-3	Pressure sensor	Inactive	Active
PAC-IF033****-E	SW4-1	Pressure sensor	Inactive	Active

4. Specifications

Ambient temperature range	-30 to 100 °C
Fluid temperature range	-30 to 120 °C



①-③ : 5 V (DC)
③-④ : Output Vout (DC)



MITSUBISHI ELECTRIC

PARTS NAME : FLOW SENSOR

PARTS No. : PAC-FS01-E

SALES MODEL CODE : 7H1FS01

MITSUBISHI ELECTRIC CORPORATION

INSTALLATION MANUAL

- Before starting installation, read the following description together with the installation manual included with the unit.
- Please read carefully and observe fully the following safety precautions.

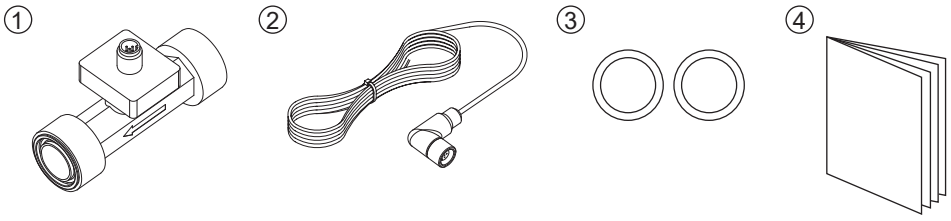
⚠ WARNING	Precautions that must be observed to prevent injuries or death.

- After installation carry out a test run to ensure correct operation, then explain operation method and safety precautions to the end user. Tell your customers to keep this installation manual together with the operation manual, and when they give or sell this machine to any other person include this installation manual and operation manual with it.

⚠ WARNING

- Before installing any accessories on the unit ensure the unit is isolated from the power supply.
- Connections must be made securely and without tension on the terminals.
- All electrical work should be performed by a qualified technician according to local regulations and the instructions given in this manual.
- Do not remodel this part.

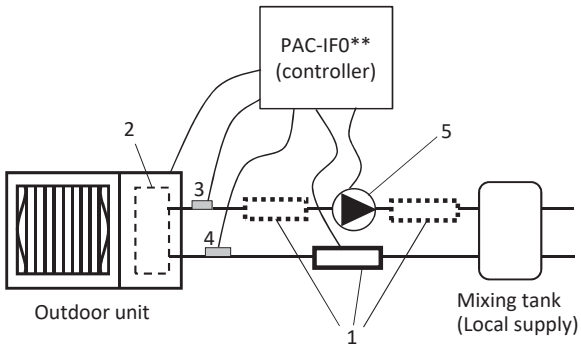
<Included items>



	Item	Piece
①	Flow sensor body	1
②	Flow sensor cable 5 m, color: black	1
③	O-ring	2
④	Installation manual (This paper)	1

■ Local system

Install the flow sensor between the mixing tank and the plate heat exchanger when using the mixing tank.



Number	Component
1	Flow sensor
2	Plate heat exchanger
3	Flow temp. thermistor (THW1)
4	Return temp. thermistor (THW2)
5	Circulation pump (local supply)

<Note>

Be sure to install this optional part when the combination of the below models are set.

