

Service Technical Book



Sanden Heat Pump Water Heater with Natural Refrigerant (CO₂)

GAUS-315EQTA

Heat Pump Unit GAU-A45HPA
Tank Unit GAU-315EQTA



Heat Pump Unit
GAU-A45HPA



Tank Unit
GAU-315EQTA

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PATENTS

This water heater may be protected by one or more patents or registered designs in the name of Sanden Australia Pty. Ltd.

TRADE MARKS

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Note: Every care has been taken to ensure accuracy in preparation of this publication. No liability can be accepted for any consequences that may arise as a result of its application.

1. Product Specifications

■ System GAUS-315EQTA	
Location	outdoor
Power Supply	
voltage (single phase)	240 V ^{+6%} _{-6%}
frequency	50 Hz (47 to 52 Hz)
Ambient Temperature	-10 to 43 °C
Separation - Tank to HP (maximum)	4 m
Water Quality	60~200 mg/L
Programming/Error Display	locate in heat pump structure (under top cover)
Water Resistance	IPX4
Approval	Electrical Approval (C-tick)
	Water Approval
	Performance Approval
	AS2712

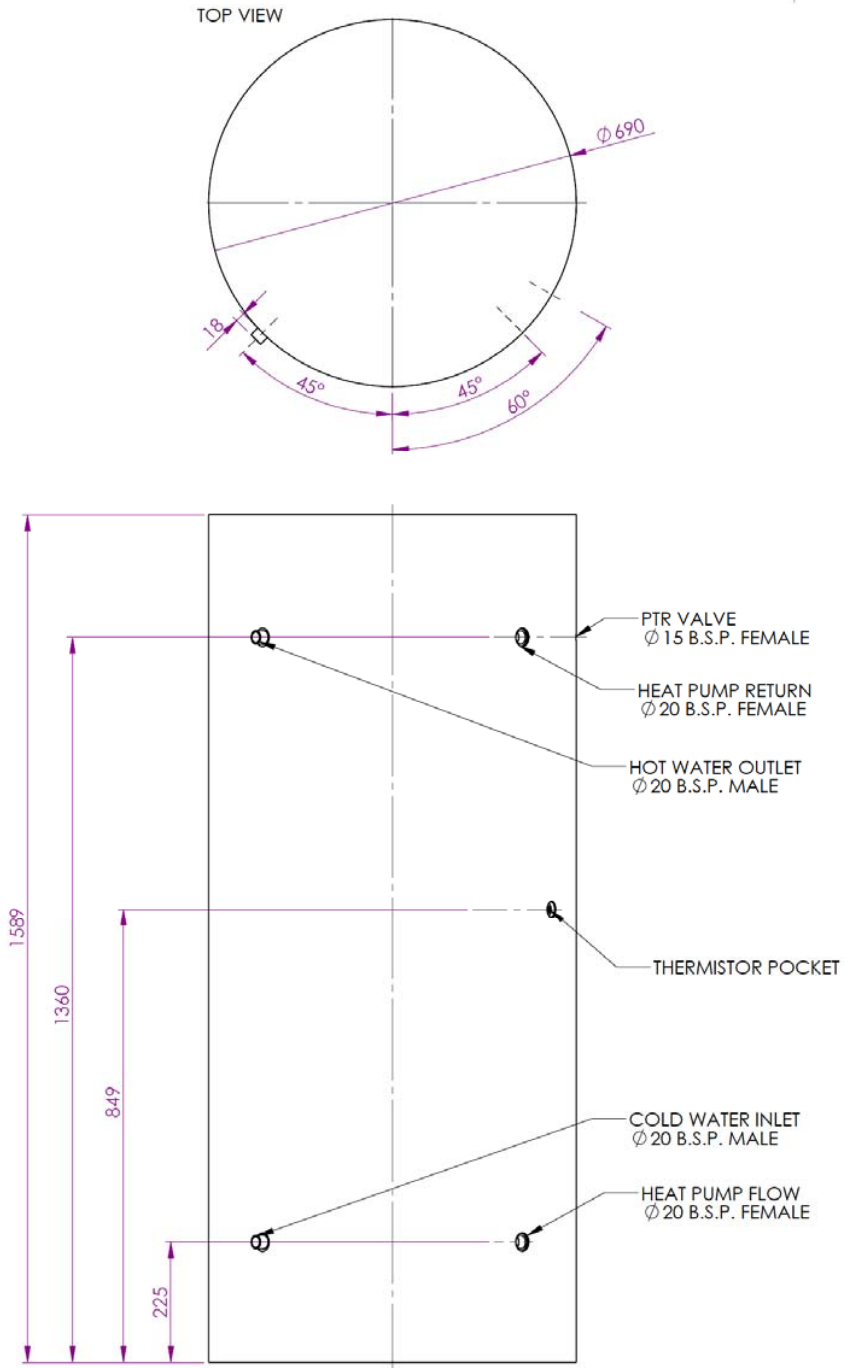
■ Heat Pump Unit GAU-A45HPA	
Refrigerant / Mass	R744 / 715g
Size (H X W X D)	754 × 828 × 283 mm
Weight	56kg
Heat Capacity / Power Consumption	
Mid Season *1	4.5kW / 1.00kW
Delivered Hot Water Temperature	65°C (Constant Temperature)
Operation Noise	Mid Season *1 : 38dB (A)

■ Tank Unit GAU-315EQTA	
Location	outdoor
Tank Capacity	315 litre
Shape	cylindrical
Height	1589 mm
Weight	89.4kg
Working Pressure (maximum)	700 kPa
Target Storage Temperature	65 Deg C
Pressure Reducer	650kPa
Pressure Temperature Relief Valve	700 kPa / 99 °C
One thermistor	150L Position

*1 Ambient Temp. (Dry / Wet) 16°C / 17°C, Inlet Water Temp. 17°C, Outlet Water Temp. 65°C

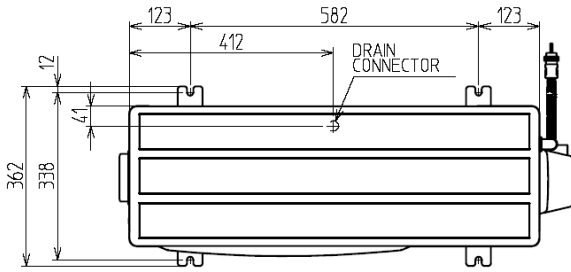
2. Dimension Outlines

Hot Water Storage Tank unit GAU-315EQTA

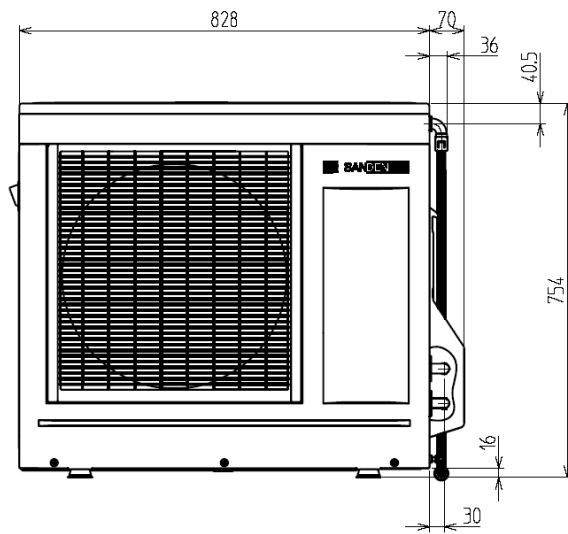


Heat Pump Unit GAU-A45HPA

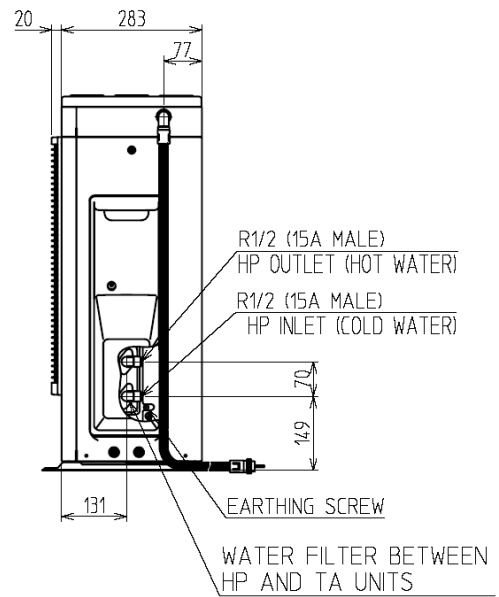
[TOP VIEW]



[FRONT VIEW]



[SIDE VIEW]

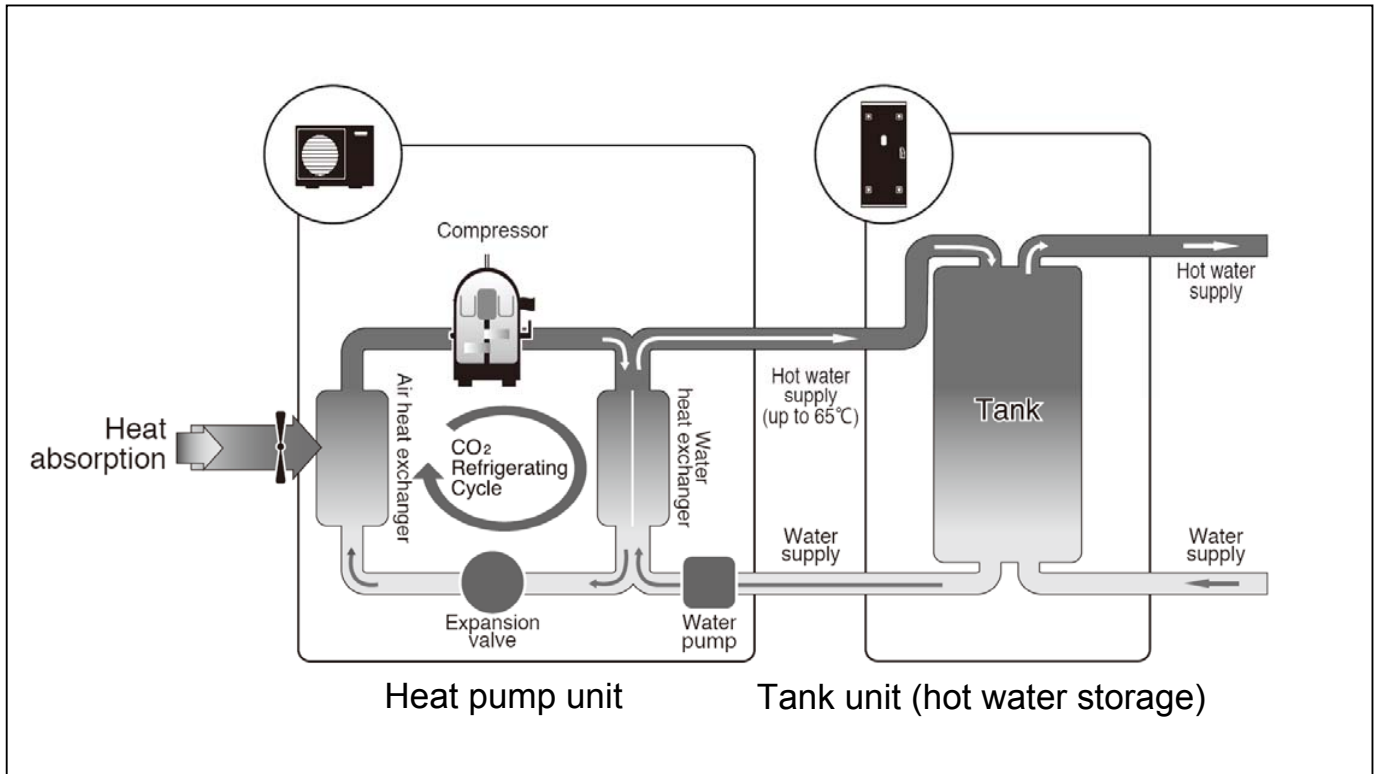


3. System Details

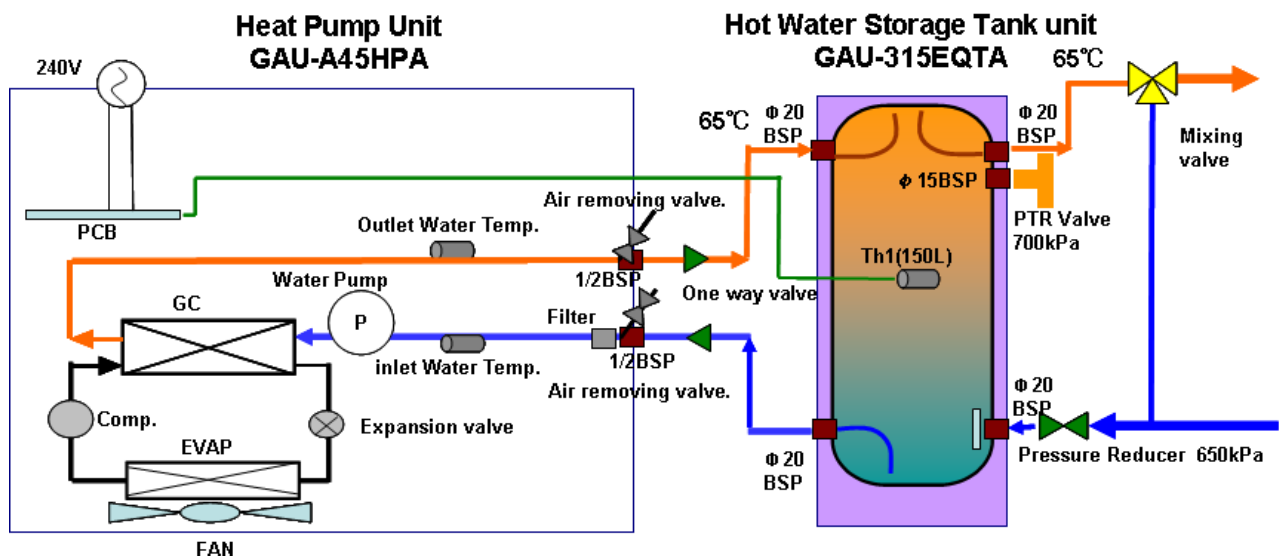
How it works

The Heat Pump Water Heater System heats water by transferring the heat from the surrounding air to the water using a refrigerant. The refrigerant is heated by a heat exchanger that absorbs heat from the surrounding air.

