Air to Water Heat Pump
Installation manual

AE160DN*MPK

- 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

All materials supplied to this manual are indispensable for the safety of equipment.

Users shall establish appropriate safety and health practices and determine the applicability of regulatory limitation based on following descriptions prior to use.

WARNING

- Always disconnect the air to water heat pump from the power supply before servicing it or accessing its internal components.
- Verify that installation and testing operations are performed by qualified personnel.
- Verify that the air to water heat pump is not installed in an easily accessible area.

GENERAL INFORMATION

- Carefully read the content of this manual before installing the air to water heat pump and store the manual in a safe place in order to be able to use it as reference after installation.
- For maximum safety, installers shall always carefully read the following warnings.
- Store the user and installation manual in a safe location and remember to hand it over to the new owner if the air to water heat pump is sold or transferred.
- This manual explains how to install an indoor unit with a mono system with two SAMSUNG units. The use of other types of units with different control systems may damage the units and invalidate the warranty. The manufacturer shall not be responsible for damages arising from the use of non compliant units.
- 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 damaged. If problems occur, switch the unit off and disconnect it from the power supply.
- 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, refrigerant tubes and protections regularly. These operations should be performed by qualified personnel only.
- The unit contains moving parts, which should always be kept out of the reach of children.
- Do not attempt to repair, move, alter or reinstall the unit. If performed by unauthorized personnel, these operations may cause electric shocks or fires.
- Do not place containers with liquids or other objects on the unit.
- All the materials used for the manufacture and packaging of the air to water heat pump are recyclable.
- The packing material and exhaust batteries of the remote control(optional) must be disposed of in accordance with current laws.
- The air to water heat pump contains a refrigerant must be disposed in authorized center or returned to retailer as special wastes.
- Do not disassemble and alter the heater at your own discretion.
- Wear protective equipment (such as safety gloves, goggles, and headgear) during installation and maintenance works. Installation/repair technicians may be injured if protective equipment is not properly equipped.
- Do not use means to accelerate the defrost operation or to clean, other than those recommended by Samsung.
- Do not pierce or burn.
- Be aware that refrigerants may not contain an odour. (Split models only)

Safety precautions

INSTALLING THE UNIT

IMPORTANT: When installing the unit, always remember to connect first the refrigerant tubes, then the electrical lines. Always disassemble the electric lines before the refrigerant tubes.

- Upon receipt, inspect the product to verify that it has not been damaged during transport. If the product appears damaged, DO NOT INSTALL it and immediately report the damage to the carrier or retailer (if the installer or the authorized technician has collected the material from the retailer.)
- After completing the installation, always carry out a functional test and provide the instructions on how to operate the air to water heat pump to the user.
- Do not use the air to water heat pump in environments with hazardous substances or close to equipment that release free flames to avoid the occurrence of fires, explosions or injuries.
- While in installation or relocation of the product, do not mix the refrigerant with other gases including air or unspecified refrigerant. Failure to do so may cause pressure increase to result in rupture or injury. (Split models only)
- Do not cut or burn the refrigerant container or pipings. (Split models only)
- Use clean parts such as manifold gauge, vacuum pump, and charging hose for the refrigerant. (Split models only)
- Installation must be carried out by qualified personnel for handling the refrigerant. Additionally, reference the regulations and laws. (Split models only)
- Be careful not to let foreign substances (lubricating oil, refrigerant other than R-32, water, etc.) enter the pipings. (Split models only)
- When mechanical ventilation is required, ventilation openings shall be kept clear of obstruction.
- For disposal of the product, follow the local laws and regulations.
- Do not work in a confined place.
- The work area shall be blocked.
- The pipings shall be installed in the position where there are no substances that may result in corrosion.
- The following checks shall be performed for installation:
  - The ventilation devices and outlets are operating normally and are not obstructed.
  - Markings and signs on the equipment shall be visible and legible.
- Upon leakage of the refrigerant, ventilate the room. When the leaked refrigerant is exposed to flame, it may cause generation of toxic gases. (Split models only)
- Make sure that the work area is safe from flammable substances.
- To purge air in the refrigerant, be sure to use a vacuum pump. (Split models only)
- Note that the refrigerant has no odour. (Split models only)
- The units are not explosion proof so they must be installed with no risk of explosion.
- This product contains fluorinated gases that contribute to global greenhouse effect. Accordingly, do not vent gases into the atmosphere. (Split models only)
- For installation with handling the refrigerant(R-32), use dedicated tools and piping materials. (Split models only)
- Servicing and installation shall be performed as recommended by the manufacturer. In case other skilled persons are joined for servicing, it shall be carried out under supervision of the person who is competent in handling flammable refrigerants. (Split models only)
- For servicing the units containing flammable refrigerants, safety checks are required to minimise the risk of ignition. (Split models only)

- Servicing shall be performed following the controlled procedure to minimize the risk of flammable refrigerant or gases. (Split models only)
- Do not install where there is a risk of combustible gas leakage.
- Do not place heat sources.
- Be cautious not to generate a spark as follows:
  - Do not remove the fuses with power on.
  - Do not disconnect the power plug from the wall outlet with power on.
  - It is recommended to locate the outlet in a high position. Place the cords so that they are not tangled.
- After installation, check for leakage. Toxic gas may be generated and if it comes into contact with an ignition source such as fan heater, stove, and cooker. cylinders, make sure that only the refrigerant recovery cylinders are used.
- Never directly touch any accidental leaking refrigerant.
- This could result in severe wounds caused by frostbite.

Preparation of fire extinguisher

- If a hot work is to be done, an appropriate fire extinguishing equipment should have been available.
- A dry powder or CO_2 fire extinguisher shall be equipped near the charging area.

Ignition sources free

- Make sure to store the units in a place without continuously operating ignition sources (for example, open flames, an operating gas appliance or an operating electric heater).
- The service engineers shall not use any ignition sources with the risk of fire or explosion.
- Potential ignition sources shall be kept away from the work area where the flammable refrigerant can possibly be released to the surrounding.
- The work area should be checked to ensure that there are no flammable hazards or ignition risks. The "No Smoking" sign shall be attached.
- Under no circumstances shall potential sources of ignition be used while in detection of leakage.
- Make sure that the seals or sealing materials have not degraded.
- Safe parts are the ones with which the worker can work in a flammable atmosphere. Other parts may result in ignition due to leakage.
- Replace components only with parts specified by Samsung. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

Area ventilation

- Make sure that the work area is well ventilated before performing a hot work.
- Ventilation shall be made even during the work.
- The ventilation should safely disperse any released gases and preferably expel them into the atmosphere.
- Ventilation shall be made even during the work.

Safety precautions

Leakage detection methods (Split models only)

- The leakage detector shall be calibrated in a refrigerant-free area.
- Make sure that the detector is not a potential source of ignition.
- The leakage detector shall be set to the LFL (lower flammability limit).
- The use of detergents containing chlorine shall be avoided for cleaning because the chlorine may react with the refrigerant and corrode the pipings.
- If leakage is suspected, ignition source shall be removed.
- If a leakage is found while in brazing, the entire refrigerant shall be recovered from the product or isolated (e.g. using shut-off valves). It shall not be directly released to the environment. Oxygen free nitrogen (OFN) shall be used for purging the system before and during the brazing process.
- The work area shall be checked with an appropriate refrigerant detector before and during work.
- Ensure that the leakage detector is appropriate for use with flammable refrigerants.

Labelling (Split models only)

- The parts shall be labelled to ensure that they have been decommissioned and emptied of refrigerant.
- The labels shall be dated.
- Make sure that the labels are affixed on the system to notify it contains flammable refrigerant.

Recovery (Split models only)

- When removing refrigerant from the system for servicing or decommissioning, it is recommended to remove the entire refrigerant.
- When transferring refrigerant into cylinders, make sure that only the refrigerant recovery cylinders are used.
- All cylinders used for the recovered refrigerant shall be labelled.
- Cylinders shall be equipped with pressure relief valves and shut-off valves in a proper order.
- The recovery system shall operate normally according to the specified instructions and shall be suitable for refrigerant recovery.
- In addition, the calibration scales shall operate normally.
- Hoses shall be equipped with leak-free disconnect couplings.
- Before starting the recovery, check for the status of the recovery system and sealing state. Consult with the manufacturer if suspected.
- The recovered refrigerant shall be returned to the supplier in the correct recovery cylinders with the Waste Transfer Note attached.
- Do not mix refrigerants in the recovery units or cylinders.
- If compressors or compressor oils are to be removed, make sure that they have been evacuated to the acceptable level to ensure that flammable refrigerant does not remain in the lubricant.
- The evacuation process shall be performed before sending the compressor to the suppliers.
- Only the electrical heating to the compressor body is allowed to accelerate the process.
- Oil shall be drained safely from the system.
- Never install a motor-driven equipment to prevent ignition.
- Empty recovery cylinders shall be evacuated and cooled before recovery.

Installation location requirements

- The unit shall be installed in an open space that is always ventilated.
- The local gas regulations shall be observed.
- For installation inside a building (this applies either to indoor or outdoor units installed inside) a minimum room floor area of space conditioned is mandatory according to IEC 60335-2-40:2018 (see the reference table into either the indoor or outdoor unit installation manual).
- To handle, purge, and dispose the refrigerant, or break into the refrigerant circuit, the worker should have a certificate from an industry-accredited authority.
- Do not install the indoor unit in the following areas:
  - Area filled with minerals, splashed oil, or steam. It will deteriorate plastic parts, causing failure or leakage.
  - Area that is close to heat sources.
  - Area that produces substances such as sulfuric gas, chlorine gas, acid, and alkali. It may cause corrosion of the pipings and brazed joints.
  - Area that can cause leakage of combustible gas and suspension of carbon fibers, flammable dust, or volatile flammables.
  - Area where refrigerant leaks and settles.
  - Area where animals may urinate on the product. Ammonia may be generated.
- Do not use the indoor unit for preservation of food items, plants, equipment, and art works. This may cause deterioration of their quality.
- Do not install the indoor unit if it has any drainage problem.

POWER SUPPLY LINE, FUSE OR CIRCUIT BREAKER

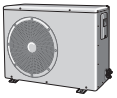
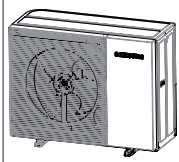
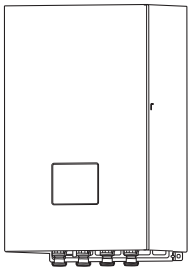
- Always make sure that the power supply is compliant with current safety standards. Always install the air to water heat pump in compliance with current local safety standards.
- Always verify that a suitable grounding connection is available.
- Verify that the voltage and frequency of the power supply comply with the specifications and that the installed power is sufficient to ensure the operation of any other domestic appliance connected to the same electric lines.
- Always verify that the cut-off and protection switches are suitably dimensioned.
- Verify that the air to water heat pump is connected to the power supply in accordance with the instructions provided in the wiring diagram included in the manual.
- Always verify that electric connections (cable entry, section of leads, protections…) are compliant with the electric specifications and with the instructions provided in the wiring scheme. Always verify that all connections comply with the standards applicable to the installation of air to water heat pumps.

⚠ CAUTION

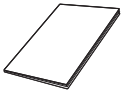
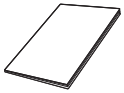
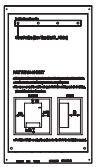
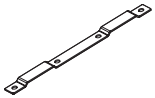
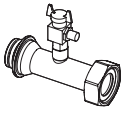
- Make sure that you earth the cables.
  - Do not connect the earth wire to the gas pipe, water pipe, lighting rod or telephone wire. If earthing is not complete, electric shock or fire may occur.
- Install the circuit breaker.
  - If the circuit breaker is not installed, electric shock or fire may occur.
- Make sure that the condensed water dripping from the drain hose runs out properly and safely.
- Install the power cable and communication cable of the indoor and outdoor unit at least 1m away from the electric appliance.

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	Hydro Units						
	Model Name	Mono	AE160DNYMPK AE160DNZMPK				

Accessories

		
Installation Manual (2)	User Manual (1)	Pattern Sheet (1)
		
Wall Mounting Bracket (1)	Ring band (1)	Cable-tie (2)
		
Temperature Sensor for DHW Tank (1x15m,YEL) (1)	Magnetic filter Opening tool (1)	Quick connector pipe (short) AE160DNYMPK (3) / AE160DNZMPK (4)
		
Quick connector pipe (long) AE160DNYMPK (2) / AE160DNZMPK (3)	Quick connector pipe (long with port) (1)	Quick connector clip AE160DNYMPK (6) / AE160DNZMPK (8)
		
Gasket AE160DNYMPK (8) / AE160DNZMPK (10)	O-ring (2)	

Optional Accessories

Item(Model Name)		Components	Compatibility	
			AE160DNY***	AE160DNZ***
Backup Heater Kit	MHC-300FP	Sub Backup Heater (3 kW)	O	X
Extension Wire Kit	MVW-EE300	AI Home extension cable (30 m), AI Home Decoration Plate	O	O
2 Zone Thermistor Kit	MOS-T1	2 Zone Temperature Sensor (2) Mixed Water Temperature Sensor (1)	O	X

Product specifications

Specifications

Model Name				AE160DNYMPK/EU	AE160DNZMPK/EU
Type				Standard	2 Zone
Power Source			Φ, V, Hz	1, 220-240, 50 or 3, 380-415, 50	
Operating Range (Water)		Heating	℃	15~75(70/65)[1]	
		Cooling	℃	5~25	
Sound	Sound Pressure	Heating	dB(A)	26 (28)[4]	28 (30)[4]
		Cooling	dB(A)	26 (28)[4]	28 (30)[4]
	Sound Power	Heating	dB(A)	40 (42)[4]	42 (44)[4]
Dimension (WxHxD)		Net	mm	530 x 840 x 350	
		Gross	mm	602 x 1,032 x 435	
Weight		Net	kg	43	54
		Gross	kg	50	61
Connection	Refrigerant pipe	Type	-	-	
		Liquid	Φ, mm		
		Gas	Φ, mm		
	Water pipe (Outdoor unit)	Type	-	BSPP Female	
		Inlet	Φ, mm	28	
		Outlet	Φ, mm	28	
	Water pipe (Zone 2)	Type	-	BSPP Female	
		Inlet	Φ, mm	28	
		Outlet	Φ, mm	28	
	Water pipe (Zone 1)	Type	-	-	BSPP Female
		Inlet	Φ, mm		28
		Outlet	Φ, mm		28
	Water pipe (Tank)	Type	-	BSPP Female	
		Inlet	Φ, mm	28	
		Outlet	Φ, mm	28	
Water Pump	Type		-	BLDC Inv	
	Motor Input		W	95	
	Max static pressure		mAq	9.0	
	Number of Unit		EA	1	2
Backup Heater	Power		kW	1Φ 2/4kW, 3Φ 6kW	
	Thermostat (Thermal Fuse)		℃	98 +0 -5	
Safety device	Pressure relief valve		bar	2.9	
	Flow Sensor		LPM	5~60	
	Temperature & Pressure relief valve (Tank)		bar, ℃	10bar, 90 ℃	
Expansion vessel	Internal water volume		liter	10	
	Working pressure		MPa	0.3	
	Pre pressure		bar	1.2	
Air Vent Valve			Φ, inch	BSPP male 3/8"	
Operating Range (Outdoor Temperature)		Heating	℃	-25~35 / -30~43[2]	
		Cooling	℃	10~46	
		DHW Water	℃	-25~43 / -30~43[3]	

NOTE

- [1] 75 ℃ : AE***CXYD*K/EU model / 70 ℃ : AE***BXYD*G/EU model / 65 ℃ : AE***RXYD*G/EU model
  [2] -25~35 ℃ : AE***CXYD*K/EU model & AE***RXYD*G/EU model / -30~43 ℃ : AE***BXYD*G/EU model
  [3] -25~43 ℃ : AE***CXYD*K/EU model & AE***RXYD*G/EU model / -30~43 ℃ : AE***BXYD*G/EU model
  [4] The value is data when connecting AE120 (~160)*XYD*G outdoor unit product.

