Air to Water Heat Pump
Installation manual

Control Kit

- Thank you for purchasing this Samsung Product.
- Before operating this unit, please read this manual carefully and retain it for future reference.

SAMSUNG

Contents

Correct Disposal of This Product
(Waste Electrical & Electronic Equipment)

(Applicable in countries with separate collection systems)

This marking on the product, accessories or literature indicates that the product and its electronic accessories (e.g. charger, headset, USB cable) should not be disposed of with other household waste at the end of their working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.

Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can take these items for environmentally safe recycling.

Business users should contact their supplier and check the terms and conditions of the purchase contract. This product and its electronic accessories should not be mixed with other commercial wastes for disposal.

For information on Samsung's environmental commitments and product regulatory obligations, e.g. REACH, visit our sustainability page available via www.samsung.com

Safety precautions

Carefully follow the precautions listed as below because they are essential to guarantee the safety of SAMSUNG product.

WARNING

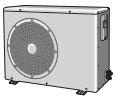
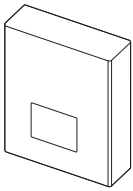
- Always disconnect a power supply of Air-Water Heat Pump before servicing it or accessing components inside the unit.
- Verify that installation and testing operations shall be performed by qualified personnel.
- To prevent serious damage on the system and injuries to users, precautions and other notices shall be observed.

Warning

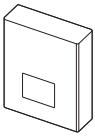
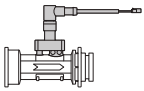
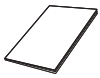
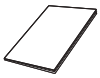
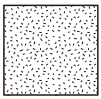
- Carefully read the contents of this manual before installing the control kit and store the manual in a safe place in order to be able to use it as reference after installation.
- For maximum safety, installers should always carefully read the following warnings.
- Store the manual in a safe location and remember to hand it over to the new owner if the kit is sold or transferred.
- The kit is compliant with the requirements of the Low Voltage Directive (72/23/EEC), the EMC Directive (89/336/EEC) and the Directive on pressurized equipment (97/23/EEC).
- The manufacturer shall not be responsible for damage originating from unauthorized changes or the improper connection of electric and hydraulic lines. Failure to comply with these instructions or to comply with the requirements set forth in the "Operating limits" table, included in the manual, shall immediately invalidate the warranty.
- Do not use the units if you see some damages on the units and recognize something bad such as loud noise, smell of burning.
- In order to prevent electric shocks, fires or injuries, always stop the unit, disable the protection switch and contact SAMSUNG's technical support if the unit produces smoke, if the power cable is hot or damaged or if the unit is very noisy.
- Always remember to inspect the unit, electric connections, and protections regularly. These operations shall be performed by qualified personnel only.
- The unit contains various electrical components, which should be kept out of the reach of children.
- Do not attempt to repair, move, alter or reinstall the unit by unauthorized personnel, these operations may cause product damage, electric shocks and fires.
- Do not place containers with liquids or other objects on the unit.
- The packing materials must be disposed of in accordance with local regulations.
- Wear protective gloves to unpack, move, install, and service the unit to avoid your hands being injured by the edge of the parts.
- Do not touch the internal parts while running the units.
- Inspect the product shipped and check if damaged during transport. If the product has some damages, DO NOT INSTALL and immediately discuss the damages with the carrier or retailer (if the installer or the authorized technician has collected the material from the retailer.)
- Our units shall be installed in compliance with the spaces described in the installation manual, to ensure accessibility from both sides and allow repairs or maintenance operations to be carried out. If the units installed without complying with procedures described in manual, additional expenses can be asked because special harnesses, ladders, scaffolding or any other elevation system for repair service will NOT be considered part of the warranty and will be charged to the end customer.
- When service works required, make sure to disconnect the power supply at least 1 minute to prevent electric shocks.
  - Always check the voltage at the terminals of main PCB before trying to touch.
- Use electric wires which are specified in the manual. Connections between wires and terminals shall be assembled without any tension. If the assembly works is not implemented well, it can lead to product damages and fires.
- After wiring works, the terminal block cover shall be fixed firmly. Without cover, it can cause to have product damage and fire.
- Be sure not to perform power cable modification, midway wiring, and multiple wire connection.
  - It may cause electric shock or fire due to poor connection or insulation and current limit override.
  - When midway wiring is required due to power line damage, refer to "How to connect your extended power cables" in the installation manual.

Product specifications

Product compatibility

Line-up							
Heat pump units	Chassis						
	Model Name	Mono	AE050RXYD**	AE080RXYD**	AE120RXYD** AE160RXYD**	AE050CXYD** AE080CXYD**	AE080BXYD** AE120BXYD** AE140BXYD** AE120CXYD** AE160CXYD**
Indoor units	Control Kit						
	Model Name		MIM-E03FN				

Accessories

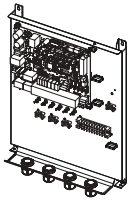
		
Control Kit (MIM-E03FN)	Temp. Sensor for Zone Control (15m, BLK) (2EA)	Flow Sensor (1EA, 1.5m)
		
Installation manual	User manual	ASSY TUBE CONNECTOR-RIGHT (OD28.0, 1EA)
		
ASSY TUBE CONNECTOR-LEFT (OD28.0, 1EA)	Fastener (2EA)	O-Ring (2EA)
		
Temp. Sensor for DHW Tank (15m, YEL) (1EA)	Temp. Sensor for Mixing Valve (15m, BLU) (1EA)	Sensor Clip Φ22 (2EA)
		
Sensor Clip Φ15 (2EA)	Sensor Clip Φ12 (2EA)	Insulator (2EA)
		
Cable-Tie (4EA)		

Optional Accessories

Item(Model Name)		Components	Compatibility
			MIM-E03FN
Backup Heater Kit	MHC-300FP	Sub Backup Heater (3 kW)	O
Extension Wire Kit	MVW-EE300	AI Home extension cable (30 m), AI Home Decoration Plate	O

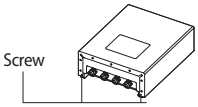
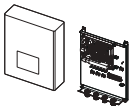
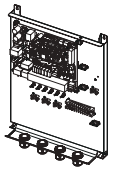
Main components

(Unit : EA)

Model name	Parts	MIM-E03FN
Detail components	Shape	
	Main PBA	1
	Grounding screw	7
	Conduit	4
	Base plate	1
	Top cover plate	1
	Case screw	2
	Terminal Block (10p)	1
Weight (Net)	7.1 kg	
Size (W x H x D)	380 mm x 480 mm x 150 mm	

✻ Flow sensor set point
AE050RXYD**/AE080RXYD**/AE080BXYD**/AE120BXYD**/AE140BXYD** : 7LPM
AE120RXYD**/AE160RXYD** : 12LPM
AE050CXYD**/AE080CXYD**/AE120CXYD**/AE160CXYD** : 7LPM

Mounting the unit

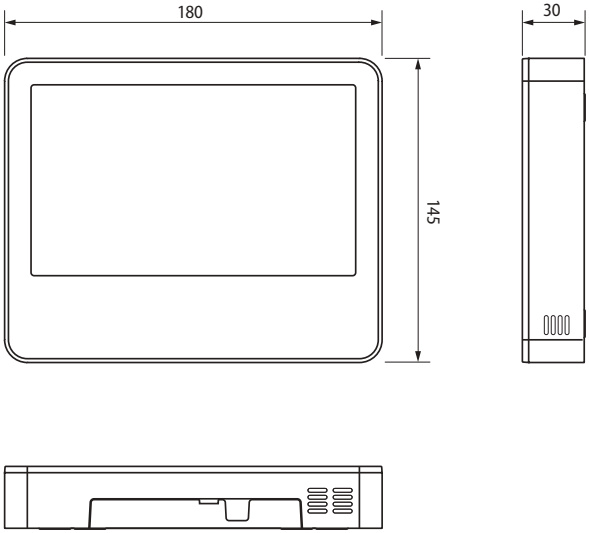
Procedure	Remark
1. Open the 2 screws located at the bottom of the unit.	
2. Open the top cover and fix the unit to the wall with 4 screws.	
3. Close the top cover and fasten 2 screws again into the unit.	

Installing the unit

Installing the AI Home

Dimension

(Unit : mm)



Installing the unit

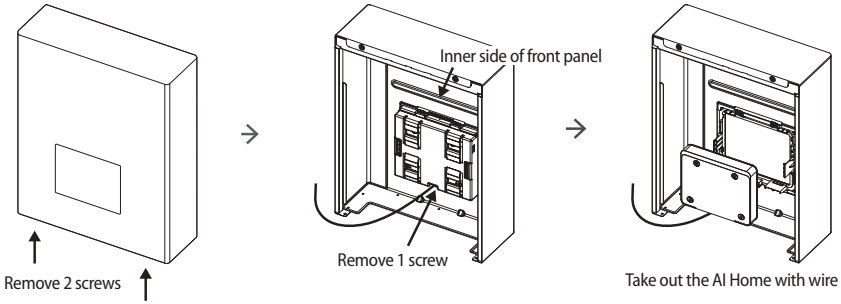
Installation of AI Home at the separate room

AI Home mounted to the Control kit can be moved to the room and serve as room thermostat.

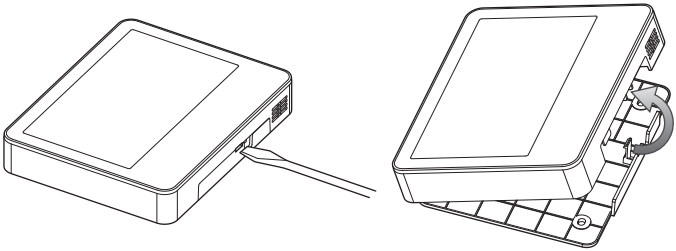
NOTE

- In order to install AI Home in a separate room, please purchase Extension Wire Kit (MVW-EE300).

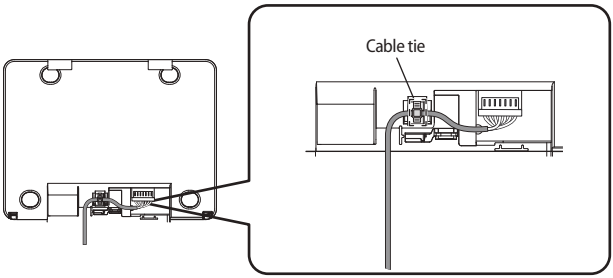
1. Remove the AI Home from Control kit.



2. Remove the wire from the Control kit and AI Home.

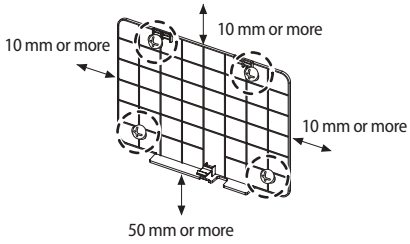


Insert the flat-head screwdriver into a square grooves at the bottom of the AI Home and slightly turn to lift the front from the rear cover.



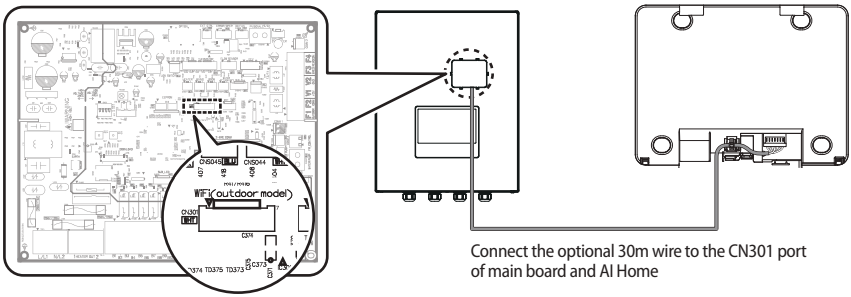
Remove cable tie and wire from the board

3. Installation of AI Home to the wall
   Using 4 screws, firmly affix the rear cover of the AI Home to the wall.



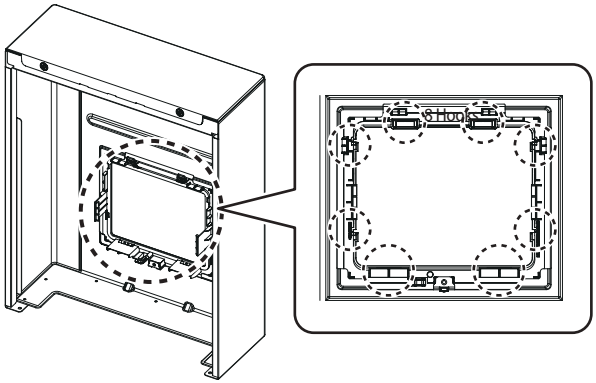
Before fixing the rear cover, secure at least 10 mm space of left, right, upper side, and 50 mm for bottom side

4. Connect extension wire (30m) to main board & AI Home.

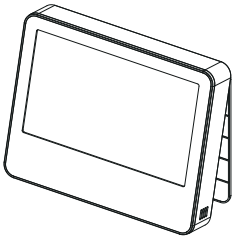


Connect the optional 30m wire to the CN301 port of main board and AI Home

5. Reassemble the Control kit and AI Home.



Fix the front cover decoration panel to the front panel



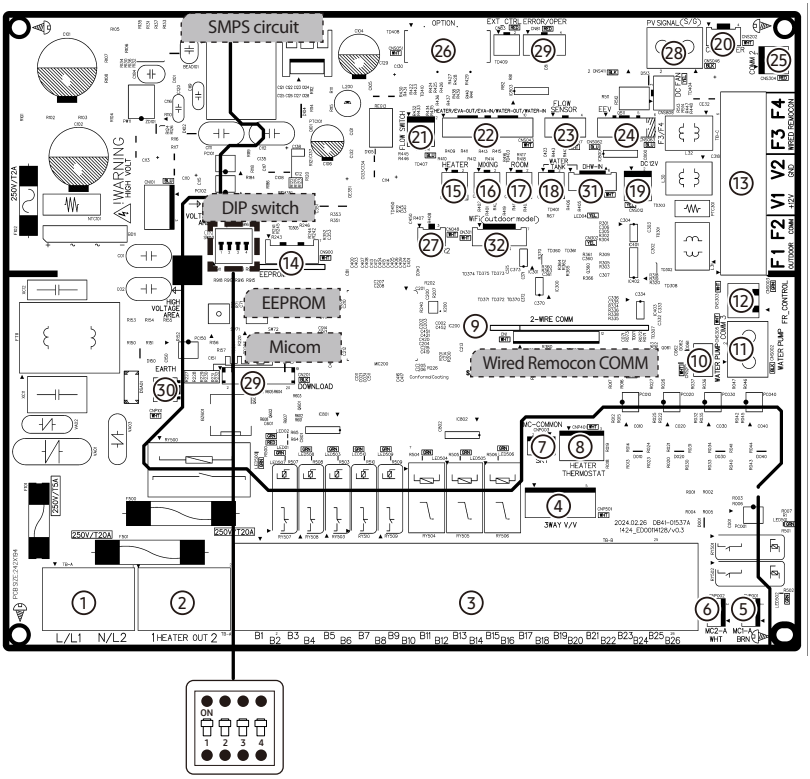
Align the controller with the upper groove first, and then insert it by turning it downwards as shown in the figure. after assemble, check that no wires are stuck in the gap between the back and front cover

Wiring work

CAUTION

- Field-supplied electrical components such as power switch, circuit breakers, wires, terminal blocks, etc must be properly chosen with compliance with national legislation or regulation.
- Switch off the power supply before making any connections.
- All field wiring and components must be installed by a licensed electrician.
- Use a dedicated power supply.
- All power connections must be protected from dew condensation by thermal insulation.
- The system shall be earthed. Do not earth the unit to a utility pipe, surge absorber or telephone earth. Incomplete earth may cause electrical problems.