Heat Pump Water Heater System



System Circuit Diagram



4. Basic Control Logic Specifications

HP unit operates to achieve the target heat capability 4.5kW to output 65°C (fixed) water once the power is on.

Conditions to start and end heating water are as stated below:

Conditions to Start Operation	<p>(1) Tank TH A \leq 45 °C (Lack in residual hot water in tank) (2) More than 24hrs passed since the last start of operation. (for anti-Legionella purpose) (3) Memory of last operation is lost. (First run after delivery, ROM writing error, etc.) (4) Electrical shutdown is occurred while HP unit is operating. (5) The current time is 10.00 (24hr clock basis). (6) HP unit was not operated by the condition (5) due to a limitation of HPU operation. HPU operation starts once the limitation is cancelled. The term limitation defines a condition where HPU cannot be operated due to the electricity cutoff or the blackout time setting.</p> <p>HP unit starts when either of (1), (2), (3), (4), (5) or (6) above is satisfied.</p>
Condition to End	GC Inlet TH > 50°C

However, operation will not be performed during the time set as the blackout time on the timer setting panel.

Freeze Prevention Drive

To avoid fracture in freezing, HP unit starts heating water when the pipes get below the specific temperature while Driving Mode is on (including hours set as blackout time).

Operation

HP unit starts operation when either GC Inlet TH or Outlet TH detects 5°C or less. It will not start if the mode is set to the Off Mode.

When Driving Mode is on (including hours in blackout time)

Target Heat Capability: 4.5kW

Condition for Ending Freeze Prevention Drive: GC Inlet TH > 50°C

If the condition meets to that to heat water during the freeze prevention drive, the operation shifts to water heating operation.

Air Exhaust Operation

If Tank TH A \leq 30°C at the start of water heating, HP unit runs the pump for 3min by 2.5L/min before starting to heat water.

If Tank TH A > 30°C, the pump does not run before operation.

Defrost

Start of defrost is determined by the temperatures detected by Defrost TH and Inlet Air TH. If the condition meets one of the determination values, HP unit starts defrost drive. However, the defrost drive is cancelled for 12min after the compressor runs or 30min after defrost drive completes. Also, if GC Inlet TH > 32°C, defrost drive does not start.

End of defrost is determined either by the temperature detected by Defrost TH or by the time passed after start. Defrost drive stops when the condition meets one of the determination values.

Times of Retries at Error Occurrence

Number of times to retry recovery when an error is detected is increased from 5 times to 7 times as a countermeasure for the electrical testing.

5. Main Functional Components List

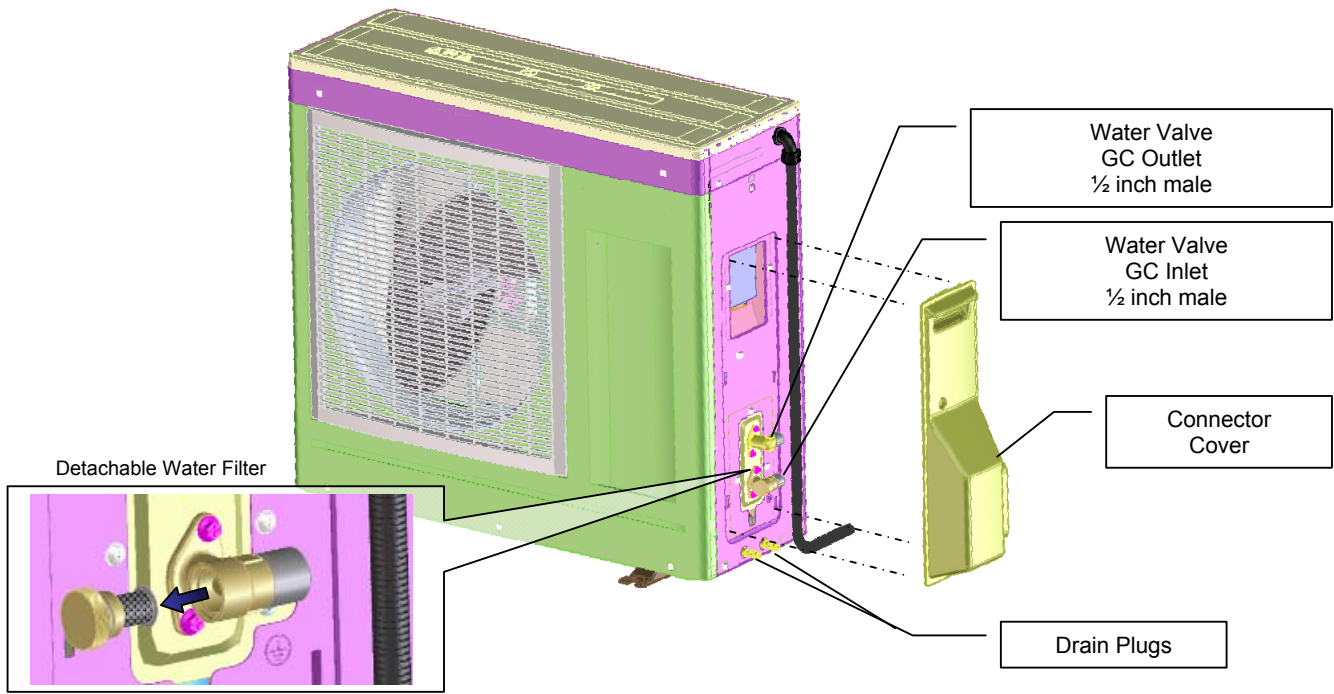
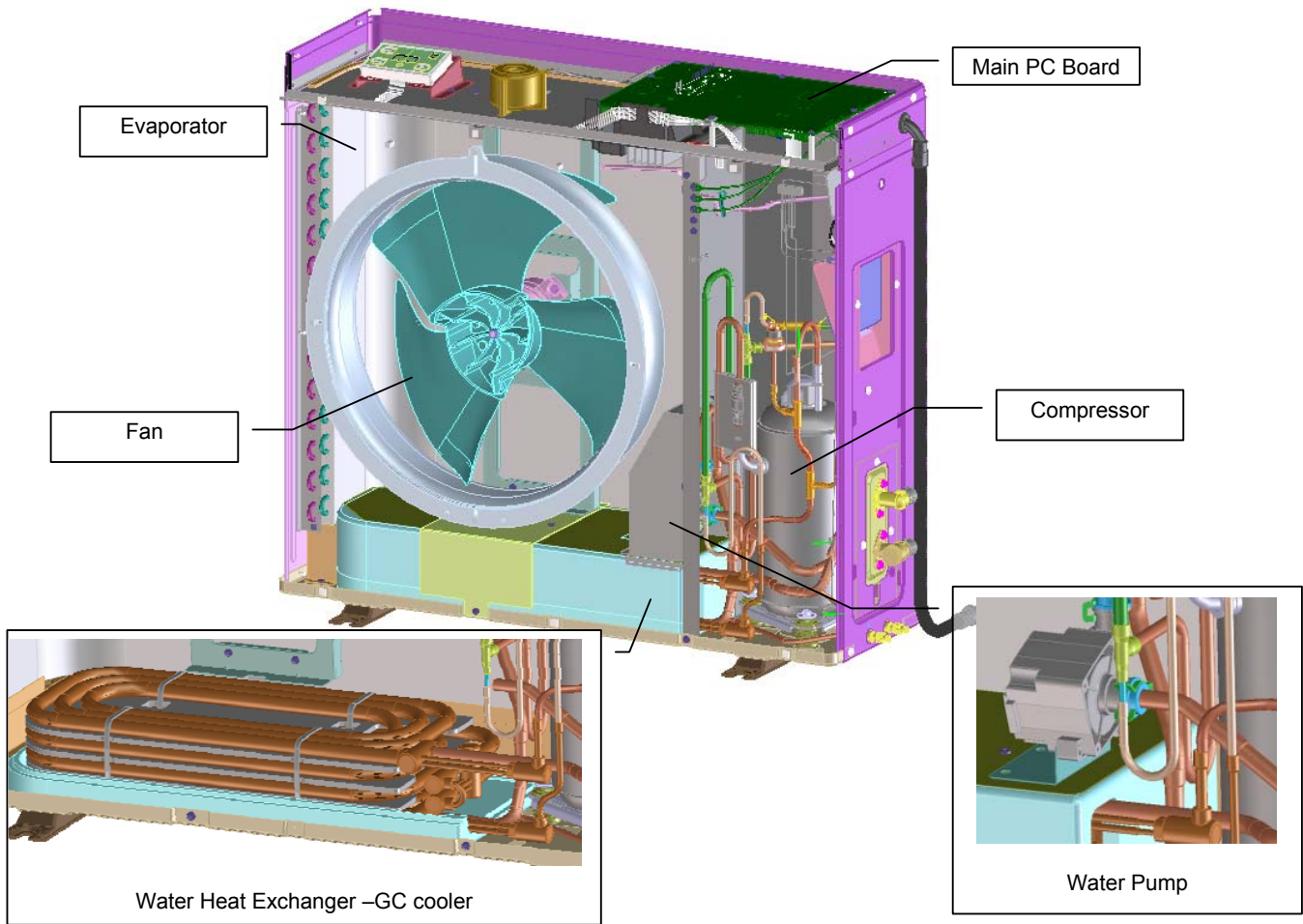
Heat Pump Unit

No.	Part Name	Remarks	Qty.
1	COMPRESSOR 8CS040XAA63	Compressor	1
2	PRESSURE SWITCH CCB-DB10 CE	Pressure switch	1
3	EVAPORATOR 5A	Air heat exchanger	1
4	GAS COOLER	Water heat exchanger	1
5	PCB A45HPA	Printed circuit board	1
6	SETTING PANEL ASM. A	Timer setting panel	1
7	O-RING P14 FP29	O-ring for water pump	2
8	PROPELLER FAN HP	Propeller fan blade	1
9	HP THERMISTOR PT2M-M51F-S2	Heat pump control thermistor Pin1,2 : Water inlet temperature Pin3,4 : Water outlet temperature Pin5,6 : Ambient temperature Pin7,8 : Refrigerant discharge temperature Pin9,10 : Defrost control	1
10	EX VALVE COIL UKV-A12V-B	Expansion valve coil	1
11	PC28L05	Water circulation pump	1
12	FAN MOTOR SIC-65FV-F515	Fan motor	1
13	DRAIN PLUG PPS	Drain plug	2
14	O-RING P3 FP29	O-ring for Drain plug	2
15	REACTOR TSN61	Reactor for inverter	1

Hot Water Storage Tank unit

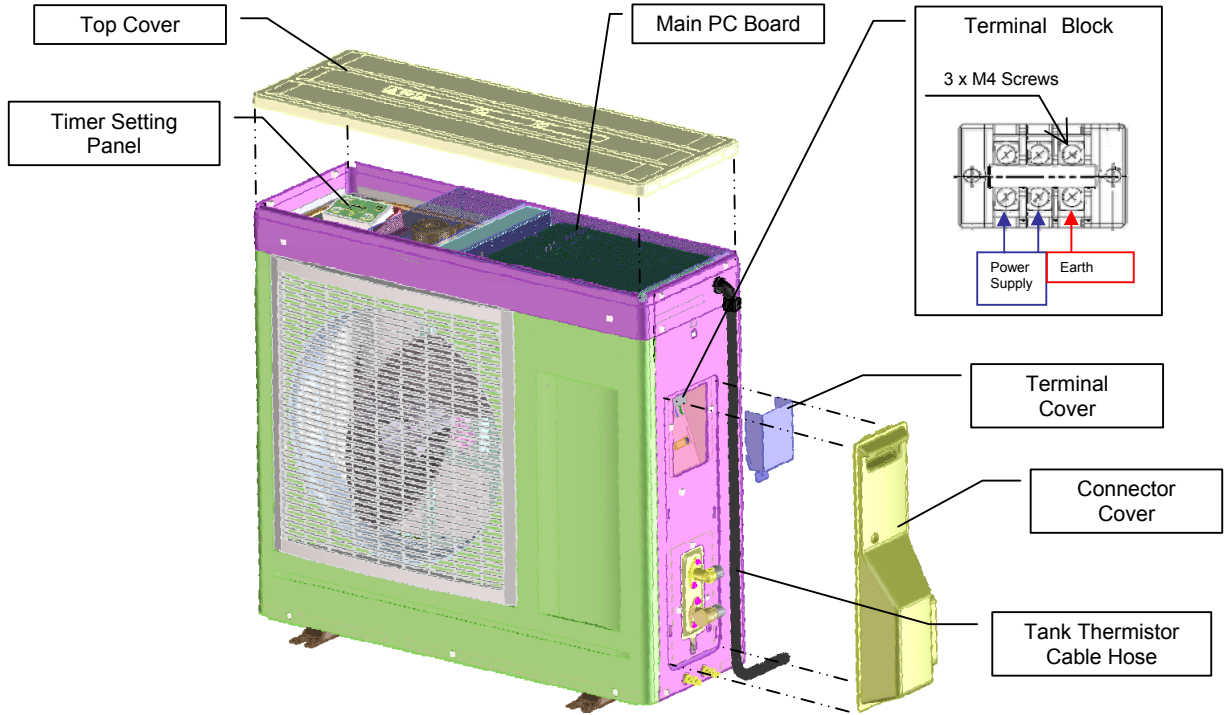
No.	Part Name	Remarks	Qty.
1	TANK THERMISTOR	Tank thermistor	1

Main Components

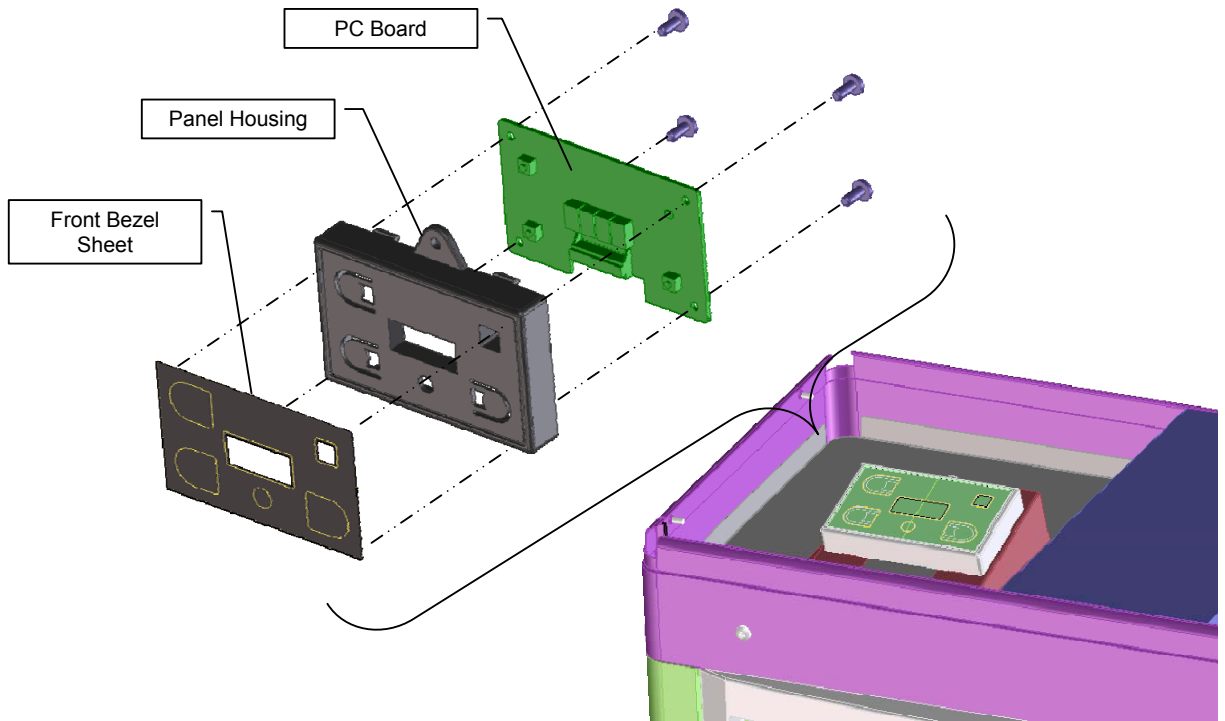


Supplies filtration for water going into HPU. It can be taken off for cleaning purpose.