Typical application examples

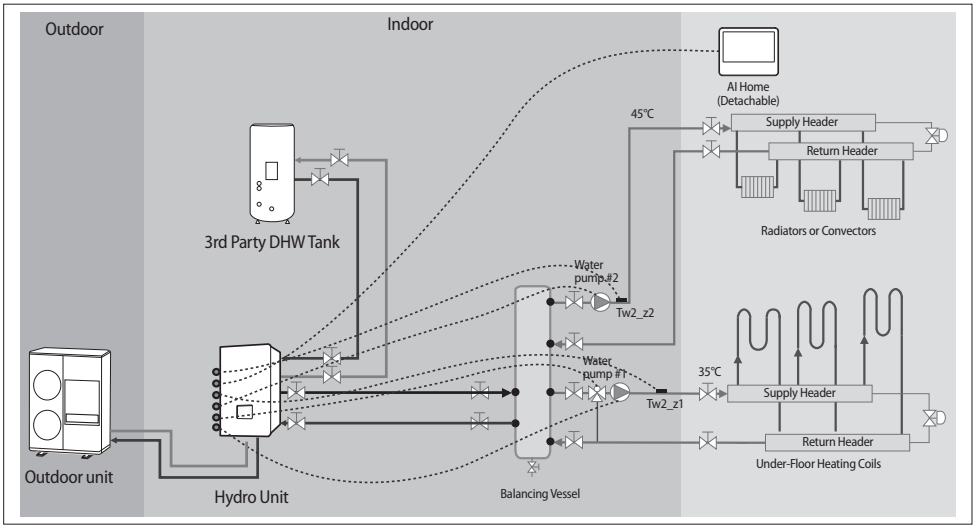
WARNING

- The application examples given below are for illustration purposes only.
- When the SAMSUNG Air-to-Water Heat Pump system is used in series with another heat source (e.g. gas boiler), ensure that the return water temperature not exceed the maximum water temperature of the outdoor unit (Max water temperature is determined according to the type of outdoor unit model 65°C/70°C/75°C).
- The unit is only to be used in a closed water system. Application in an open water circuit can lead to excessive corrosion of the water piping.
- SAMSUNG can not be responsible for incorrect or unsafe situations in the water system. Make sure that the boiler, radiators, convectors, solar collectors, UFHs, FCUs, additional pumps, pipings, and controls in the water system are in accordance with relevant local laws and regulations under the installer's responsibility.
- SAMSUNG shall not be held liable for any damage resulting from not observing this rule.
- SAMSUNG do not provide specific water system components such as Pressure relief valve, Air vent valve, buffer tank and etc. Installers and end-users shall consider how to install the above designated components in overall water system depending on the installation conditions. If the components are not installed in appropriate location, the water system can not be operated as designed.

✻ The below examples are for illustration purposes only.

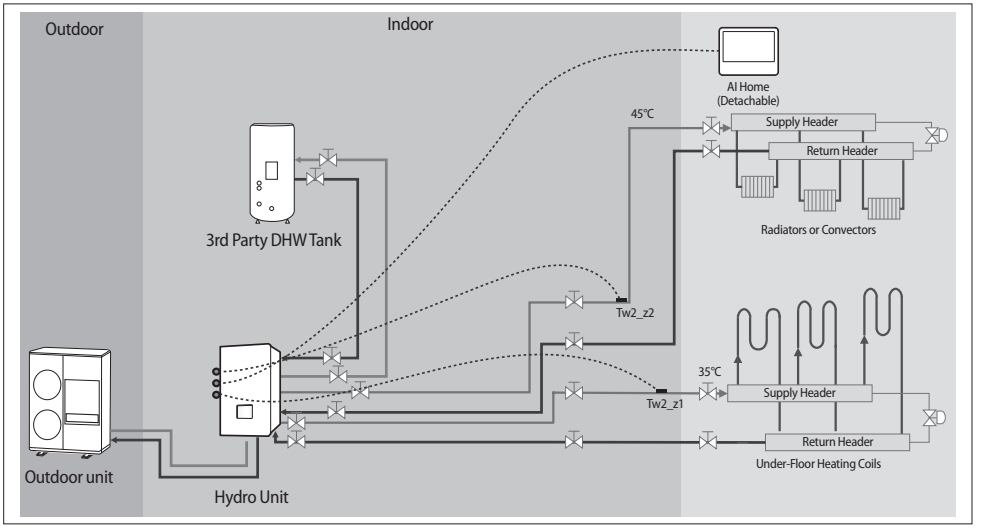
Application 1: Space heating + water heating

✻ AE160DNYMPK(Standard)



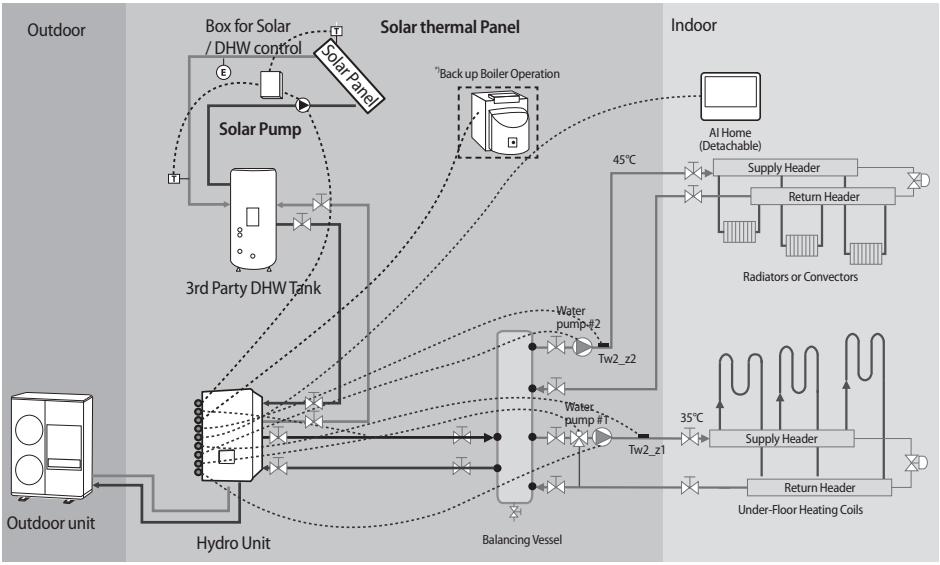
Typical application examples

✻ AE160DNZMPK(2 Zone)



Application 2: Hybrid application(backup boiler and solar panel connected)

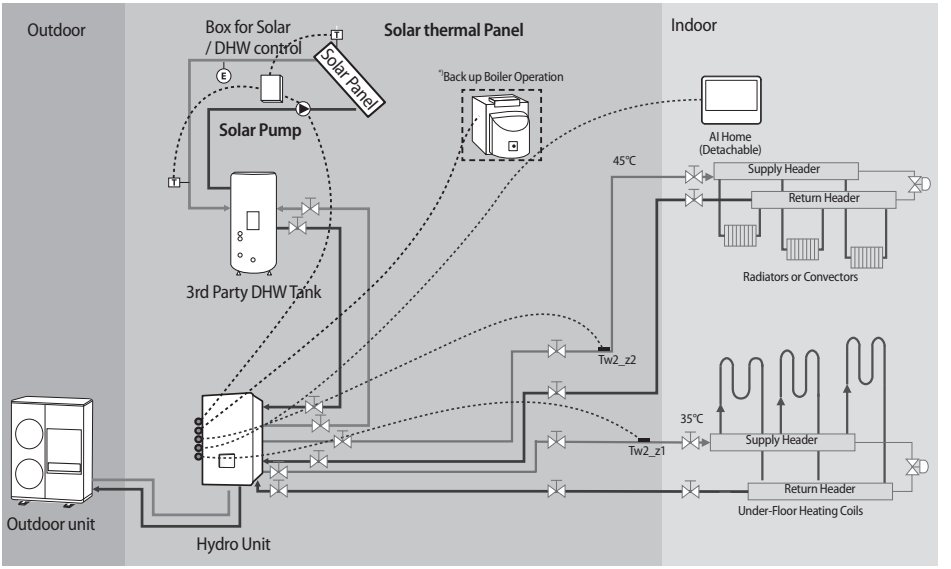
❋ AE160DNYMPK(Standard)



*) We control only the on / off signal of backup boiler according to outdoor temperature.
Backup boiler should be installed with own device according to the field condition.

Typical application examples

✻ AE160DNZMPK(2 Zone)

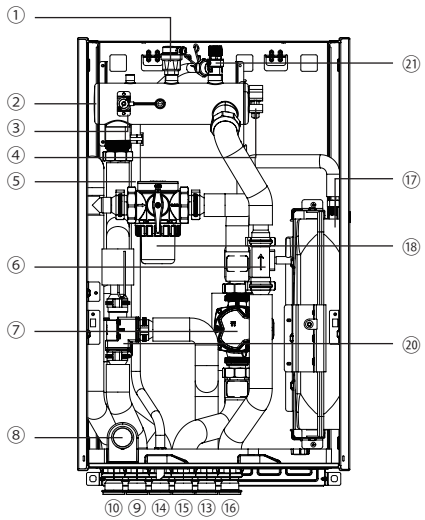


*) We control only the on / off signal of backup boiler according to outdoor temperature.
Backup boiler should be installed with own device according to the field condition.

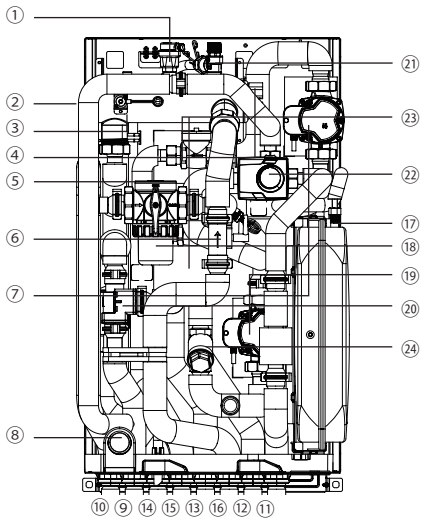
CAUTION
- Samsung has not responsible for performance and stability of backup boiler.
- Water quality must be according to Directive (EU) 2020/2184.

Main components

✻ AE160DNYMPK



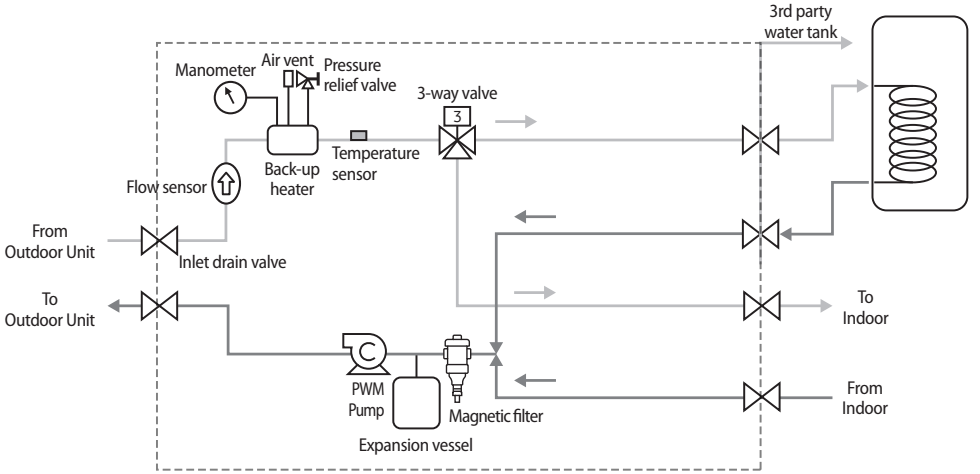
✻ AE160DNZMPK



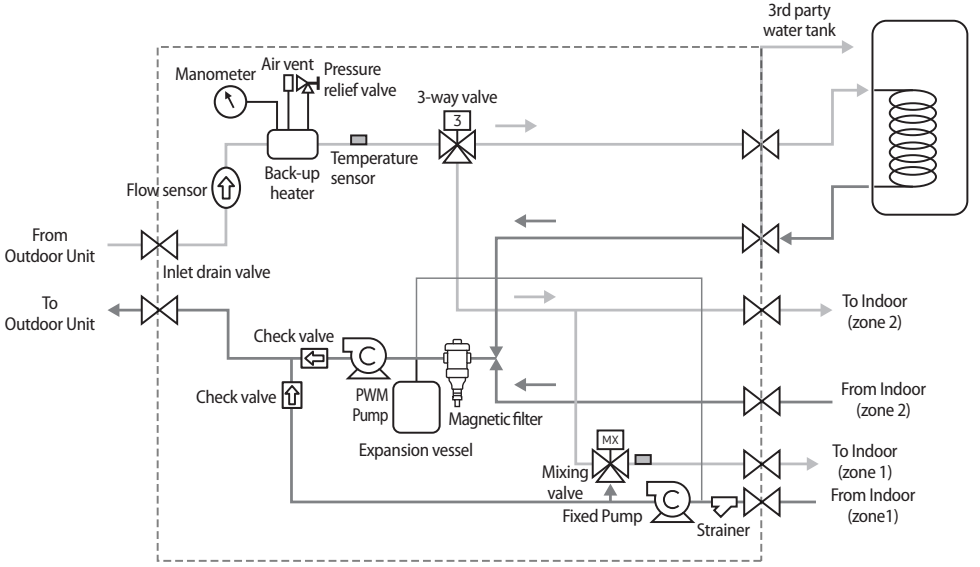
No.	Name	Note
①	Air vent 3/8″	BSPP male 3/8″
②	Backup heater thermal fuse	Thermal cut out 98 ℃ (+0,-5 ℃)
③	Backup heater thermostat	Disc. 65 ℃ ±4 ℃
④	Backup heater element	2, 4 kW: 1Φ AC 230V 50Hz / 6 kW: 3Φ AC 400V 50Hz
⑤	Drain hose	
⑥	Flow sensor	5~80L/min
⑦	Water pump	1P-230 V-50 Hz, 46 LPM x 54 kPa
⑧	Manometer	ø48, 0~4bar
⑨	Heating outlet(To zone) for AE160DNYMPK Heating outlet(Zone 2) (To zone 2) for AE160DNZMPK	BSPP female, 1-1/4"
⑩	Heating inlet(From zone) for AE160DNYMPK Heating inlet(Zone 2) (From zone 2) for AE160DNZMPK	BSPP female, 1-1/4"
⑪	Heating outlet(Zone 1) (To zone 1) for AE160DNZMPK	BSPP female, 1-1/4"
⑫	Heating inlet(Zone 1) (From zone 1) for AE160DNZMPK	BSPP female, 1-1/4"
⑬	DHW outlet (Hot water)	BSPP female, 1-1/4"
⑭	DHW inlet (Cold water)	BSPP female, 1-1/4"
⑮	Outdoor outlet (To outdoor unit)	BSPP female, 1-1/4"
⑯	Outdoor inlet (From outdoor unit)	BSPP female, 1-1/4"
⑰	Expansion vessel	10L, Pre-charge gas: 1.2 bar 90 ℃, N_2, BSPP 3/8"
⑱	Magnetic filter	
⑲	Water pump (Zone 1)	
⑳	3way valve	
㉑	Pressure relief valve	2.9 bar, BSPP 1/2″
㉒	Mixing valve	
㉓	Check valve	
㉔	Strainer	

Functional diagram

❋ AE160DNYMPK

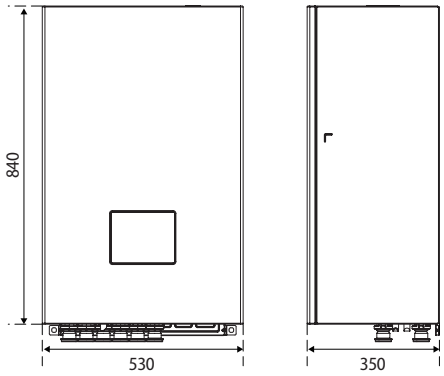


❋ AE160DNZMPK

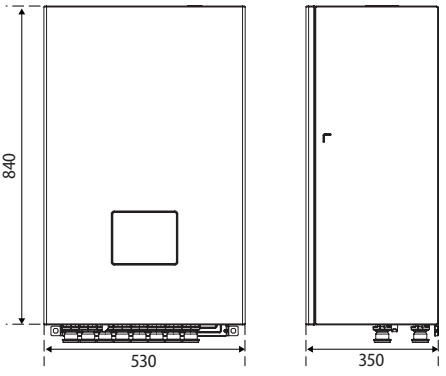


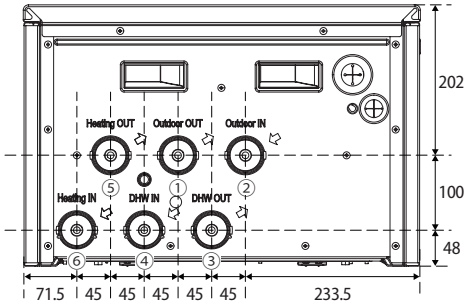
Dimensional drawing

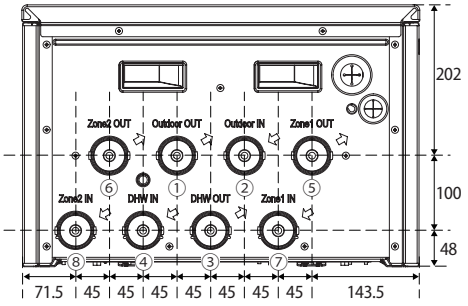
✻ AE160DNYMPK



✻ AE160DNZMPK







No.	Size	Name		Type
		AE160DNYMPK	AE160DNZMPK	
①	Φ28, T1.2, Copper	Outdoor outlet (To outdoor unit)	Outdoor outlet (To outdoor unit)	BSPP female 1-1/4"
②		Outdoor inlet (From outdoor unit)	Outdoor inlet (From outdoor unit)	
③		DHW outlet (Hot water)	DHW outlet (Hot water)	
④		DHW inlet (Cold water)	DHW inlet (Cold water)	
⑤		Heating outlet (To zone)	Heating outlet(Zone 1) (To zone 1)	
⑥		Heating inlet (From zone)	Heating outlet(Zone 2) (To zone 2)	
⑦		N/A	Heating inlet(Zone 1) (From zone 1)	
⑧		N/A	Heating inlet(Zone 2) (From zone 2)	

Installing the unit

Installation of the indoor unit

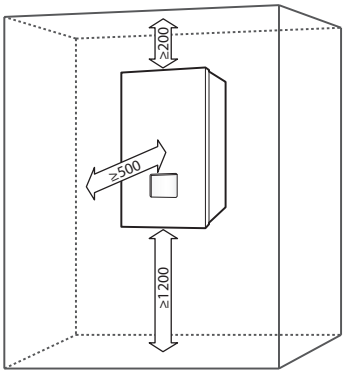
The indoor unit should be installed indoors and meet the following conditions.