Layout of PCB



No.	Part code	Part name	Terminal	Terminal description
①	TB-A	AC POWER-IN	#1: L	AC INPUT
			#2: N	AC INPUT
②	TB-A1	BOOSTER HEATER	#1: BOOSTER HEATER SIGNAL(L)	AC OUTPUT
			#2: N	AC OUTPUT
③	TB-B	LOAD CONTROL	#1: N	AC OUTPUT
			#2: MIXING VALVE_CW (L)	AC OUTPUT
			#3: MIXING VALVE_CCW (L)	AC OUTPUT
			#4: BOILER (L)	AC OUTPUT
			#5: N	AC OUTPUT
			#6: WATER PUMP(L)	AC OUTPUT
			#7: N	AC OUTPUT
			#8: WATER PUMP ADD(L)	AC OUTPUT
			#9: 2WAY VALVE1_NO (L)	AC OUTPUT
			#10: 2WAY VALVE1_NC (L) Zone1 Water Pump output(FSV 4061=1)	AC OUTPUT
			#11: N	AC OUTPUT
			#12: L	AC OUTPUT
			#13: 2WAY VALVE2_NO (L)	AC OUTPUT
			#14: 2WAY VALVE2_NC (L) Zone2 Water Pump output(FSV 4061=1)	AC OUTPUT
			#15: N	AC OUTPUT
			#16: L	AC OUTPUT
			#17: 3WAY VALVE_NO (L)	AC OUTPUT
			#18: 3WAY VALVE_NC (L)	AC OUTPUT
			#19: N	AC OUTPUT
			#20: L	AC OUTPUT
			#21: THERMOSTAT1_C (L)	AC INPUT
			#22: THERMOSTAT1_H (L)	AC INPUT
			#23: THERMOSTAT2_C (L)	AC INPUT
			#24: THERMOSTAT2_H (L)	AC INPUT
④	CNP501	3WAY VALVE	#1: N	AC OUTPUT
			#2: -	
			#3: 3WAY VALVE_NO (L)	AC OUTPUT
			#4: -	
			#5: 3WAY VALVE_NC (L)	AC OUTPUT
⑤	CNP001	MC1-A	#1: BACK UP HEATER FOR MHC-300FP MODEL(L)	AC OUTPUT
⑥	CNP002	MC2-A	#1: -	
⑦	CNP003	MC-COMMON	#1: THERMOSTAT OUTPUT(N)	AC OUTPUT
⑧	CNP401	HEATER THERMOSTAT	#1: THERMOSTAT OUTPUT(N)	AC OUTPUT
			#2: -	
			#3: N	AC OUTPUT

Wiring works

No.	Part code	Part name	Terminal	Terminal description
⑨	CN1	WIRED REMOCON COMM. SUB PBA		
⑩	CNS001	WATER PUMP	#1: WATER PUMP PWM SIGNAL	DC OUTPUT
			#2: -	
			#3: GND	DIGITAL GROUND
⑪	CNS002	WATER PUMP	#1: WATER PUMP PWM SIGNAL	DC OUTPUT
			#2: GND	DIGITAL GROUND
⑫	CNS003	FR_CONTROL	#1: FR CONTROL DC INPUT	DC INPUT
			#2: GND	DIGITAL GROUND
⑬	TB-C	COMMUNICATION & DC 12V	#1: COM1 (F1)	RS485 - COMM.
			#2: COM1 (F2)	
			#3: V1 (DC 12V)	DC OUTPUT
			#4: V2 (GND)	DIGITAL GROUND
			#5: COM2 (F3)	WIRED REMOTE CONTROLLER
			#6: COM2 (F4)	
⑭	CN900	EEPROM	#1: GND	DIGITAL GROUND
			#2: -	
			#3: DC 5V	DC OUTPUT
			#4: EEPROM_SELECT	DC SIGNAL
			#5: EEPROM_SO	DC SIGNAL
			#6: EEPROM_SI	DC SIGNAL
			#7: EEPROM_CLK	DC SIGNAL
⑮	CNS047	HEATER SENSOR	#1: HEATER TEMP. (10kΩ @ 25 ℃)	DIGITAL INPUT
			#2: GND	DIGITAL GROUND
⑯	CNS045	MIXING VALVE SENSOR	#1: MIXING VALVE TEMP. (10kΩ @ 25 ℃)	DIGITAL INPUT
			#2: GND	DIGITAL GROUND
⑰	CNS044	ROOM SENSOR	#1: ROOM TEMP. (10kΩ @ 25 ℃)	DIGITAL INPUT
			#2: GND	DIGITAL GROUND
⑱	CNS042	WATER TANK SENSOR	#1: WATER TANK TEMP. (200kΩ @ 25 ℃)	DIGITAL INPUT
			#2: GND	DIGITAL GROUND
⑲	CNS012	DC 12V	#1: DC 12V	DC OUTPUT
			#2: GND	DIGITAL GROUND
⑳	CNS202	EHS CONVERTER	#1: COM1 (F1)	RS485 - COMM.
			#2: COM1 (F2)	
			#2: GND	DIGITAL GROUND
			#4: DC 12V	DC OUTPUT
㉑	CNS041	FLOW SWITCH	#1: FLOW SWITCH	DC INPUT
			#2: GND	DIGITAL GROUND

No.	Part code	Part name	Terminal	Terminal description
㉒	CNS043	SENSOR	#1: HEATER TEMP. (10kΩ @ 25 ℃)	DIGITAL INPUT
			#2: GND	DIGITAL GROUND
			#3: EVA-OUT TEMP. (10kΩ @ 25 ℃)	DIGITAL INPUT
			#4: GND	DIGITAL GROUND
			#3: EVA-IN TEMP. (10kΩ @ 25 ℃)	DIGITAL INPUT
			#6: GND	DIGITAL GROUND
			#7: WATER-OUT TEMP. (10kΩ @ 25 ℃)	DIGITAL INPUT
			#8: GND	DIGITAL GROUND
			#9: WATER-IN TEMP. (10kΩ @ 25 ℃)	DIGITAL INPUT
			#10: GND	DIGITAL GROUND
㉓	CNS057	FLOW SENSOR	#1: DC 5V	DC OUTPUT
			#2: FLOW SENSOR DC INPUT	DC INPUT
			#3: GND	DIGITAL GROUND
			#4: -	
㉔	CNS062/ CNS063	EEV (SPLIT/MONO : Not use)	#1~#4: EEV CONTROL PWM SIGNAL	DC OUTPUT
			#5: DC 12V	DC OUTPUT
			#6: DC 12V (CNS063 ONLY)	DC OUTPUT
㉕	CNS304	COMMUNICATION	#1: COM2 (F3)	WIRED REMOTE CONTROLLER
			#2: COM2 (F4)	
㉖	CNS051	OPTION CONNECT (DRY CONTACT, Thermistor)	#1: SG READY1 SIGNAL	DC INPUT
			#2: OPTION TEMP.(10kΩ @ 25 ℃)	DIGITAL INPUT
			#5: SG READY2 SIGNAL	DC INPUT
			#6: ZONE2 TEMP. (10kΩ @ 25 ℃)	DIGITAL INPUT
			#9: EMERGENCY_STOP	DC INPUT
			#10: ZONE1 FLOW TEMP. (10kΩ @ 25 ℃)	DIGITAL INPUT
			#13: DRY CONTACT_1	DC INPUT
			#14: ZONE2 FLOW TEMP. (10kΩ @ 25 ℃)	DIGITAL INPUT
			#17: DRY CONTACT_2	DC INPUT
			#21: DRY CONTACT_3	DC INPUT
			#3,4,7,8,11,12,15,16,19,23: GND	DIGITAL GROUND
			#18,20,22,24: -	
㉗	CN048	HEATER SENSOR2	#1: HEATER TEMP. (10kΩ @ 25 ℃)	DIGITAL INPUT
			#2: GND	DIGITAL GROUND
㉘	CNS046	PV/Peak power control SIGNAL	#1: PV(Photovoltaic) Control Signal / Peak power control Signal	DC INPUT
			#2: GND	DIGITAL GROUND
㉙	CN201	DOWNLOAD		
㉚	CNP101	EARTH	#1: EARTH	EARTH

Wiring works

No.	Part code	Part name	Terminal	Terminal description
㉛	CNS042-1	WATER TANK / DHW IN SENSOR	#1: WATER TANK TEMP.(200kΩ @25℃)	DIGITAL INPUT
			#2: GND	DIGITAL GROUND
			#3: DHW IN TEMP.(10kΩ @25℃)	DIGITAL INPUT
			#4: GND	DIGITAL GROUND
			#5: -	
			#6: -	
㉜	CN301	AI Home	#1, 2: MICOM Tx SIGNAL	UART
			#3, 4: MICOM Tx SIGNAL	UART
			#6: GND	DIGITAL OUTPUT
			#7: DC 12V	DC OUTPUT

No.	Part code	Part name	Terminal	Terminal description

③ Detail

Terminal No.	Function	Description	Input /output	Control kit
B1/B6	Water Pump	B1: Neutral	AC 230V output	1 A
		B6: Water Pump(Live)		
B2/B3/B5	Mixing valve	B2: CW(Live)	AC 230V output	50 mA
		B3: CCW(Live)		
		B5: Neutral		
B4/B5	Backup Boiler	B4: Boiler Signal(Live)	AC 230V output	50 mA
		B5: Neutral		
B7/B8	Additional Water Pump	B7: Neutral	AC 230V output	1 A
		B8: Add Water Pump(Live)		
B9/B10/ B11/B12	2Way Valve #1 or Water pump (Zone1)	B9: 2WAY1_NO(Live)	AC 230V output	50 mA
		B10: 2WAY1_NC(Neutral)		
		B11: Neutral		
		B12: Live		
B13/B14/ B11/B12	2Way Valve #2 or Water pump (Zone2)	B11: Neutral	AC 230V output	50 mA
		B12: Live		
		B13: 2WAY_NO(Live)		
		B14: 2WAY_NC(Live)		
B15/B16/ B17/B18	3Way valve	B15: Neutral	AC 230V output	50 mA
		B16: Live		
		B17: 3WAY_NO(Live)		
		B18: 3WAY_NC(Live)		
B19/B20	Power for Thermostat	B19: Neutral	AC 230V output	50 mA
		B20: Live		
B21/B22	Thermostat1 (Zone1)	B21: THERMOSTAT01_C	AC 230V Input	22 mA
		B22: THERMOSTAT01_H		
B23/B24	Thermostat2 (Zone2)	B23: THERMOSTAT02_C	AC 230V Input	22 mA
		B24: THERMOSTAT02_H		
B25/B26	Solar Input or DHW Thermostat	B25: SOLAR_N	AC 230V Input	22 mA
		B26: SOLAR_L		

⚠ CAUTION

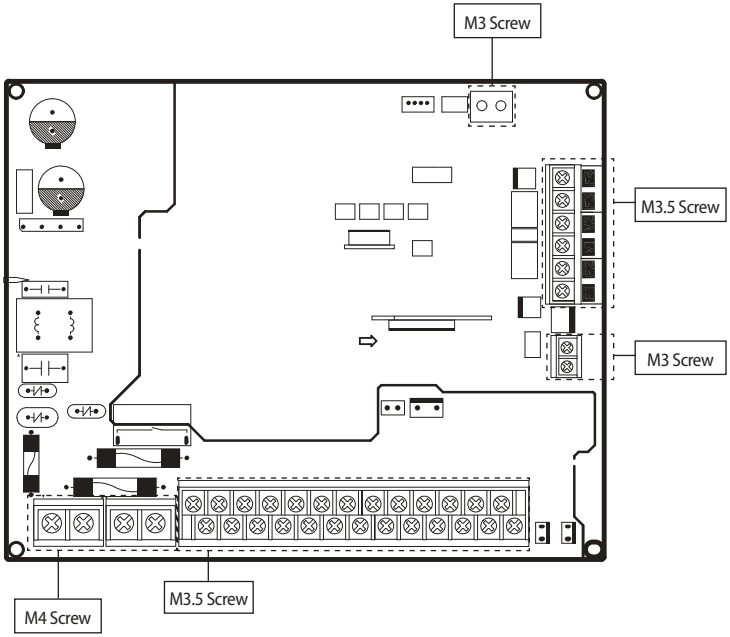
- If you use more than the current corresponding to each terminal, use a separate external relay to connect to each power source.

