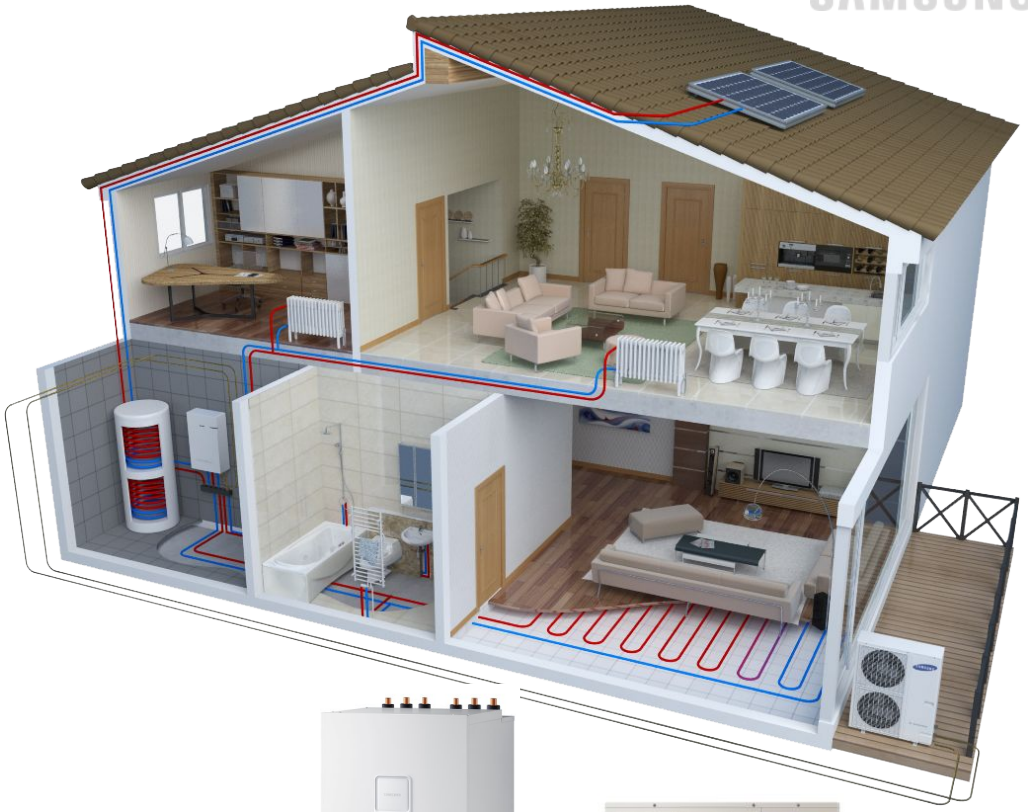


Samsung Electronics

EHS

Tank Integrated Hydro Unit

Design & Installation

Modification history

Date	Ver.	Modifier	Modified detail	Remarks
22 Apr 16	0.0	Sungtae Kim	Made the original version of installation training materials	

Contents

Proces

s

- Before start
- What is EHS
- Nomenclature
- Preparation of installation
- General guide of pipe drawing
- Installation tip
- Required tool

Before start

Things what should be checked before installation

- Read **Installation Manual** carefully to guarantee the proper installation
- Every information which is related to proper installation is in Installation Manual and **Technical Data Book**
- Proper installation will improve the **reliability & performance** of the system
- **Keep safety** at 1st place while working at site
- Right tool, enough material & well-trained workers should be on site

When you have any technical question or support is required please access BTSP.

https://btsp.samsunggsbn.com

What is EHS

■ What is EHS

Eco Heating System

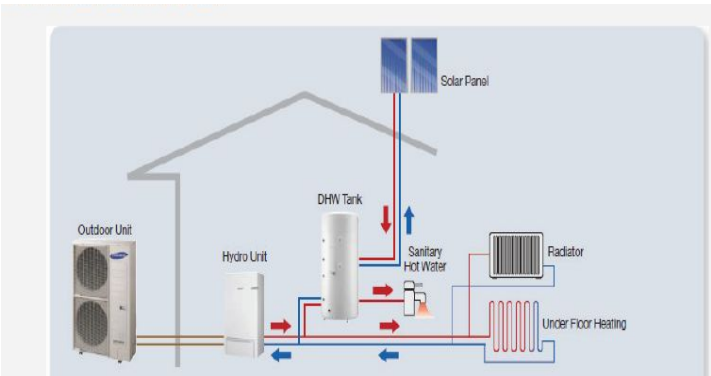
- ✔ Heating or Cooling can be used with Hot or Cold Water
- ✔ High Efficiency than convential boiler
- ✔ Inverter compressor & R-32 refrigerant
- ✔ 3Type in EHS