- ▶ Installation site should be sheltered from frost.
- ▶ In area with suitable space for servicing.
- ▶ A place with adequate ventilation.
- ▶ Where there is no risk of leakage of flammable gases.
- ▶ There is a provision for condensate drain and pressure relief valve blow-off.
- ▶ The wall for installation is a flat, vertical and non-combustible wall, capable of supporting the operation weight of the unit.

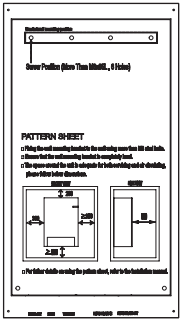
Installation space

- ▶ Ensure to leave the appropriate space as indicated in the drawing.
- ▶ Installation site should be secured with adequate ventilation so that the components of hydro unit will not be damaged from overheating.

(Unit : mm)

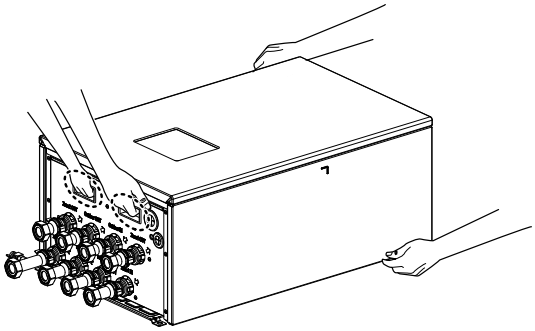


- ▶ Before installing the indoor unit, fix the pattern sheet on the wall. This sheet has a function to take correct position for the wall mounting bracket and screws.



Pattern Sheet

Mounting the indoor unit

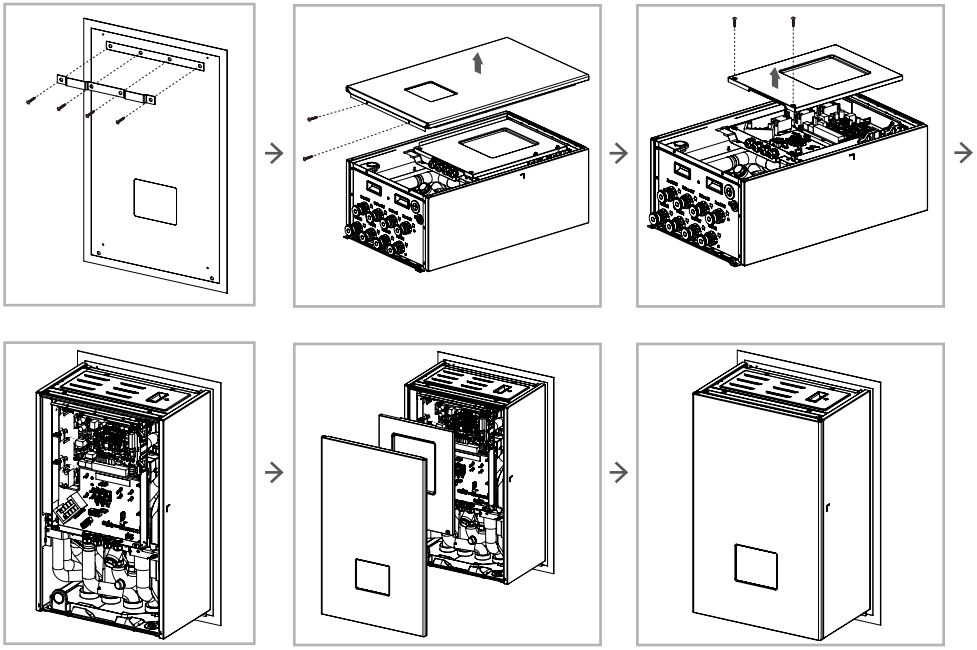


✻ A minimum of two people should lift the unit by the handles and not by the drain pan or pipe work.

CAUTION

- The handle in the top case is used to fit the position when installing on the wall. It's not for carrying a unit, so don't use it for carrying handle.

- ▶ Drill 6 holes from the pattern sheet for fixing the wall bracket and unit. After completing holes, detach the pattern sheet.
- ▶ Fix the wall-mount-bracket to the wall using appropriate plugs and screws(Use over M8 6 screws).
- ▶ Hang the indoor unit on an wall-mount-bracket and fix a front cabinet on the unit by using 2 screws.



- ▶ Fix screw through base panel of the unit.

Installing the unit

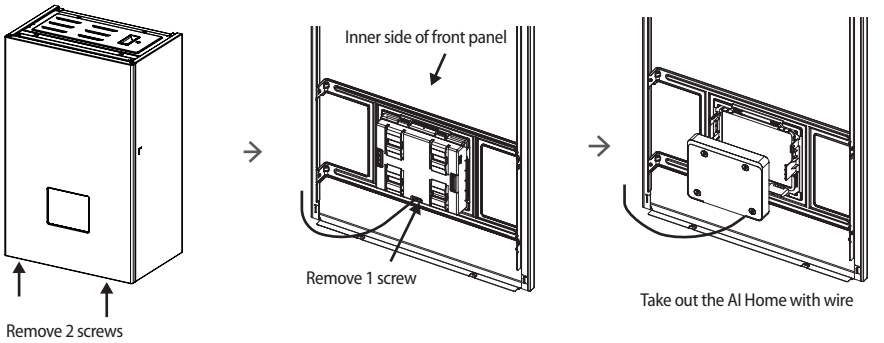
Installation of AI Home at the separate room

AI Home mounted to the Hydro Unit can be moved to the room and serve as room thermostat.

NOTE

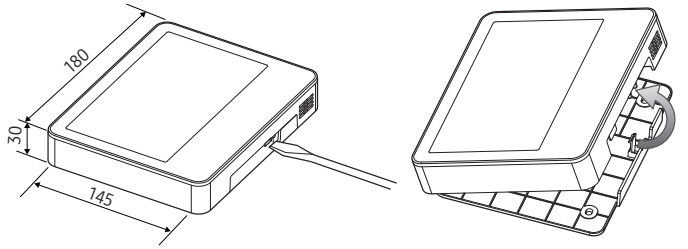
- In order to install AI Home in a separate room, please purchase Extension Wire Kit (MVW-EE300).

1. Remove the AI Home from Hydro Unit.

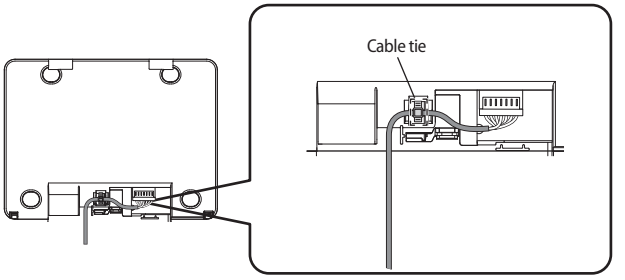


2. Remove the wire from the Hydro Unit and AI Home.

(Unit : mm)

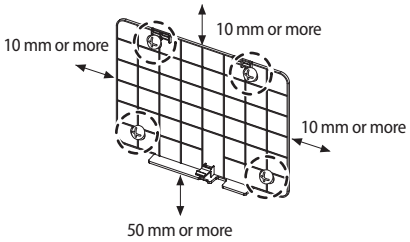


Insert the flat-head screwdriver into a square grooves at the bottom of the AI Home and slightly turn to lift the front from the rear cover.



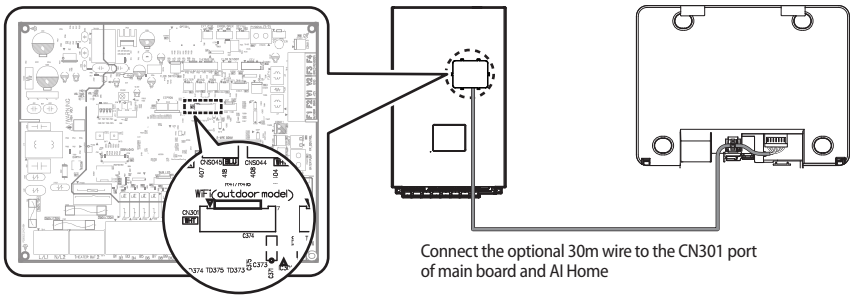
Remove cable tie and wire from the board

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



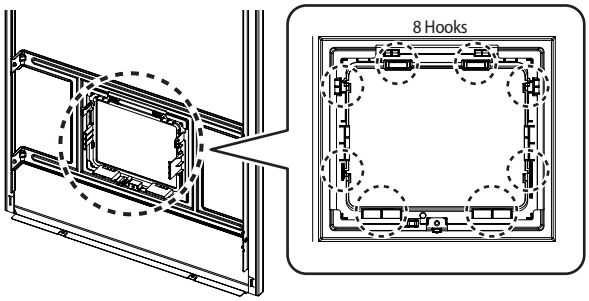
Before fixing the rear cover, secure at least 10 mm space of left, right, upper side, and 50 mm for bottom side

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

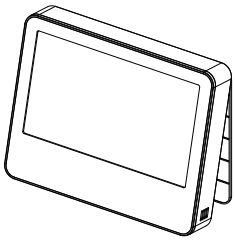


Connect the optional 30m wire to the CN301 port of main board and AI Home

5. Reassemble the Hydro Unit 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

CAUTION

- If the AI Home is attached indoors, the temperature sensing position must be changed to the AI Home sensor.
- Please activate room temperature control(2093) by entering Service Mode → Heat Pump
- For information on how to enter service mode, please refer to page 16 of the user manual.

Pipe work

Water pipe work

The hydro unit is equipped with components listed on the table below.

All entering, leaving water direction is embossed right next to the pipe. Please connect the pipe with attention to the direction of the arrow

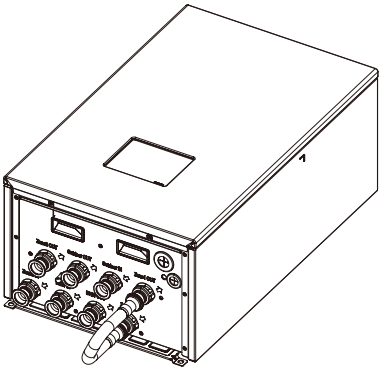
Whole water plumbing system including Hydro unit shall be installed by a qualified technician and must comply with all relevant European and national regulations.

- ▶ Allowable water pressure of hydro unit is maximum 3.0bar.
- ▶ An air-vent valve is integrated on the hydro unit. Please check that air-vent valve is not overtightened so the air-vent valve can release any air out of the system during system operation.
- ▶ AE160DNZ*** (2zone built-in type) is designed to supply water at 2 different temperatures
  - For heating operations, please connect the Zone1 supply line to a room that requires a lower water temperature (ex,underfloor heating) and the Zone2 supply line to a room that requires a higher water temperature (ex,radiators).

NOTE

If you install AE160DNZ*** (2zone built-in type) as a single-zone application, then:

- Install a bypass pipe between the water inlet and outlet for Zone 1 and use Zone 2 for space heating.
- Change FSV Setting #4061=0(Zone control= No), #4041=0 (Mixing V/Vcontrol= No)

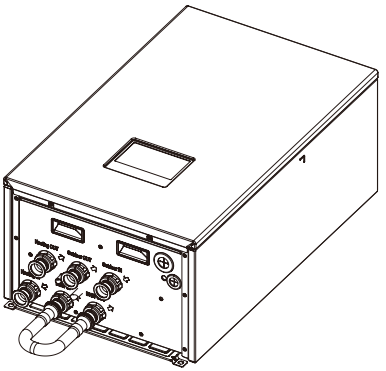


NOTE

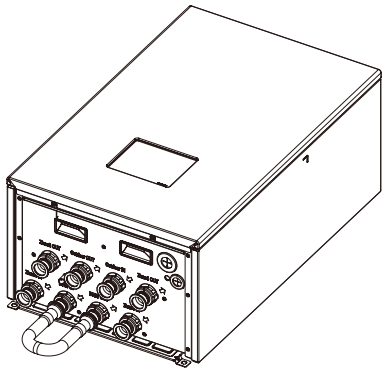
If you install AE160DN**** with no 3rd party tank then:

- Install a bypass pipe between the water inlet and outlet for DHW.
- Please check FSV Setting #3011=0(DHW= No)

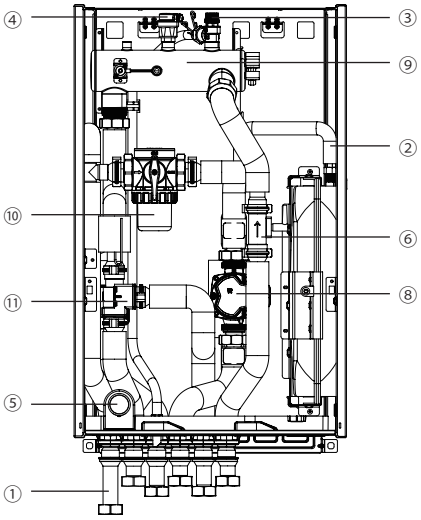
❋ AE160DNYMPK



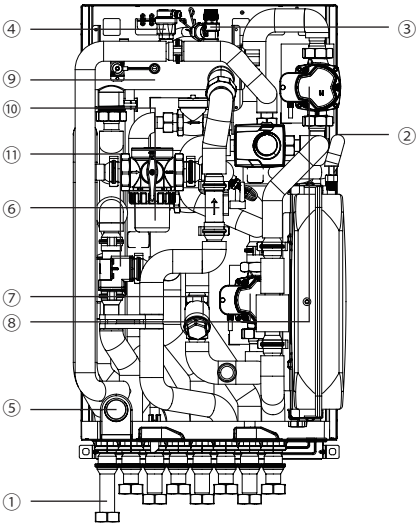
❋ AE160DNZMPK



✻ AE160DNYMPK



✻ AE160DNZMPK



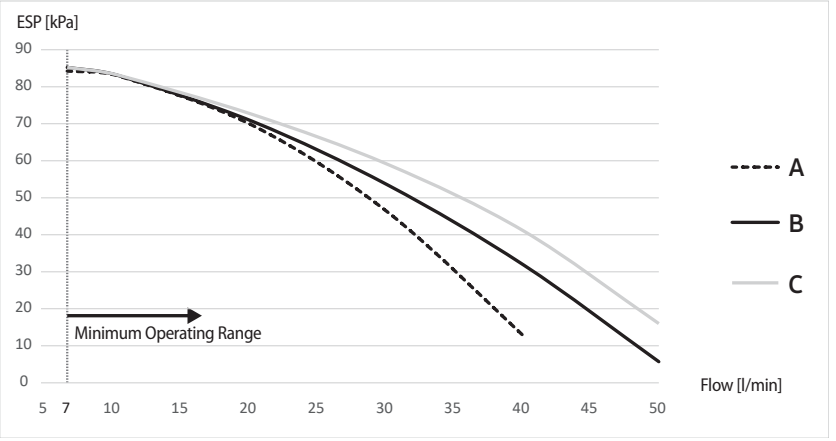
	No.	Name	Tightening Torque	
Hydro unit	①	1.25″ BSPP	350 ~ 380 kgf•cm	34 ~ 37 N•m
	②	3/8″ BSPP	120 ~ 150 kgf•cm	12 ~ 15 N•m
	③	Pressure relief valve	120 ~ 150 kgf•cm	12 ~ 15 N•m
	④	Air-vent valve	120 ~ 150 kgf•cm	12 ~ 15 N•m
	⑤	Manometer	92 ~ 102 kgf•cm	9 ~ 10 N•m
	⑥	Flow Sensor	O-ring type	O-ring type
	⑦	Strainer	350 ~ 380 kgf•cm	34 ~ 37 N•m
	⑧	Water pump	350 ~ 380 kgf•cm	34 ~ 37 N•m
	⑨	Backup heater	350 ~ 380 kgf•cm	34 ~ 37 N•m
	⑩	Magnetic filter	O-ring type	O-ring type
	⑪	3way valve	O-ring type	O-ring type

Pipe work

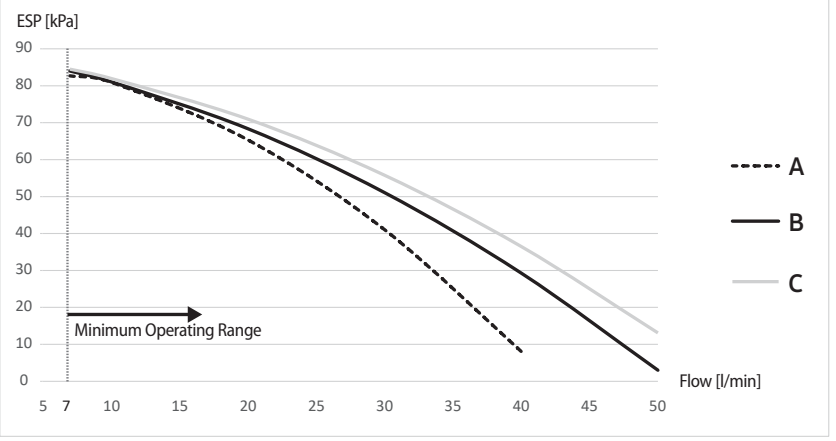
ESP(External Static Pressure) Diagram

The illustration below shows the external static pressure of the unit depending on the water flow and the pump setting.