Selection for the power and booster heater wire terminal

- Connect the cables to the terminal board using the solderless ring terminal.
- Use certified and verified cables.
- Connect using a driver which is able to apply the rated torque to the screws.
- If the terminal is loose, fire may occur due to arcing.
  If the terminal is connected too tightly, it may be damaged.
- External force should not be applied to the terminal block and wires.
- The cable ties for securing the wires must be made from nonflammable materials, V0 or higher.
  Cable ties must be used to secure the power wire, and they come with the unit.

Tightening Torque (kgf • cm)	
M3	0.5 ~ 0.75
M3.5	8 ~ 12
M4	12 ~ 18
M5	20 ~ 30

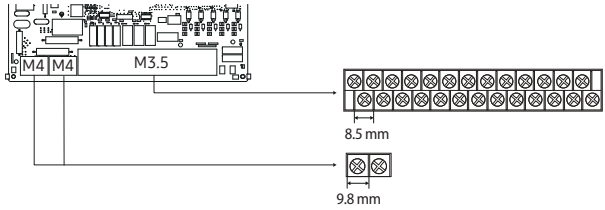
- Main PCB



Wiring works

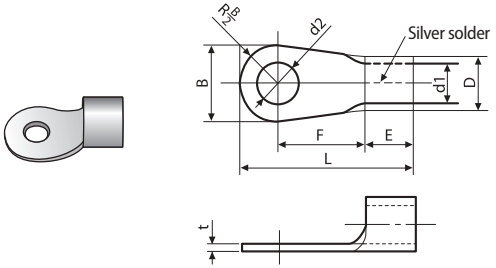
Connecting the power terminal

- Connect the cables to the terminal board using the solderless ring terminal.
- Use certified and reliable cables.
- Connect the cables with the torque chart as below.
- If the terminal is loose, fire may occur caused by arc. If the terminal is connected too firmly, the terminal may be damaged.
- External force should not be applied to the terminal block and wires.
- The cable ties to fasten the wire should be an incombustible material, V0 or above. (The cable ties should be used to fasten the power wire and they are supplied with the unit.)



Selecting solderless ring terminal

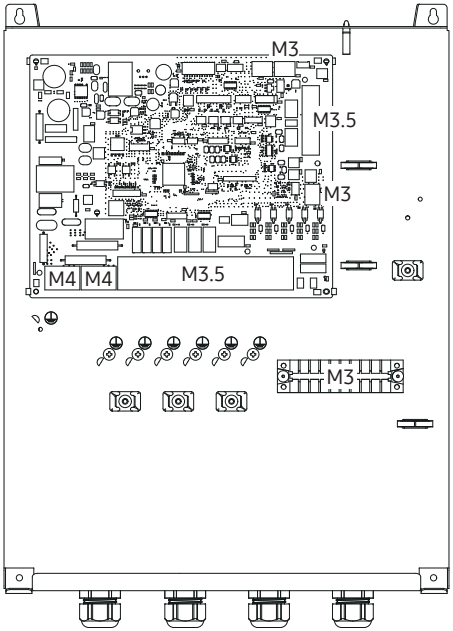
- Select a solderless ring terminal of a connecting power cable based on a nominal dimensions for cable.
- Cover a solderless ring terminal and a connector part of the power cable and then connect it.



Nominal dimensions for cable (mm²)		1.5	2.5	4/6	
Nominal dimensions for screw (mm)		4	4	4	8
B	Standard dimension (mm)	8	9.5	9.5	12
	Allowance (mm)	±0.2	±0.2	±0.2	
D	Standard dimension (mm)	3.4	4.2	5.6	
	Allowance (mm)	+0.3 -0.2	+0.3 -0.2	+0.3 -0.2	
d1	Standard dimension (mm)	1.7	2.3	3.4	
	Allowance (mm)	±0.2	±0.2	±0.2	
E	Min.	4.1	4.1	6	
F	Min.	6	7	5	9
L	Max.	16	17.5	20	28.5
d2	Standard dimension (mm)	4.3	5.3	4.3	8.4
	Allowance (mm)	+ 0.2 0	+ 0.2 0	+ 0.2 0	+0.4 0
t	Min.	0.7	0.8	0.9	

Torque requirements

CONTROL BOX & MAIN CONTROL PBA



Screw size	Tightening torque (kfg·m)	Part	Terminal code	Remarks
M4	12~18	MAIN Control PBA 2P Terminal Block	TB-A (POWER)	MAIN POWER Input (AC 220V~240V)
		MAIN Control PBA 2P Terminal Block	TB-A1 (BOOSTER HEATER POWER)	BOOSTER HEATER OUTPUT (AC 220V~240V)
M3.5	8~12	MAIN Control PBA 6P Terminal Block	TB-C (F1,F2,V1,V2,F3,F4)	F1,F2,F3,F4 : Comm. Signal V1,V2 : DC12V Output
		MAIN PBA 26P Terminal Block	TB-B (B1~B26)	POWER Input/Output (AC 220V~240V)
M3	5~7.5	MAIN Control PBA 2P Terminal Block	CNS046 (PV/Peak Power Control Signal)	Dry Contact Input
		MAIN Control PBA 2P Terminal Block	CNS002 (WATER PUMP)	PWM Signal Input
		C-BOX 10P Terminal Block	Zone Control Signal etc.	Dry Contact Input DC Input(Thermistor)

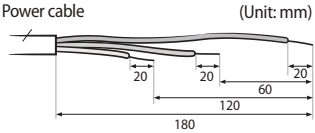
Wiring works

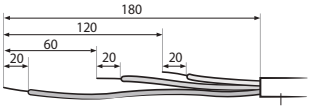
How to connect your extended power cables

1. Prepare the following tools.

Tools	Crimping pliers	Connection sleeve (mm)	Insulation tape	Contraction tube (mm)
Spec	MH-14	20xØ6.5(HxOD)	Width 19mm	70xØ8.0(LxOD)
Shape				

2. As shown in the figure, peel off the shields from the rubber and wire of the power cable.
   - Peel off 20 mm of cable shields from the pre-installed tube.





Pre-installed tube for the power cable

> **CAUTION**
> - For information about the power cable specifications for indoor and outdoor units, refer to the installation manual.
> - After peeling off cable wires from the pre-installed tube, insert a contraction tube.

3. Insert both sides of core wire of the power cable into the connection sleeve.

► **Method 1**

Push the core wire into the sleeve from both sides.

Connection sleeve

► **Method 2**

Twist the wire cores together and push it into the sleeve.

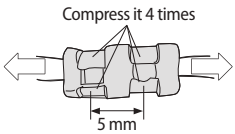
Connection sleeve

> **CAUTION**
> - If cable wires are connected without using connecting sleeves, their contact area becomes reduced, or corrosion develops on the outer surfaces of the wires (copper wires) over a long time. This may cause an increase of resistance (reduction of passing current) and consequently may result in a fire.

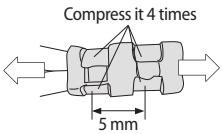
4. Using a crimping tool, compress the two points and flip it over and compress another two points in the same location.
   - The compression dimension should be 8.0 mm².

   - After compressing it, pull both sides of the wire to make sure it is firmly pressed.

► **Method 1**

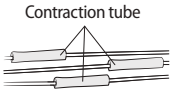


► **Method 2**

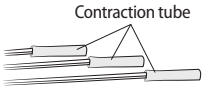


5. Apply heat to the contraction tube to contract it.

▶ **Method 1**

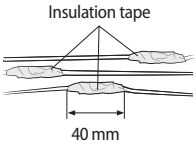


▶ **Method 2**

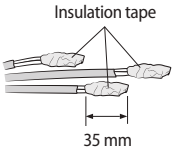


6. Wrap it with the insulation tape twice or more and position your contraction tube in the middle of the insulation tape.

▶ **Method 1**

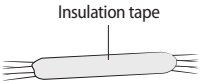


▶ **Method 2**

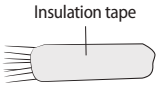


7. After tube contraction work is completed, wrap it with the insulation tape to finish.
   Three or more layers of insulation are required.

▶ **Method 1**



▶ **Method 2**

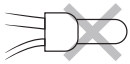


CAUTION

- Make sure that the connection parts are not exposed to outside.
- Be sure to use insulation tape and a contraction tube made of approved reinforced insulating materials that have the same level of withstand voltage with the power cable. (Comply with the local regulations on extensions.)

WARNING

- In case of extending the electric wire, please DO NOT use a round-shaped Pressing socket.
  - Incomplete wire connections can cause electric shock or a fire.



Wiring works

Grounding work

► Grounding must be done by a qualified installer for your safety.

Grounding the power cable

► The standard of grounding may vary according to the rated voltage and installation place of the heat pump.

► Ground the power cable according to the following.

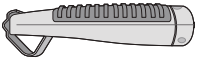
Installation place / Power condition	High humidity	Average humidity	Low humidity
Electrical potential of lower than 150V		Perform the grounding work 3. Note 1)	Perform the grounding work 3 if possible for your safety. Note 1)
Electrical potential of higher than 150V	Must perform the grounding work 3. Note 1) (In case of installing circuit breaker)		

✻ **Note 1) Grounding work 3**

- Grounding must be done by your installation specialist.
- Check if the grounding resistance is lower than 100 Ω.

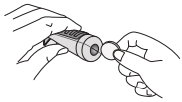
When installing a circuit breaker that can cut the electric circuit in case of a short circuit, the allowable grounding resistance can be 30~500 Ω.

✻ **Examples to use cable striper**



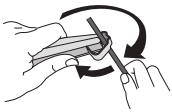
<Cable striper>

1. Adjust the blade position by coin(the controller is at the bottom side of the tool). Fix the blade position according to the outer sheath thickness of the power cable.

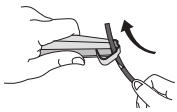


2. Fix the power cable and tool by using the hook at the top side of the tool.

3. Cut out the outer sheath of the power cable by revolving the tool in the direction of the arrow, two or three times.

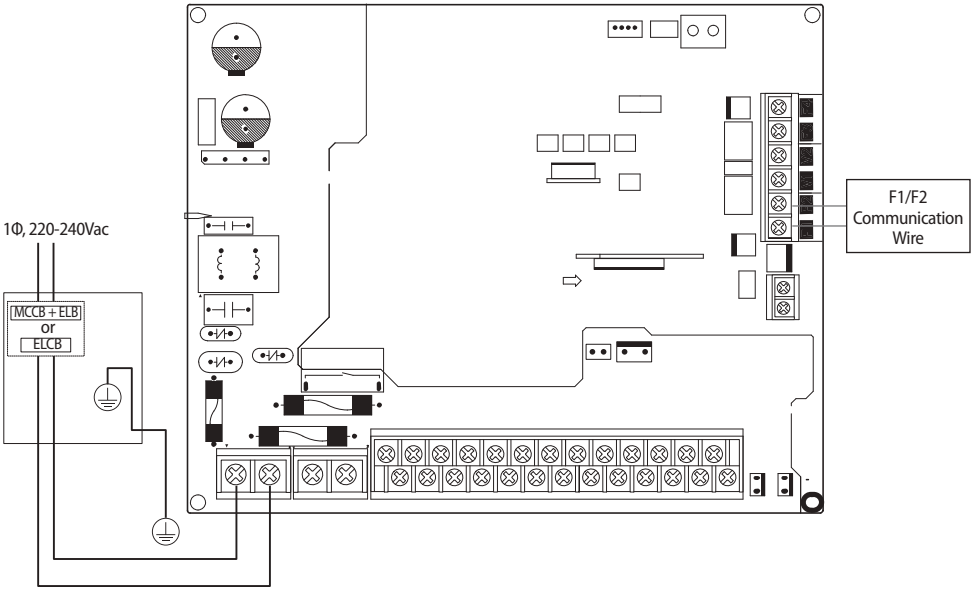


4. At this situation, cut out the outer sheath of the power cable by moving the tool toward the arrow direction expressed.



5. Slightly bend the wire and pull out the cut part of the outer sheath.

Power and communication with outdoor unit



CAUTION

- Be careful when connecting L, N.

Connecting the power wire

1. Main and heater power must be configured through each ELCB or MCCB+ELB.
2. Connect the 'Live' and 'Neutral' power lines to TB-A of the main PBA through the ELCB.
3. Connect 'Protective Earth' line with 'Earth screw' In case.

Recommended wire specification

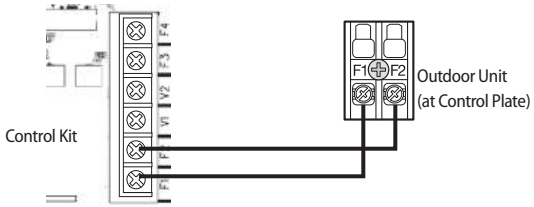
Load	Power Supply	Power Cable	Max. Length
		mm², wires	m
Do NOT use Heater (Water Pump, Valve, Wired RMC)	1Ø, 220-240V, 50Hz	1.5 / 3	L < 10m
		2.5 / 3	10m < L
Use Booster Heater (Max. 3kW)		4.0 / 3	L < 10m
		6.0 / 3	10m < L

- The power cable is not supplied with Air to water heat pump.
- This equipment follow the "IEC 61000-3-12"
- Power supply wires of parts of appliances for outdoor use shall not be lighter than polychloroprene sheathed flexible wires. (Code designation IEC:60245 IEC 57 / CENELEC: H05RN-F or IEC:60245 IEC 66 / CENELEC: H07RN-F)
- When installing the control kit in a computer room or net work room, server room or in the presence of risk of disturbance to the communication cable, use the double shielded (tape aluminium / polyester braid + copper) cable of FROHH2R type.