Electrical Components



Timer Setting Panel



6. Main Functional Components Specifications

<HP Thermistor>

Temperature-resistance conversion table

Table
1

Water inlet thermistor, Water outlet thermistor

Temperature (°C)	-10	0	10	20	30	40	50	60	70	80	90	100
Thermistor resistance (kΩ)	37.5	23.7	15.5	10.3	7.0	4.9	3.5	2.5	1.9	1.4	1.1	0.8

Table
2

Ambient thermistor

Temperature (°C)	-10	0	10	20	30	40	50	60	70	80	90	100
Thermistor resistance (kΩ)	12.0	7.20	4.45	2.83	1.85	1.24	0.84	0.59	0.42	0.31	0.23	0.17

Table
3

Discharge thermistor

Temperature (°C)	-10	0	10	20	30	40	50	60	70	80	90	100
Thermistor resistance (kΩ)	276	162	98.3	61.5	39.5	26.1	17.6	12.1	8.54	6.12	4.46	3.30

Table
4

Defrost thermistor

Temperature (°C)	-10	0	10	20	30	40	50	60	70	80	90	100
Thermistor resistance (kΩ)	9.39	6.00	3.94	2.64	1.82	1.27	0.91	0.66	0.49	0.37	0.28	0.22

Table
5

Tank thermistor A

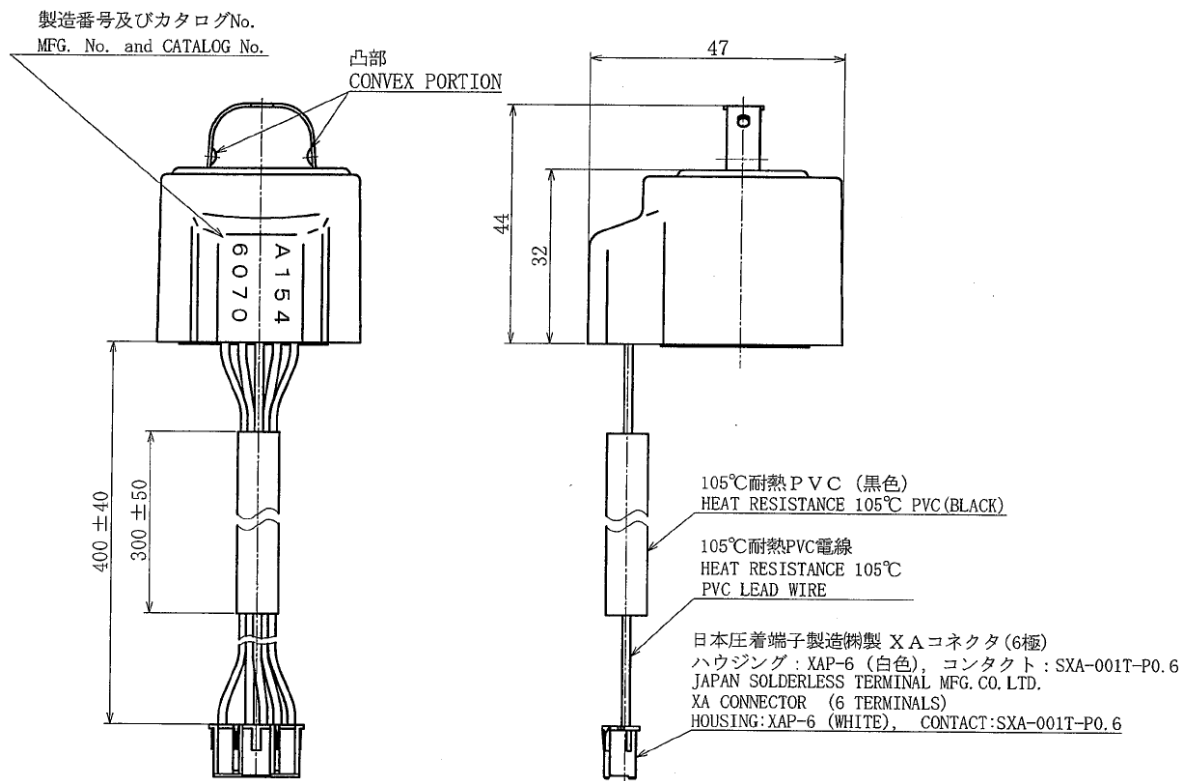
Temperature (°C)	-10	0	10	20	30	40	50	60	70	80	90	100
Thermistor resistance (kΩ)	54.6	32.4	19.9	12.5	8.1	5.3	3.6	2.5	1.8	1.3	0.9	0.7

< Compressor Specifications >

Part Name	COMPRESSOR 8CS040XAA63		
Compressor type	Hermetic motor compressor		
Pump type	Involute scroll		
Motor	Brushless motor		
Rated output	1.8 kW		
Insulation grade	B Grade		
Winding resistance (at 20 °C)	RED-WHT	WHT-BLU	BLU-RED
	1.434	1.434	1.434

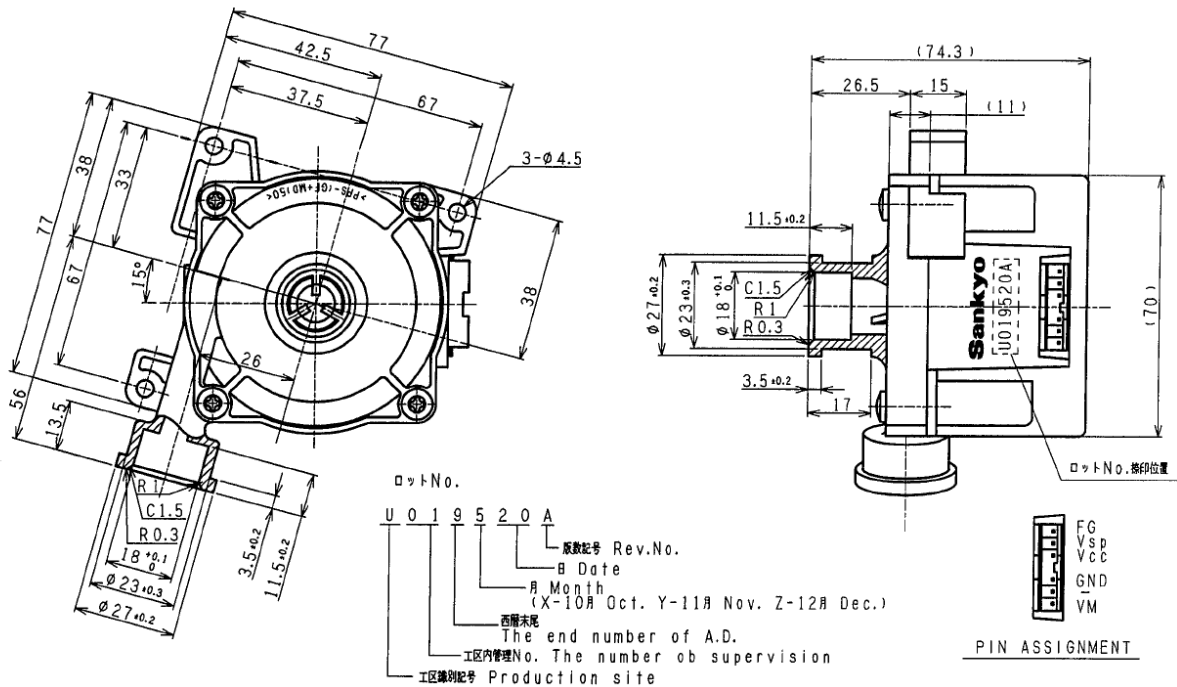
< Expansion Valve Coil Specifications >

Part Name	EX VALVE COIL UKV-A12V-B
Dielectric strenght	AC 1800V 1sec.
Insulation resistance	DC 500 V , 100MΩ OR More Terminal - Housing
Rated voltage	DC 12V ± 10%
Current	0.26 A / Phase (20°C)
Coil resistance	46 ± 3 Ω (20°C)
Insulation grade	E Grade



< Water Circulation Pump Specifications >

Part Name	PC28L05
Pump type	DC driver operation , Variable flow performance
Coupling Caliber inlet / outlet	Outer diameter $\phi 27$, Inside diameter $\phi 18$ (Quick fastener type)
Motor type	DC brushless motor
Bearing type	Underwater slide shaft
Direction of rotation	CCW
Operating position	Impeller shaft horizontal
Driving power supply : Vm	282V [DC] +40% / -10% (254 ~ 395V [DC])
Driving MAX voltage	Below 450V
Flow variable system	Variable rotation rate by PWM
Insulation grade	E Grade (Winding temperature 115°C below)
Fluid temperature	3 ~ 65°C



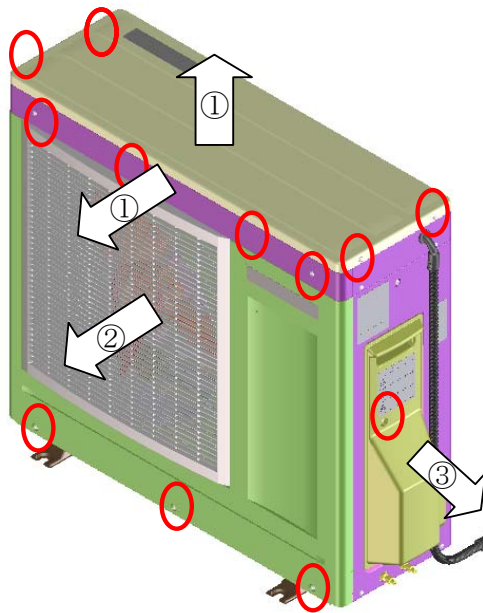
7. Maintenance

The procedures to replace the functional components are shown in the following pages.

Since this product utilises a high-pressurised gas (CO₂), those components contained in the refrigerant circuit such as refrigerant pipes, heat exchanger, compressor, pressure switch, are not subject for replacement.

- 1) How to Replace Printed Circuit Board
- 2) How to Replace Timer Setting Panel
- 3) How to Replace Water Circulation Pump and its P14 O-Rings
- 4) How to Replace Propeller Fan Blade and Fan Motor
- 5) How to Replace Thermistors
- 6) How to Replace Expansion Valve Coil
- 7) How to Replace Drain Plugs and P3 O-Rings
- 8) How to Replace Reactor

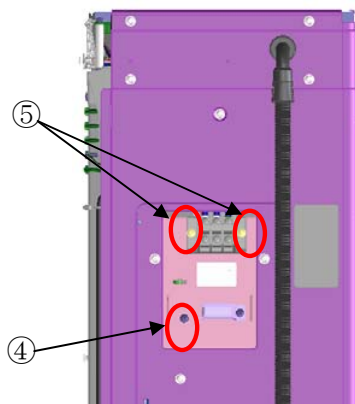
1) How to Replace Printed Circuit Board



① Remove Top Panel and Front Panel Retainer
(6 screws)

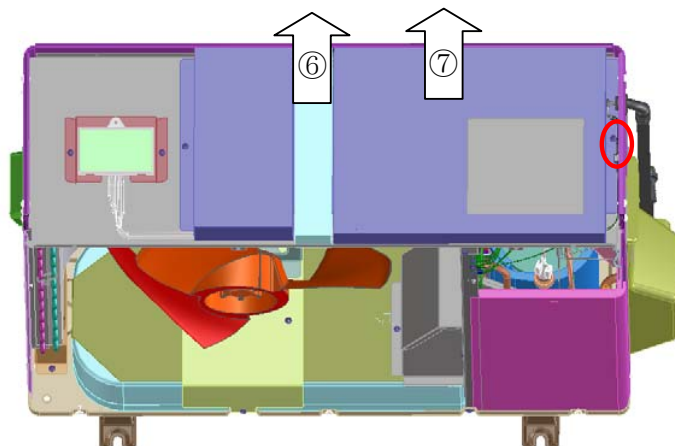
② Remove Front Panel
(5 screws)

③ Remove Piping Cover
(1 screw)