AE160DNY***



AE160DNZ***



When ESP is not enough, additional pump should be installed. In this case, install the PWM control external type pump (Heating type) additionally.

*A: AE050(080)RXYD*G, AE050(080)CXYD*K

*B: AE120(160)RXYD*G, AE080BXYD*G, AE120(160)CXYD*K

*C: AE120(140)BXYD*G

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.

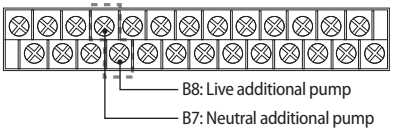
CAUTION

- Each terminal set (Live+Neutral) for additional pumps can supply ampere up to Max 1.0A.
- If an additional pump is needed, the additional pump should be installed in a designated location according to the installation case below
- [Case I] AE160DNZ*** without connection to DHW tank : additional pump should be installed in the Zone2 piping line
- [Case II] AE160DNZ*** with connection to DHW tank : additional pump should be installed in the Zone2 piping line
- [Case III] AE160DNY*** without connection to DHW tank : additional pump should be installed in the piping lines of Zone or outdoor unit
- [Case IV] AE160DNY*** with connection to DHW tank : additional pump should be installed in the Zone piping line
- For installation cases I to IV, refer to wire works cases 1 and 2.
- If an additional pump is needed for Zone1 in AE160DNZ***, refer to wire works case 3.
- The maximum number of pumps that can be powered by the terminal block of the hydro unit is two. Therefore, if necessary, be sure to connect pumps other than the two to a separate power source.
- Ex) AE160DNZ*** already has 2 pumps (Inverter and fixed pump). In this case, all additional pumps should be connected to a separate power source. For AE160DNY*** including only one main pump, one additional pumps can be driven by the terminal block of the hydro unit without using a separate power source.

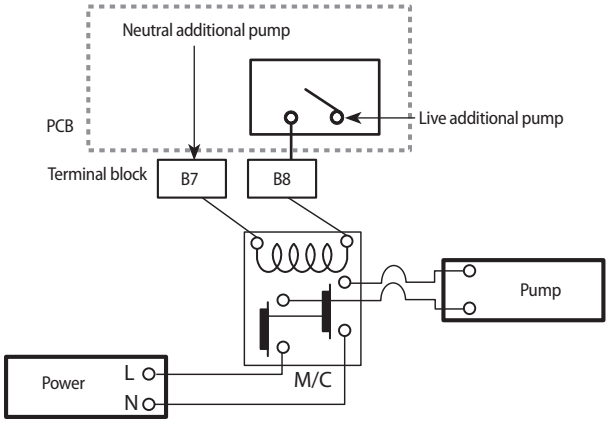
Case 1) AC pump

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

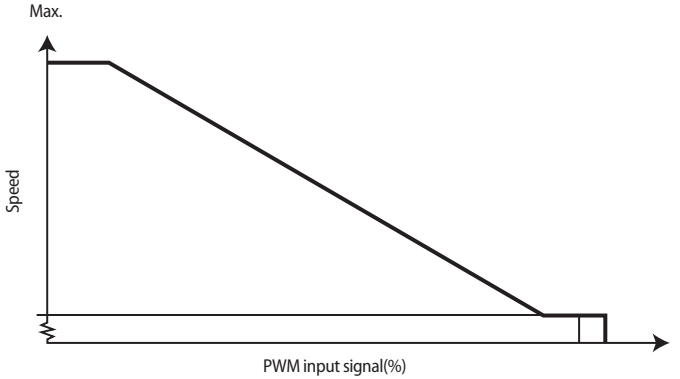
- The maximum allowable current that this terminal block can supply for the additional water pump is 1.0A.

Pipe work

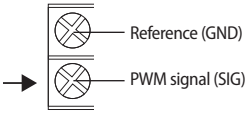
Case 2) Inverter pump

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)



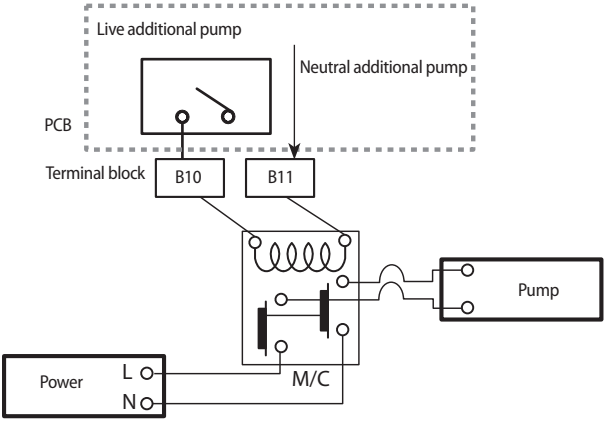
GRUNDFOS UPMM 25-95 (Heating Type), SHINHOO GPA25-9H (Heating Type)

CAUTION

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

Case3) Additional pump for Zone 1 in AE160DNZ***

Only AC pump can be used as an additional pump for Zone 1 in AE160DNZ***. The pump should be installed in piping line of Zone1 and connected to a separate power source as figure shown below.



Setting the pre-pressure of the expansion vessel

When it is required to change the default pre-pressure of the expansion vessel(1 bar), keep in mind the following guidelines:

- ▶ Use only dry nitrogen to set the expansion vessel pre-pressure.
- ▶ Inappropriate setting of the expansion vessel pre-pressure will lead to malfunction of the system. Therefore, the pre-pressure should only be adjusted by a licensed installer.
- ▶ Below table applies only to combinations where the maximum water temperature is equal to or less than 65 °C.

Installation height difference[a)]	Water volume	
	< 240 Litres	> 240 Litres
< 7 m	No pre-pressure adjustment required.	Actions required: • Pre-pressure must be decreased, calculate according to "Calculating the pre-pressure of the expansion vessel". • Check if the water volume is lower than maximum allowed water volume
> 7 m	Actions required: • Pre-pressure must be increased, calculate the appropriate value following by "Calculating the pre-pressure of the expansion vessel". • Check if the water volume is lower than maximum allowed water volume	Expansion vessel of the unit too small for the installation.

- ▶ Below table applies only to combinations where the maximum water temperature is equal to or less than 70 °C.

Installation height difference[(a)]	Water volume	
	< 210 Litres	> 210 Litres
<7m	No pre-pressure adjustment required.	Actions required: • Pre-pressure must be decreased, calculate according to "Calculating the pre-pressure of the expansion vessel". • Check if the water volume is lower than maximum allowed water volume.
>7m	Actions required: • Pre-pressure must be increased, calculate the appropriate value following by "Calculating the pre-pressure of the expansion vessel". • Check if the water volume is lower than maximum allowed water volume.	Expansion vessel of the unit too small for the installation.

Pipe work

► Below table applies only to combinations where the maximum water temperature is equal to or less than 75 °C.

Installation height difference[a]	Water volume	
	< 185 Litres	> 185 Litres
<7m	No pre-pressure adjustment required.	Actions required: • Pre-pressure must be decreased, calculate according to "Calculating the pre-pressure of the expansion vessel". • Check if the water volume is lower than maximum allowed water volume.
>7m	Actions required: • Pre-pressure must be increased, calculate the appropriate value following by "Calculating the pre-pressure of the expansion vessel". • Check if the water volume is lower than maximum allowed water volume.	Expansion vessel of the unit too small for the installation.

a) Installation height difference: height difference(m) between the highest point of the water circuit and the indoor unit. If the indoor unit is located at the highest point of the installation, the installation height is considered 0 m.

Calculating the pre-pressure of the expansion vessel

The pre-pressure(Pg) to be set depends on the maximum installation height difference(H) and is calculated as below:
Pg=(H/10+0.3) bar

Minumum Water volume

When using DHW tank, there are no other minimum water volume restrictions.

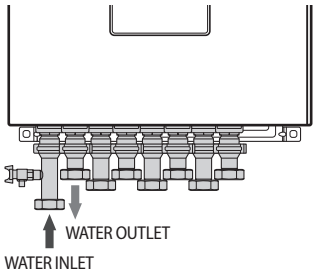
If DHW tank is not used, minimum water volume need to be checked.

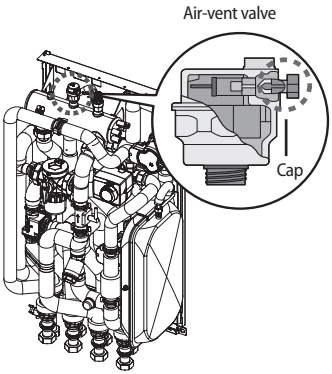
❋ Water volume = Water volume in the shortest water pipe (exclude water in the outdoor unit)

❋ If the valve is not installed, it is regarded as the amount of water in all pipes.

Model	Minimum water volume (L)
AE050(080)RXYD**	20
AE080BXYD** AE120(160)RXYD** AE050(080)CXYD**	35
AE120(140)BXYD** AE120(160)CXYD**	60

Charging water





After installation is completed the following procedures shall be used to charge water into the hydro unit.

- Connect water lines to water connections of hydro unit.
- The air-vent valve shall be opened at least 2 turns and drain valves shall be closed.
- Open the service valve in the water supply connection.
- Water pressure of supply line shall be over 2.0 bar for good charging work.
- Stop water supply when the pressure gauge of hydro unit indicates 2.0 bar.

CAUTION
- Service space should be secured.
- Water pipe and connections must be cleaned using water.
- If internal water pump capacity is not enough, install external water pump.
- Do not connect electric wire while water charging.
- When initial installation or re-installation required, open the cap to prevent air trap in the unit while charging water.
- The back-up heater vessel shall be full of water before heater is turned on. Confirm if the vessel is empty by opening the pressure relief valve of hydro unit. (OK if water is flowing out)
- It is recommended to install the make-up water assembly to feed small quantities of water to the system automatically, replacing the minor water losses and maintaining the system pressure. This assembly usually consists of a pressure-reducing valve, water filter, check-valve and shut-off valves. In this case, Check-valve must be installed to prevent from contaminating city water.

Air vent valve

Air-vent valve is provided in the Hydro unit.

However, provide air vents at all the highest points of the system, so that automatic release of air in the water circuit is possible.

Pressure relief valve

A pressure relief valve is integrated on heater vessel of hydro unit and shall work in abnormal condition for protecting the hydro unit.

CAUTION
- The pressure relief valve will operate releasing the pressure by flowing out some water through the drain hose.
- Make certain that the discharged water out of drain pan can not contact any electrical parts.

Overpressure bypass valve

Overpressure bypass valve should be installed if the minimum flow rate is not guaranteed in all conditions including defrost or backup heater operations.

Piping insulation

The complete water circuit, including all piping must be insulated to prevent condensation forming on the surface of the pipe and heat loss to external environment.

Pipe work

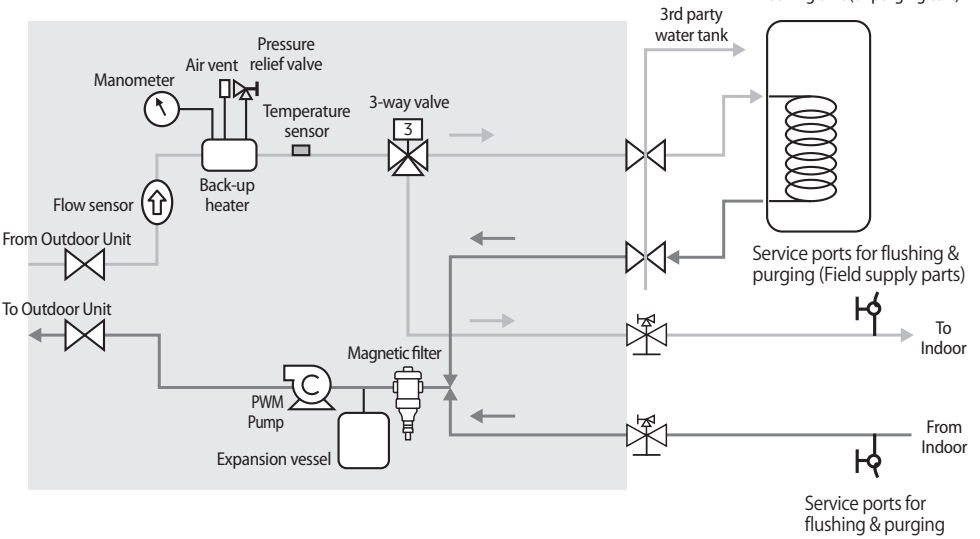
Flushing and air-purging

When filling water, the following start-up procedure should be followed.

1. All system components and pipes must be tested for the presence of leaks.
2. Make-up water assembly or Flushing unit is recommended for installation and service.
3. Before connecting pipes to the hydro unit, Flush water pipes clean to remove contaminants during 1 hours using a flushing unit or tap water pressure if it is adequate (at 2 to 3 bar)
4. Fill water into the hydro unit by opening service valves.
5. Purge the air. (Fill with a flushing unit with sufficient capacity: avoid aerating the water)
6. Circulate for long enough to ensure that all air has been bled from the complete water piping system.

After installations, Commissioning should be performed by qualified representatives. Unless flushing and air-purging works are performed adequately, It might result in malfunctions.

Flushing unit (or purging cart)



CAUTION

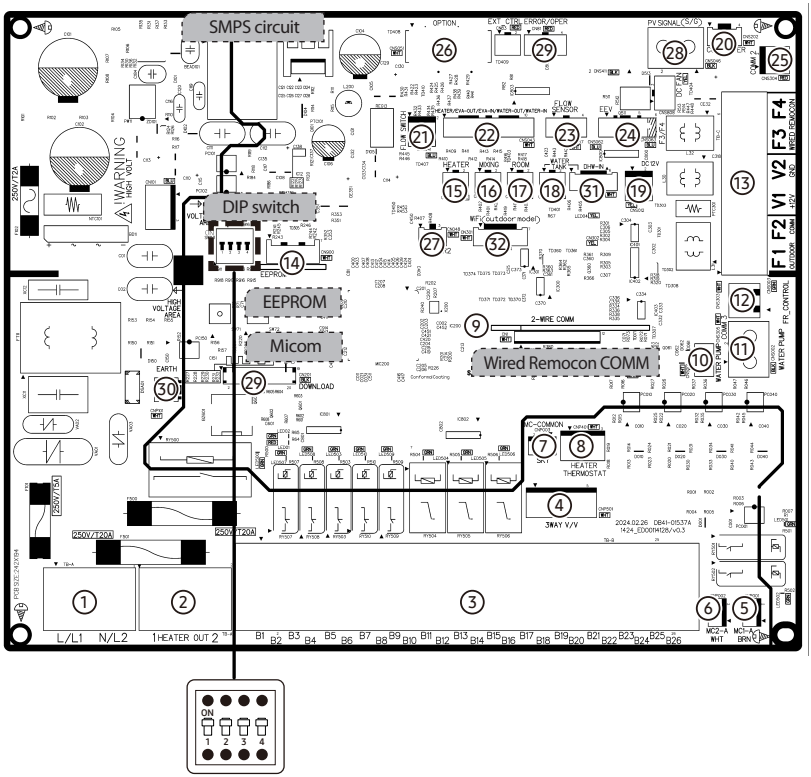
- Check and clean Magnetic Filter periodically using the filter opener (Note: Accessories)
- Replace Magnetic Filter when necessary
- Its recommended that you flush the system for 4 hours minimum once a year.
- Use chemical cleaning agents(Begin with acid , finish with alkali).
- Install Air vents on the top of the system
- Pressure of entering water(over 2.0 bar)

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



Wiring work

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(L)	AC OUTPUT
⑥	CNP002	MC2-A	#1: BACK UP HEATER FOR MHC-300FP MODEL(L)	AC OUTPUT
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

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

Wiring work

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

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
			#5: RESET	DC INPUT
			#6: GND	DIGITAL OUTPUT
			#7: DC 12V	DC OUTPUT

No.	Part code	Part name	Terminal	Terminal description

③ Detail

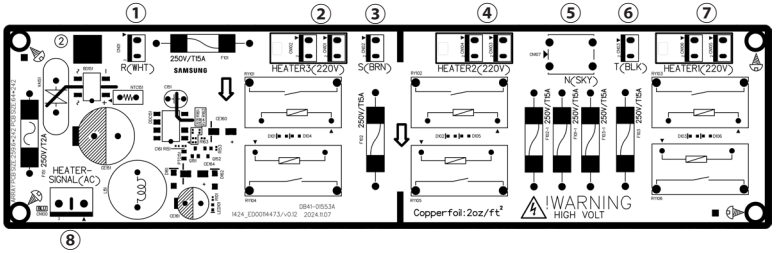
Terminal No.	Function	Description	Input /output	Hydro unit	
				2 Zone	Standard
B1/B6	Water Pump	B1: Neutral	AC 230V output	Default	
		B6: Water Pump(Live)			
B2/B3/B5	Mixing valve	B2: CW(Live)	AC 230V output	Default	50 mA
		B3: CCW(Live)			
		B5: Neutral			
B4/B5	Backup Boiler	B4: Boiler Signal(Live)	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	Default	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.