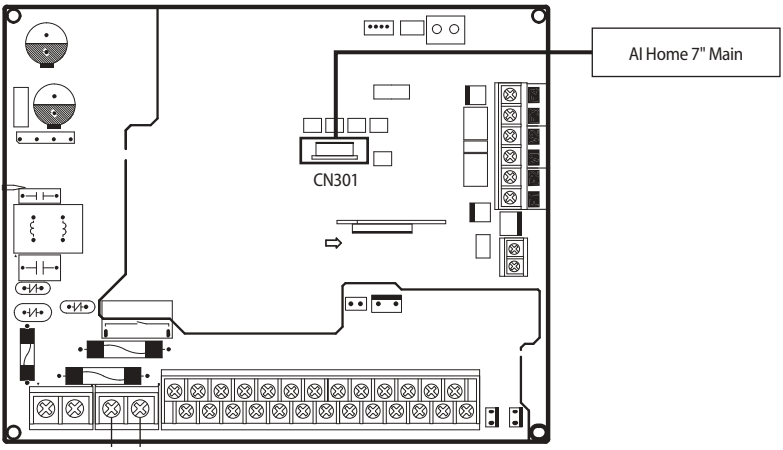
Wiring works

Connecting the communication wire

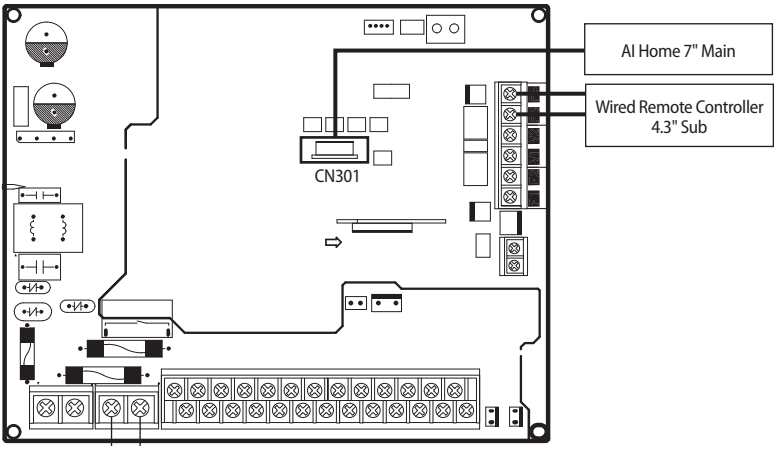
► Connect 'outdoor unit's F1&F2' with 'control kit's F1&F2 in TB-C' by 2 core cable.



Communication with a AI Home (1 unit)



Communication with a AI Home & sub remote controller (2 units)

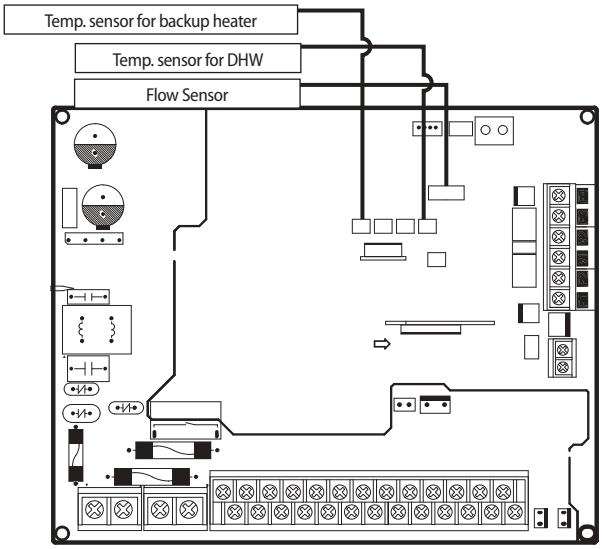


Connecting a wired remote controller

1. The product is delivered with the AI Home connected to CN301 by default.
2. To use an additional remote controller, simply connect it to F3 & F4 on the TB-C.

Temp. Sensor for DHW, Backup heater and a Water Flow Sensor

External wiring to control a switch of relay by a installer



Connecting a temp. sensor wire into Water Tank

1. Put the sensor side of a temp. sensor wire into the designated location in a DHW.
2. Connect the other side of the line at CNS042. (YEL,2PIN)

Connecting a temp. sensor wire to outlet of backup heater

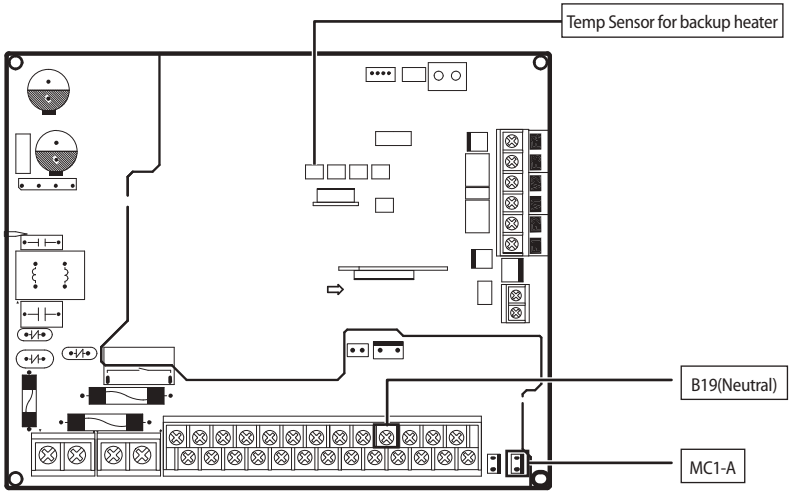
1. Put the sensor side of a temp. sensor wire into the designated location in a backup heater.
2. Connect the other side of the line at CNS047. (BLK,2PIN)

Connecting a flow sensor

1. Install a flow sensor in water line.
2. Connect a wire from a flow sensor into 'CNS057' connector. (WHT,4PIN)

Wiring works

Backup heater



Connecting a external backup heater (MHC-300FP)

1. Connect a MHC-300FP with CNP001 and B19(Neutral)
2. Connect a Thermistor to CNS047(BLK Connector)

► The N phase of the heater Signal can be connected to B5, B7, B11, B15 instead of B19 (Maximum 2 wires can be connected 1 Screw)

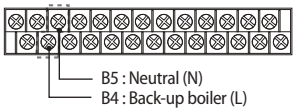
NOTE For the external Back-up heater connection, Only Samsung Heater kit(MHC-300FP) is compatible. It's just for providing a ON/OFF control signal.

Connection of the back-up boiler

► This function is to determine which heating source can/will provide the space heating, either the heat pump system or the back-up boiler.

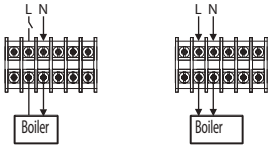
► To control the back-up boiler , configure FSV #4031~ #4033. Please refer to the controller manual for this setting.

Description	No. of wires	Max. current	Thickness	Supply Scope
Back-up Boiler	2	50 mA	0.75mm² H05RN-F or H07RN-F	Field supply (220~240Vac, Output)



When it set back up boiler on the control kit (relay off)

When it order to back up boiler operates (relay on)

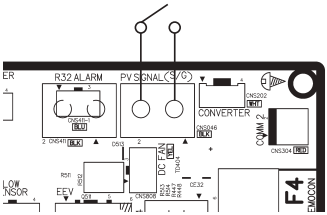


1. Before the installation, control kit should be turned off.
2. Using the appropriate equipment to correct position of terminal block as shown on the diagram.

✻ Heat pump does not work when the Back-up boiler operates.

Connection of the Peak Power Control or PV control(Photovoltaics control)

Description	No. of wires	Max. current	Thickness	Supply Scope
Peak Power Control or PV control (Photovoltaics control)	2	-	-	Field supply



❋ Function 1 (Peak Power Control)

► This is a function that allows you to disable the booster heater, backup heater, and compressor operation of the outdoor unit depending on the power input contact.

► If users make contracts with local electric power company for limiting the amount of power consumption when a surge in power usage, users can set FSV of "Forced off".

► To control the Power Peak , configure FSV #5041~ #5043. Please refer to the controller manual for this setting.

❋ Function 2 (PV[Photovoltaics] control)

► This is for energy saving by using the solar energy.

► To control PV, configure FSV #5081~ #5083. Please refer to the controller manual for this setting.

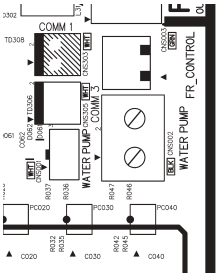
► Cooling/heating operation: Enables the FSV value that is set only when the PV signal is in out mode.
Hot water operation: Activate immediately with the set FSV value.

NOTE

- It operates according to the setting of FSV, and both functions can not be used at the same time. (PV Control / Peak power control)
- Except for domestic hot water mode, this function is only activated for the outing mode.

Connection of the the FR Control(Frequency ratio control)

Description	No. of wires	Max. current	Thickness	Supply Scope
FR Control	2	-	-	Field supply



► The FR control function application is to limit the maximum frequency of the outdoor unit compressor. (if FSV #5051 = 1 "use")

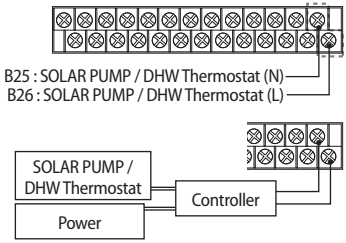
► Mothod 1 : External DC signal Control uses a DC voltage of 0 ~ 10V (0v = 50%, ~ 10v = 150%)

► Mothod 2 : Demand ratio (DR) control through Modbus communication

Wiring works

Connection of the the Solar Pump / DHW thermostat

Description	No. of wires	Max. current	Thickness	Supply Scope
Solar pump / DHW Thermostat	2	22mA	0.75mm² H05RN-F or H07RN-F	Field supply (220~240Vac, Input)



1. Before connecting the external control kit, make sure it is turned off.
2. Using the appropriate equipment to correct position of terminal block as shown on the diagram.
3. The external control kit must provide an output signal when Solar pump/ DHW Thermostat is operating.
4. It is the installers responsibility to connect the output of the control kit to the Solar Pump/ DHW Thermostat input terminal (B25-26). In operating mode, signal shall be around 230VAC (N-L). In non-operating mode, signal shall be around 0VAC (N-L).

When solar pump signal is On, Control kit DHW mode will be turned off.

If a solar pump for DHW is used, the signal input line from the solar pump can be connected as shown above

► if a solar pump is used, FSV#3061 should be set to 1

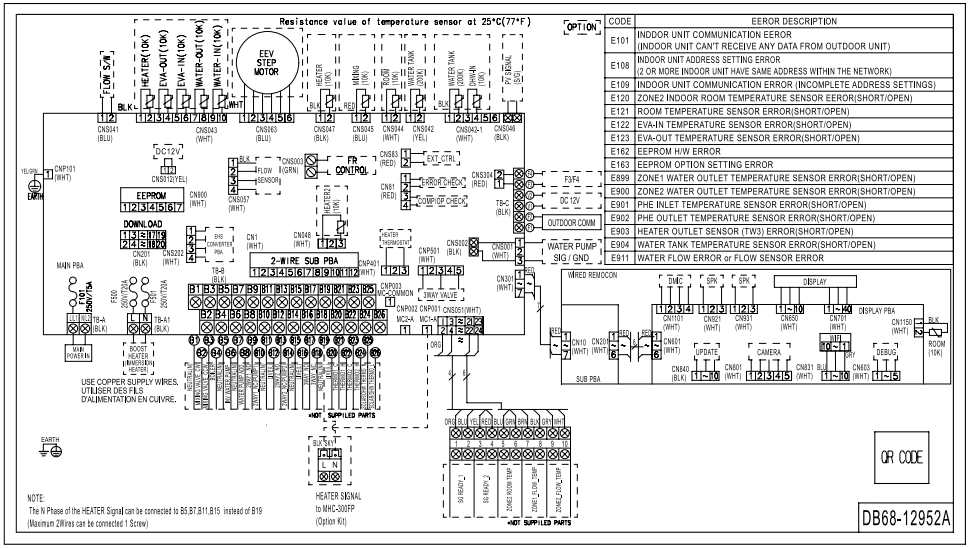
If DHW thermostat is used, the signal input line from the DHW thermostat can be connected as shown above

► if DHW thermostat is used, FSV#3061 should be set to 2

NOTE

- Solar pump and DHW thermostat cannot be used simultaneously.

Wiring diagram



CODE	EERROR DESCRIPTION
E101	INDDOR UNIT COMMUNICATION EERROR (INDOOR UNIT CAN'T RECEIVE ANY DATA FROM OUTDOOR UNIT)
E108	INDOOR UNIT ADDRESS SETTING ERROR (2 OR MORE INDOOR UNIT HAVE SAME ADDRESS WITHIN THE NETWORK)
E109	INDOOR UNIT COMMUNICATION ERROR (INCOMPLETE ADDRESS SETTINGS)
E120	ZONE2 INDOOR ROOM TEMPERATURE SENSOR EERROR(SHORT/OPEN)
E121	ROOM TEMPERATURE SENSOR ERROR(SHORT/OPEN)
E122	EVA-IN TEMPERATURE SENSOR ERROR(SHORT/OPEN)
E123	EVA-OUT TEMPERATURE SENSOR ERROR(SHORT/OPEN)
E162	EEPROM H/W ERROR
E163	EEPROM OPTION SETTING ERROR
E899	ZONE1 WATER OUTLET TEMPERATURE SENSOR ERROR(SHORT/OPEN)
E900	ZONE2 WATER OUTLET TEMPERATURE SENSOR ERROR(SHORT/OPEN)
E901	PHE INLET TEMPERATURE SENSOR ERROR(SHORT/OPEN)
E902	PHE OUTLET TEMPERATURE SENSOR ERROR(SHORT/OPEN)
E903	HEATER OUTLET SENSOR (TW3) ERROR(SHORT/OPEN)
E904	WATER TANK TEMPERATURE SENSOR ERROR(SHORT/OPEN)
E911	WATER FLOW ERROR or FLOW SENSOR ERROR

Pipe work

Connection guide of additional pump

Ensuring proper water flow is an important factor for performance and efficiency.

If the water flow is not adequate, consider installing additional pumps.

When installing an additional pump, the system's maximum allowable water flow rate and maximum water pressure should not be exceeded.

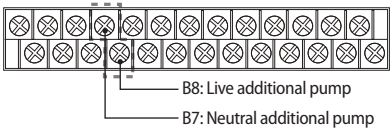
CAUTION

- Each terminal set (Live+Neutral) for additional pumps can supply ampere up to Max 1.0A.
- The maximum number of pumps that can be powered by the terminal block of the control kit is two. Therefore, if necessary, be sure to connect pumps other than the two a separate power source.