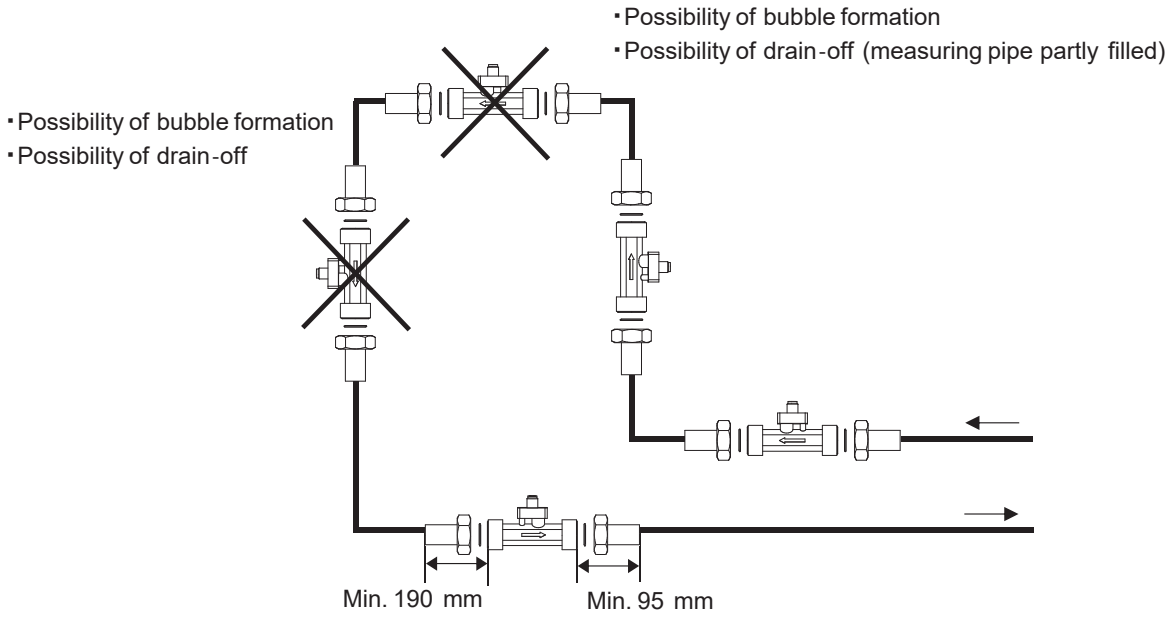
▪ Outdoor unit: PUZ-(H)WM****A ▪ Indoor unit: PAC-IF072B-E
PAC-IF033****-E

Install this flow sensor optionally for the combination of the below models.

▪ Outdoor unit: SUZ-SWM**VA ▪ Indoor unit: PAC-IF071B-E
PUD-S(H)WM***AA PAC-IF033****-E
PUHZ-S(H)W*****A

1.Installation

The unit can be installed in both horizontal as well as vertical pipelines.
The flow sensor is only suitable for use in fully filled piping.



<Note>
▪ The length of the inlet section should be at least 190 mm and the length of the outlet section should be at least 95 mm.

2. Electrical work

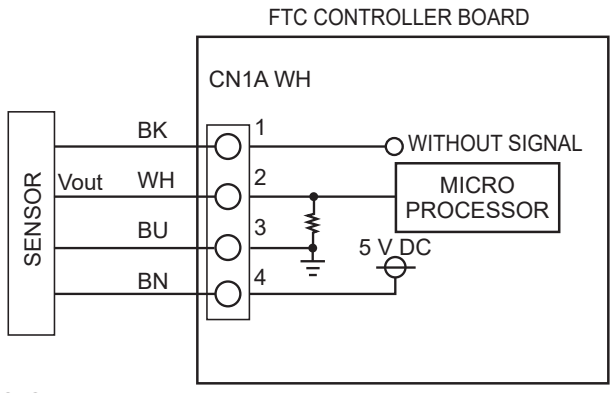
Model	Signal name	Terminal block	Connector	Item
PAC-IF07*B-E	INA1	TBI.4 1-3	CN1A	Flow sensor
PAC-IF033****-E	—	—	CN1A	Flow sensor

3. Dip switch setting

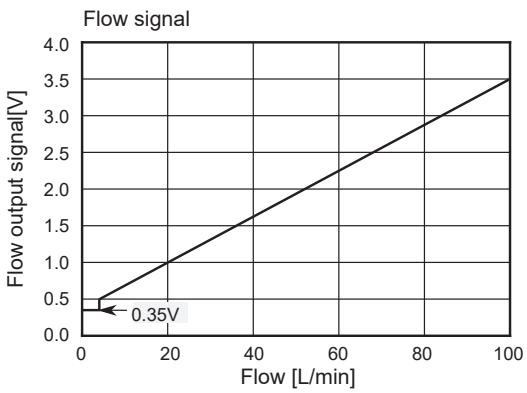
Model	Dip switch	Function	OFF	ON
PAC-IF07*B-E	SW2-8	Flow sensor	WITHOUT Flow sensor	WITH Flow sensor
PAC-IF033****-E	SW4-2	Flow sensor	WITHOUT Flow sensor	WITH Flow sensor

4. Specifications

Ambient temperature range	0 to 70 °C
Fluid temperature range	5 to 90 °C



④-③ : 5 V (DC)
②-③ : Output Vout (DC)



Optional parts

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Specifications are subject to change without notice.