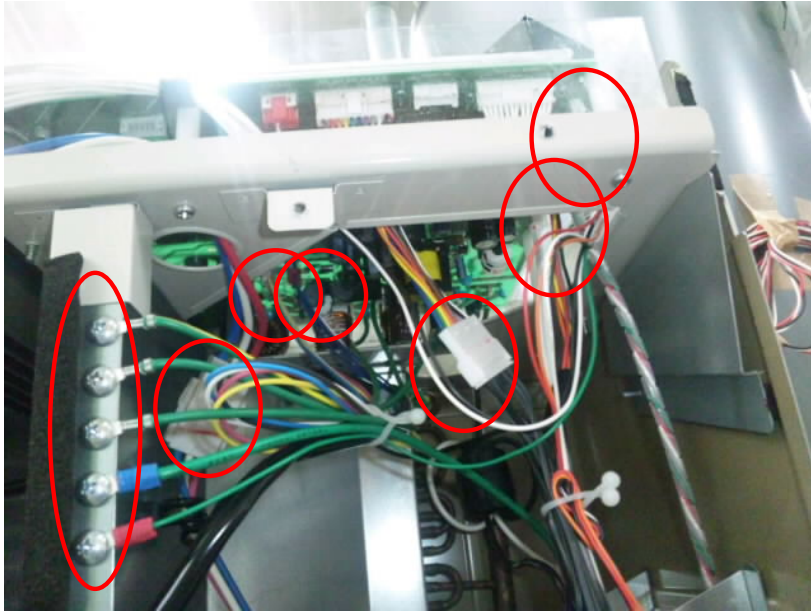
④ Remove Terminal Block Cover .
(1 screw)

⑤ Unscrew Terminal Block
(2 screws)

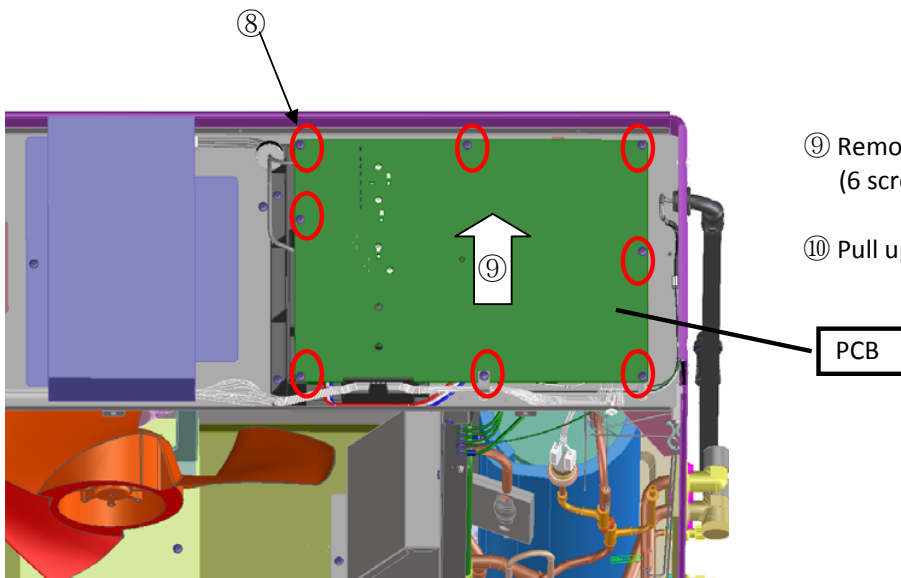


⑥ Remove Case Reinforcement (PS)

⑦ Remove Controller Case Cover
(1 screw)



⑧ Unplug all the necessary cable connectors and remove the earth screws(5 screws).



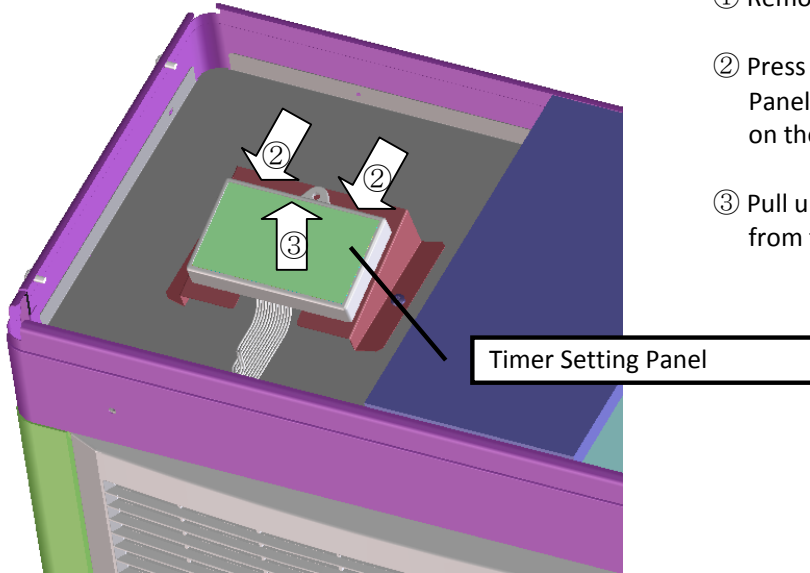
⑨ Remove screws retaining the PCB (6 screws)

⑩ Pull up the PCB

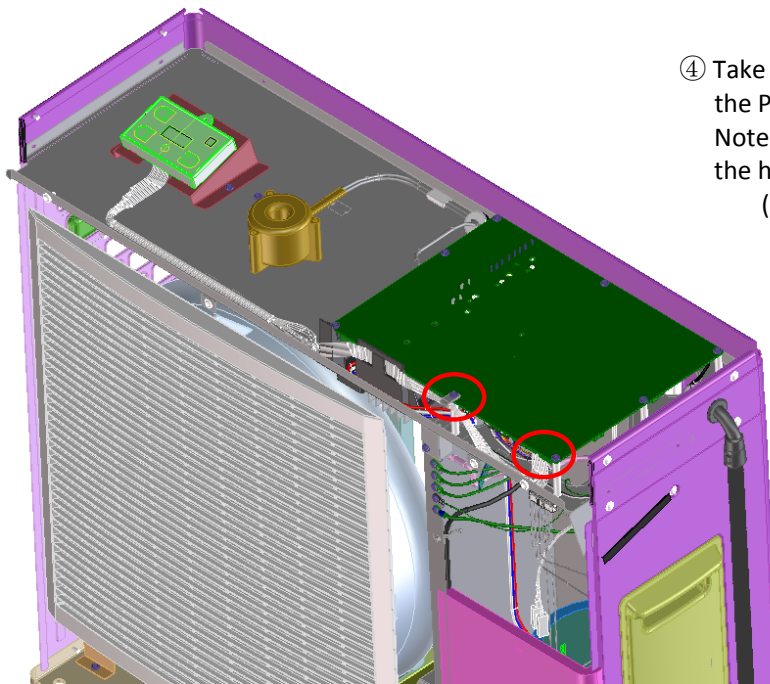
End of Steps

To put it back on, follow the same steps in back order

2) How to Replace Timer Setting Panel



- ① Remove Top Panel
- ② Press the top surface of Timer Setting Panel to release the snaps off the fitting on the base component
- ③ Pull up Timer Setting Panel to remove it from the base

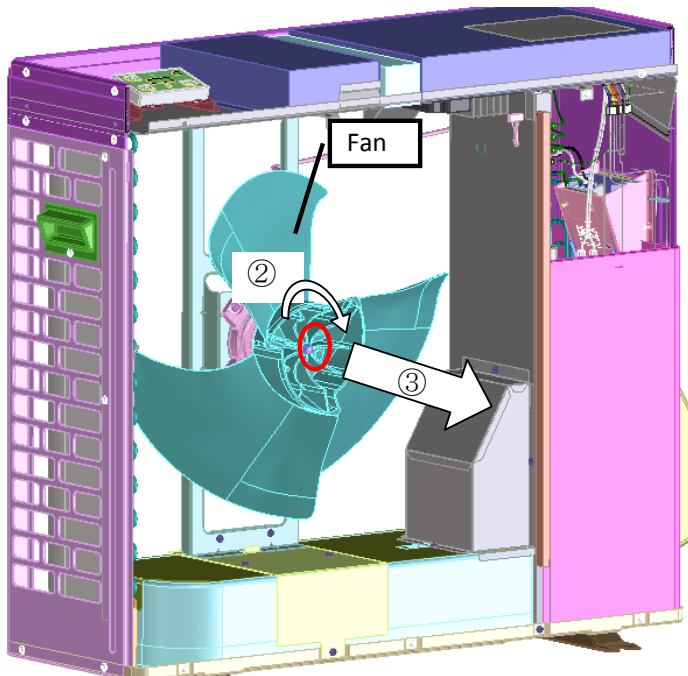


- ④ Take the Timer Setting Panel cable off the PCB
Note: Remove the screw together with the harness holder (1 screw)

End of Steps

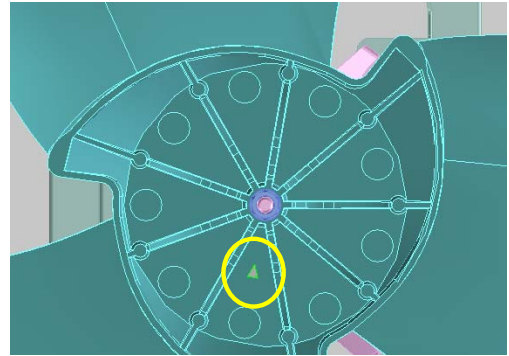
To put it back on, follow the same steps in back order

4) How to Replace Propeller Fan Blade and Fan Motor



① Remove Top Panel, Front Panel Retainer and Front Panel (11 screws)

② Remove the fan blade retainer nut
Note: This nut needs to be turned counter clockwise to remove.



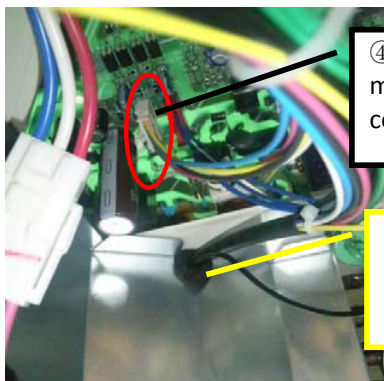
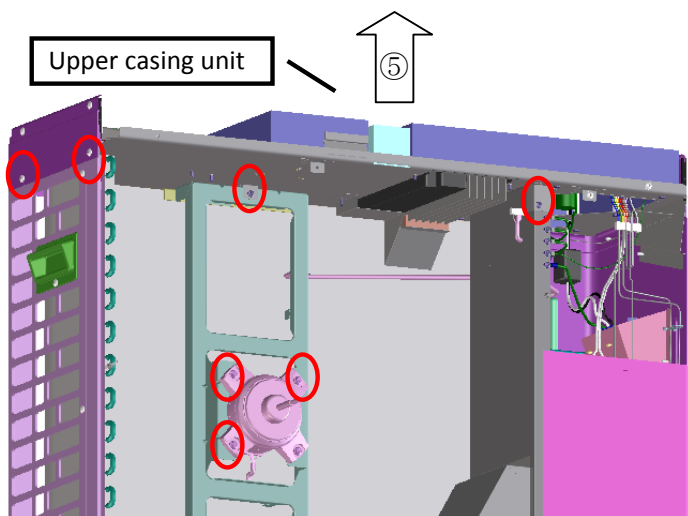
③ Pull the fan blade forward to take it off the motor

Note: When attaching the fan blade, align the straight part on the through hole on the fan blade (refer to identification triangle mark shown above for the straight part) to the flat surface on the motor shaft

④ Unplug the fan motor cable connector from the PCB

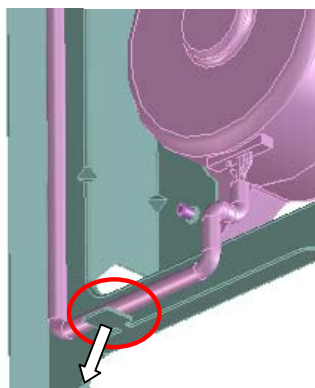
⑤ Remove the screws holding the upper casing unit (6 screws)
Hold up the upper casing unit and pull the fan motor cable through Divider

⑥ Remove the screws retaining the fan motor to take it off. (3 screws)



④ Unplug the fan motor cable connector (white)

Pull the cable together with the cushion gasket attached on it



Note:
Motor cable is held in place at the back of the motor base frame. Open the cable holding piece before pulling the cable. (2 places)

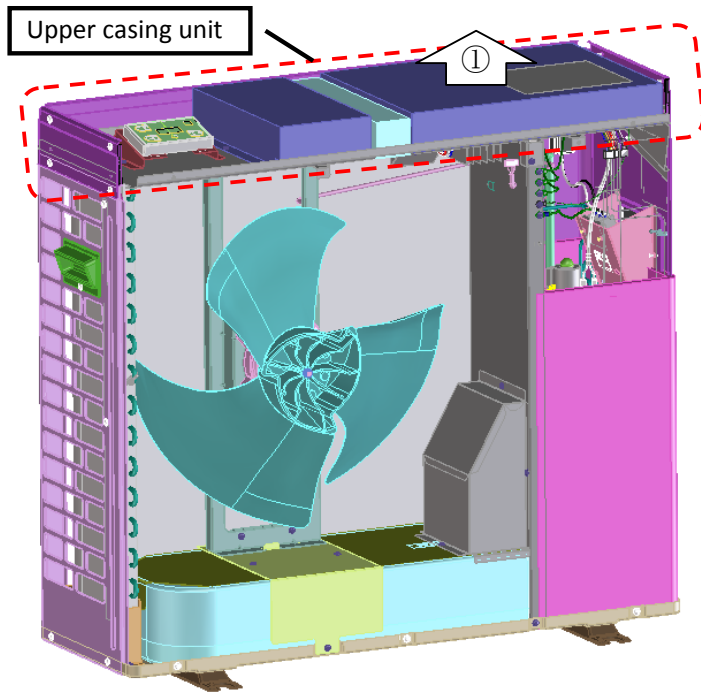
End of Steps

To put it back on, follow the same steps in back order

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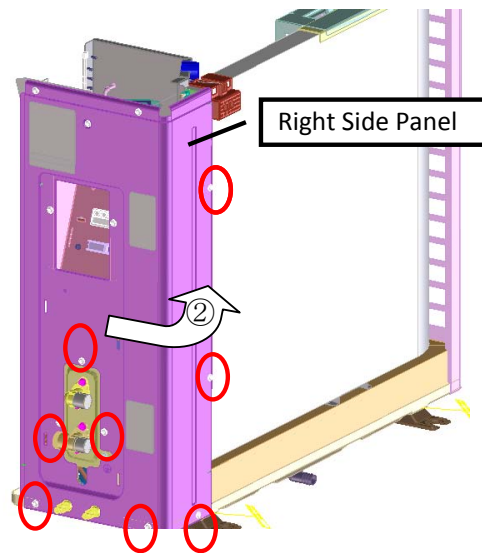
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5) How to Replace Thermistors