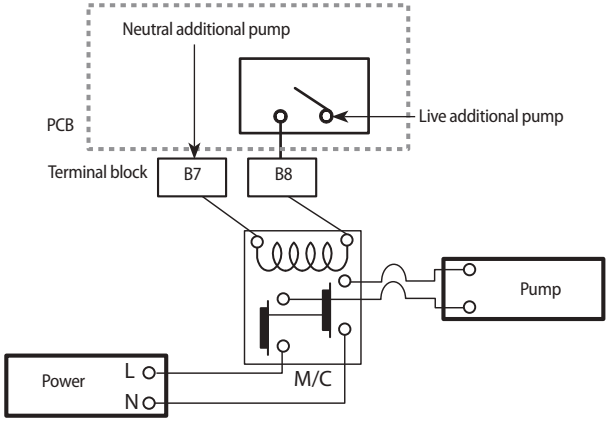
Case 1) AC pump

The terminal set (B8+B7) can supply ampere up to Max 1.0A.

1. Power supply (Pump)



2. If the maximum output of the pump exceeds 1A, please connect it to a separate power source.



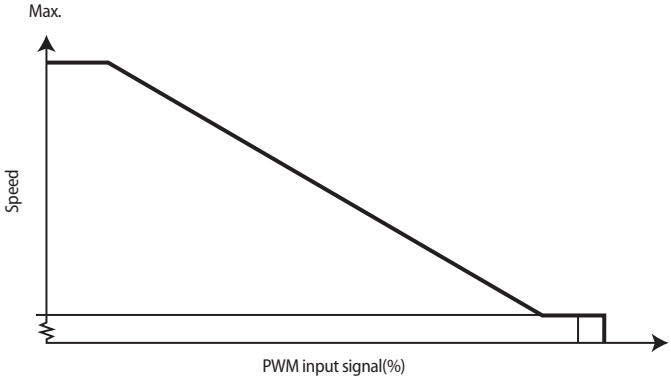
CAUTION

- The maximum allowable current that this terminal block can supply for the additional water pump is 1.0A.

Case 2) Inverter pump

Power supply connection is the same as the case1) AC pump

PWM characteristic curve

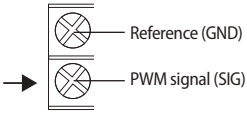


The additional pump should be the same type of product as the above graph.

Recommendation

Connect the PWM control line to the main control PBA output(CNS002) signal function for PWM control.

(Note: Wiring diagram)



GRUNDFOS UPMM 25-95 (Heating Type), SHINHOO GPA25-9H (Heating Type)

CAUTION

- If there is wrong wiring between PWM and reference, INV. Water Pump may not work or wrong operation.

Pipe work

Connection of the 2-way valve (2zone control is not used as FSV Setting #4061="0")

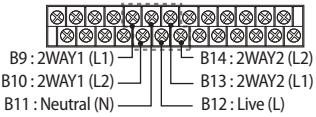
1. 2Way Valve performs open/close operations according to cooling/heating Thermo On/Off control.
2. When setting up two thermostats, then;
   - 2way valve 1 operates according to the input signal of thermostat 1 and 2way valve 2 according to that of thermostat 2.
   - If you use the 2way valve output as the output of the Room Water Pump with buffer tank for Thermostat 1 and 2, please connect it to terminal block "normal close" and set FSV Setting #6041 to "0". [Reference: EHS CONTROL KIT Manual]

Description	No. of wires	Max. current	Thickness	Supply Scope
2 Way Valve	2+ground	50 mA	> 0.75 mm², H05RN-F or H07RH-F	Field supply (220~240Vac, Output)

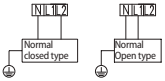
CAUTION

- When FSV#4041=0 is set without using the mixing valve, if the water outlet temperature is less than 16 degrees, 2way valve 1 is closed to prevent floor condensation.
  - Connect the output of 2way valve 1 for underfloor cooling shutoff.

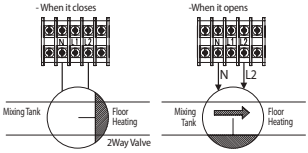
▶ Connect the output of 2way valve 1 for underfloor cooling shutoff.



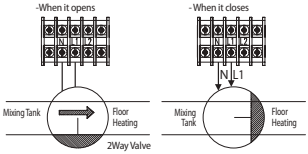
* Connection of 2 wires 2-way valve



In case of normal closed type



In case of normal open type



2-way motorized valve

- ▶ 220 ~ 240 Vac
- ▶ 2 wires(Normal Open or Normal Close)

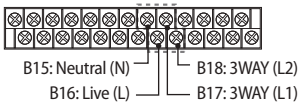
1. Before the installation, control kit should be turned off.
2. Using the appropriate equipment to correct position of terminal block as shown on the diagram.
3. Make sure what type is you use.
   - Normal OPEN or Normal CLOSED.

CAUTION

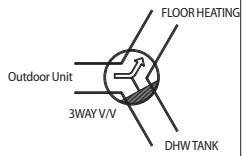
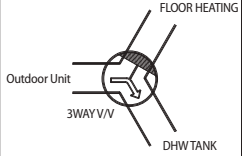
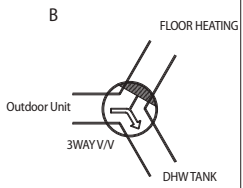
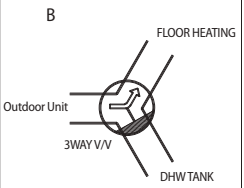
- There are 2 types of 2-way valve, normal open type and normal closed type. Make sure to connect terminals to right positions of terminal block. As detailed on the wiring diagram and illustrations above.

Connection of the 3-way valve

Description	No. of wires	Max. current	Thickness	Supply Scope
Diverting type 3way valve	4	50mA	> 0.75 mm², H05RN-F or H07RN-F	Field supply (220~240Vac, Output)



Status	L1	L2
A (Initial)	OFF	ON
B	ON	OFF

Field Setting Valve (#3071) "0" Floor heating as default	Field Setting Valve (#3071) "1" DHW tank as default
A 	A 
B 	B 

3-way diverting valve for water tank

- ► Diverting typecooling mode, UFH loops will be closed.
- ► 220 ~ 240 Vac

1. Before the installation, control kit should be turned off.
2. Using the appropriate equipment to correct position of terminal block as shown on the diagram.
3. Make sure what type of 3 way V/V you use.

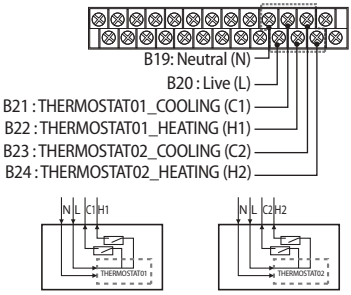
Installation options and wiring work

Connection of the thermostat

To use thermostat control, configure FSV #2091/#2092 to "Use." Please refer to the controller manual for this setting.
Cooling/Heating operation and water temperature are determined by the Thermostat input signal and Water Law setting. Please refer to the controller manual for this setting.

NOTE
- For thermostat control, FSV Setting #4061 must be set to "0".

Description	No. of wires	Max. current	Thickness	Supply Scope
Room Thermostat	4	#19,#20 : 50 mA(Output, Thermostat Power) #21,#22,#23,#24 : 22 mA each Pin(Input)	> 0.75 mm², H05RN-F or H07RH-F	Field supply (220~240Vac, Output)



1. Before the installation, control kit should be turned off.
2. Using the appropriate equipment to correct position of terminal block as shown on the diagram.
3. Make sure what type is you use.
   - If the operating mode (heating/cooling) of thermostat 1 and thermostat 2 are different, the operating mode is determined based on thermostat 2.

CAUTION
- Product will not operate when signal for cooling and heating mode is inputted at the same time.

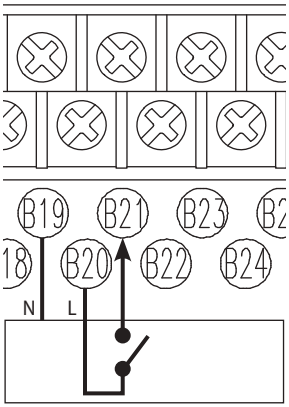
When setting up two thermostats;

- ► For heating operation, please install Thermostat 01 to a room that requires lower water temperature (ex,underfloor heating) and Thermostat 02 to a room that requires higher water temperature (ex,radiators).
- ► For cooling operation, please install Thermostat 02 to a room that requires lower water temperature (ex,radiators) and Thermostat 01 to a room that requires higher water temperature (ex,underfloor heating).
- ► In order to properly control the two thermostats with different temperature settings, it is necessary to connect the mixing valve and the mixing temperature sensor(TW4)[Optional parts].
- ► When controlling the thermostat in a multi-room(Two thermostat control), please refer to the "Connection of the 2-way valve" wiring works for valve control.
- ► Please find additional installation information refer "Connection of the 2-way valve" [Page 30] and "Connection of the mixing valve" [Page 30]

CAUTION
- When using thermostat01 in cooling mode, to prevent floor condensation, if the room water temperature is below 16 °C, the 2-way valve of thermostat 01 is automatically closed.

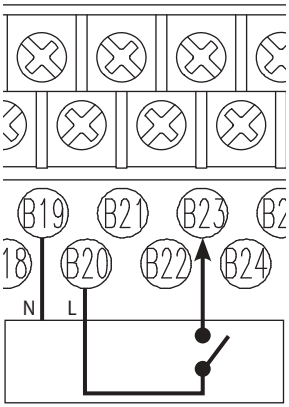
Example

Thermostat01 only : cooling mode



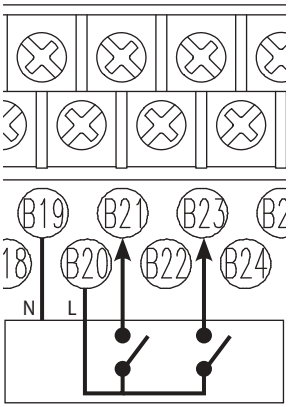
Room thermostat

Thermostat02 only : cooling mode



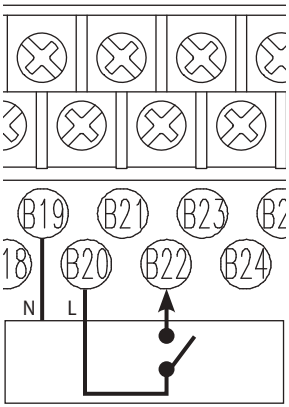
Room thermostat

Thermostat01, Thermostat02 : cooling mode



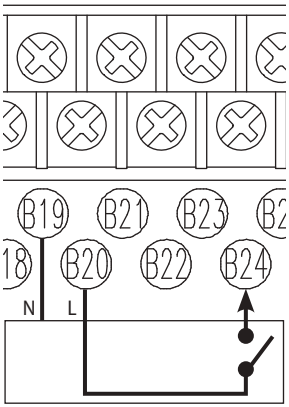
Room thermostat

Thermostat01 only : heating mode



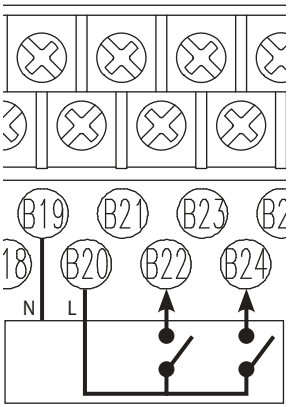
Room thermostat

Thermostat02 only : heating mode



Room thermostat

Thermostat01, Thermostat02 : heating mode



Room thermostat

⚠ WARNING

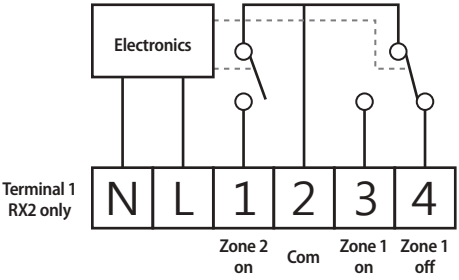
- Before completing installation of Room thermostat, check the wiring method in a manual of Room thermostat to output L line.