  Split : R-32 Outdoor Unit + Hydro Unit (Including PHE)

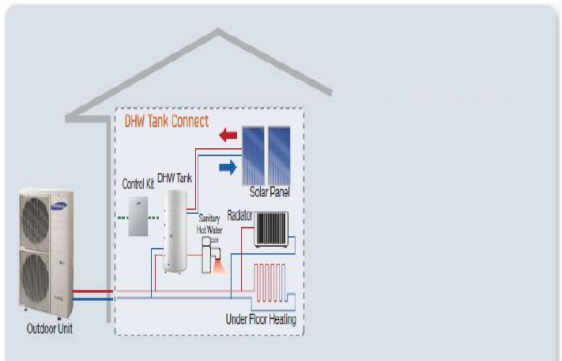
  Mono : R-32 Outdoor Unit (Including PHE)

  TDM : R-32 Outdoor Unit+Hydro Unit + Aircon Indoor Unit

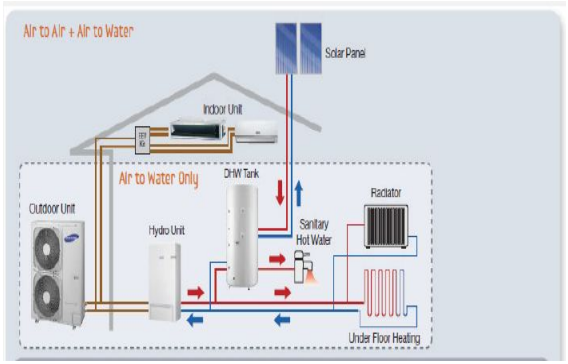
■ Split



■ Mono

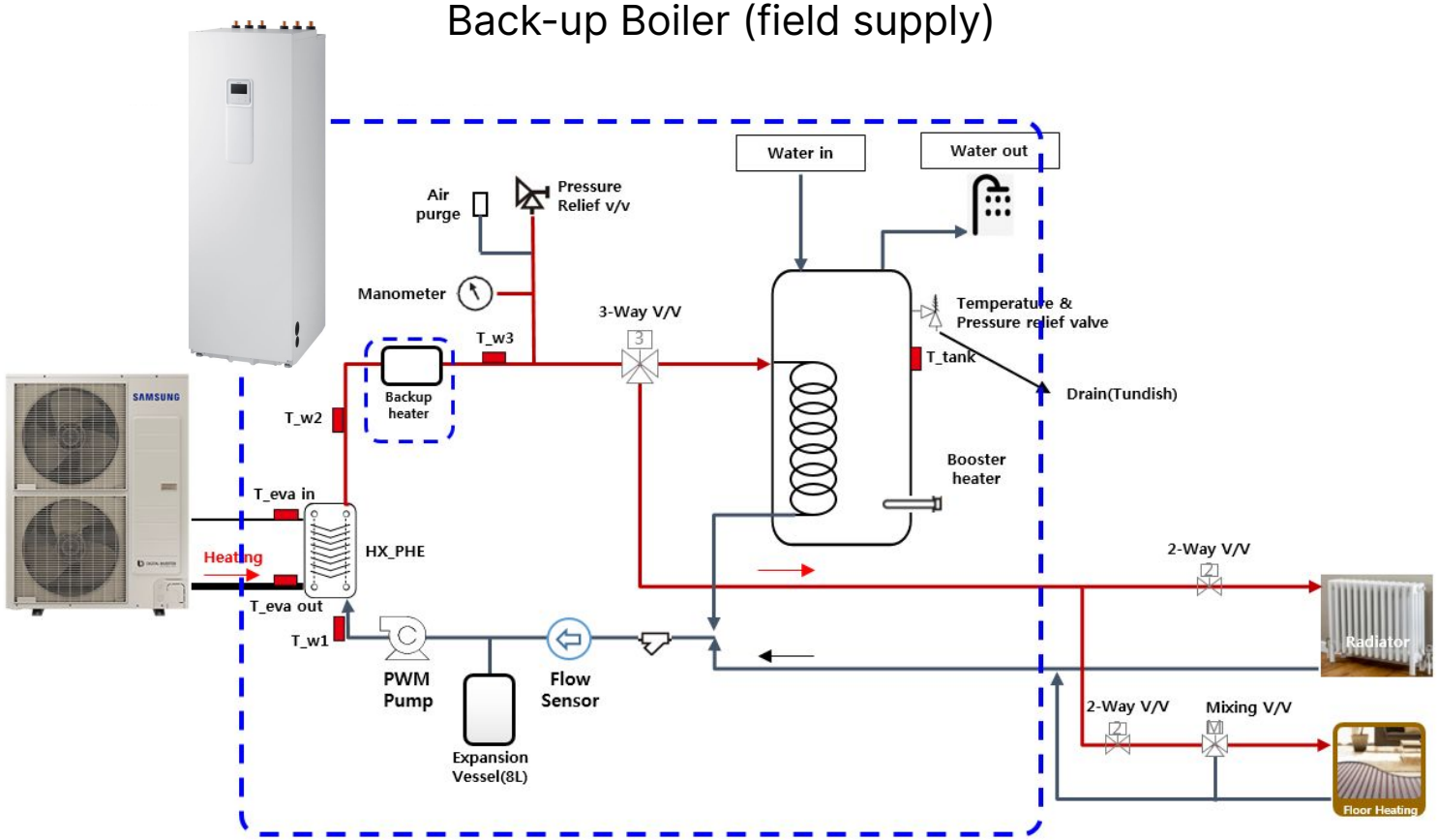


■ TDM