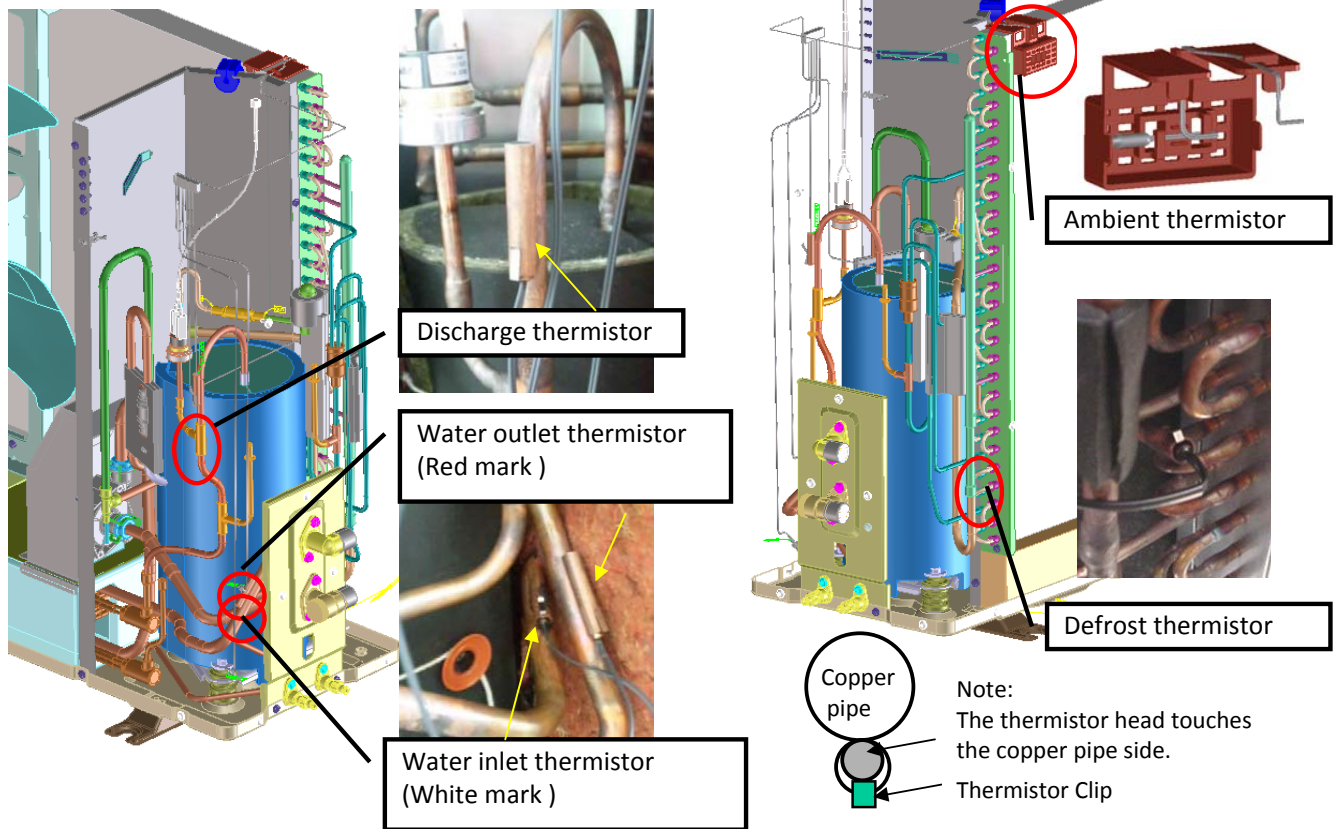


① Remove Top Panel, unplug all the necessary cable connectors and remove the earth screws. And remove the upper casing unit

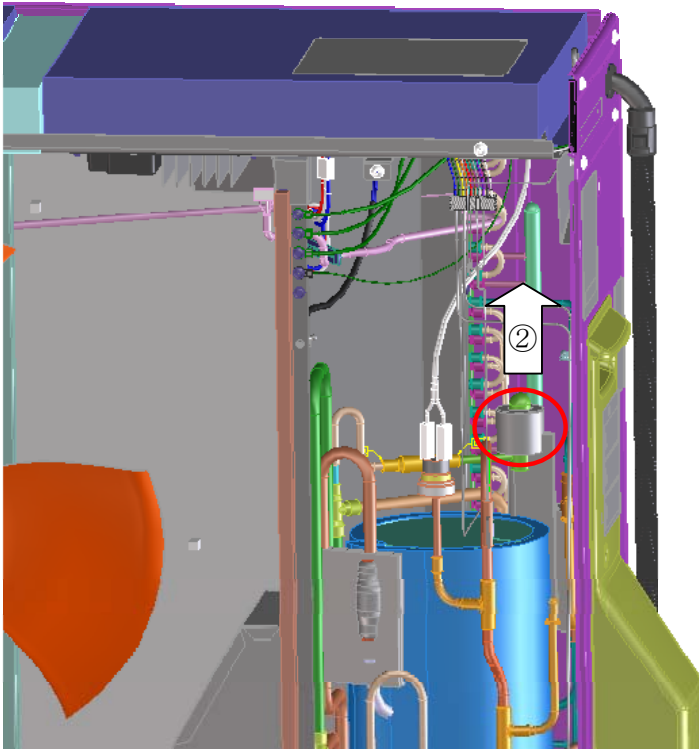
② Remove Right Side Panel (8 screws)



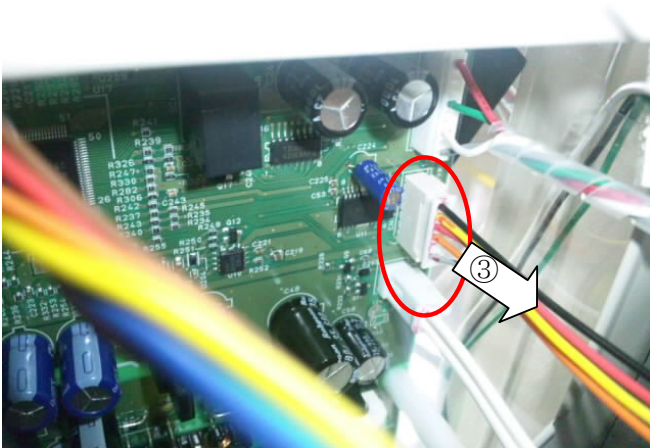
③ Remove the Thermistors (5 thermistors).



6) How to Replace Expansion Valve Coil



- ① Remove Top Panel, Front Panel Retainer and Front Panel (11 screws)
- ② Pull exp. valve upwards to take it off.



- ③ Take the cable connector off the PCB

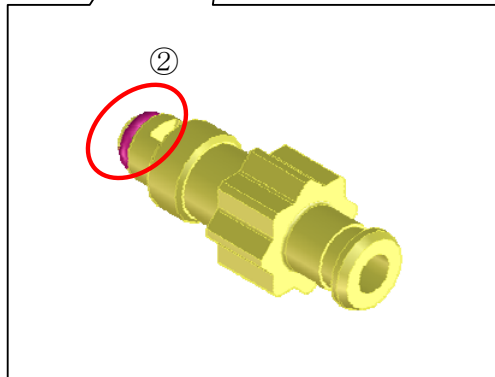
End of Steps

To put it back on, follow the same steps in back order

7) How to Replace Drain Plugs and P3 O-Rings



① Grab the drain plug with fingers and twist in clockwise direction

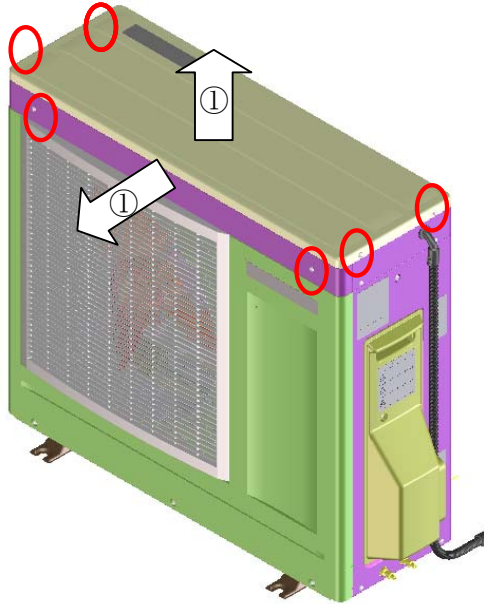


② Take off the O-ring on the tip of the drain plug

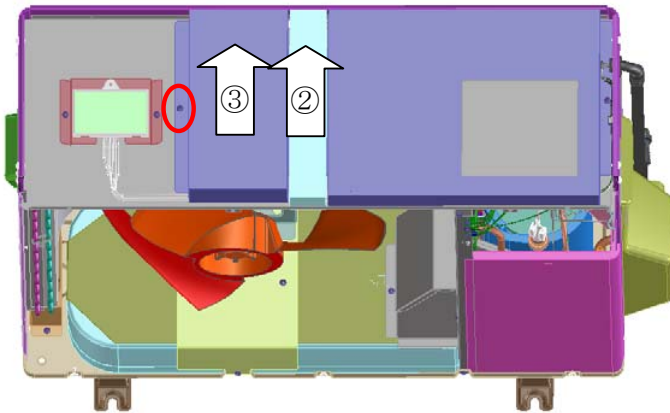
End of Steps

To put it back on, follow the same steps in back order

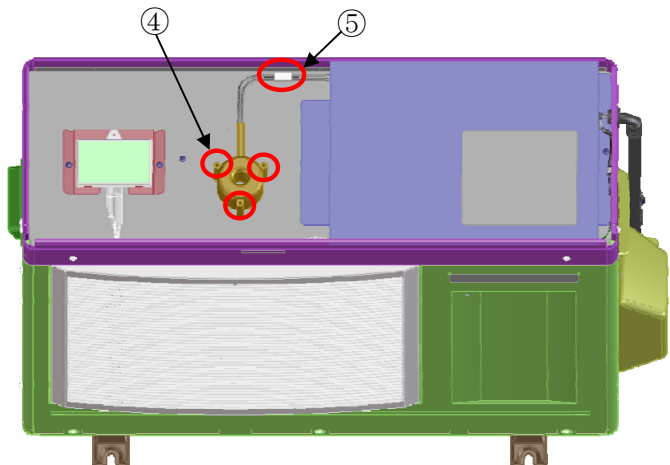
8) How to Replace Reactor



- ① Remove Top Panel and Front Panel Retainer (6 screws)



- ② Remove Case Reinforcement (PS)
- ③ Remove Reactor Cover (1 screw)



- ④ Remove Reactor screws (3 screws)
- ⑤ Pull off the cable connector

End of Steps

To put it back on, follow the same steps in back order

8. Error Codes

When an error has occurred, a red lamp on the LED status window turns on and an error code is displayed on the display window. The panel does not turn to the display sleep mode while the error code is shown.

After a component is replaced or the inspection is completed, turn the breaker on/off several times to confirm the error does not re-occur.

Below is the list of the error codes. If the corrective action does not solve the error problem, a malfunction of the PCB valve is highly likely.

Error Code	Error Contents	Error Detection Condition & Diagnostic	Check Points		Judgment & Repair Methods
			Connector No. or Maintenance Monitor No.	Connector Colour	
E010	HP Inlet Temperature Thermistor Wire Break	When -30degC or less is detected Refer to Thermistor diagnostic	CN4	White	- Resistance: (See Table-1 in p.g.12)
E011	HP Inlet Temperature Thermistor Short Circuit	When -30degC or less is detected Refer to Thermistor diagnostic			- Resistance: (See Table-1 in p.g.12)
E012	HP Outlet Temperature Thermistor Wire Break	When -30degC or less is detected Refer to Thermistor diagnostic			- Resistance: (See Table-1 in p.g.12)
E013	HP Outlet Temperature Thermistor Short Circuit	When -30degC or less is detected Refer to Thermistor diagnostic			- Resistance: (See Table-1 in p.g.12)
E014	HP Ambient Temperature Thermistor Wire Break	When -30degC or less is detected Refer to Thermistor diagnostic			- Resistance: (See Table-2 in p.g.12)
E015	HP Ambient Temperature Thermistor Short Circuit	When 100degC or more is detected Refer to Thermistor diagnostic			- Resistance: (See Table-2 in p.g.12)
E016	HP Defrost Temperature Thermistor Wire Break	When 150degC or more is detected Refer to Thermistor diagnostic			- Resistance: (See Table-4 in p.g.12)
E017	HP Defrost Temperature Thermistor Short Circuit	When 150degC or more is detected Refer to Thermistor diagnostic			- Resistance: (See Table-4 in p.g.12)
E018	HP Discharge Temperature Thermistor Wire Break	When 100degC or more is detected Refer to Thermistor diagnostic			- Resistance: (See Table-3 in p.g.12)
E019	HP Discharge Temperature Thermistor Short Circuit	When 100degC or more is detected Refer to Thermistor diagnostic			- Resistance: (See Table-3 in p.g.12)
E020	Tank Thermistor A Wire Break	When -30degC or less is detected Refer to Thermistor diagnostic	CN5	White	- Resistance: (See Table-5 in p.g.12)
E021	Tank Thermistor A Short Circuit	When -30degC or less is detected Refer to Thermistor diagnostic	CN5	White	- Resistance: (See Table-5 in p.g.12)