Installation options and wiring work

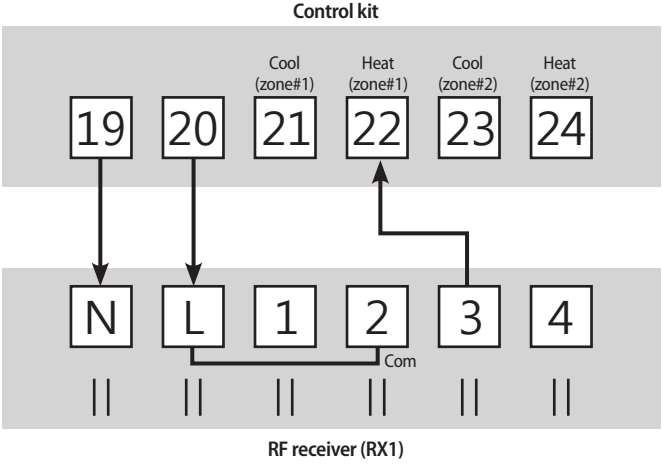
Example of RX1 (Danfoss)

► In manual of a RF receiver

RX1 and RX2



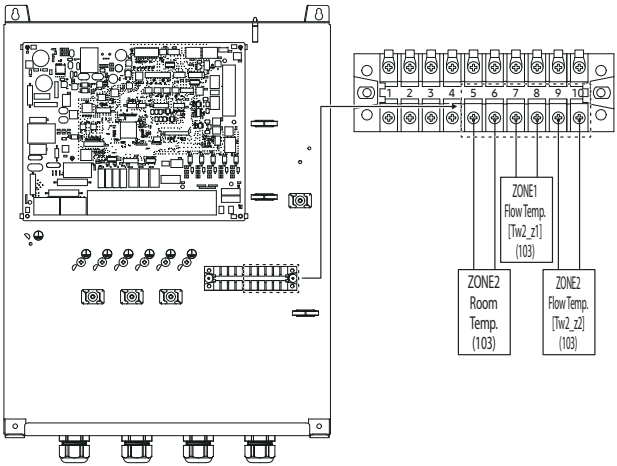
► Example of wiring works



Connecting for external contact functions

Screw size	Tightening torque (kgf·m)	Part	Terminal code
M3	5~7.5	10P Terminal block	1~10

Connecting external sensors for 2Zone control (FSV#4061=1)

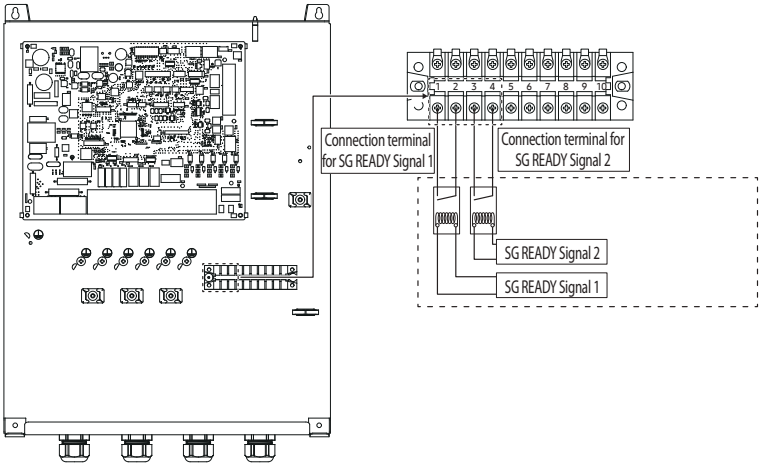


CAUTION

- When connecting sensors, use the Sensor for Zone Control enclosed in accessories. (Thermistor with the specifications of 10kΩ at 25°C, B constant = 3435K)

Installation options and wiring work

Connecting for SG Ready(Smart Grid Ready) control



SG READY Signal 1	SG READY Signal 2	Product operation
Short	Open	Forced thermo off operation
Open	Open	Normal operation
Open	Short	Heating / DHW setting temperature 1step-up operation
Short	Short	Heating / DHW setting temperature 2step-up operation

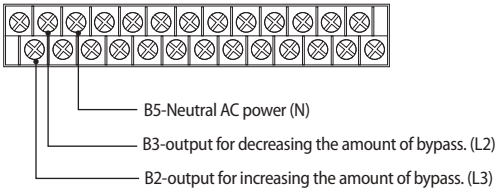
CAUTION
- These parts are optional and not included with the product.
- Turn off the ELCB first before connecting the SG Ready.

Connection of the mixing valve

In order to properly control the 2 Zone or two thermostat with different temperature settings,
it is necessary to connect the mixing valve.
The mixing valve controls the amount of bypass to provide low temperature water by applying the mixing valve.

Description	No. of wires	Max. current	Thickness	Supply Scope
Mixing valve	3	50mA	> 0.75 mm^2, H05RN-F or H07RH-F	Field supply (220~240Vac, Output)

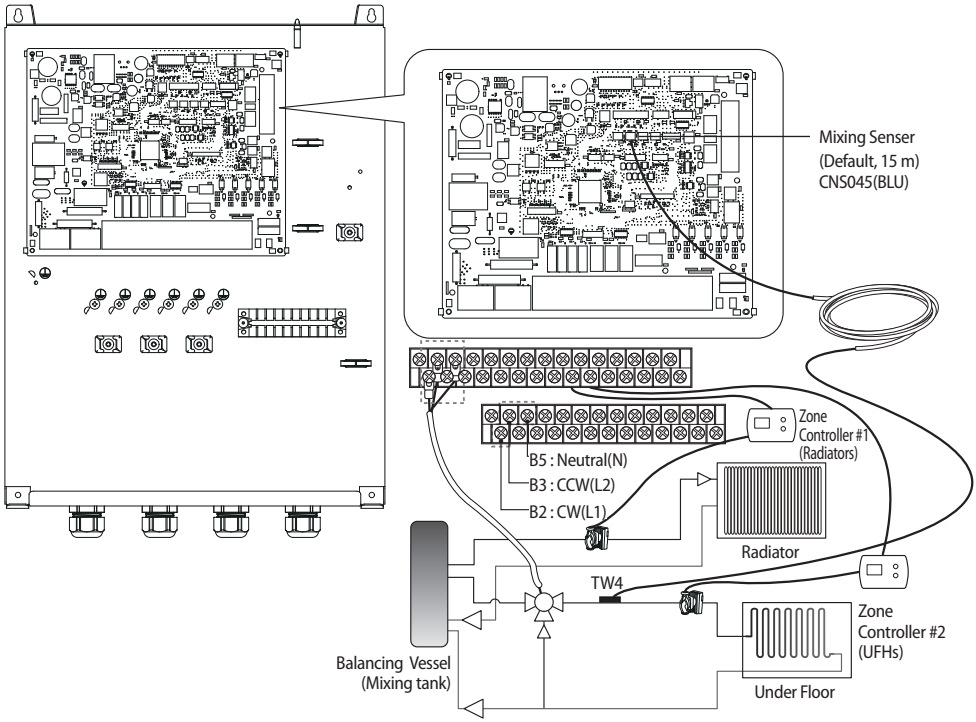
1. Before the installation, control kit should be turned off.
2. Using the appropriate equipment to correct position of terminal block as shown on the diagram.



B2- output for increasing the amount of bypass : The amount of return water that is mixed with supply water through mixing valve is increased.

B3- output for decreasing the amount of bypass. : The amount of return water that is mixed with supply water through mixing valve is decreased.

2 Zone with Two thermostat control



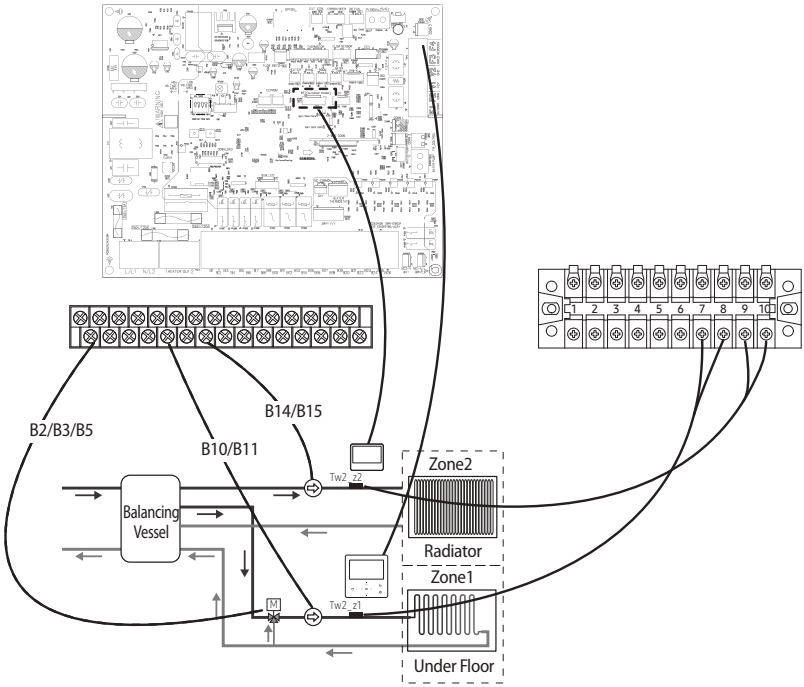
1. Before the installation, control kit should be turned off.
2. Using the appropriate equipment to correct position of terminal block as shown on the diagram.
3. Install the supplied Mixing temperature sensor (TW4) on the rear part of the mixing valve.Install TW4 Sensor within 1m of Mixing Valve.
4. Set the FSV value #4041~ #4046. Please refer to the controller manual for this setting.

CAUTION

- When using Zone control (FSV 4061 = 1), ignore Thermostat signal.

Installation options and wiring work

2- Zone Control [FSV #4061 =1]



You can operate the 2-zone control using a mixing value, water-out temperature sensors, and built-in or external room temperature sensors installed in a wired remote controller.
When both zones are simultaneously Thermo on, the operation is performed based on Zone2. Therefore, set the zone that you want to have the higher set temperature to Zone2.
(The mixing valve must be installed in the zone that you want to have the lower set temperature.)

1. Install the mixing valve. (See "Installation of mixing valve.")
2. Install the water-out temperature sensors (Tw2_z1, Tw2_z2) for all zones.
3. Unlike the zone control with a thermostat, connect the water pump signal lines to the product.

► Zone1 water pump connection: B10 (L1) + B11 (N)
► Zone2 water pump connection: B14 (L1) + B15 (N)

4. FSV 4061 = 1: Enable the 2-zone control using the wired remote controller.

* If you want to operate the 2-zone control by using water-out temperatures, you have only to complete steps 1 to 4 above.
* If you want to operate the 2-zone control by using room temperatures and built-in temperature sensors in wired remote controllers, you must install two wired remote controllers in each room.
(If you use external room temperature sensors, you can control each room temperature with only one wired remote controller.)

Select a mixing valve from the manufacturers as below (recommended)

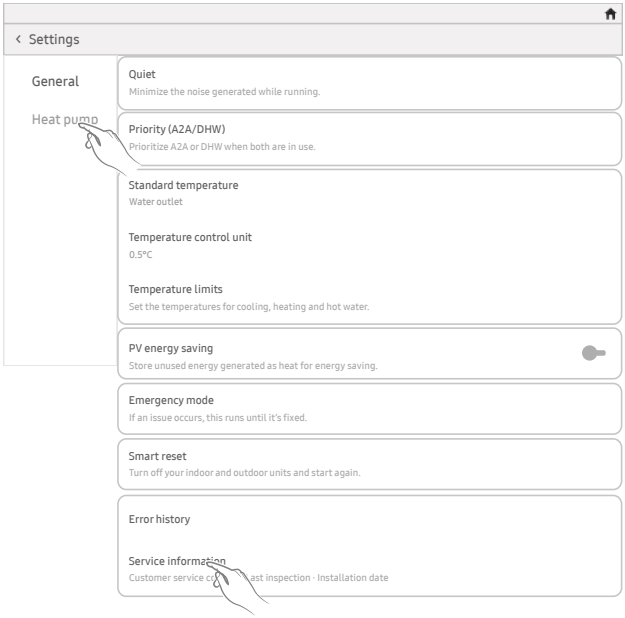
Maker		BELIMO	SIEMENS	HONEYWELL
Model code	3 Way Valve	R3020-6P3-S2	VXP45.20-4 (kvs 4)	V5011E1213
	Actuator	LR230A(-S)	SSB31	ML6420A3015
Running time		90 sec.	150 sec.	60 sec.
FSV(#4046) setting		9	15	6

Self-test mode of AI Home

Use of self-test mode

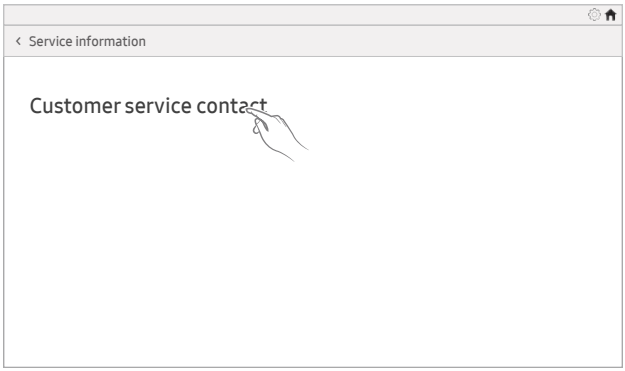
1. if you want to use the various additional functions for your AI Home, press .

► The setting screen appears.



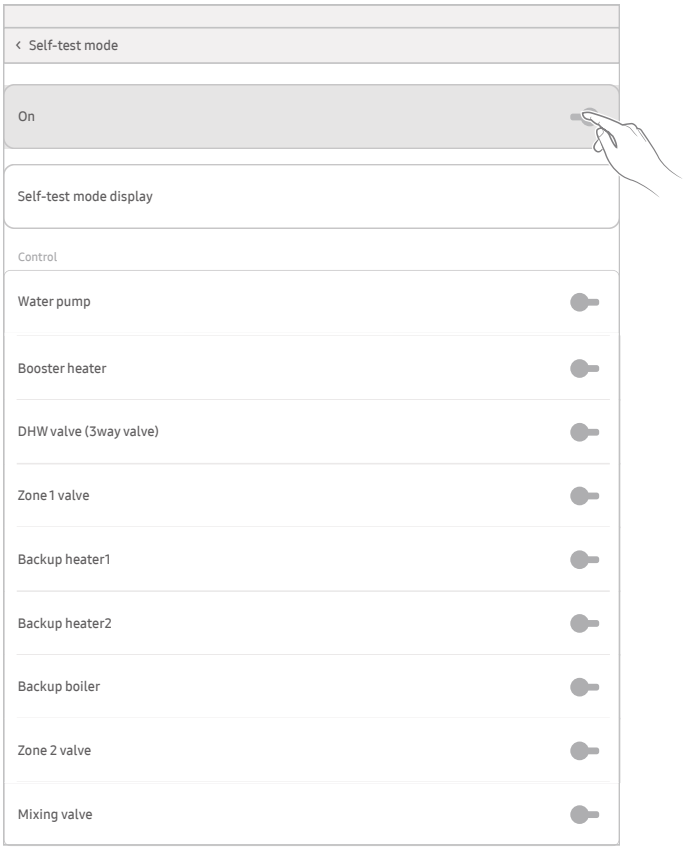
2. Press the "Heat pump" and you can see the service information at the end of screen.
3. Press the Service mode.

Self-test mode of AI Home



4. Press the "Customer service contact" more than 10 times in a row.

► The self-test mode screen appears.



5. Press the "On".
6. Select the item you want to test from the Control menus that can turn each component on or off.

‹ Self-test mode display	
Thermostat #1 (Zone 1)	Value
Thermostat #1 (Zone 2)	Value
Solar panel	Value
Temperature	
Water inlet (Tw1)	NN°C
Water outlet	NN°C
Backup heater outlet (Tw3)	NN°C
Mixing valve outlet (Tw4)	NN°C
Tank	NN°C
Indoor ambient (Zone 1)	NN°C
Indoor ambient (Zone 2)	NN°C
Water outlet (Zone 1)	NN°C
Water outlet (Zone 2)	NN°C

7. You can check the operation status by pressing "Self-test mode display".

DHW tank

DHW tank should be purchased separately (not supplied).