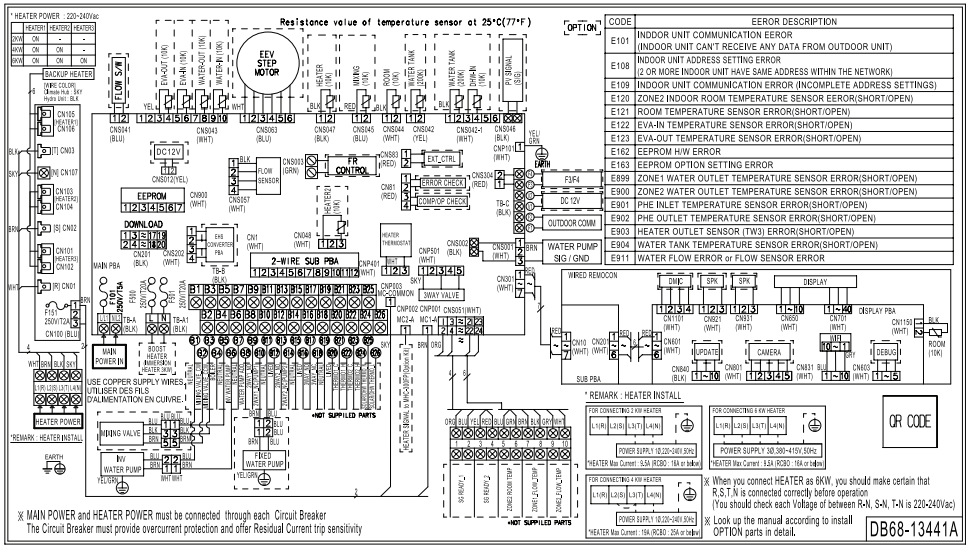
Wiring work

Layout of heater sub PCB



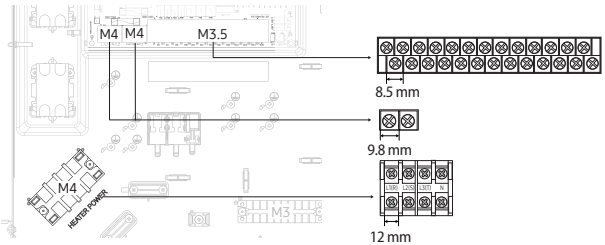
No.	Part code	Terminal	Terminal description
①	CN01	#1 : AC POWER(R)	AC INPUT
②	CN101	#1 : HEATER3(R)	AC OUTPUT (AC220~240V)
	CN102	#1 : HEATER3(N)	
③	CN02	#1 : AC POWER(S)	AC INPUT
④	CN103	#1 : HEATER2(S)	AC OUTPUT (AC220~240V)
	CN104	#1 : HEATER2(N)	
⑤	CN107	#1 : AC POWER(N)	AC INPUT
⑥	CN03	#1 : AC POWER(T)	AC INPUT
⑦	CN105	#1 : HEATER1(T)	AC OUTPUT (AC220~240V)
	CN106	#1 : HEATER1(N)	
⑧	CN100	#1 : HEATER ON/OFF SIGNAL(L)	AC INPUT
		#3 : HEATER ON/OFF SIGNAL(N)	

Wiring diagram



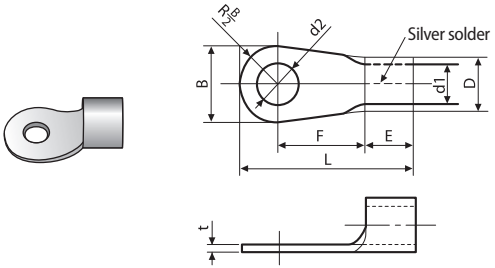
Connecting the power terminal

- 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.

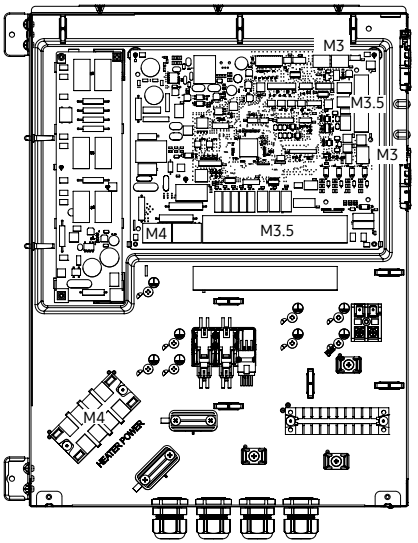


Nominal dimensions for cable (mm²)		1.5	2.5	4/6	
Nominal dimensions for screw (mm)		4	4	4	8
B	Standard dimension (mm)	8	9.5	9.5	12
	Allowance (mm)	±0.2	±0.2	±0.2	
D	Standard dimension (mm)	3.4	4.2	5.6	
	Allowance (mm)	+0.3 -0.2	+0.3 -0.2	+0.3 -0.2	
d1	Standard dimension (mm)	1.7	2.3	3.4	
	Allowance (mm)	±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	

Wiring work

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)
		C-BOX 4P Terminal Blcok	HEATER POWER	HEATER POWER INPUT AC 220V~240V(2 kW, 4 kW HEATER) or AC 380V~415V(6 kW HEATER)
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)

Types of allowable current

Conductors of supply wire shall have a nominal cross-sectional area not less than that shown in the table below.

Minimum cross-sectional area of conductors

Rated current of appliance (A)	Nominal cross-sectional area (mm2)
≤0.2	Tinsel cord [a)]
≤0.2 and ≤3	0.5 [a)]
>3 and ≤6	0.75
>6 and ≤10	1.0
>10 and ≤15	1.5
>15 and ≤21	2.5
>21 and ≤32	4

a) These wire may only be used if their length does not exceed 2m between the point where the wire or wire guard enters the appliance and the entry to the plug.

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 a heat pump.

► Ground the power cable according to the following.

<table>
<tr><th>Installation place
Power condition</th><th>High humidity</th><th>Average humidity</th><th>Low humidity</th></tr>
<tr><td>Electrical potential of lower than 150V</td><td rowspan="2"></td><td>Perform the grounding work 3. [Note 1)]</td><td>Perform the grounding work 3 if possible for your safety. [Note 1)]</td></tr>
<tr><td>Electrical potential of higher than 150V</td><td colspan="2">Must perform the grounding work 3. [Note 1)]
(In case of installing circuit breaker)</td></tr>
</table>

❋ **Note 1) Grounding work 3**

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

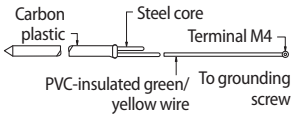
When installing a circuit breaker that can cut the electric circuit in case of a short circuit, the allowable grounding resistance can be 30~500 Ω.

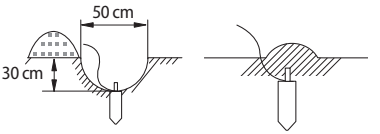
Wiring work

Checking correct grounding

If the power distribution circuit does not have a grounding or the grounding does not comply with specifications, an grounding electrode must be installed. The corresponding accessories are not supplied with the Air to Water Heat pump.

1. Select an grounding electrode that complies with the specifications given in the illustration.





2. Connect the flexible hose to the flexible hose port.

► In damp hard soil rather than loose sandy or gravel soil that has a higher grounding resistance.

► Away from underground structures or facilities, such as gas pipes, water pipes, telephone lines and underground cables.

► At least two metres away from a lightening conductor grounding electrode and its cable.

NOTE

• The grounding wire for the telephone line cannot be used to ground the Air to Water Heat pump.

3. Finish wrapping insulating tape around the rest of the pipes leading to the outdoor unit.
4. Install a green/yellow coloured grounding wire :

► If the grounding wire is too short, connect an extension lead, in a mechanical way and wrapping it with insulating tape (do not bury the connection).

► Secure the grounding wire in position with staples.

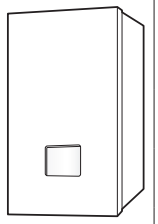
NOTE

• If the grounding electrode is installed in an area of heavy traffic, its wire must be connected securely.

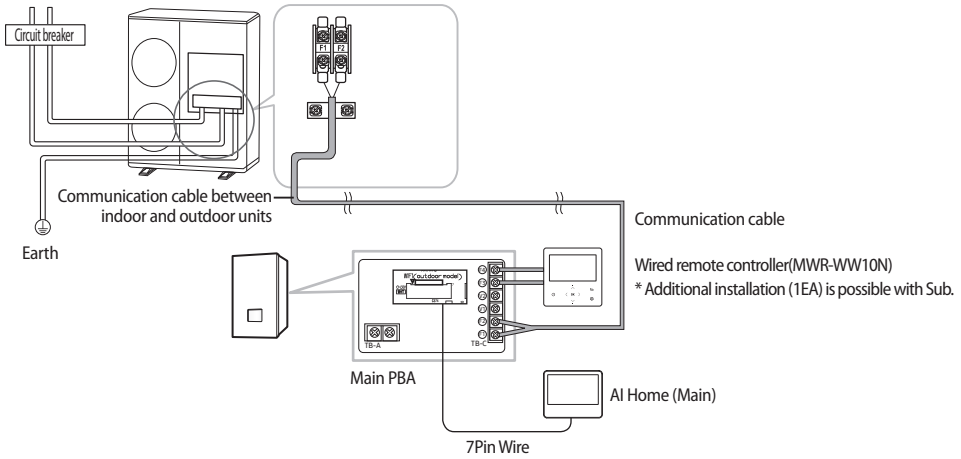
5. Carefully check the installation, by measuring the grounding resistance with a ground resistance tester. If the resistance is above required level, drive the electrode deeper into the ground or increase the number of grounding electrodes.
6. Connect the grounding wire to the electrical component box inside of the outdoor unit.

Connection of the power supply and communication cable

Model	Description		No. of Wires	Max. A	Thickness	Supply Scope
AE160DN****	Main Power (1 Phase)	In case of not connecting a booster heater	2 + ground	5 A	1.5mm² ↑ H05RN-F or H07RN-F	Field Supply (220-240Vac, Input)
		In case of connecting a booster heater	2+ ground	18.7 A	4.0mm² ↑ H05RN-F or H07RN-F	Field Supply (220-240Vac, Input)
	Heater Power	3 Phase Heater (6 kW)	4 + ground	9.5 A	2.5mm² ↑ H05RN-F or H07RN-F	Field Supply (380-415Vac, Input)
		1 Phase Heater (4 kW)	2 + ground	19 A	4.0mm² ↑ H05RN-F or H07RN-F	Field Supply (220-240Vac, Input)
		1 Phase Heater (2 kW)	2+ ground	9.5 A	2.5mm² ↑ H05RN-F or H07RN-F	Field Supply (220-240Vac, Input)
	Communication		2	0.1 A	0.75mm² ↑ H05RN-F or H07RN-F	Field Supply (~Vdc, Data)



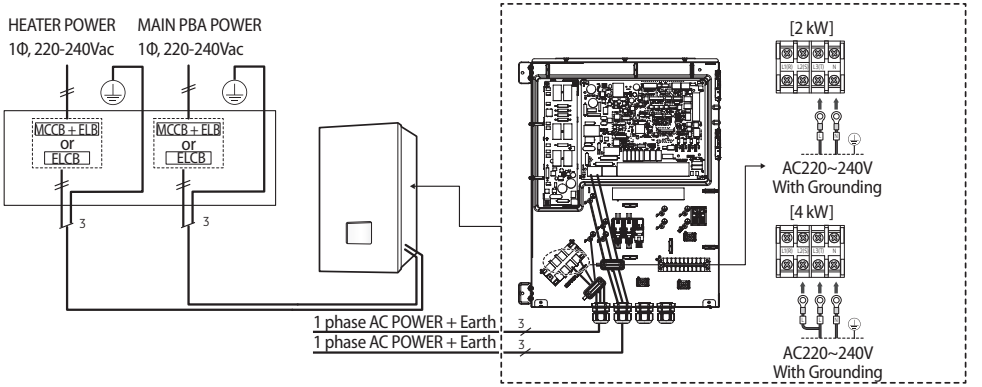
Communication cable connection



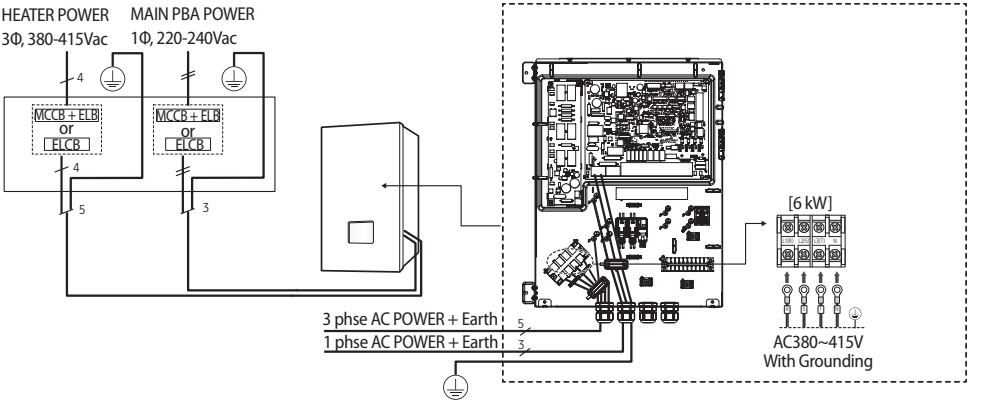
Wiring work

CAUTION
- Main and heater power must be configured through each ELCB or MCCB + ELB.
- Backup heater should use the right power according to the power of the outdoor unit.

1. 1 phase product



2. 3 phase product



CAUTION
- **Circuit Breaker (ELCB or MCCB + ELB) for outdoor and indoor units shall be installed by installers because they are not sub-parts in the units.**
- If the supply cable is damaged, it must be replaced by a special cable or assembly available from the manufacturer or installer.
- The improper connection of the main and heater may result in damage to the chassis, PCB, and heater.
- When connecting the 3 phases for a 6 kW heater, be sure that the R, S, T, N terminals of the heater are properly connected before turning on the unit.
- Please check that the voltage between R-N, S-N, and T-N on the heater power terminal block is within the range of 220 to 240Vac.

❋ ELCB : Earth leakage circuit breaker
ELB : Earth leakage breaker
MCCB : Molded case circuit breaker

Connection of the backup heater power supply

CAUTION

- Do not use a power supply shared by other appliances. Each components for outdoor unit, indoor unit, backup heater and booster heater has the dedicated power supply.

Model	Outdoor unit Power (Φ, #, V, Hz)	Backup Heater Capacity (kW)	Max Current	1 Phase RCBO (A)	3 Phase ELCB (A)
AE160DN****	1,2,220-240,50	2	Max 9.5 A	16 A or below	N/A
		4	Max 19 A	25 A or below	N/A
	3,4,380-415,50	6	Max 9.5 A	N/A	16 A or below

The FSV #3081 setting value must be changed according to the heater capacity

2kW: 2(default)

4, 6kW: Need to change to 4 or 6 depending on the heater capacity

NOTE

- The power consumption of backup heater is calculated according to the heater signal, so an error may occur with the actual usage.