What is EHS

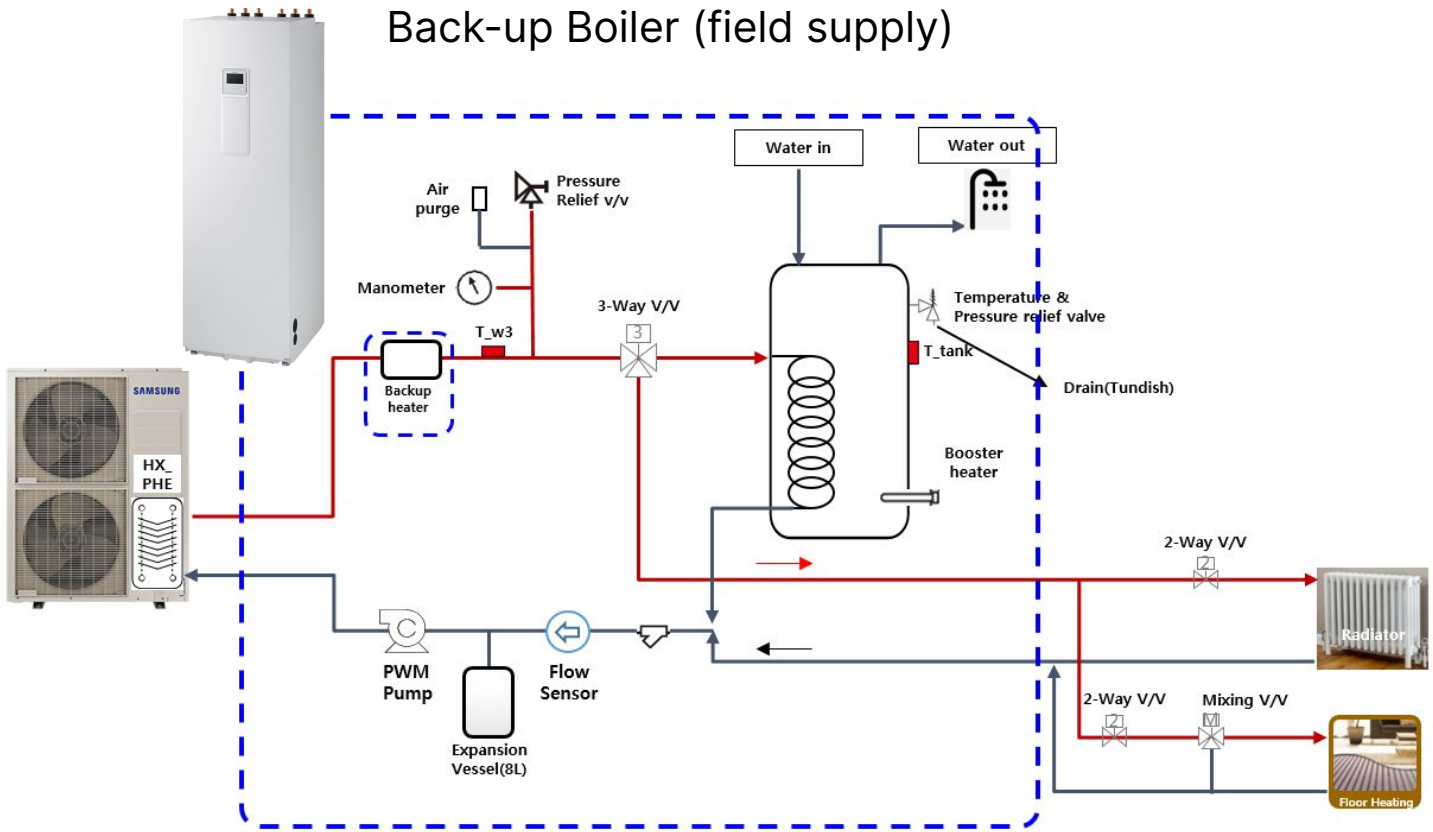
- System Types – Tank Integrated Split
  - Both water heating and hot water supply
  - Reversible (water cooling enable)
  - Outdoor Unit + Hydro Unit + DHW Tank
  - Hybrid Energy Source : Solar Collector (field supply)
    Back-up Boiler (field supply)