Safety information

Before installing an DHW Tank, please read this manual thoroughly to ensure that you know how to safely and efficiently install a new appliance.

WARNING • If you don't follow the safety precautions, you may get the risk of serious wound or death.

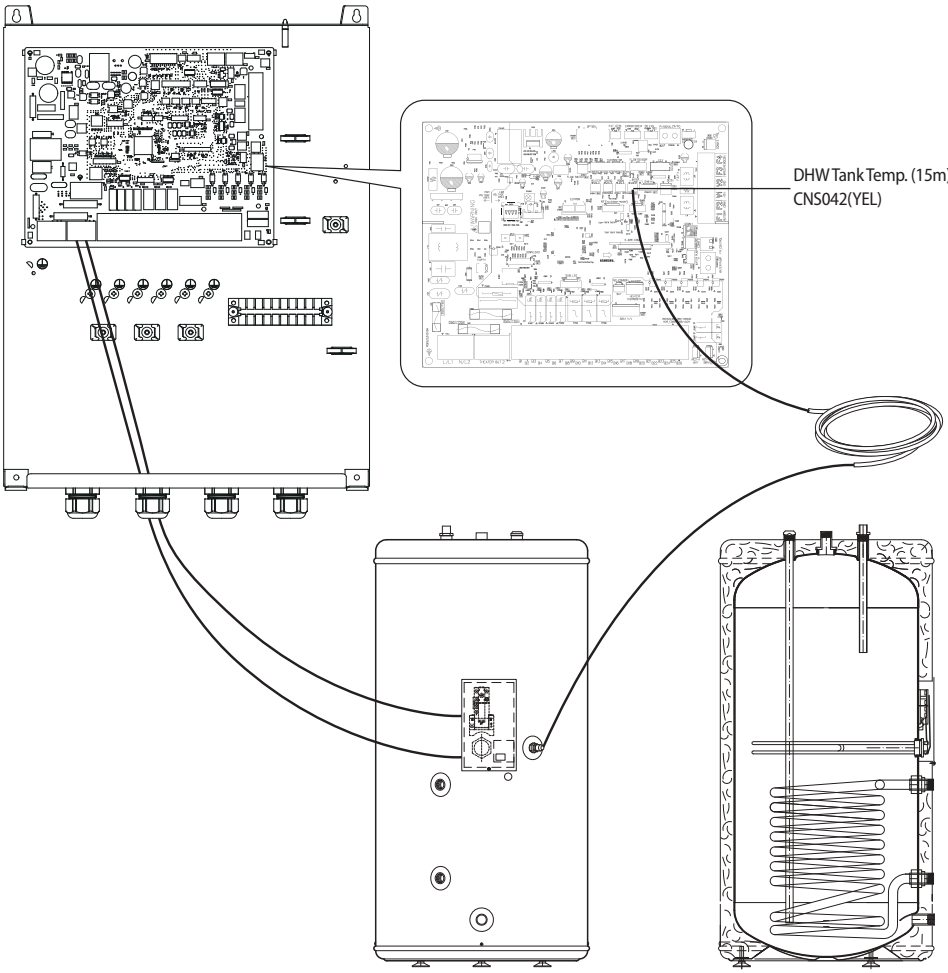
- ▶ The installation must be done by the manufacturer or its service agent or a qualified person in order to avoid a hazard.
  - Installation by an unqualified person may cause a water leakage, electric shock or fire and so on.
- ▶ The electric work must be done by service agent or qualified persons according to national wiring regulations and use only rated cable.
  - Use certified power cable in the market suggested here and do electric work according to installation manual otherwise, electric shock or fire may occur.
- ▶ Manufacturer is not responsible for accidents due to incorrect installation.
- ▶ Use certified parts in the market and supplied parts from the factory.
  - All wiring, components and materials to be procured on the site must comply with the applicable local and national codes. If you don't use the certified parts and tools, it can cause trouble to the Air to Water Heat pumpand bring into injury.
- ▶ Install the DHW Tank on a hard and even place that can support its weight.
  - If the place cannot support its weight, the outdoor unit may fall down and it may cause injury.
- ▶ Secure power cable with a conduit, which is accessory part for DHW tank, not to be pulled out by external force.
  - If fixing is incomplete, it can cause trouble with a heat generation, electric shock or fire and so on.

GENERAL INFORMATION

- ▶ The piping, valves and system configuration of DHW tank system should be followed a relevant local or national regulations.
- ▶ A pressure relief valve should be installed according to the use pressure of DHW Tank.
- ▶ The electrical box must be opened by a licensed electrician.
- ▶ Switch off the power supply before opening the electrical box lid.
- ▶ Make sure that the installation location of DHW tank system including piping and valves is frost free.

CAUTION • DHW Tank shall be located and installed indoors area (garage, utility room, boiler room).

Booster heater



✻ Use a correct sensor pocket which is fit for the DHW tank sensor(OD Ø6).
If the gap between the supplied sensor and DHW tank sensor pocket is big, use thermal grease.

NOTE

- When you set the hot water supply temperature to 55℃ or less, do not use the booster heater.
  - The heatpump and the booster heater operate until the initial set temperature is reached. After that, only the booster heater may operate depending on the settings.

CAUTION

- The maximum allowed booster heater capacity that can be connected to the terminal output is 3 kW or less.
- For connecting a booster heater above 3 kW, please use the output power to switch a relay or contactor to switch power to the booster heater safely.

DHW tank

Troubleshooting

CAUTION
- All maintenance or repair work must be executed by an approved installer.

Problem	Possible cause	Solution
Hot water is not coming out.	No power supply to the water heater	Check if there is any power on the power supply terminal on the thermostat.
	The thermostat may be set too high and cause the fuse or safety cut-off to operate.	Reduce thermostat setting by 5 °C and press the reset button.
Heating is not working	Heating element or internal electrical wiring is out of order.	Check if there is any power on the power supply on the connector of the heating element between black and yellow/ green wires. If this is OK, press the reset button on the fuse/safety cut-off.
Water is not warm enough	Thermostat is set too low.	Adjust the thermostat up using a standard screwdriver.
	Heating element or the internal electrical wiring is partially out of order.	Check the resistance of the heating element on the connector of the heater bundle, and the condition of the internal wiring.
	UX mixing valve(fitted on top) is incorrectly adjusted.	Adjust the UX mixing valve correctly to the preferred temperature.
Safety valve(SV) is dripping.	Water expands when heated. If there is no consumption of hot water over a period of time pressure builds up, causing the safety valve to open.	If drip from the SV is severe, it might need to be replaced. Some dripping is normal. Alternatively an expansion vessel can be fitted.
Leak warning outlet is dripping.	The heating element may not be properly tightened.	Check the heating element o-ring seal and all connections.
	There may be a leak.	
Other problems, or if none of the above solves the problem.	-	Contact the installer/supplier regarding any other failure.

WARNING
Incorrect handling of thermostat, safety valve or other valves may lead to tank rupture. When servicing the unit follow instructions carefully:
- Always turn off main power supply when water supply is being shut off.
- Test the free operation of the safety valve regularly by opening the valve ensuring the water flows freely.
- Electrical connection and all servicing of the electrical components should only be carried out by an authorized electrician.
- Fitting and all servicing of plumbing fixtures should only be carried out by an authorized installer.
- When replacing the thermostat, safety valve or any other valve or part supplied with this unit, use only approved parts of the same specification.

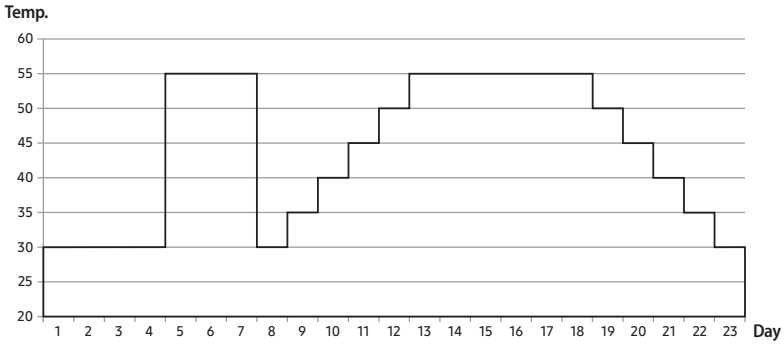
CAUTION
- Before resetting the safety cut-off or altering the thermostat setting, always remember to isolate the electrical supply to the unit. This must be done prior to removing the electrical box lid.
- If the electric element or thermostat is defective, contact authorized electrician.
- After adjustments are completed, ensure the lid to the electrical box is refitted correctly and that the retaining screw is properly fitted.

Concrete curing function

When pipes of floor heating are installed, operation for reinforcing concrete curing is applied. (Period of operation: 23 days)

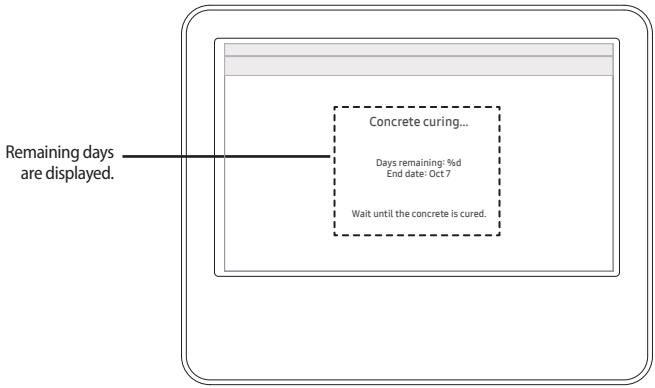
Entering procedure

1. After turning off the DIP switch K3 of indoor unit (Default ON), power off and on the indoor unit. The operation for concrete curing starts automatically. (If blackout occurs and communictation restarts later, operation will continue.)
2. Temperature of discharge water is controlled as time goes on like below.



Classification	Initial Heating		Step raise					Heating	Step down					Total (Hour)
Time	96	72	24	24	24	24	24	144	24	24	24	24	24	552
Temperature	30	55	30	35	40	45	50	55	50	45	40	35	30	-

3. Remaining days are displayed on the wired remote controller during operation but key operation is unavailable.



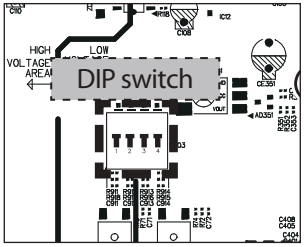
✻ If an error is displayed, concrete curing function does not work.

Concrete curing function

NOTE

- Definition of Dip switch function

Dip S/W	S/W #1	S/W #2	S/W #3	S/W #4
ON (default)	• None	• None	• None	• Turn off when an E101 error occurs
OFF	• Emergency heating	• Emergency hot water supply	• Concrete curing	• E101 error does not turn off
reference item	• Please refer to the user manual		• Please refer to the previous page	• Please refer to below



- When outdoor unit only power supply change by local condition, it is an option to auto restart system.

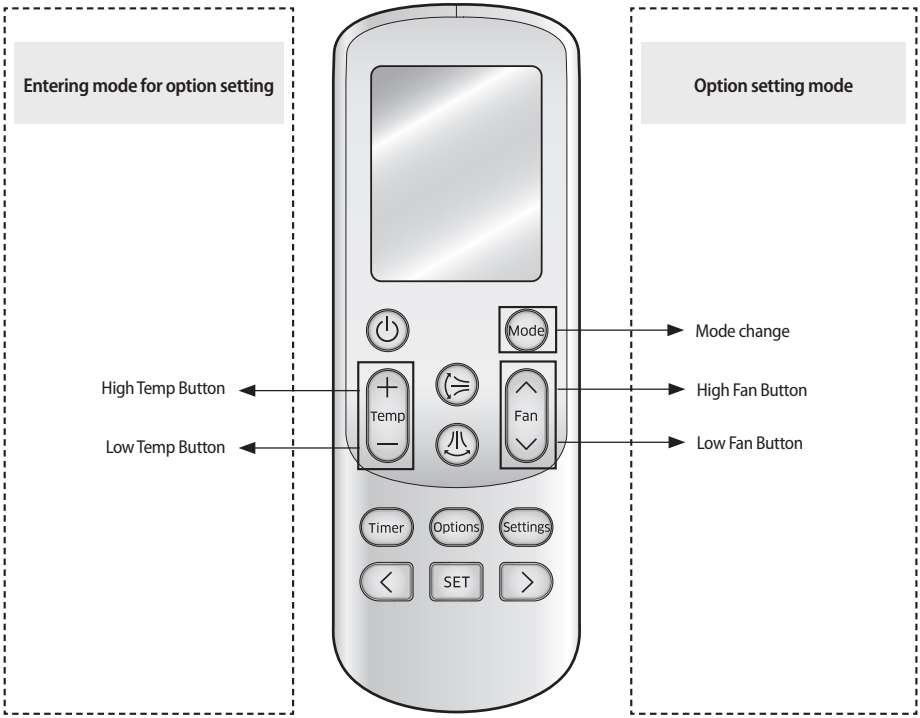
Classification		When the outdoor unit is power off	When the outdoor unit is power on
Control kit operation according to the DIP S/W #4 setting	**ON (default)**	• Control kit E101 error occurs.	• Control kit E101 error disappears. • Control kit operation turns off.
	OFF	• Control kit E101 error occurs.	• Control kit E101 error disappears. • Control kit keeps its previous operation.

- The outdoor unit on/off control is not available with the A2A indoor unit.
- Although the outdoor unit is turned on after the E101 error occurred, the A2A indoor unit operation keeps turned off.

Installation option setting

► Set the control kit installation option with remote controller option.

The procedure of option setting



Entering mode to set option

1. Remove batteries from the remote controller.
2. Insert batteries and enter the option setting mode while pressing High Temp button and Low Temp button. 

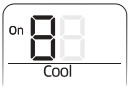
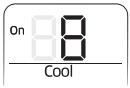
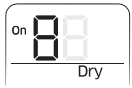
3. 

Check if you have entered the option setting status.

Installation option setting

Changing a particular option

You can change each digit of set option.