Installation options and wiring work

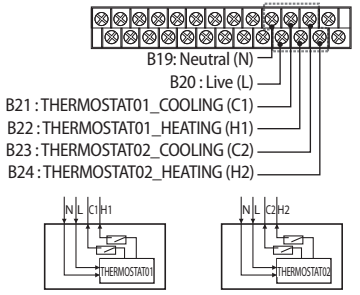
Connection of the thermostat

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, hydro unit 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;

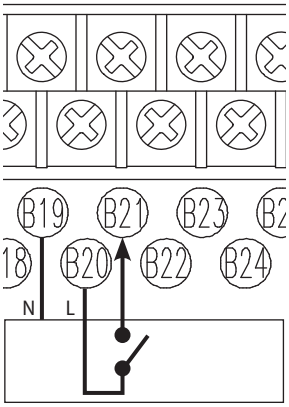
- ▶ For heating operation, please install Thermostat 01 to a room that requires lower water temperature (ex,underfloor heating) and Thermostat 02 to a room that requires higher water temperature (ex,radiators).
- ▶ For cooling operation, please install Thermostat 02 to a room that requires lower water 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 46] and "Connection of the mixing valve" [Page 49]

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.

NOTE
- The supply line for Zone 1 of the hydro unit is designed to be used for floor heating/cooling. Therefore, if the Zone 1 is connected to a radiator, insufficient cooling can be made because the 2-way valve of Zone 1 is closed when the room water temperature is below 16 °C as described above.

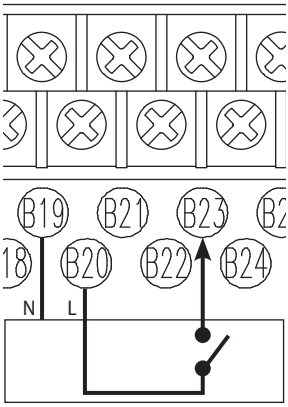
Example

Thermostat01 only : cooling mode



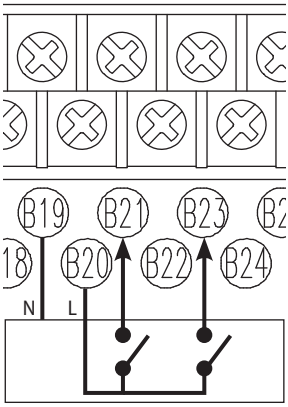
Room thermostat

Thermostat02 only : cooling mode



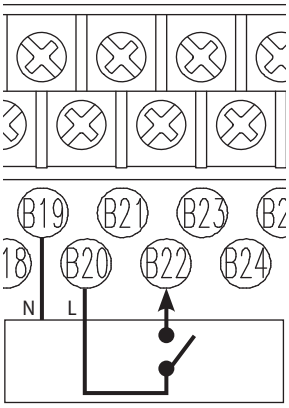
Room thermostat

Thermostat01, Thermostat02 : cooling mode



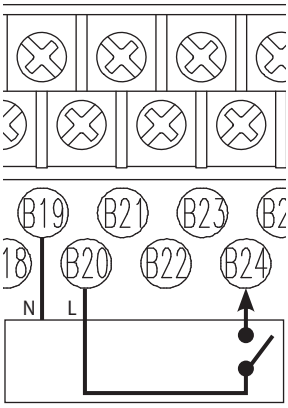
Room thermostat

Thermostat01 only : heating mode



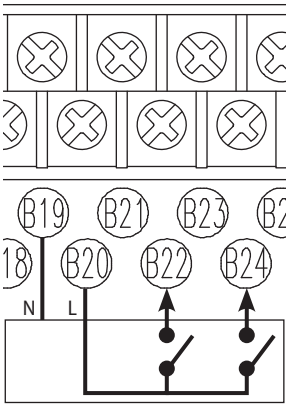
Room thermostat

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

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)

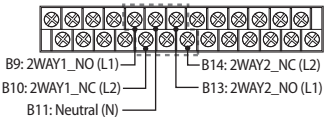
CAUTION

- 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.

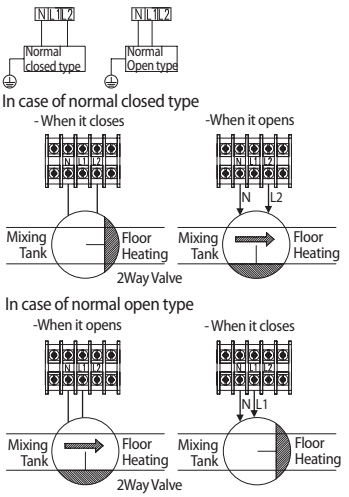
NOTE

- The supply line for Zone 1 of the hydro unit is designed to be used for floor heating/cooling. Therefore, if the Zone 1 is connected to a radiator, insufficient cooling can be made because the 2-way valve of Zone 1 is closed when the room water temperature is below 16 °C as described above.

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



* Connection of 2 wires 2-way valve



2-way motorized valve

► 220 ~ 240 Vac

► 2 wires(Normal Open or Normal Close)

1. Before the installation, hydro unit 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.

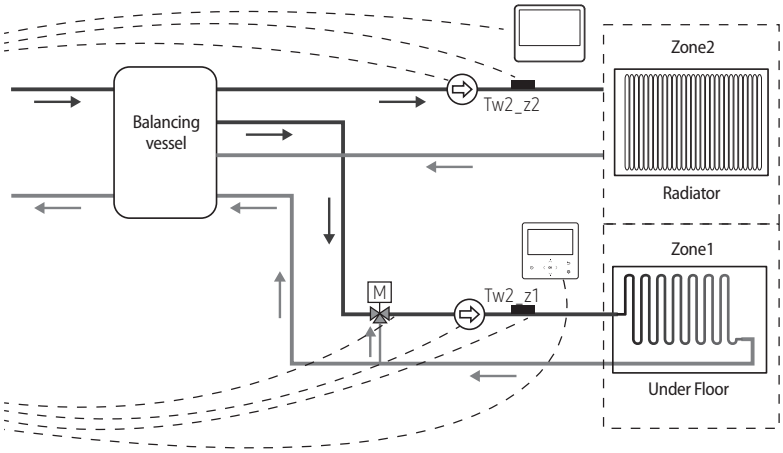
CAUTION

- 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 water pump for 2 Zone control (FSV 4061=1)

When setting up 2 Zone control;

- For heating operations, please conncect the Zone1 supply line to a room that requires a lower water temperature (ex,underfloor heating) and the Zone2 supply line to a room that requires a higher water temperature (ex,radiators).
- For cooling operations, please conncect the Zone2 supply line to a room that requires a lower water temperature (ex,radiators) and the Zone1 supply line to a room that requires a higher water temperature (ex,underfloor cooling).
- In order to properly control the 2 Zone with different temperature settings, it is necessary to connect the mixing valve and the Zone1 and Zone2 temp. sensors[Optional parts].
- Please find additional installation information refer "Connection of the mixing valve" [Page 49]
- Zone1 water pump connection: B10(L1) + B11(N)
- Zone2 water pump connection: B14(L1) + B15(N)



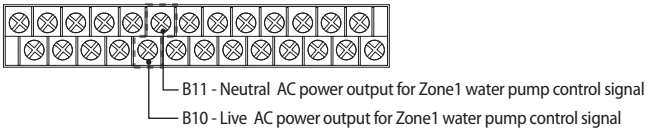
CAUTION
- When using Zone1 in cooling mode, to prevent floor condensation, if the zone1 water temperature is below 16 °C, the pump of zone 1 is automatically turned off.

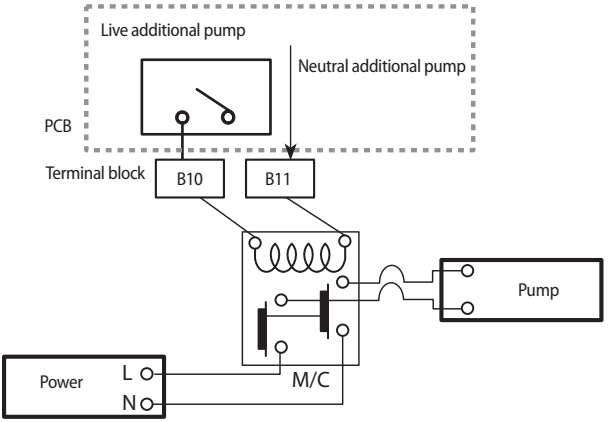
NOTE
- The supply line for Zone 1 of the hydro unit is designed to be used for floor heating/cooling. Therefore, if the Zone 1 is connected to a radiator, insufficient cooling can be made because the 2-way valve of Zone 1 is closed when the room water temperature is below 16 °C as described above.

NOTE
- AE160DNZ*** (2zone built-in type) is designed to supply water at 2 different temperatures. Therefore, it is not necessary to connect or configure the Zone1 and Zone2 water pumps.

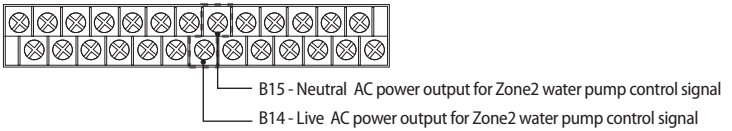
CAUTION
- There are 2 types of 2-way valve, normal open type and normal closed type. Make sure to connect terminals to right positions of terminal block. As detailed on the wiring diagram and illustrations above.
- To use the zone control (FSV #4061=1), set the thermostat control option (FSV #2091 & #2092) to "0" for disabling it.

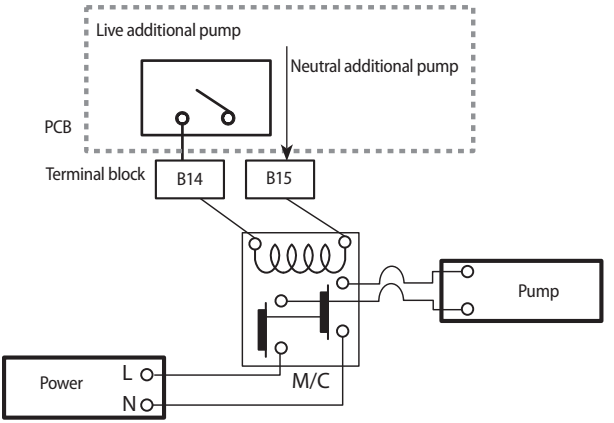
Installation options and wiring work





CAUTION
- The maximum allowable current that this terminal block can supply for the additional water pump is 50mA.
- When using external power of 50 mA or more, make sure to connect using relay and separate power source.





CAUTION
- The maximum allowable current that this terminal block can supply for the additional water pump is 50mA.
- When using external power of 50 mA or more, make sure to connect using relay and separate power source.

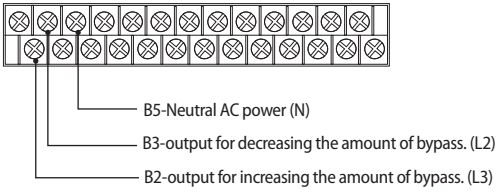
Connection of the mixing valve

NOTE
- In order to install mixing valve for standard model(AE160DNYMPK), please purchase 2 Zone Thermistor Kit (MOS-T1).

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 water that is mixed with the supply water to provide water at a pre-set temperature.

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.



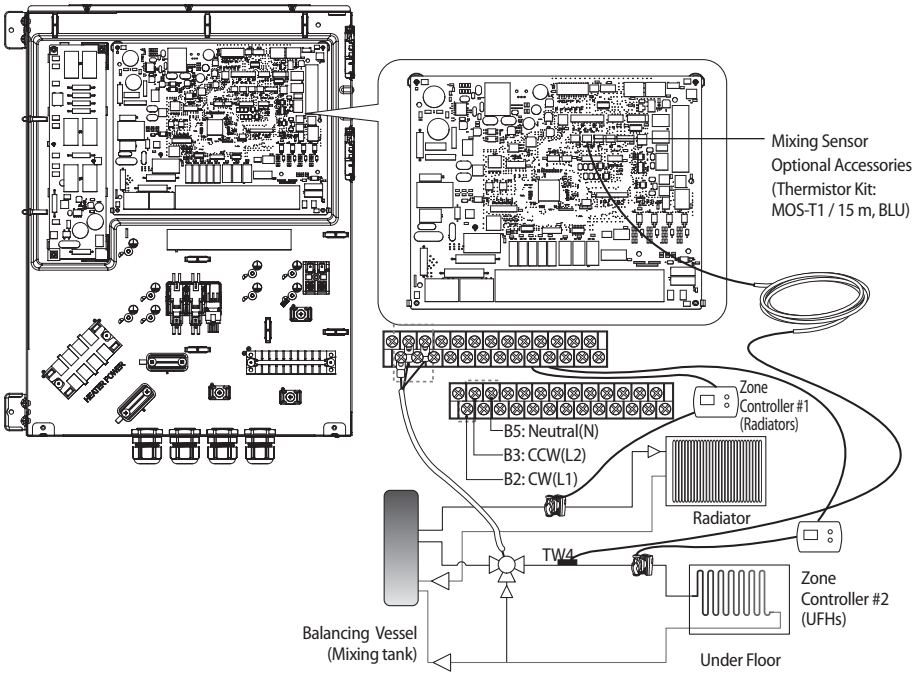
B2- output for increasing the amount of bypass : The amount of return water that is mixed with supply water through mixing valve is increased.

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

NOTE
- AE160DNZ*** (2zone built-in type) is designed to supply water at 2 different temperatures. Therefore, it is not necessary to connect or configure the Mixing Valve.

Installation options and wiring work

2 Zone with Two thermostat control

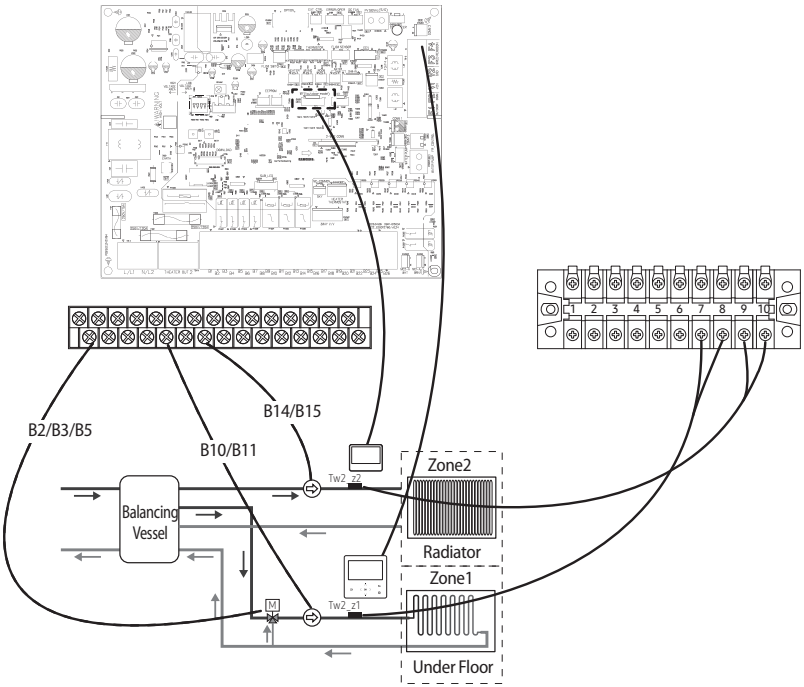


1. Before the installation, hydro unit should be turned off.
2. Using the appropriate equipment to correct position on the terminal block as shown on the diagram.
3. Install the supplied Mixing temperature sensor (TW4) on the mixed water side within 1 m from the Mixing Valve, as shown in the figure above.
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.

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.)

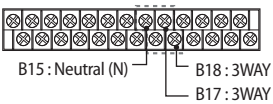
Select a mixing valve from the manufacturers as below (recommended)

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

Installation options and wiring work

Connection of the 3-way valve

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



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

3-way diverting valve for water tank

- ► When cooling operating mode, floor heating loops will be closed.
- ► 220 ~ 240 Vac

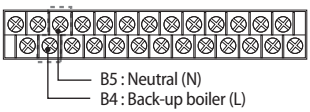
1. Before the installation, hydro unit should be turned off.
2. Using the appropriate equipment to correct position of terminal block as shown on the diagram.
3. Make sure what type of 3 way V/V you use.