What is EHS

System Types – Tank Integrated Mono

- Both water heating and hot water supply
- Reversible (water cooling enable)
- Mono Unit + DHW Tank
- Hybrid Energy Source : Solar Collector (field supply)
  Back-up Boiler (field supply)



Nomenclature

Model Name

AE	200	R	N	W	S	E	G /	EU
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(Buyer)

(1) Classification	
AE	EHS

(2) Capacity (3Digit)	
HP	x 1/10
BTU	x 1000

(3) Year	
R	2019

(4) Type	
N	Indoor unit
X	Outdoor Unit

(5) Feature 1 (Indoor Unit)	
W	Tank Integrated Hydro Unit

(5) Feature 1 (Outdoor Unit)	
E	Single Split
Y	Mono

(6) Feature 2 (Indoor Unit)	
S	Split
M	Mono

(6) Feature 2 (Outdoor Unit)	
D	Basic

(7) Voltage	
E	E(220~240V, 50Hz)
G	G(380~415V, 50Hz, 3Φ)

(8) Mode		
G	Heat Pump	R-32

Preparation of installation

■ Precautions

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.

▶ Do not cut or burn the refrigerant container or pipings.

▶ Use clean parts such as manifold gauge, vacuum pump, and charging hose for the refrigerant.

▶ Installation must be carried out by qualified personnel for handling the refrigerant.Additionally, reference the regulations and laws.

▶ Be careful not to let foreign substances (lubricating oil, refrigerant other than R-32, water, etc.) enter the pipings.

▶ 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 refrigerant 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.

Preparation of installation

■ Precautions

▶ Upon leakage of the refrigerant, ventilate the room.When the leaked refrigerant is exposed to flame, it may cause generation of toxic gases.
▶ Make sure that the work area is safe from flammable substances.
▶ To purge air in the refrigerant, be sure to use a vacuum pump.
▶ Note that the refrigerant has no odour.
▶ 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.
▶ For installation with handling the refrigerant(R-32), use dedicated tools and piping materials.
▶ 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.
▶ For servicing the units containing flammable refrigerants, safety checks are required to minimise the risk of ignition.
▶ Servicing shall be performed following the controlled procedure to minimize the risk of flammable refrigerant or gases.
▶ 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.
▶ If the indoor unit is not R-32 compatible, an error signal appears and the unit will not operate.
▶ 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 installation

■ Indoor unit / Outdoor unit compatibility

Type		Power Source	Model Name	Capa.	Indoor Unit								
					Tank integrated (Split)			Tank integrated (Mono)			Wall-mounted type		Mono
					200L(1Φ)	260L(1Φ)	260L(3Φ)	200L(1Φ)	260L(1Φ)	260L(3Φ)	Split(1Φ)	Split(3Φ)	
					AE200RNWSEG	AE260RNWSEG	AE260RNWSGG	AE200RNWMEG	AE260RNWMEG	AE260RNWMGG	AE090RNYDEG (W43)	AE090RNYDEG (W43)	MIM-E03CN (W31)
Outdoor unit	Split	1Φ	AE040RXEDEG	4kW	●	●					●		
			AE060RXEDEG	6kW	●	●					●		
			AE090RXEDEG	9kW	●	●					●		
		3Φ	AE090RXEDGG	9kW			●				●	●	
	Mono	1Φ	AE050RXYDEG	5kW				●					●
			AE080RXYDEG	8kW				●	●				●
			AE120RXYDEG	12kW				●	●				●
			AE160RXYDEG	16kW				●	●				●
		3Φ	AE080RXYDGG	8kW						●			●
			AE120RXYDGG	12kW						●			●
			AE160RXYDGG	16kW						●			●