Error Code	Error Contents	Error Detection Condition & Diagnostic	Check Points		Judgment & Repair Methods
			Connector No. or Maintenance Monitor No.	Connector Colour	
E040	HP Water Outlet Over Temperature 1	<p>When 80degC or more is detected:</p> <p><Check Items></p> <ul style="list-style-type: none"> - Check dust being stuck on HP connector filter - Bends or blockings on HP connection pipes - freeze on pipes - Water valve is closed - Stopper valve is closed - confirm tank is filled - Water circulation pump malfunction 			<ul style="list-style-type: none"> - Remove dust if any -Correct piping and remove bends and blockings - Melt the freeze if any and apply insulation - Open water valve - Open stopper valve - fill tank with water if it is not - If Water circulation pump do not start operating even after turning it on on the timer setting panel, it is a malfunction of the water circulation pump.
E041	HP Water Outlet Over Temperature 2	<p>Outlet water temperature error</p> <p><Check Items></p> <ul style="list-style-type: none"> - Check dust being stuck on HP connector filter - Bends or blockings on HP connection pipes - freeze on pipes - Water valve is closed - Stopper valve is closed - confirm tank is filled - Water circulation pump malfunction 			<ul style="list-style-type: none"> - Remove dust if any -Correct piping and remove bends and blockings - Melt the freeze if any and apply insulation - Open water valve - Open stopper valve - fill tank with water if it is not - If Water circulation pump do not start operating even after turning it on on the timer setting panel, it is a malfunction of the water circulation pump.
E042	HP Outlet Temperature Thermistor Detection Error	<p>When 55degC or less is detected</p> <p><Check Items></p> <ul style="list-style-type: none"> - Check if thermistor is fallen out 			<ul style="list-style-type: none"> - Put thermistor back into the pocket on pipe if it is out.
E043	HP Discharge Over Temperature 1	<p>When 130degC or more is detected</p> <p><Check Items></p> <ul style="list-style-type: none"> - Malfunction of discharge thermistor - Check if expansion valve connector is fallen out or not connected properly - Check resistance between 2 phases on expansion valve coil (see table) - Blockage in refrigerant pipes 	<p>CN4</p> <p>CN10</p>	<p>White</p> <p>White</p>	<ul style="list-style-type: none"> - Replace discharge thermistor - Put it back on properly if it is not in right position - Abnormal: Valve coil replacement required (together with PC board) - Normal: Heat pump unit replacement required - Heat pump unit replacement required

Error Code	Error Contents	Error Detection Condition & Diagnostic	Check Points		Judgment & Repair Methods
			Connector No. or Maintenance Monitor No.	Connector Colour	
E044	HP Discharge Temperature Thermistor Detection Error	<p>When 50degC or less is detected</p> <p><Check Items></p> <ul style="list-style-type: none"> - Check if discharge thermistor is fallen out - Check if expansion valve connector is fallen out or not connected properly - Check resistance between 2 phases on expansion valve coil (see table) - leakage on refrigerant pipes 	<p>CN4</p> <p>CN10</p>	<p>White</p> <p>White</p>	<ul style="list-style-type: none"> - Put thermistor back into the pocket on pipe if it is out. - Put it back on properly if it is not in right position - Abnormal: Valve coil replacement required (together with PC board) - Normal: Heat pump unit replacement required - Heat pump unit replacement required
E045	HP Defrost Thermistor Detection Error	<p>When detected temperature is that detected on ambient temperature thermistor +3degC</p> <p><Check Items></p> <ul style="list-style-type: none"> - Check if discharge thermistor is fallen out from evaporator - Malfunction of defrost thermistor 	<p>CN4</p>	<p>White</p>	<ul style="list-style-type: none"> - Put thermistor back into the pocket on evaporator if it is out. - Replace defrost thermistor
E047	High Pressure Side Error	<p>When detected high pressure switch open</p> <p><Check Items></p> <ul style="list-style-type: none"> - Check on HP connector filter - Bends or blockings on HP connection pipes - freeze on pipes - Water valve is closed - Stopper valve is closed - confirm tank is filled - Water circulation pump malfunction - Check if air exists in water - Check if HP inlet thermistor is fallen out - Check if HP outlet thermistor is fallen out - Check if discharge thermistor is fallen out - Check if expansion valve connector is fallen out or not connected properly - Check resistance between 2 phases on expansion valve coil (see table) 	<p>CN7</p>	<p>White</p>	<ul style="list-style-type: none"> - Remove dust if any -Correct piping and remove bends and blockings - Check temperature on pipe cover that is exposed to ambient temperature - Open water valve - Open stopper valve - fill tank with water if it is not - If Water circulation pump do not start operating even after turning it on on the timer setting panel, it is a malfunction of the water circulation pump. - If noise of air being released can be heard when water drain plug or PTR valve is loosened, remove air. - Put thermistor back to the right position if it is out - Put thermistor back to the right position if it is out - Put thermistor back to the right position if it is out - Put it back on properly if it is not in right position - Abnormal: Valve coil replacement required (together with PC board) - Normal: Heat pump unit replacement required

Error Code	Error Contents	Error Detection Condition & Diagnostic	Check Points		Judgment & Repair Methods
			Connector No. or Maintenance Monitor No.	Connector Colour	
E048	High Ambient Temperature Defrost Drive Error	Defrost drive conducted while ambient temperature thermistor detected 20degC <Check Items> - Trouble in air absorption due to foreign object blocking air path through evaporator - Ambient temperature thermistor malfunction - defrost thermistor malfunction			- Remove foreign object from evaporator - Replace ambient temperature thermistor - Replace defrost temperature thermistor
E070	Fan Motor Locked	Continuous fan motor abnormal operation. <Check Items> - Fan blade rotated with foreign object stuck on it - Fan motor locked - Check if connector is fallen out or not connected properly - Fan motor malfunction	CN12	White	- Remove foreign object - Replace fan motor - Put it back on properly if it is not in right position - Replace fan motor
E071	Fan Motor Revolution Error	Continuous fan motor abnormal operation. <Check Items> -Fan blade do not rotate -Fan blade rotates in higher speed than usual - Fan motor malfunction	CN12	White	- Put it back on properly if it is not in right position - Replace fan motor - Replace fan motor
E073	Water Circulation Pump Locked	When less than 150rpm of water circulation pump rotation detected <Check Items> - Check if pump connector is fallen out or not connected properly - Water pump malfunction - Check for bends or blockings on HP connection pipes	CN13	Red	- Put it back on properly if it is not in right position - If rotation of water circulation pump do not reach expected number of rotation even after turning it on on the timer setting panel, it is a malfunction of the water circulation pump. - Correct piping and remove bends and blockings
E090	Clock IC Error	Error in clock IC writing or reading			- Try rebooting and if the same error occurs again, PC board replacement is necessary
E101	Communication Error (to inverter module)	Error detected on serial communication driver <Check Items> Error in compressor wiring - Check resistance between 2 phases on compressor compressor malfunction			- Correct compressor wiring - Normal: PC board replacement required - Abnormal: Heat pump unit replacement required - Heat pump unit replacement required

Error Code	Error Contents	Error Detection Condition & Diagnostic	Check Points		Judgment & Repair Methods
			Connector No. or Maintenance Monitor No.	Connector Colour	
E102	INV Compressor Start Error	<p>Compressor start error detected in compressor operation control</p> <p><Check Items></p> <p>Error in compressor wiring</p> <ul style="list-style-type: none"> - Error in connection on power supply terminal block - Power supply voltage error - PC Board malfunction - Compressor malfunction 			<ul style="list-style-type: none"> - confirm connection of wire terminals to compressor is in the right order - Confirm cable is connected correctly at terminal block - Confirm power supply voltage (240+/-14V) - PCB replacement required if same error occurs again after re-run of heat pump - Heat pump unit replacement required
E110	INV Transient Over-Current Error on Hardware (converter)	<p>Over current error detected in compressor operation control</p> <p><Check Items></p> <ul style="list-style-type: none"> - Check for HP control PC board connector connection - Error in compressor wiring - Error in connection on power supply terminal block - Check dust being stuck on HP connector filter - Bends or blockings and freeze on HP connection pipes - Stopper valve is closed - Air exists in water pipe - Water circulation pump malfunction - Power cutoff occurred - Power supply voltage error - PC board malfunction 			<ul style="list-style-type: none"> - Confirm connector connections - confirm connection of wire terminals to compressor is in the right order - Confirm cable is connected correctly at terminal block - Remove dust on filter -Correct piping and remove bends and blockings - Open stopper valve - Remove air - Conduct operation check on water circulation pump - Check Power supply cable wiring layout - Confirm power supply voltage (240+/-14V) - PCB replacement required if same error occurs again after re-run of heat pump

Error Code	Error Contents	Error Detection Condition & Diagnostic	Check Points		Judgment & Repair Methods
			Connector No. or Maintenance Monitor No.	Connector Colour	
E111	INV Transient Over-Current Error on Hardware (inverter)	<p>Over current error detected in compressor operation control</p> <p><Check Items></p> <ul style="list-style-type: none"> - Check for HP control PC board connector connection - Error in compressor wiring - Error in connection on power supply terminal block - Check dust being stuck on HP connector filter - Bends or blockings and freeze on HP connection pipes - Stopper valve is closed - Air exists in water pipe - Water circulation pump malfunction - Power cutoff occurred - Power supply voltage error - PC board malfunction 			<ul style="list-style-type: none"> - Confirm connector connections - confirm connection of wire terminals to compressor is in the right order - Confirm cable is connected correctly at terminal block - Remove dust on filter -Correct piping and remove bends and blockings - Open stopper valve - Remove air - Conduct operation check on water circulation pump - Check Power supply cable wiring layout - Confirm power supply voltage (240+/-14V) - PCB replacement required if same error occurs again after re-run of heat pump
E112	INV Transient Over-Current Error on Software (converter)	<p>Over current error detected in compressor operation control</p> <p><Check Items></p> <ul style="list-style-type: none"> - Check for HP control PC board connector connection - Error in compressor wiring - Error in connection on power supply terminal block - Check dust being stuck on HP connector filter - Bends or blockings and freeze on HP connection pipes - Stopper valve is closed - Air exists in water pipe - Water circulation pump malfunction - Power cutoff occurred - Power supply voltage error - PC board malfunction 			<ul style="list-style-type: none"> - Confirm connector connections - confirm connection of wire terminals to compressor is in the right order - Confirm cable is connected correctly at terminal block - Remove dust on filter -Correct piping and remove bends and blockings - Open stopper valve - Remove air - Conduct operation check on water circulation pump - Check Power supply cable wiring layout - Confirm power supply voltage (240+/-14V) - PCB replacement required if same error occurs again after re-run of heat pump

Error Code	Error Contents	Error Detection Condition & Diagnostic	Check Points		Judgment & Repair Methods
			Connector No. or Maintenance Monitor No.	Connector Colour	
E113	INV Transient Over-Current Error on Software (inverter)	<p>Over current error detected in compressor operation control</p> <p><Check Items></p> <ul style="list-style-type: none"> - Check for HP control PC board connector connection - Error in compressor wiring - Error in connection on power supply terminal block - Check dust being stuck on HP connector filter - Bends or blockings and freeze on HP connection pipes - Stopper valve is closed - Air exists in water pipe - Water circulation pump malfunction - Power cutoff occurred - Power supply voltage error - PC board malfunction 			<ul style="list-style-type: none"> - Confirm connector connections - confirm connection of wire terminals to compressor is in the right order - Confirm cable is connected correctly at terminal block - Remove dust on filter -Correct piping and remove bends and blockings - Open stopper valve - Remove air - Conduct operation check on water circulation pump - Check Power supply cable wiring layout - Confirm power supply voltage (240+/-14V) - PCB replacement required if same error occurs again after re-run of heat pump
E114	INV Converter Current detection Circuit Error	<p>Error detected inside PC board</p> <p><Check Items></p> <ul style="list-style-type: none"> - PC Board malfunction 			<ul style="list-style-type: none"> - PCB replacement required if same error occurs again after re-run of heat pump
E115	INV Inverter Current Detection Circuit Error	<p>Error detected inside PC board</p> <p><Check Items></p> <ul style="list-style-type: none"> - PC Board malfunction 			<ul style="list-style-type: none"> - PCB replacement required if same error occurs again after re-run of heat pump
E120	INV Power Supply Over-Voltage Error	<p>Over voltage error detected in compressor operation control</p> <p><Check Items></p> <ul style="list-style-type: none"> - Check for HP control PC board connector connection - Error in compressor wiring - Error in connection on power supply terminal block - Check dust being stuck on HP connector filter - Bends or blockings and freeze on HP connection pipes - Stopper valve is closed - Air exists in water pipe - Water circulation pump malfunction - Power cutoff occurred - Power supply voltage error - PC board malfunction 			<ul style="list-style-type: none"> - Confirm connector connections - confirm connection of wire terminals to compressor is in the right order - Confirm cable is connected correctly at terminal block - Remove dust on filter -Correct piping and remove bends and blockings - Open stopper valve - Remove air - Conduct operation check on water circulation pump - Check Power supply cable wiring layout - Confirm power supply voltage (240+/-14V) - PCB replacement required if same error occurs again after re-run of heat pump

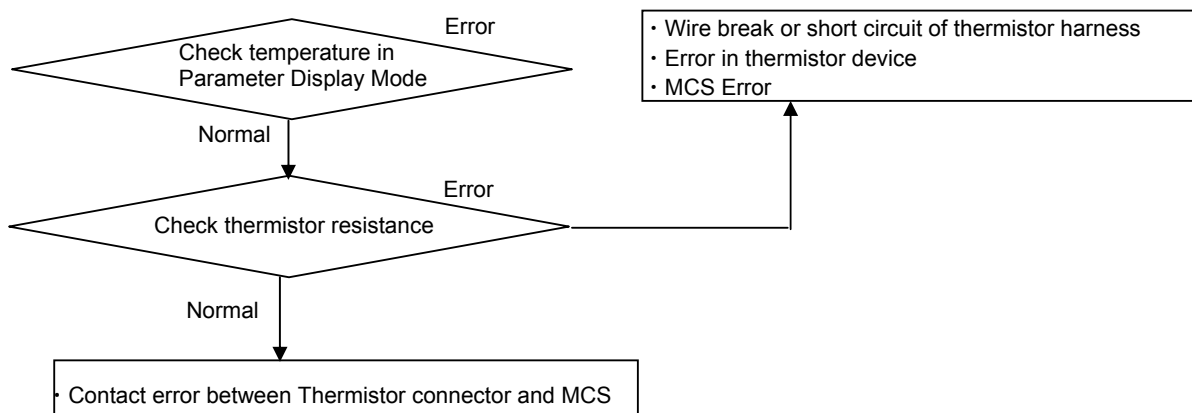
Error Code	Error Contents	Error Detection Condition & Diagnostic	Check Points		Judgment & Repair Methods
			Connector No. or Maintenance Monitor No.	Connector Colour	
E121	INV Power Supply Low-Voltage Error	Power supply voltage drop detected in compressor operation control <Check Items> - Check for HP control PC board connector connection - Error in compressor wiring - Error in connection on power supply terminal block - Power cutoff occurred - Power supply voltage error - PC board malfunction			- Confirm connector connections - confirm connection of wire terminals to compressor is in the right order - Confirm cable is connected correctly at terminal block - Check Power supply cable wiring layout - Confirm power supply voltage (240+/-14V) - PCB replacement required if same error occurs again after re-run of heat pump
E122	INV Transient Voltage Drop Detection Error	Power cutoff detected in compressor operation control <Check Items> - Check for HP control PC board connector connection - Error in compressor wiring - Error in connection on power supply terminal block - Power cutoff occurred - Power supply voltage error - PC board malfunction			- Confirm connector connections - confirm connection of wire terminals to compressor is in the right order - Confirm cable is connected correctly at terminal block - Check Power supply cable wiring layout - Confirm power supply voltage (240+/-14V) - PCB replacement required if same error occurs again after re-run of heat pump
E123	INV Transient Power Cutoff Detection Error 1	Power cutoff detected in compressor operation control <Check Items> - Check for HP control PC board connector connection - Error in compressor wiring - Error in connection on power supply terminal block - Power cutoff occurred - Power supply voltage error - PC board malfunction			- Confirm connector connections - confirm connection of wire terminals to compressor is in the right order - Confirm cable is connected correctly at terminal block - Check Power supply cable wiring layout - Confirm power supply voltage (240+/-14V) - PCB replacement required if same error occurs again after re-run of heat pump