Field Setting Valve (#3071) "0" Floor heating as default	Field Setting Valve (#3071) "1" DHW tank as default
A FLOOR HEATING HYDRO UNIT 3WAY V/V DHW TANK	A FLOOR HEATING HYDRO UNIT 3WAY V/V DHW TANK
B FLOOR HEATING HYDRO UNIT 3WAY V/V DHW TANK	B FLOOR HEATING HYDRO UNIT 3WAY V/V DHW TANK

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 hydro unit (relay off)

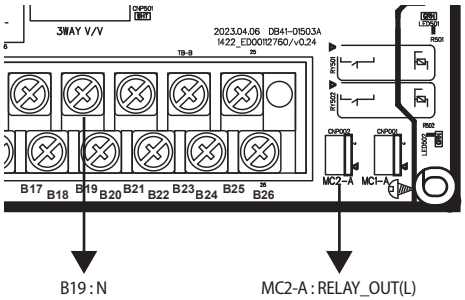
When it order to back up boiler operates (relay on)

1. Before the installation, hydro unit 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 external back-up heater

Description	No. of wires	Max. current	Thickness	Supply Scope
Back-up Heater	2	0.3 A	0.75mm² H05RN-F or H07RN-F	Field supply(220~240Vac, Output)



B19 : N

MC2-A : RELAY_OUT(L)

- ▶ If you need an additional heater, it can be installed as an option.

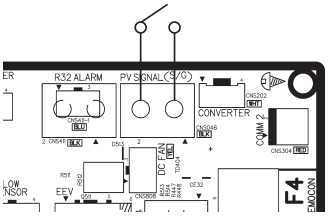
NOTE
- AE160DNZ*** (2 Zone built-in type) is strictly prohibited from installing external back-up heaters.
- An additional back-up heater for AE160DNY*** should be installed on the Zone piping line.

WARNING
- 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)
- For the external Back-up heater connection, Only Samsung Heater kit(MHC-300FP) is compatible.

Installation options and wiring work

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)

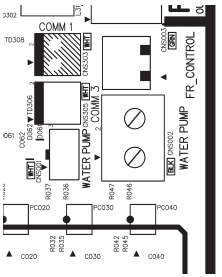
- ▶ This is for energy saving by using the solar energy.
- ▶ To control PV, configure FSV #5081~ #5083. Please refer to the controller manual for this setting.
- ▶ Cooling/heating operation: Enables the FSV value that is set only when the PV signal is in out mode.
  Hot water operation: Activate immediately 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 activated only for the outing mode.

Connection of the FR Control(Frequency ratio control)

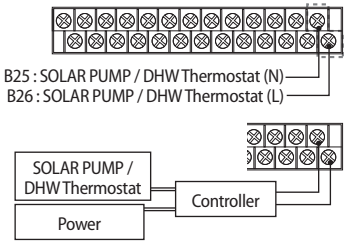
Description	No. of wires	Max. current	Thickness	Supply Scope
FR Control	2	-	-	Field supply



- ▶ The FR control function application is to limit the maximum frequency of the outdoor unit compressor. (if FSV #5051 = 1 "use")
- ▶ Method 1 : External DC signal Control uses a DC voltage of 0 ~ 10V (0v = 50%, ~ 10v = 150%)
- ▶ Method 2 : Demand ratio (DR) control through Modbus communication

Connection of 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, Output)



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, Hydro unit 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

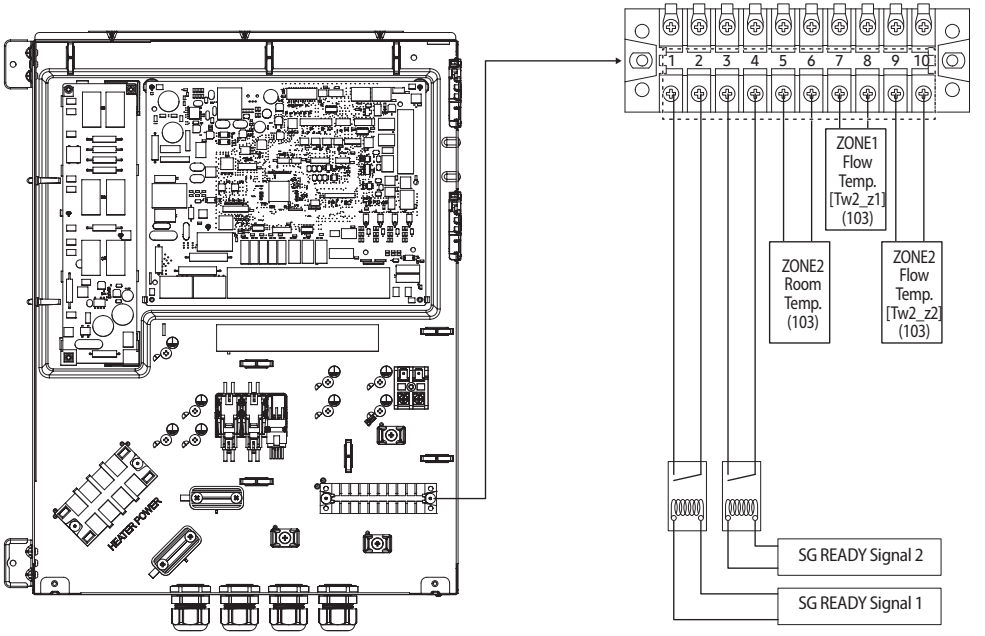
► if DHW thermostat is used, FSV#3061 should be set to 2

NOTE

- Solar pump and DHW thermostat cannot be used simultaneously

Installation options and wiring work

Connecting for smart grid ready control



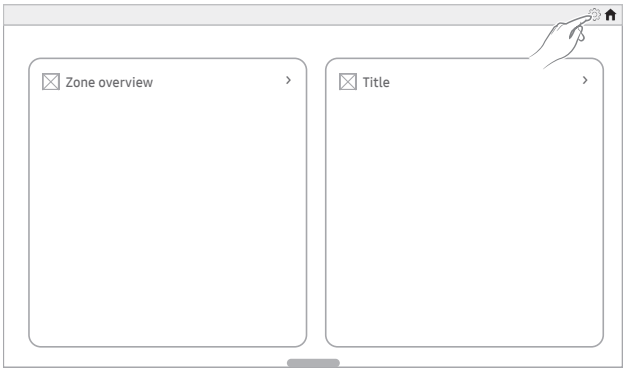
SG READY Signal 1	SG READY Signal 2	Product operation
Short	Open	Forced thermo off operation
Open	Open	Normal operation
Open	Short	Heating / DHW setting temperature 1step-up operation
Short	Short	Heating / DHW setting temperature 2step-up operation

CAUTION

- These parts are optional and not included with the product.
- Maker sure to connect to non-power on/off contacts.

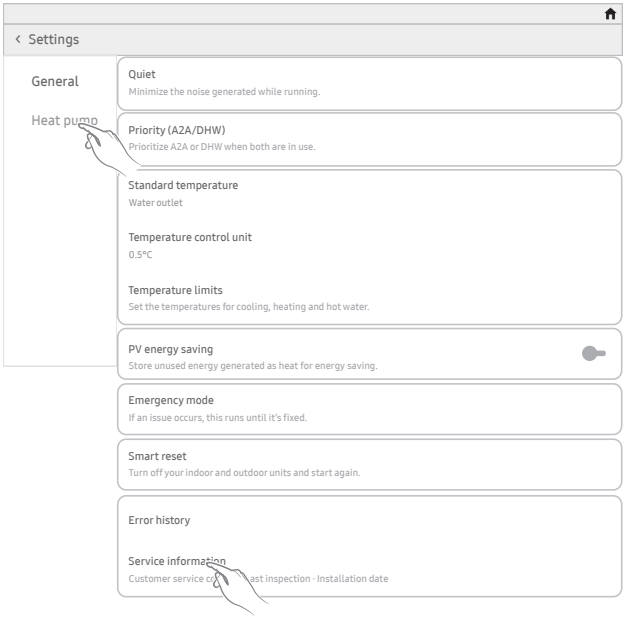
Self-test mode of AI Home

Use of self-test mode



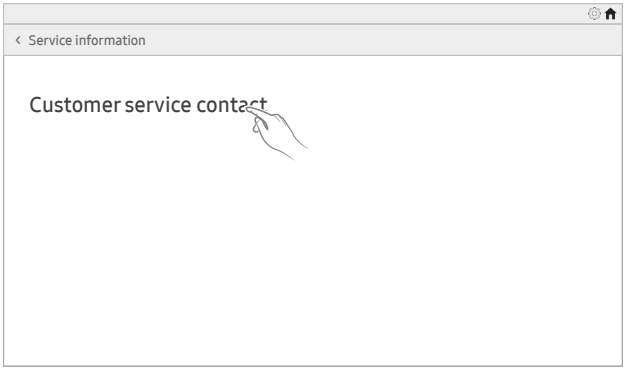
1. if you want to use the various additional functions for your AI Home, press .

► The setting screen appears.



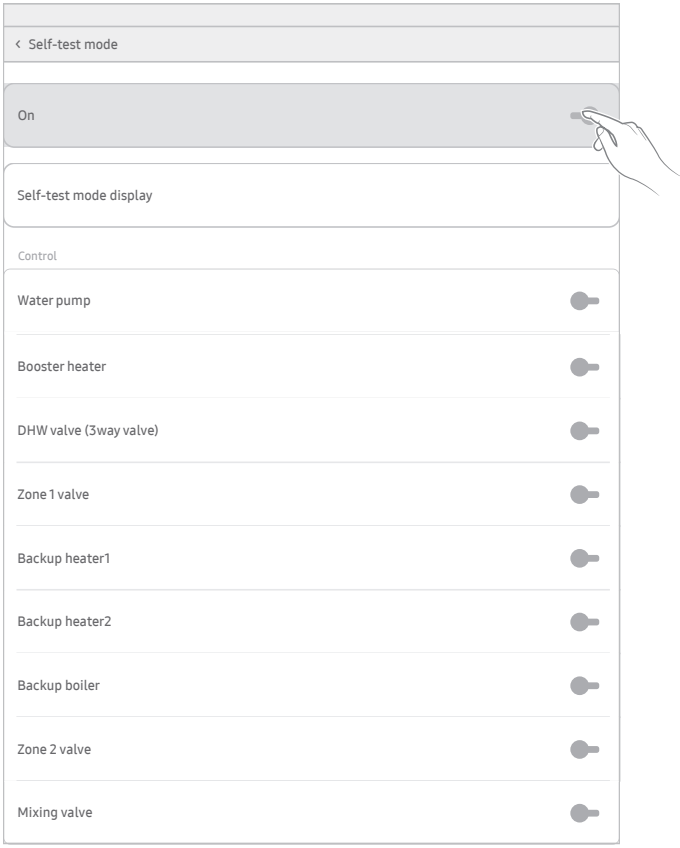
2. Press the "Heat pump" and you can see the service information at the end of screen.
3. Press the Service mode.

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".

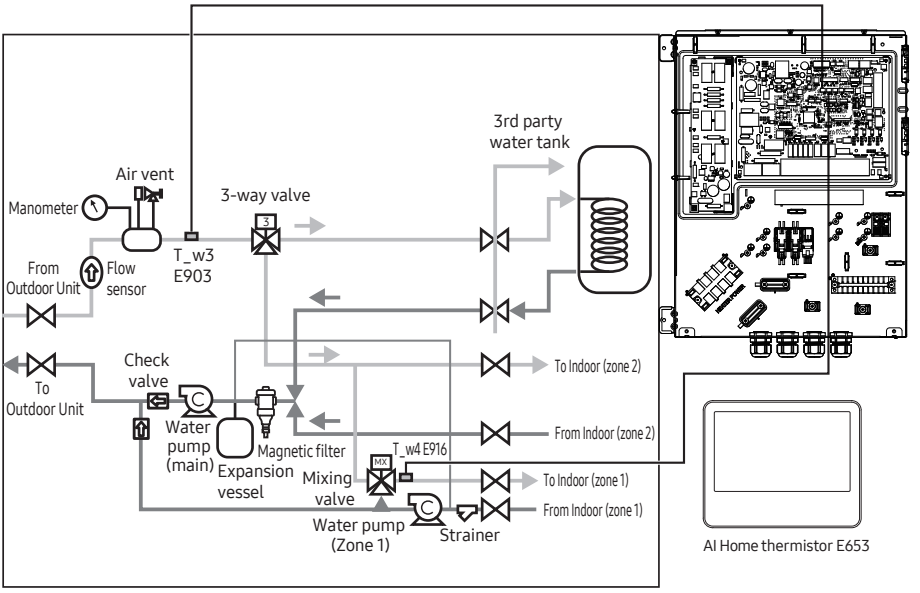
Troubleshooting

If the unit has some problem to work properly, the LED on hydro unit will flash and 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 (Hydro unit), 200kohm@25 °C (DHW Tank)
- Check its location as shown at the diagram.
- Check its contact status with pipe.
- Final solution is to change parts

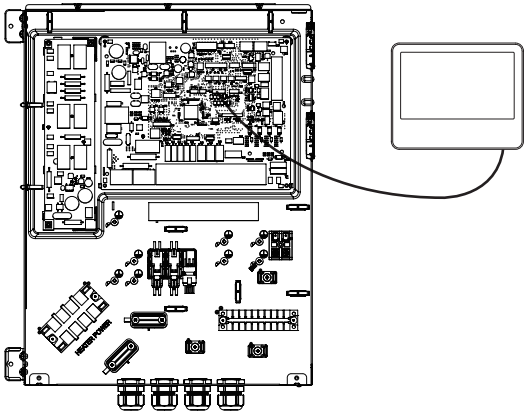
Display	Explanation
120	Short- or open-circuit error of the room temperature sensor of the Zone 2 indoor unit (detected only when the room thermostat is used)
121	Short- or open-circuit error of the room temperature sensor of the Zone 1 indoor unit (detected only when the room thermostat is used)
653	AI Home 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 thermistor SHORT or OPEN
904	Water TANK thermistor SHORT or OPEN
916	Mixing Valve thermistor SHORT or OPEN



Communication

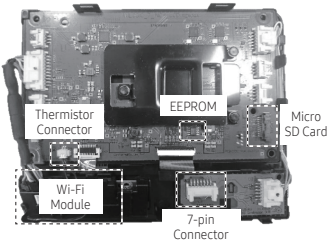
Display	Explanation
105	Wi-Fi communication error
601	Communication error between remote controller and the Hydro unit
604	Tracking error between remote controller and the Hydro unit
654	Memory(EEPROM) Read/Write Error(Wired remote controller data error)
670	Controller combination error

E601, E604



E654

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



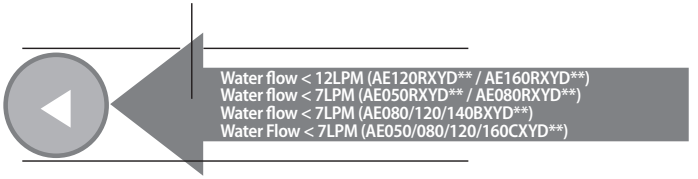
Troubleshooting

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



NOTE

• The AE160DNZ*** (2 zone built-in type) model has 2 pumps built-in. It is necessary to check which pump among the main INV pump and the Fixed pump causes the error. Use the controller's 'Self Test Mode' to check the operation status of each pump.

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

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.
- Install the outdoor unit correctly according to the installation manual.
  - An incorrect installation may cause a water leakage, electric shock or fire and so on.
- 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.
- Fix the outdoor unit securely on it's foundation or it might fall over by strong wind or an earthquake.
  - If the outdoor unit is not properly fixed, it turns over and accidents may occur.
- 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.

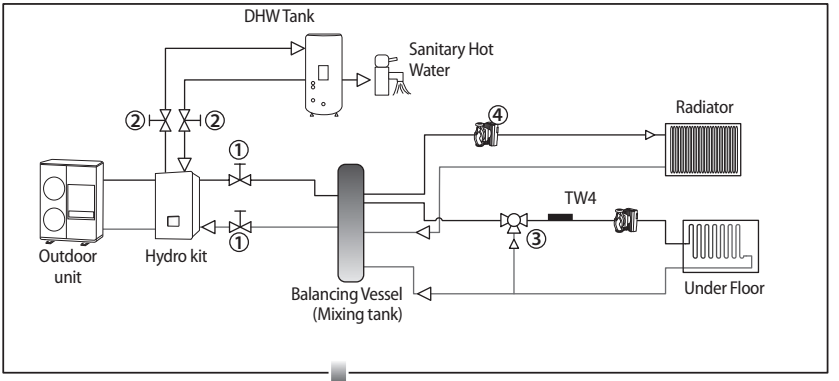
CAUTION • DHW Tank shall be located and installed indoors (garage, utility room, boiler room).