Preparation of installation

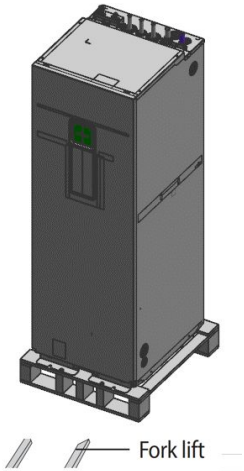
■ Move the unit

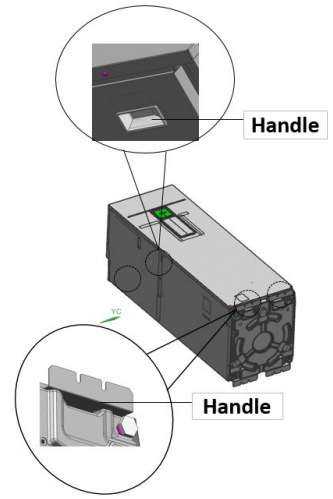
▷ Moving the indoor unit with a fork lift

- elect the moving route in advance.
- Be sure that moving route is safe from weight of the indoor unit.

▷ Moving the indoor unit with a fork lift

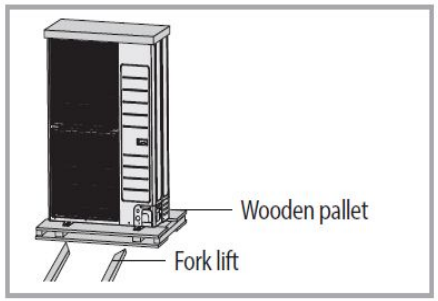
- Insert the fork into the wooden pallet at the bottom of the outdoor unit carefully.
  Be careful that the fork does not damage the outdoor unit.
- A minimum of two people should lift the unit by the handles





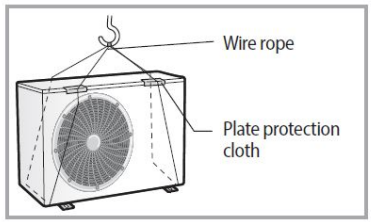
▷ Moving the outdoor unit with a fork lift

- Insert the fork into the wooden pallet at the bottom of the outdoor unit carefully.
  Be careful that the fork does not damage the outdoor unit.



▷ Moving the outdoor unit by wire rope

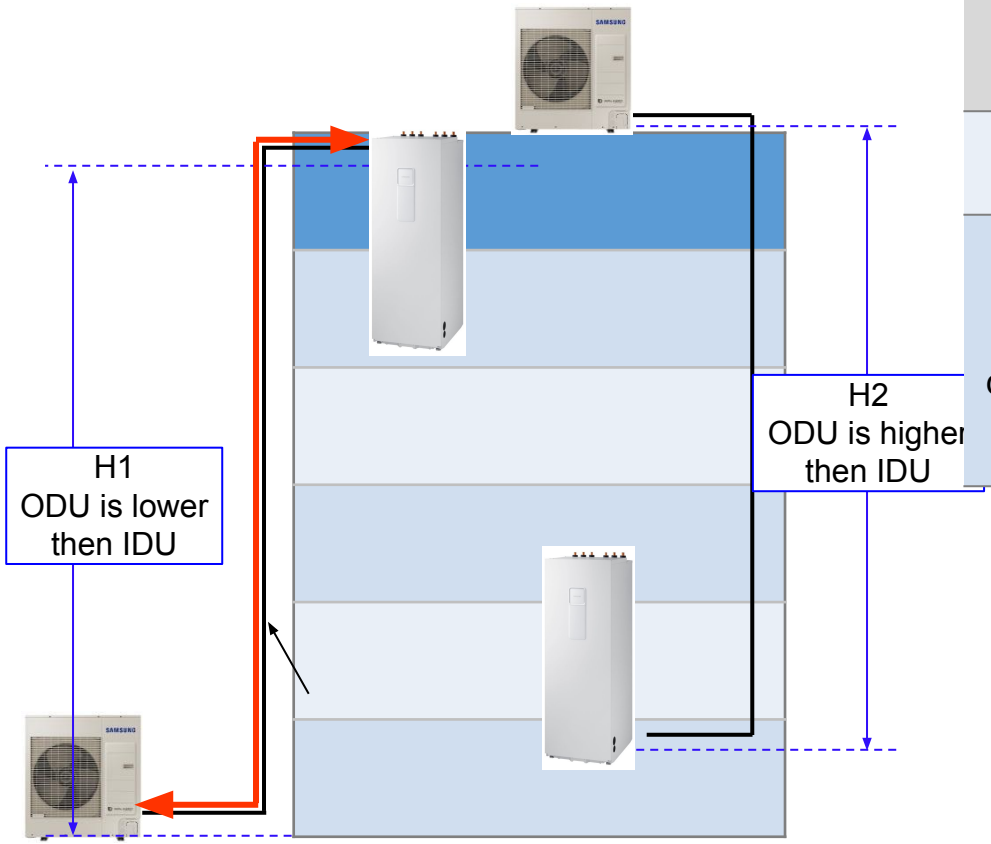
- Fasten the outdoor unit by two 8m or longer wire ropes as shown at the figure. To prevent from damage or scratches, insert a piece of cloth between the outdoor unit and rope, then move the unit.