Error Code	Error Contents	Error Detection Condition & Diagnostic	Check Points		Judgment & Repair Methods
			Connector No. or Maintenance Monitor No.	Connector Colour	
E124	INV Transient Power Cutoff Detection Error 2	Power cutoff detected in compressor operation control <Check Items> - Check for HP control PC board connector connection - Error in compressor wiring - Error in connection on power supply terminal block - Power cutoff occurred - Power supply voltage error - PC board malfunction			- Confirm connector connections - confirm connection of wire terminals to compressor is in the right order - Confirm cable is connected correctly at terminal block - Check Power supply cable wiring layout - Confirm power supply voltage (240+/-14V) - PCB replacement required if same error occurs again after re-run of heat pump
E125	INV Control Circuit Board Power Supply Error	Error detected inside PC board <Check Items> - PC Board malfunction			- PCB replacement required if same error occurs again after re-run of heat pump
E130	INV Temperature Sensor Error	Wire break or short circuit detected on thermistor in HP control PC board <Check Items> - Thermistor wiring error - malfunction of thermistor on HP control PC board	CN1	White	- Confirm connector connections - PCB replacement required if same error occurs again after re-run of heat pump
E131	INV Heatsink Temperature Error	90degC or more detected by thermistor on HP control PC board <Check Items> - No fan blade rotation - No efficient air absorption amount - Fan motor malfunction			- Check fan motor rotation - Confirm connector connections - Check if any damage on propellar fan blade - Remove foreign object from evaporator if any - Replace fan motor

Error Code	Error Contents	Error Detection Condition & Diagnostic	Check Points		Judgment & Repair Methods
			Connector No. or Maintenance Monitor No.	Connector Colour	
E140	INV Motor Operation Detection Error	<p>Compressor rotation error was detected</p> <p><Check Items></p> <ul style="list-style-type: none"> - Check for HP control PC board connector connection - Trouble in air absorption due to foreign object blocking air path through evaporator - Check dust being stuck on HP connector filter - Bends or blockings and freeze on HP connection pipes - Stopper valve is closed - Air exists in water pipe - Water circulation pump malfunction - Compressor wiring error - Power cutoff occurred - Power supply voltage error - Error in connection on power supply terminal block - PC board malfunction 			<ul style="list-style-type: none"> - Confirm connector connections - Remove foreign object from evaporator if any - Remove foreign object from filter if any -Correct piping and remove bends and blockings - Open stopper valve - Remove air - Conduct operation check on water circulation pump - confirm connection of wire terminals to compressor is in the right order - Check Power supply cable wiring layout - Confirm power supply voltage (240+/-14V) - Confirm wire connection on terminal block. - PCB replacement required if same error occurs again after re-run of heat pump
E141	INV Overload Detection Error	<p>Overload Detected in compressor operation control</p> <p><Check Items></p> <ul style="list-style-type: none"> - Check for HP control PC board connector connection - Compressor wiring error - Error in connection on power supply terminal block - Check dust being stuck on HP connector filter - Bends or blockings and freeze on HP connection pipes - Check if stopper valve is open - Air exists in water pipe - Water circulation pump malfunction - Power cutoff occurred - Power supply voltage error - PC board malfunction 			<ul style="list-style-type: none"> - Confirm connector connections - confirm connection of wire terminals to compressor is in the right order - Confirm wire connection on terminal block. - Remove foreign object from filter if any -Correct piping and remove bends and blockings - Open stopper valve - Remove air - Conduct operation check on water circulation pump - Check Power supply cable wiring layout - Confirm power supply voltage (240+/-14V) - PCB replacement required if same error occurs again after re-run of heat pump

Error Code	Error Contents	Error Detection Condition & Diagnostic	Check Points		Judgment & Repair Methods
			Connector No. or Maintenance Monitor No.	Connector Colour	
E150	INV Serial Communication Error	Communication error detected in compressor operation control <Check Items> - Wiring layout is not following instruction - noise source is near harnesses - PC board malfunction			- Confirm connector connections - Stop operation of all the surrounding electrical products and reboot Heat Pump - PCB replacement required if same error occurs again after re-run of heat pump

Thermistor Diagnostic Flow



9. Trouble Shooting Guide

If you faced to a problem in a use of our heat pump water heater system, please check the following things prior to calling for a support.

Status	Considerable Causes	Action to Take
No hot water comes out of water tap Temperature of hot water is too low	Small or no hot water is left in the storage tank.	<ul style="list-style-type: none"> - Stop using hot water and wait for about 1 hour - Consider a change of the electricity supply off-peak mode (Length of power-supply hours may be too short for the water heating cycle to cover the hot water consumption)
	Air removing procedure from the heat pump system may be insufficient.	- Open the water drain plugs on the Heat Pump Unit to remove air from water circuit. (Be careful for burning)
	Filter on cold inlet connector may be blocked.	- Check the filter and remove if there is any blockage
	Water flow speed may be dropped due to the heat pump piping bend, blockage or crush.	- Check for any piping bend or crush and remove if any
	Pipes may be frozen.	- If frozen area is found on the piping, melt the ice on the pipe and provide a heat insulation
	Stop valve is closed.	- Open the valve
	Air absorption is not sufficient due to a blockage on the evaporator.	-Remove the object being blocking the air flow through the evaporator (e.g. fallen leaves, grass, snow, etc.)

For those problems not listed in the list above, an inspection provided by a skilled engineer is required. Please contact the distributor.

Caution:

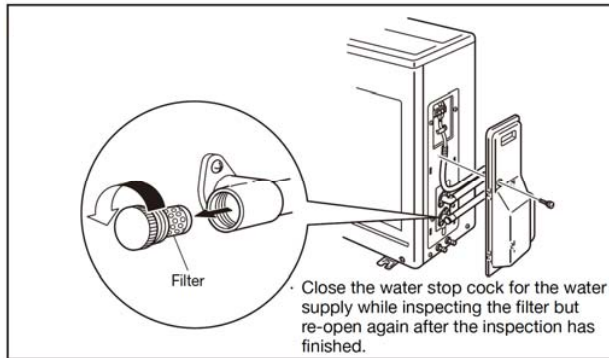
Do not shut the electricity supplied to the heat pump system even if you go away from home and do not use hot water for a long while.

If the system is equipped with freeze protect heaters, also do not shut the power supply to the heaters.

Failure to do so may cause a crack on the pipes due to the pipes getting frozen.

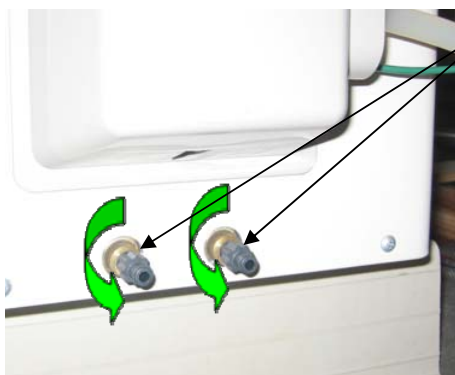
Cleaning the Inlet Filter

1. Remove end cover from the Heating Unit to expose inlet/outlet connections
2. Turn off inlet water (tap to inlet or at main supply)
3. Remove filter plug by unscrewing knurled knob anti-clockwise
4. Clean filter by washing (do not pry anything loose)
5. Replace filter plug (insert & screw clockwise)
6. Turn inlet water on & check to ensure no leak around filter
7. Replace the inside cover and the end cover



Removing air from the system

Air Removing Process



Water drain plugs

Open the water drain plugs (2 places) on the Heat Pump Unit.

Close the plugs after no air is confirmed in the water.

Supply the power to the Heat Pump Unit and leave the water tap open for 3 minutes.

Close the tap after no air is confirmed in the water.

Caution

Hot water may come out. Be careful not to get the hands burnt.

10. How to Use Timer Setting Panel

1. How to Operate

1-1 7-Segment Display

7-segment display on the timer setting panel ordinary displays the current time as a function of the Clock Display Mode. However, the display is switched to the Display Sleep Mode and turns off when no panel operation is performed for more than 60 seconds. Display Sleep Mode is cancelled when either of “UP”, “DOWN” or “Func/Enter” key is pressed. When an error is occurred, a red LED on the timer setting panel turns on and an error code is displayed on the 7-segment LED display. The panel does not turn to the Display Sleep Mode while the error code is shown.

1-2 Current Time Setting

This product contains a built-in clock IC. As a part of the water heating cycle logic refers to the current time, it is necessary to set the clock before start using the product. The Current time can be set in the Clock Setting Mode as described below.

*Note

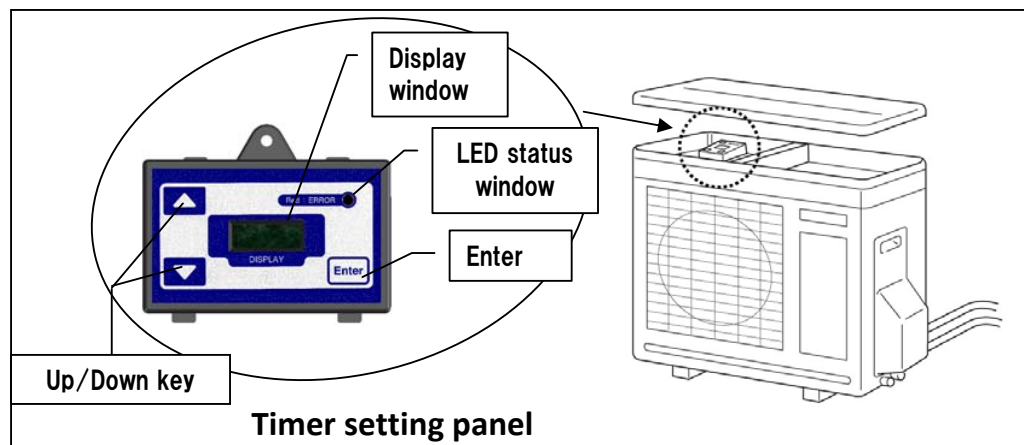
There is no need to adjust the time setting for the daylight saving period. Even if the installation is conducted during the daylight saving period, the clock setting to the ordinary time (not daylight saving time) is preferable.

1. Switching to Clock Setting Mode
Press the “Enter” key in the Clock Display Mode to switch to the Clock Setting Mode. Time Display starts flashing once the mode is switched.
2. Setting the Clock
The time setting can be adjusted by pressing “Up” and “Down” keys. Fast forward and rewind are available by pressing and holding down a key.
3. Executing Setting the Clock
After the clock is adjusted to the current time, press the Enter key to execute the setting. The time display stops flashing and comes on once the setting is finished.

*Caution

The display automatically goes back to the Clock Display Mode when no panel operation is performed for more than 60 seconds in the Clock Setting Mode. If this occurs, changes made will not be reflected to the setting. If the clock setting is rewound to a time that is earlier than the time when a heating cycle is triggered, the system will start the heating cycle.

*Note When no panel operation is performed for more than 60 seconds the display is switched to the Display Sleep Mode and turns off. Display Sleep Mode is cancelled when Up, Down or Enter key is pressed.



1-3 Maintenance Mode

Maintenance Mode is a function to check the heat pump status check and perform other settings.

It should generally be assumed that a user do not operate this function.

1-3-1 Types of Maintenance Mode

There are some modes as described below exist in the Maintenance Mode.

(1) Blockout Time Setting Mode

This is a mode to set the blockout time (a setting to block HP unit operation within the setting time)

(2) Error History Display Mode

This is a mode to check the history of occurred errors.

(3) Parameter Display Mode

This is a mode to check the values measured by thermistors, etc.

(4) Drive Setting Mode

This is a mode to switch on/off the HP unit.

This mode is to disable the Heat Pump operation. Make sure to put the setting back to “d_on” mode after using this mode.

(5) Compulsory Operation Mode

This is a mode to compulsorily operate the water heating cycle.

This mode is to start the Heat Pump operation immediately no matter the timer setting.

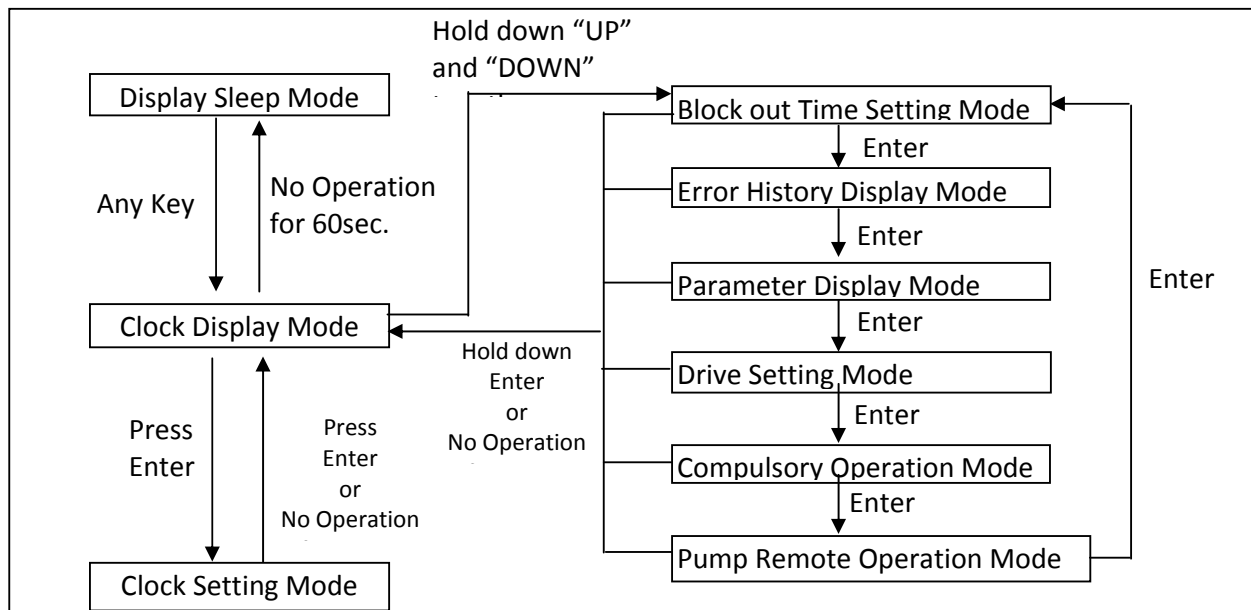
(6) Pump Remote Operation Mode

This is a mode to run the water circulation pump

This mode is used when you would like to manually remove the air inside the heat pump unit.