DHW tank

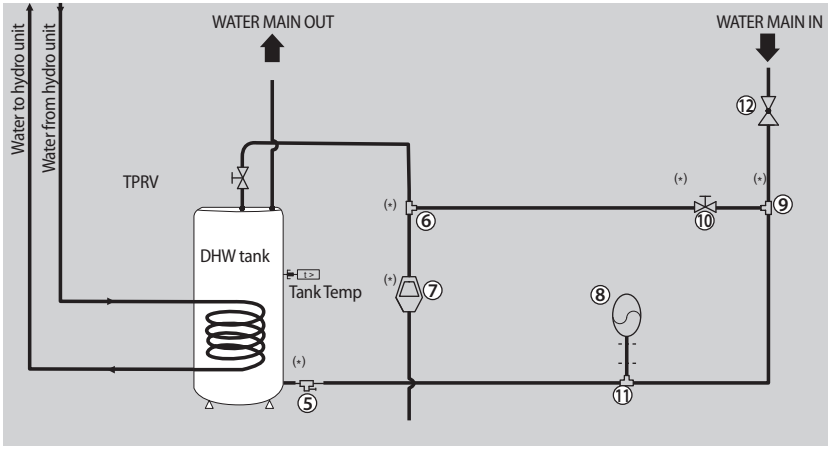
Piping diagram

CAUTION
- The product must be installed without any water leakage.
- Please verify that the DHW tank and other components are properly installed and reinstall them if necessary.
  - Use certified components and the correct tools.
  - Make sure there is sufficient installation space.

OVERVIEW



Sanitary warm water Tank Diagram(Field Scope)



No.	Note	No.	Note
①	Service valve (Zone)	⑧	Expansion vessel
②	Service valve (Tank)	⑨	T-Joint
③	Mixing Valve	⑩	Expansion relief Valve
④	Ciculation Pump	⑪	T-Joint
⑤	Drain Valve	⑫	Pressure reducing valve with integrated check valve and strainer
⑥	T-Joint	TW4	Temperature Sensor for Mixing Valve
⑦	Tundish	Tank Temp	Temperature sensor for DHW tank

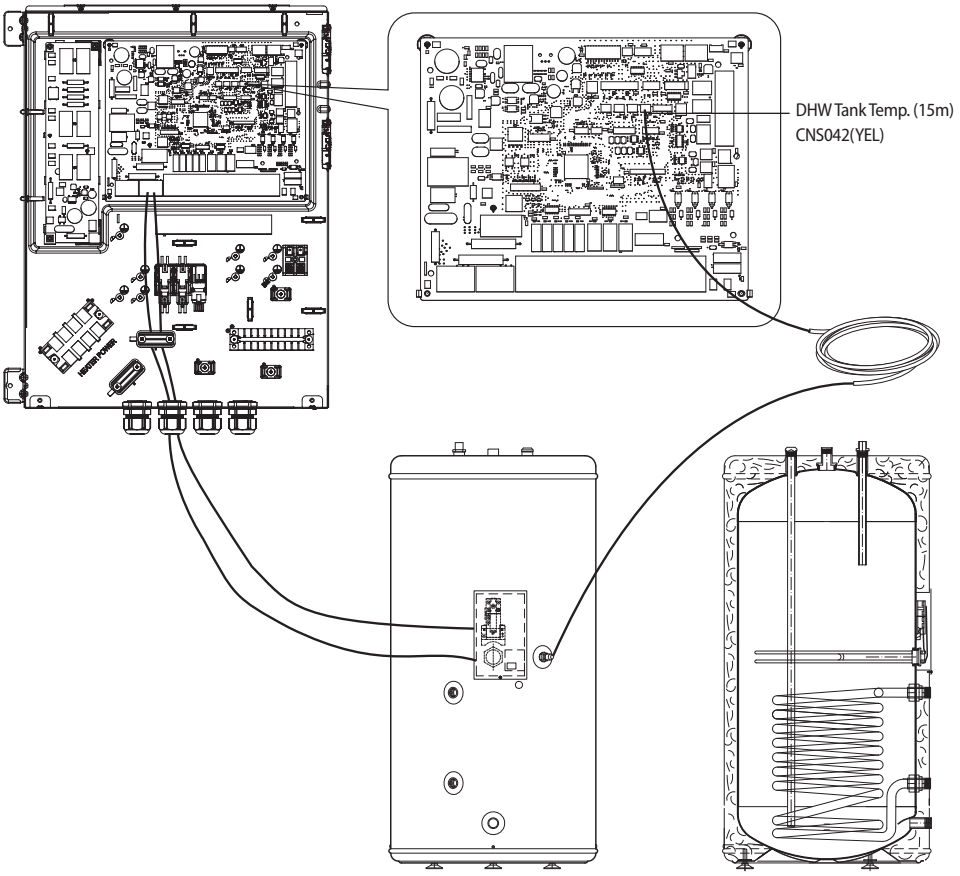
✻ The table above contains the different components of the functional diagrams.

System configuration

- ▶ For the reliable performance and durability, all parts as listed below ,including a relief valve, an expansion vessel, a drain valve and pressure reducing valve, should be installed according to each national or regional standards. They are not supplied by SAMSUNG.
  - Pressure relief valve
  - Expansion vessel
  - Drain valve
  - Tundish
  - Expansion relief valve
  - Pressure reducing valve
- ▶ Screw the thermistor socket in the threaded thermistor hole in the tank, use a thread sealant such as Teflon or similar to make water tight.
- ▶ Apply contact glue to the thermistor and insert the thermistor as deep as possible in the thermistor socket. Fix using the nut provided.

DHW tank

Switch box layout



✻ 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°C 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.

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

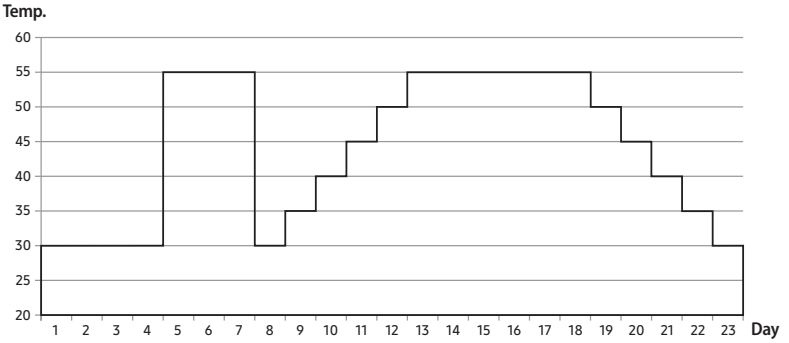
- Before resetting the safety cut-off or altering the thermostat setting, always remember to isolate the electrical supply to the unit. This must be done prior to removing the electrical box lid.
- If the electric element or thermostat is defective, contact authorized electrician.
- After adjustments 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)

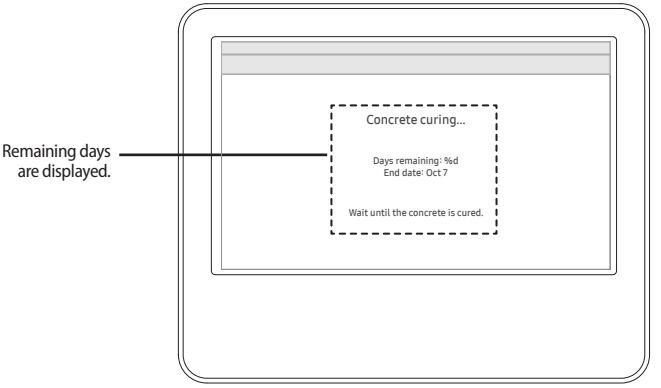
Entering procedure

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 communication 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.

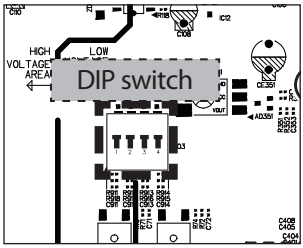


✻ If an error is displayed, concrete curing function does not work.

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.

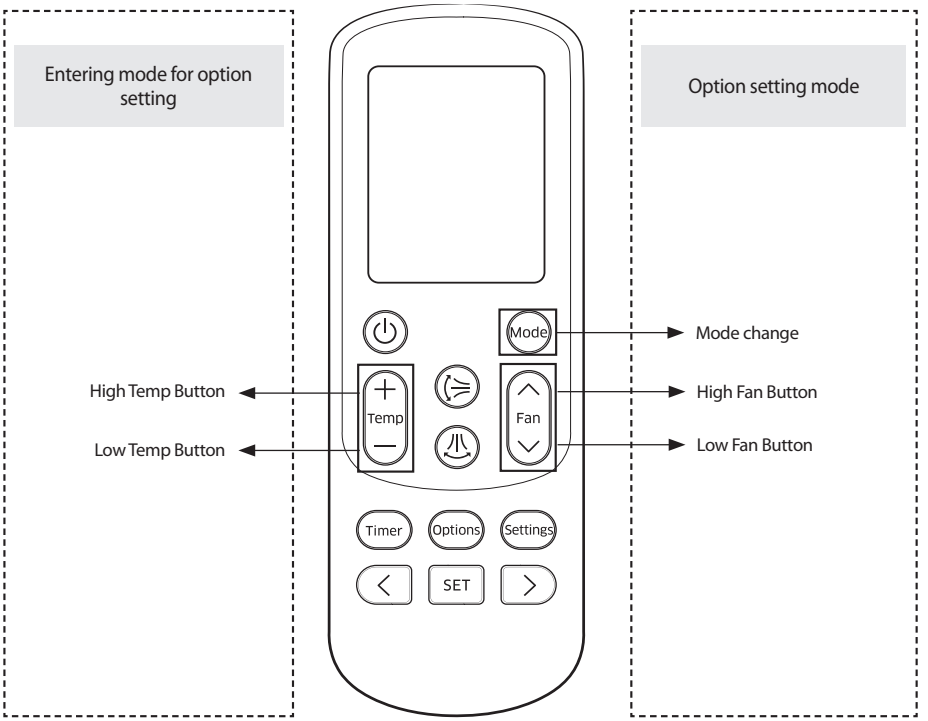
Classification		When the outdoor unit is power off	When the outdoor unit is power on
Hydro Unit operation according to the DIP S/W #4 setting	ON (default)	• Hydro Unit E101 error occurs.	• Hydro Unit E101 error disappears. • Hydro Unit operation turns off.
	OFF	• Hydro Unit E101 error occurs.	• Hydro Unit E101 error disappears. • Hydro Unit 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 indoor unit installation option with remote controller option.

The procedure of option setting



Entering mode to set option

1. Remove batteries from the remote controller.

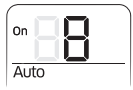
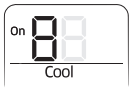
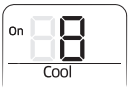
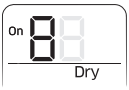
2. Insert batteries and enter the option setting mode while pressing High Temp button and Low Temp button. 

3. 

Check if you have entered the option setting status.

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 Productin Option(Factory default)

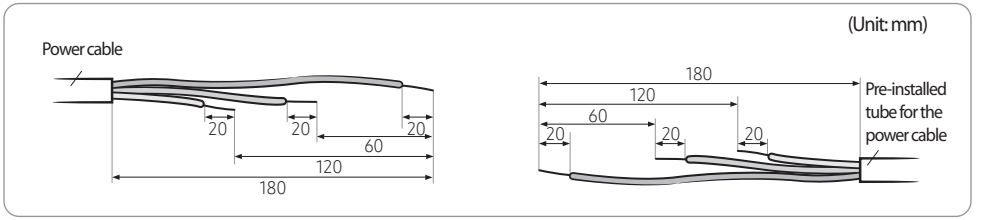
Model	SEG1~24
AE160DNZMPK/EU(2 Zone)	012300-100000-200000-300100
AE160DNYMPK/EU(Standard)	012300-100000-200000-300000

Optional : Extending the power cable

1. Prepare the following tools.

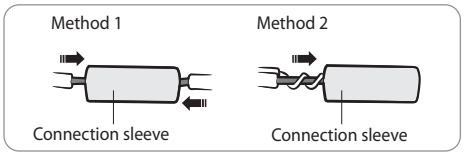
Tools	Spec	Shape
Crimping pliers	MH-14	
Connection sleeve (mm)	20xØ6.5 (HxOD)	
Insulation tape	Width 19 mm	
Contraction tube (mm)	70xØ8.0 (LxOD)	

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.



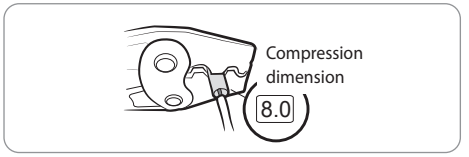
CAUTION
- For information about the power cable specifications for indoor and outdoor units, refer to the installation manual.
- After peeling off cable wires from the pre-installed tube, insert a contraction tube.

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.
   - Method 2: Twist the wire cores together and push it into the sleeve.

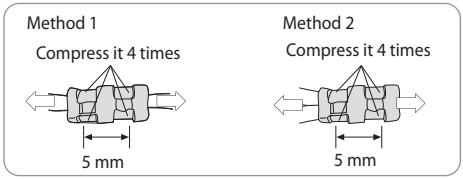


CAUTION
- If cable wires are connected without using connecting sleeves, their contact area becomes reduced, or corrosion develops on the outer surfaces of the wires (copper wires) over a long time. This may cause an increase of resistance (reduction of passing current) and consequently may result in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

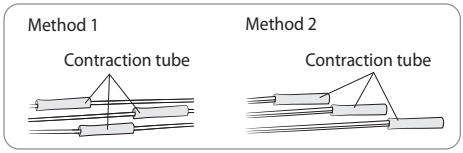
4. Using a crimping tool, compress the two points and flip it over and compress another two points in the same location.
   - The compression dimension should be 8.0 mm².



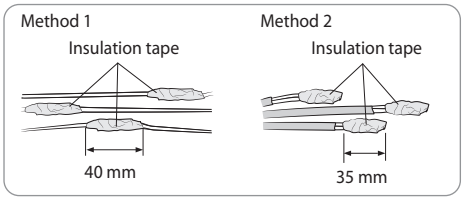
- After compressing it, pull both sides of the wire to make sure it is firmly pressed.



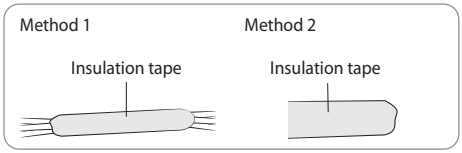
5. Apply heat to the contraction tube to contract it.



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



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

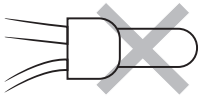


CAUTION

- 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.



Reference (KEYMARK Certification)

Model code Outdoor	Model code Indoor	Registration number	Accessory* Mono Control Kit
AE050RXYDEG/EU	AE160DNZMPK/EU	011-1W0802	
AE050RXYDEG/EU	AE160DNYMPK/EU		
AE080RXYDEG/EU	AE160DNZMPK/EU	011-1W0803	
AE080RXYDEG/EU	AE160DNYMPK/EU		
AE080RXYDGG/EU	AE160DNZMPK/EU		
AE080RXYDGG/EU	AE160DNYMPK/EU		
AE120RXYDEG/EU	AE160DNZMPK/EU	011-1W0804	
AE120RXYDEG/EU	AE160DNYMPK/EU		
AE160RXYDEG/EU	AE160DNZMPK/EU		
AE160RXYDEG/EU	AE160DNYMPK/EU		
AE120RXYDGG/EU	AE160DNZMPK/EU		
AE120RXYDGG/EU	AE160DNYMPK/EU		
AE160RXYDGG/EU	AE160DNZMPK/EU		
AE160RXYDGG/EU	AE160DNYMPK/EU		
AE080BXYDEG/EU	AE160DNZMPK/EU	011-1W0805	
AE080BXYDEG/EU	AE160DNYMPK/EU		
AE080BXYDGG/EU	AE160DNZMPK/EU		
AE080BXYDGG/EU	AE160DNYMPK/EU		
AE120BXYDEG/EU	AE160DNZMPK/EU	011-1W0806	
AE120BXYDEG/EU	AE160DNYMPK/EU		
AE140BXYDEG/EU	AE160DNZMPK/EU		
AE140BXYDEG/EU	AE160DNYMPK/EU		
AE120BXYDGG/EU	AE160DNZMPK/EU		
AE120BXYDGG/EU	AE160DNYMPK/EU		
AE140BXYDGG/EU	AE160DNZMPK/EU		
AE140BXYDGG/EU	AE160DNYMPK/EU		
AE050CXYDEK/EU	AE160DNZMPK/EU	011-1W0807	
AE050CXYDEK/EU	AE160DNYMPK/EU		
AE080CXYDEK/EU	AE160DNZMPK/EU	011-1W0808	
AE080CXYDEK/EU	AE160DNYMPK/EU		
AE080CXYDGK/EU	AE160DNZMPK/EU		
AE080CXYDGK/EU	AE160DNYMPK/EU		
AE120CXYDEK/EU	AE160DNZMPK/EU	011-1W0809	
AE120CXYDEK/EU	AE160DNYMPK/EU		
AE160CXYDEK/EU	AE160DNZMPK/EU		
AE160CXYDEK/EU	AE160DNYMPK/EU		
AE120CXYDGK/EU	AE160DNZMPK/EU		
AE120CXYDGK/EU	AE160DNYMPK/EU		
AE160CXYDGK/EU	AE160DNZMPK/EU		
AE160CXYDGK/EU	AE160DNYMPK/EU		

SAMSUNG

This appliance is filled with R-32.