* The appearance of the unit may be different from the picture depending on the model.

General guide of pipe drawing

■ Pipe limitation – 4/6/9 kW 1 fan Split outdoor unit



Category		Length		Remark
		4/6kW	9kW	
ODU to IDU		30m	35m	
Level difference	H1 ODU-IDU	15m	15m	
	H2 ODU-IDU	20m	20m	

※ Check installation manuals to find more information

Additional refrigerant charging

[SPLIT]

Outdoor unit	Liquid Pipe [mm]	Gas Pipe [mm]	Factory charge [kg]
AE040RXEDEG	ø6.35	ø15.88	1.2
AE060RXEDEG	ø6.35	ø15.88	1.2
AE090RXEDEG	ø6.35	ø15.88	1.4
AE090RXEDGG	ø6.35	ø15.88	1.4

$$\text{Additional Charge}[g] = (L - 15) \times 20$$

Copper pipe

■ Copper pipe

- ✔ ASTM standard copper pipe
- ✔ Follow the minimum thickness & temper grade.
  Otherwise pipe may be broken due to high pressure
- ✔ Use proper tool

Pipe size mm(inch)	Minimum thickness(mm)	Temper grade
Φ 6.35(1/4”)	0.7	Annealed type C1220T-O
Φ 9.52(3/8”)	0.7	
Φ12.70(1/2”)	0.8	
Φ15.88(5/8”)	1.0	

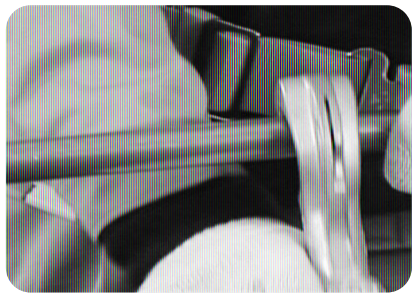
Tube cutter

De-burring tool

*** Brazing required to keep pipe more than 1 month on site**

Cutting

- Use a tube Cutter

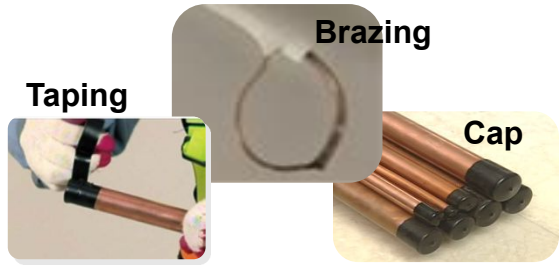


Burring

- Removing burr

Covering

- Block the end of pipe to prevent foreign substance entering



Nitrogen gas blowing

Nitrogen gas blowing

- To prevent buildup of non-condensable substances in the refrigerant pipes, nitrogen blowing must be used during brazing of copper connections

- Failure to use nitrogen while brazing will cause accumulation of oxides at the compressor, various strainers, and expansion valves impacting performance and causing premature failure