1-3-2 How to switch to Maintenance Mode

Press and hold down Up and Down keys together in the clock display mode to go to the maintenance mode. After the mode is switched, press the Enter key to select a mode from the six modes described above. To finish the maintenance mode, press and hold down the Enter key, or leave for more than 60 seconds with no panel operation.



1-3-3 Block out time setting mode

This mode is used to set the block out time that blocks the heat pump unit operation within the setting time.

Block out times are used if the customer has a time of use tariff.

Change the mode

Press and hold down Up and Down keys together in the clock display mode to go to the block out time setting mode. Once the mode is changed, 'bo' and '00XX' (00 = start time, XX = end time) are displayed. (Initial setting = 00 o'clock for both start and end)

Adjust set block out start time

Press Up or Down key and '00' (start time) in '00XX' starts flashing and 'XX' (end time) illuminates. Now the block out start time can be adjusted. Setting can be performed only in hour increments, not in minutes.

Set block out start time

Press the Enter key to set the desired time setting. After the start time is set, the start time display stops flashing. The end time display starts flashing at the same time.

Adjust block out end time

Set to the desired end time by using Up and Down keys. Setting can be performed only in hour increments, not in minutes.

Set block out end time

Press enter key to adjust the desired time setting. After the end time is set, the start time and end time are displayed for two seconds, then it starts to display 'bo' and '00XX' (00 = start time, XX = end time) by turns.

Go back to clock display mode

Press Enter key to go back to the clock display mode. It will automatically go back to the clock display mode when no panel operation is performed for more than 60 seconds. Block out time setting mode cannot be set unless the end time setting is executed.

Cancel block out setting

To cancel the block out setting, set both start and end times to '00'. Setting to other than '00' (01 ~ 23) will be interpreted as a setting error and the end time will flash. Make sure to set both times to '00' when cancelling the block out time setting

1-3-4 Error History Display Mode

1) How to Change Mode

Press and hold down “UP” and “DOWN” keys together in the Clock Display Mode to show the Block out Time Setting Mode. Press Enter key once to switch to the Error History Display Mode. “Err0” will be displayed when the mode is switched over.

2) How to Check Error History

The display repeats “Err*” -> “E***” -> “****” in the Error History Display Mode. (“*” should be a number on the actual panel)

“*” in “Err*” shows the number of errors. The latest 10 times of errors can be memorized.

The error number can be changed by pressing “UP” or “DOWN” key.

“*” in “****” shows the time that an error has occurred. For instance, if the display shows “1446”, it means the time that an error occurred is 14:46 (2:46 p.m.). Date of an error occurrence is not memorized.

Following shows the correlation of display and error history:

[Err0] Error occurred most recently

[Err1] Error occurred earlier than Err0

:

[Err9] Oldest error memorized in Error History

“*” in “E***” shows the generated error code.

Shown below is the list of the error codes.

E000	No error generated
E010	HP Inlet Temperature Thermistor wire break
E011	HP Inlet Temperature Thermistor short circuit
E012	HP Outlet Temperature Thermistor wire break
E013	HP Outlet Temperature Thermistor short circuit
E014	HP Ambient Temperature Thermistor wire break
E015	HP Ambient Temperature Thermistor short circuit
E016	HP Defrost Temperature Thermistor wire break
E017	HP Defrost Temperature Thermistor short circuit
E018	HP Discharge Temperature Thermistor wire break
E019	HP Discharge Temperature Thermistor short circuit
E020	Tank Thermistor A wire break
E021	Tank Thermistor A short circuit
E040	HP water outlet over temperature 1
E041	HP water outlet over temperature 2
E042	HP Outlet Temperature Thermistor detection error
E043	HP discharge over temperature 1
E044	HP Discharge Temperature Thermistor detection error
E045	HP Defrost Thermistor detection error
E047	High pressure side error
E048	High ambient temperature defrost drive error
E070	Fan motor locked
E071	Fan motor revolution error
E073	Water circulation pump locked

E090	Clock IC error
E101	Communication error
E102	INV compressor start error
E110	INV transient over-current error on hardware (converter)
E111	INV transient over-current error on hardware (inverter)
E112	INV transient over-current error on software (converter)
E113	INV transient over-current error on software (inverter)
E114	INV converter current detection circuit error
E115	INV inverter current detection circuit error
E120	INV power supply over-voltage error
E121	INV power supply low-voltage error
E122	INV transient voltage drop detection error
E123	INV transient power cutoff detection error 1
E124	INV transient power cutoff detection error 2
E125	INV control circuit board power supply error
E130	INV temperature sensor error
E131	INV heatsink temperature error
E140	INV motor operation detection error
E141	INV overload detection error
E150	INV serial communication error

3) How to Exit the Mode

Press and hold down “Enter” key to return to the Clock Display Mode.

Also, it automatically goes back to the Clock Display Mode when no panel operation is performed for more than 60 seconds.

1-3-5 Parameter Display Mode

1) How to Change Mode

Press and hold down “UP” and “DOWN” keys together in the Clock Display Mode to show the Block out Time Setting Mode. Press Enter key twice to switch to the Parameter Display Mode. “no.00” will be displayed when the mode is switched over.

2) How to Check Parameters

In the Parameter Display Mode, the display shows “no.**” and “****” repeatedly by turns. (“*” should be a number on the actual panel. Display shows “A****” if below 0 °C)

“*” in “no.**” shows the parameter item number and “****” shows the value of the corresponding parameter.

Shown below is the list of the available parameters and their corresponding item numbers.

no.00	Tank Thermistor A (10 times larger value to be displayed)
no.01	-
no.02	HP Ambient Temperature Thermistor (10 times larger value to be displayed)
no.03	HP Inlet Temperature Thermistor (10 times larger value to be displayed)
no.04	HP Outlet Temperature Thermistor (10 times larger value to be displayed)
no.05	HP Defrost Temperature Thermistor (10 times larger value to be displayed)
no.06	HP Discharge Temperature Thermistor (10 times larger value to be displayed)
no.07	INV Heatsink Temperature Thermistor (10 times larger value to be displayed)
:	
no.98	Control software version number
no.99	Flash version number

3) How to Exit the Mode

Press and hold down “Enter” key to return to the Clock Display Mode.

Also, it automatically goes back to the Clock Display Mode when no panel operation is performed for more than 60 seconds.

1-3-6 Drive Setting Mode

1) How to Change Mode

Press and hold down “UP” and “DOWN” keys together in the Clock Display Mode to show the Block out Time Setting Mode. Press Enter key three times to switch to the Drive Setting Mode. Once the mode has switched, the display shows either “d_on” or “d_oF” which corresponds the current setting. Also, when the drive setting is On Mode, LED is lighted in green.

2) How to Set to Driving Mode

Press “UP” key to change the setting to On Mode. By pressing the key, the display turns to “d_on” and the LED turn on in green. The default setting when the power is conducted should be “d_on”.

3) How to Turn Off Driving Mode

Press “DOWN” key to change the setting to Off Mode. By pressing the key, the display turns to ”d_oF” and the LED turns off. When the power is cut off, the Off Mode setting will not be maintained and switched to the default setting “d_on”.

4) How to Exit the Mode

Press and hold down “Enter” key to return to the Clock Display Mode. Also, it automatically goes back to the Clock Display Mode when no panel operation is performed for more than 60 seconds. Settings in the Drive Setting Mode can be retained even after returning to the Clock Display Mode.

1-3-7 Compulsory Operation Mode

1) How to Change Mode

Press and hold down “UP” and “DOWN” keys together in the Clock Display Mode to show the Block out Time Setting Mode. Press Enter key four times to switch to the Compulsory Operation Mode. The display shows “HPoF” once the mode has switched.

2) How to Start Compulsory Operation

Press “UP” key to start HP unit operation compulsorily. By pressing the key, the display turns to ”HPon”. The dot on the first digit of the 7-segment LED display turns on while in the compulsory HP unit operation. The dot is on also in the Clock Display Mode.

3) How to Stop Compulsory Operation

Press “DOWN” key to stop the compulsory HP unit operation. By pressing the key, the display turns to “HPoF”.

4) How to Exit the Mode

Press and hold down “Enter” key to return to the Clock Display Mode. Also, it automatically goes back to the Clock Display Mode when no panel operation is performed for more than 60 seconds. The compulsory operation command can be retained even after returning to the Clock Display Mode.

1-3-8 Pump Remote Operation Mode

1) How to Change Mode

Press and hold down “UP” and “DOWN” keys together in the Clock Display Mode to show the Block out Time Setting Mode. Press Enter key five times to switch to the Pump Remote Operation Mode. The display shows “PuoF” once the mode has switched.

2) How to Start Compulsory Pump Operation

Press “UP” key to start the water circulation pump operation compulsorily. By pressing the key, the display turns to “Puon”.

3) How to Stop Compulsory Pump Operation

Press “DOWN” key to stop the compulsory water circulation pump operation. By pressing the key, the display turns to “PuoF”.

4) How to Exit the Mode

Press and hold down “Enter” key to return to the Clock Display Mode. Also, it automatically goes back to the Clock Display Mode when no panel operation is performed for more than 180 seconds when the pump is in operation, and 60 seconds when the pump is stopped. The compulsory pump operation command cannot be retained if returning to the Clock Display Mode. The operation will be stopped also when the mode is switched to another.

1-4 Programme Initialising

This product contains a programme that saves operation data to the flash ROM by detecting a voltage drop. Therefore, an initialising is necessary when overwriting the programme or changing the setting back to the default at the delivery.

As an initialising process, apply 240V power supply while holding down “UP” and “DOWN” keys together. After the power is conducted, confirm the 7-segment LEDs on the timer setting panel shows “Fclr”, and the initialising is complete. After the initialising is complete, unplug the power supply then plug it back on. (The system continues to initialise unless plugging the power again, thus it would not step forward to the heating process.)

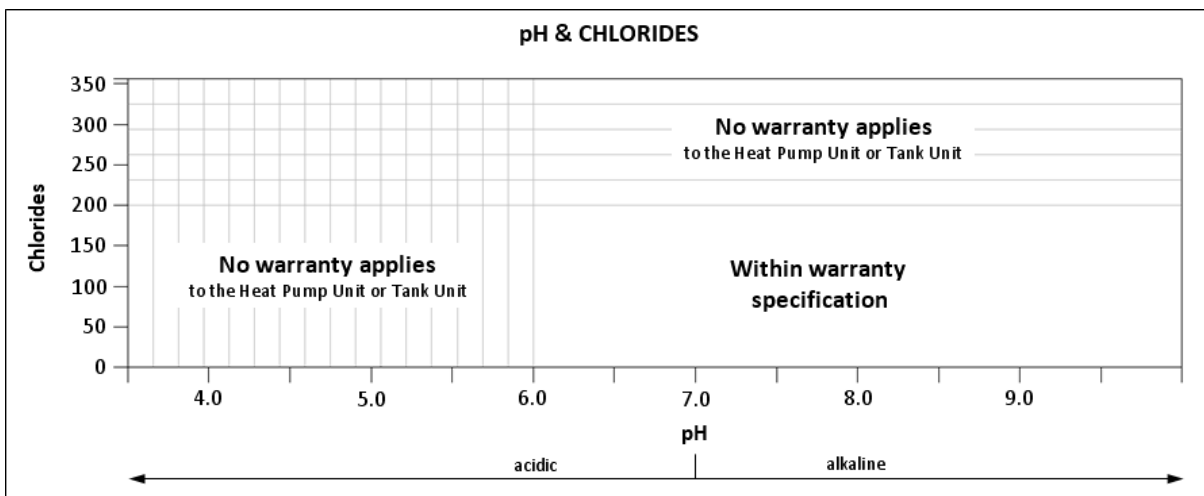
1-5 Initial Setting List

Item	Initial Values	Display
Block out Time	Start 00 o'clock, End 00 o'clock	0000
Error History Display Mode	Error number 0 to 9 Error code: E000 Error occurrence time: 0000	Err0 -> E000 -> 0000 : Err9 -> E000 -> 0000
Drive Setting Mode	ON	d_on
Compulsory Operation Mode	OFF	HPoF
Pump Remote Operation Mode	OFF	PuoF

11. Water Supply Quality

▪ Chloride and pH

In high chloride water supply areas, the water can corrode some parts and cause them to fail. Where the chloride level exceeds 200 mg/litre warranty does not apply to the heat pump unit and tank unit. pH is a measure of whether the water is alkaline or acid. In an acidic water supply, the water can attack the parts and cause them to fail. No warranty applies to the heat pump unit and tank unit where the pH is less than 6.0. The water supply from a rainwater tank unit in a metropolitan area is likely to be corrosive due to the dissolution of atmospheric contaminants. Water with a pH less than 6.0 may be treated to raise the pH. It is recommended that an analysis of the water from a rainwater tank be conducted before connecting this type of water supply to the system. In an area where the water quality is unstable, it is necessary to install an anti scale water conditioner to remove scale from the water flowing into the system. Use of the system with scale contained in the water can drop the system performance.



Change of water supply

Changing, or alternating, from one water supply to another can have a detrimental effect on the operation and/or life expectation of the water tank unit cylinder, PTR valve, water heating circulation and the heat exchanger in the system. Where there is a changeover from one water supply to another, for example, a rainwater tank supply, desalinated water supply, public reticulated water supply or water brought in from another supply, then water chemistry information should be sought from the supplier or the water should be tested to ensure it meets the warranty requirements in the installation manual.

12. Wiring Diagram