Option	SEG1		SEG2		SEG3		SEG4		SEG5		SEG6	
Explanation	PAGE		MODE		The option mode you want to change		The tens' digit of an option SEG you will change		The unit digit of an option SEG you will change		The changed value	
Remote Controller Display												
Indication and Details	Indication	Details	Indication	Details	Indication	Details	Indication	Details	Indication	Details	Indication	Details
	0		D		Option mode	1~6	Tens' digit of SEG	0~9	Unit digit of SEG	0~9	The changed value	0~F

NOTE

- When changing a digit of an control kit address setting option, set the SEG3 as 'A'.
- When changing a digit of control kit installation option, set the SEG3 as '2'.

Ex) When setting the 'central controller' into disuse status.

Option	SEG1	SEG2	SEG3	SEG4	SEG5	SEG6
Explanation	PAGE	MODE	The option mode you want to change	The tens' digit of an option SEG you will change	The unit digit of an option SEG you will change	The changed value
Indication	0	D	2	0	5	0

✻ 02 Series installation option

Classification	SEG1~24
Use central controller (Default)	020010 100000 200000 300000
Disuse central controller	020000 100000 200000 300000

✻ 01 Series Production Option (Factory default)

Mode 1	SEG1~24
MIM-E03FN	012300 100000 200000 300008

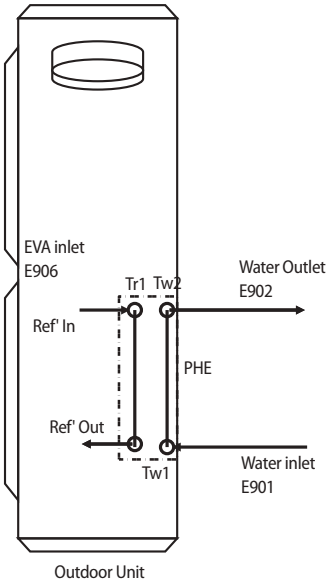
Troubleshooting

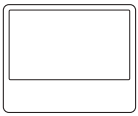
If the unit has some problem to work properly, some error codes will be displayed on the controller.
The following table described the explanation of error codes on the LCD display.

Thermistor

- Check its resistance. 10kohm@25 °C (Control kit), 200kohm@25 °C (DHW Tank, Solar)
- Check its location as shown at the diagram.
- Check its contact status with pipe.
- Final solution is to change parts

Display	Explanation
120	Short- or open-circuit error of the room temperature sensor of the Zone 2 indoor unit (detected only when the room thermostat is used)
121	Short- or open-circuit error of the room temperature sensor of the Zone 1 indoor unit (detected only when the room thermostat is used)
653	Wired remote controller thermistor SHORT or OPEN
896	Water outlet temperature sensor(Tw5) for external heater short or open
897	Water tank in sensor error SHORT or OPEN
899	Zone1 Water Outlet Themistor SHORT or OPEN
900	Zone2 Water Outlet Themistor SHORT or OPEN
901	Water Inlet thermistor SHORT or OPEN (Split models only)
902	PHE Outlet thermistor SHORT or OPEN (Split models only)
903	Water outlet (Back up Heater) temp sensor SHORT or OPEN (The Backup heater for using)
904	Water TANK thermistor SHORT or OPEN
906	Outdoor Eva Inlet Temp Sensor SHORT or OPEN
916	Mixing Valve thermistor SHORT or OPEN





AI Home Thermistor
E653

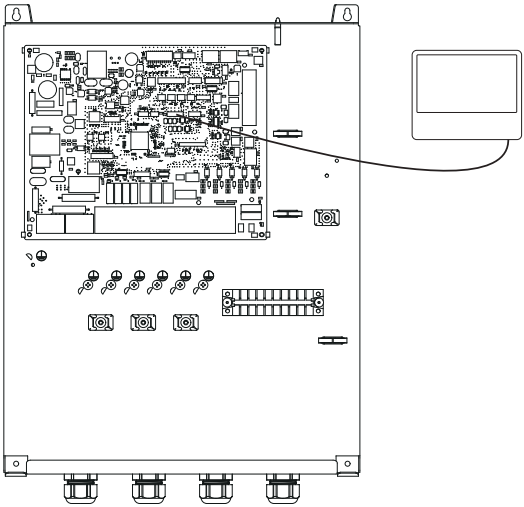
Water tank temp sensor
E904

Troubleshooting

Communication

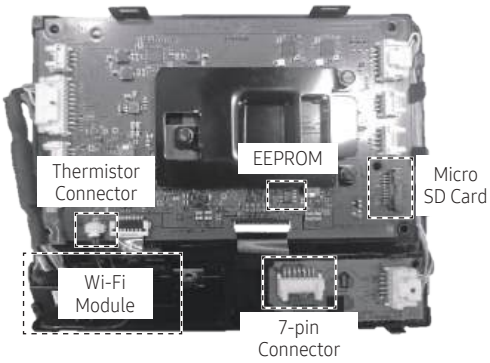
Display	Explanation
105	Wi-Fi communication error
601	Communication error between remote controller and the Control kit
604	Tracking error between remote controller and the Control kit
654	Memory(EEPROM) Read/Write Error(Wired remote Controller data error)
670	Controller combination error

E601, E604



E654

MEMORY(EEPROM) Read/Write Error (AI Home data error)

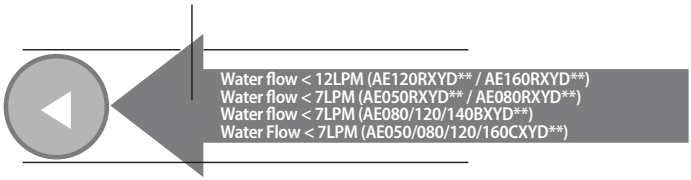


Water pump & Flow Sensor

Display	Explanation
911	Low flow rate error • in case of low flow rate in 30 sec during water pump signals is ON(Starting) • in case of low flow rate in 15 sec during water pump signals is ON(After starting)

E911

► Water pump ON (Low flow rate) : NOT enough water flow



Water flow range

	Water flow rates (LPM)	
	Min	Max
AE050RXYD** / AE080RXYD**	7	48
AE120RXYD** / AE160RXYD**	12	58
AE080BXYD** / AE050CXYD** / AE080CXYD**	7	48
AE120BXYD** / AE140BXYD** / AE120CXYD** / AE160CXYD**	7	58

Error codes

If the unit has some problems and does not work normally, error code is shown on the OUTDOOR UNIT main PBA or LCD of the wired remote controller.

Display	Explanation	Error Source
101	CONTROL KIT / OUTDOOR UNIT wire connection error	CONTROL KIT, OUTDOOR UNIT
120	Short- or open-circuit error of the room temperature sensor of the Zone 2 indoor unit (detected only when the room thermostat is used)	CONTROL KIT
121	Short- or open-circuit error of the room temperature sensor of the Zone 1 indoor unit (detected only when the room thermostat is used)	CONTROL KIT
122	Error of Evaporator in Sensor of Indoor unit short/open	CONTROL KIT
123	Error of Evaporator out Sensor of Indoor unit short/open	CONTROL KIT
162	EEPROM Error	CONTROL KIT
163	EEPROM OPTION SETTING Error	OUTDOOR UNIT
177	In hydro box, take place emerency signal Error	CONTROL KIT
198	Error of Terminal Block's Thermal Fuse(Open)	CONTROL KIT
201	CONTROL KIT/OUTDOOR UNIT communication error (Matching error)	CONTROL KIT, OUTDOOR UNIT
202	CONTROL KIT/OUTDOOR UNIT communication error (3 min)	CONTROL KIT, OUTDOOR UNIT
203	Communication error between INVERTER and MAIN MICOM (6 min)	OUTDOOR UNIT
205	Communication Error Between Outdoor Unit Inv Micom - Fan Motor Micom	OUTDOOR UNIT
221	OUTDOOR UNIT temperature sensor error	OUTDOOR UNIT
231	Condenser temperature sensor error	OUTDOOR UNIT
241	COND OUT Sensor of Outdoor Unit breakaway Error	OUTDOOR UNIT
251	Discharge temperature sensor error	OUTDOOR UNIT
262	Discharge Sensor breakaway Error	OUTDOOR UNIT
266	Comp Top Sensor breakaway Error	OUTDOOR UNIT
269	SUCTION Sensor breakaway Error	OUTDOOR UNIT
276	Compressor Top Temperature Sensor Error (open/short)	OUTDOOR UNIT
291	High Pressure Sensor Error (open/short)	OUTDOOR UNIT
296	Low Pressure Sensor Error (open/short)	OUTDOOR UNIT
308	Suction Sensor Error (open/short)	OUTDOOR UNIT
320	OLP sensor error	OUTDOOR UNIT
321	EVI Inlet Sensor Error (open/short)	OUTDOOR UNIT
322	EVI Outlet Sensor Error (open/short)	OUTDOOR UNIT
381	Inverter1 PCB overheat error	OUTDOOR UNIT
403	Plate heat exchanger freeze detection (During cooling operation)	OUTDOOR UNIT

Display	Explanation	Error Source
404	Protection of OUTDOOR UNIT when it is overload (during Safety Start, Normal operation state)	OUTDOOR UNIT
407	Comp down due to high pressure sensor	OUTDOOR UNIT
410	COMP down due to Low PressureSensor Protection Control	OUTDOOR UNIT
416	Discharge of a compressor is overheated	OUTDOOR UNIT
425	Power source line missing error (only for 3-phase model)	OUTDOOR UNIT
428	COMP down by Compression Ratio control Error	OUTDOOR UNIT
436	Plate heat exchanger freeze detection (During heating operation)	OUTDOOR UNIT
438	EVI EEV Opening Error	OUTDOOR UNIT
439	Refrigerant Leakage Error (Detect when the system is not operated)	OUTDOOR UNIT
440	Heating operation blocked (outdoor temperature over 35°C)	OUTDOOR UNIT
441	Cooling operation blocked (outdoor temperature under 9°C)	OUTDOOR UNIT
443	No startup due to Low pressure	OUTDOOR UNIT
450	Error due to high cond temperature	OUTDOOR UNIT
458	OUTDOOR UNIT fan1 error	OUTDOOR UNIT
461	[Inverter] Compressor startup error	OUTDOOR UNIT
462	[Inverter] Total current error/PFC over current error	OUTDOOR UNIT
463	OLP is overheated	OUTDOOR UNIT
464	[Inverter] IPM over current error	OUTDOOR UNIT
465	Compressor V limit error	OUTDOOR UNIT
466	DC LINK over/low voltage error	OUTDOOR UNIT
467	[Inverter] Compressor rotation error	OUTDOOR UNIT
468	[Inverter] Current sensor error	OUTDOOR UNIT
469	[Inverter] DC LINK voltage sensor error	OUTDOOR UNIT
470	Outdoor unit EEPROM Read/Write Error	OUTDOOR UNIT
471	Outdoor unit EEPROM Read/Write Error(OTP error)	OUTDOOR UNIT
474	IPM(IGBT Module) or PFCM temperature sensor Error	OUTDOOR UNIT
475	OUTDOOR UNIT fan2 error	OUTDOOR UNIT
483	H/W DC_link over voltage Error	OUTDOOR UNIT
484	PFC Overload Error	OUTDOOR UNIT
485	Input current sensor error	OUTDOOR UNIT
488	AC Input Voltage Sensor Error	OUTDOOR UNIT
500	IPM is overheated	OUTDOOR UNIT
507	Comp down due to high pressure switch	OUTDOOR UNIT

Error codes

Display	Explanation	Error Source
536	PHE refrigerant leak error	OUTDOOR UNIT
554	Gas leak error	OUTDOOR UNIT
563	INDOOR UNIT Mixed Install Error	OUTDOOR UNIT
590	[Inverter] Data flash Error	OUTDOOR UNIT
601	Communication error between the CONTROL KIT and wired remote controller	Wired Remote Controller
602	Wired remote controller Main/Sub setting error	Wired Remote Controller
604	Communication tracking error between the CONTROL KIT and wired remote controller	CONTROL KIT, Wired Remote Controller
607	Communication error between the Main and Sub wired remote controllers	Wired Remote Controller
670	Controller combination error	CONTROL KIT
897	Water TANK Inlet Thermistor SHORT or OPEN	CONTROL KIT
899	Short- or open-circuit error of the Zone 1 water-out temperature sensor	CONTROL KIT
900	Short- or open-circuit error of the Zone 2 water-out temperature sensor	CONTROL KIT
901	Water inlet (PHE) temperature sensor error(open/short)	OUTDOOR UNIT
902	Water outlet (PHE) temperature sensor error(open/short)	OUTDOOR UNIT
903	Water outlet (backup heater) temperature sensor error.	CONTROL KIT
904	DHW tank temperature sensor error	CONTROL KIT
906	Outdoor evaporator inlet temperature sensor (open/short)	OUTDOOR UNIT
907	Error due to pipe rupture protection	CONTROL KIT
908	Error due to freeze prevention(Re-Operation is possible)	CONTROL KIT
909	Error due to freeze prevention(Re-Operation is impossible)	CONTROL KIT
910	Water Temperature Sensor on water Outlet pipe is datached	CONTROL KIT
911	Low flow rate error • in case of low flow rate in 30 sec during water pump signals is ON(Starting) • in case of low flow rate in 15 sec during water pump signals is ON(After starting)	CONTROL KIT
913	Six times detection for FLow Switch Error(Re-Operation is not possible)	CONTROL KIT
914	Error due to Incorrect Themostat Connection	CONTROL KIT
915	Error on DC fan(Non-operating)	CONTROL KIT
916	Mixing valve temperature sensor (open/short)	CONTROL KIT
919	Error that the set temperature for disinfection operation is not reached, or, after reaching, the temperature fails to continue for the requested time	CONTROL KIT
920	FSV SD Card Read Error	CONTROL KIT
973	Water pressure error (Short/Open)	OUTDOOR UNIT

Memo

SAMSUNG

Samsung, PO Box 12987, Blackrock, Co. Dublin. IE
or Euro QA Lab. Saxony Way, Yateley, Hampshire GU46 6GG, UK

This appliance is filled with R-32.