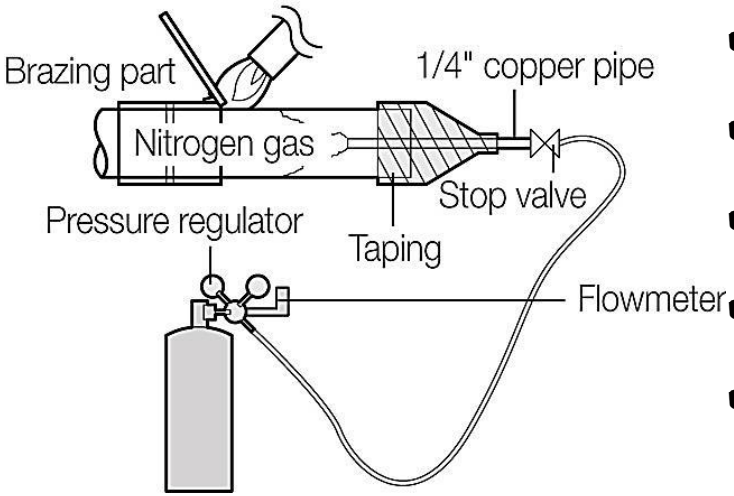
With Nitrogen

Without Nitrogen blowing

Ex) Filter clinginess

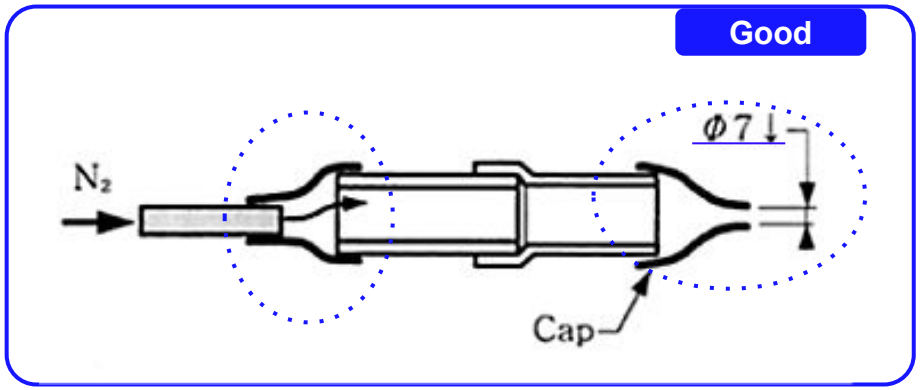
Nitrogen gas blowing

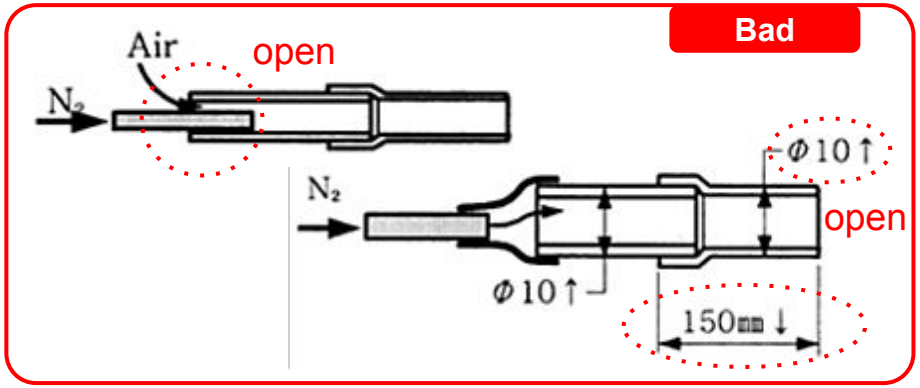
■ Nitrogen gas blowing



- ✔ Connect a nitrogen tank near the point that will be brazed
- ✔ Using a flow regulator, maintain 5.0ℓ/min [1.76 ft³/hr] of dry nitrogen
- ✔ If flow is too low, it will not effectively prevent oxide formation
- ✔ If flow is too high, it will be difficult to make a quality brazed connection
- ✔ Maintain flow after brazing is complete until pipe is no longer hot

Nitrogen is not available to stay in the pipe



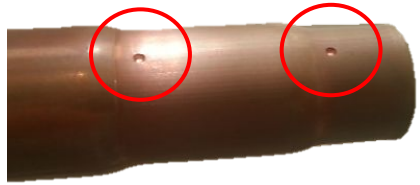


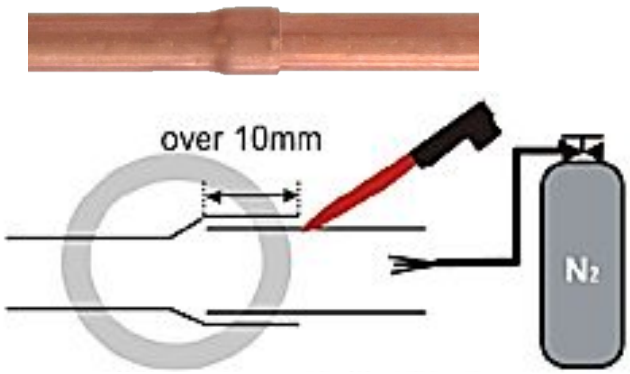
Brazing

■ Brazing

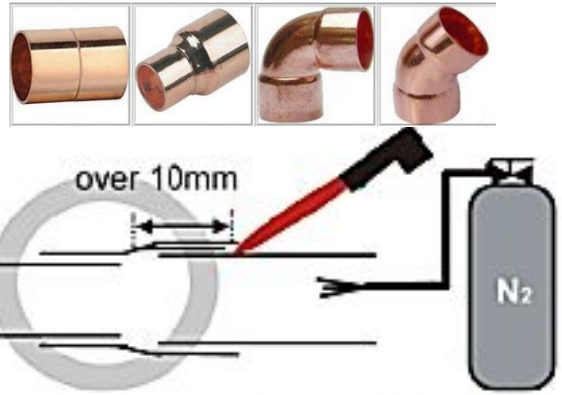
- Make sure that there are no foreign materials and impurities inside the pipe.
- Use socket when need brazing for connecting pipes.

The stopper area of socket should be covered with welding material

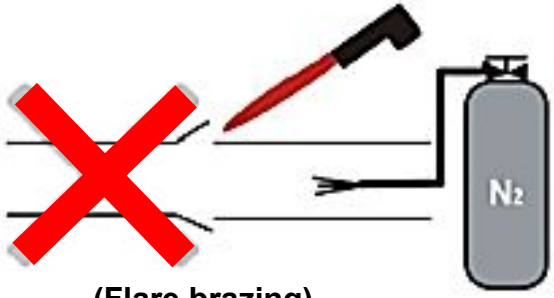




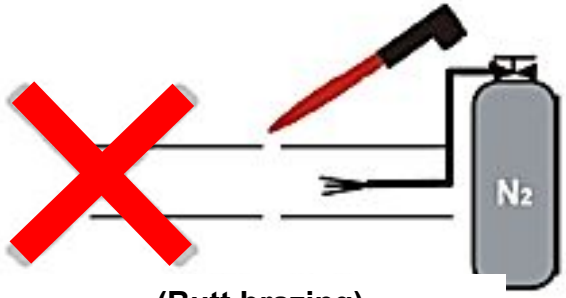
(Expending pipe brazing)



(Pipe brazing with socket)



(Flare brazing)



(Butt brazing)

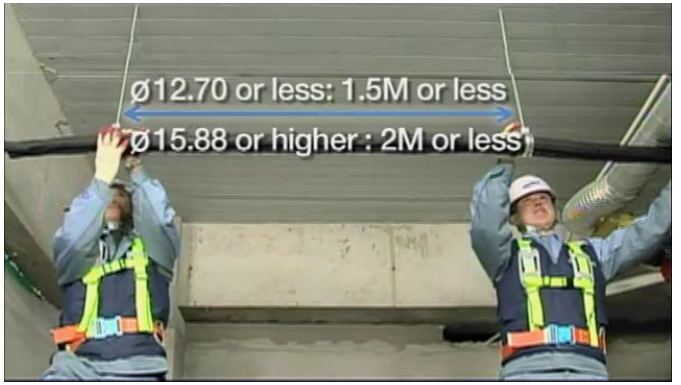
Mounting

■ Mounting

1) Installing the hanger bolt(or others like ladder tray)

- Φ12.7 or less : 1.5m or less
- Φ15.88 or more : 2m or less

* If the distance is longer, pipe might be sagged by its weight

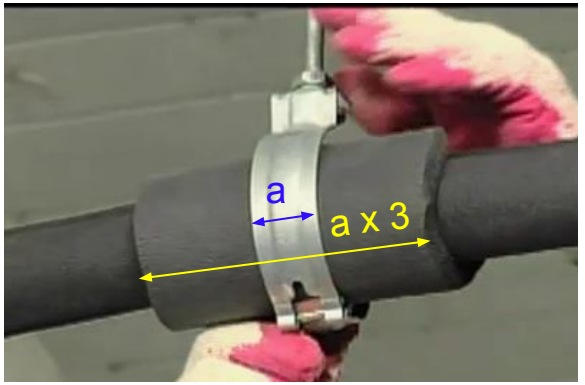


2) Insulating the pipe (Refer to Insulation work)

- Keep the tape or cap end of each side

3) Hanging the pipe

- Insert Insulation pad between pipe & hanger to prevent insulation being pressed



Airtight Test

■ Airtight Test

✔ **Perform the air Tight Test to check leakage with Nitrogen gas**

- Block end of each pipe by Pinching & brazing
- Connect one of Gas & Liquid pipe , Install Pressure gage.
- Pressurize nitrogen gas

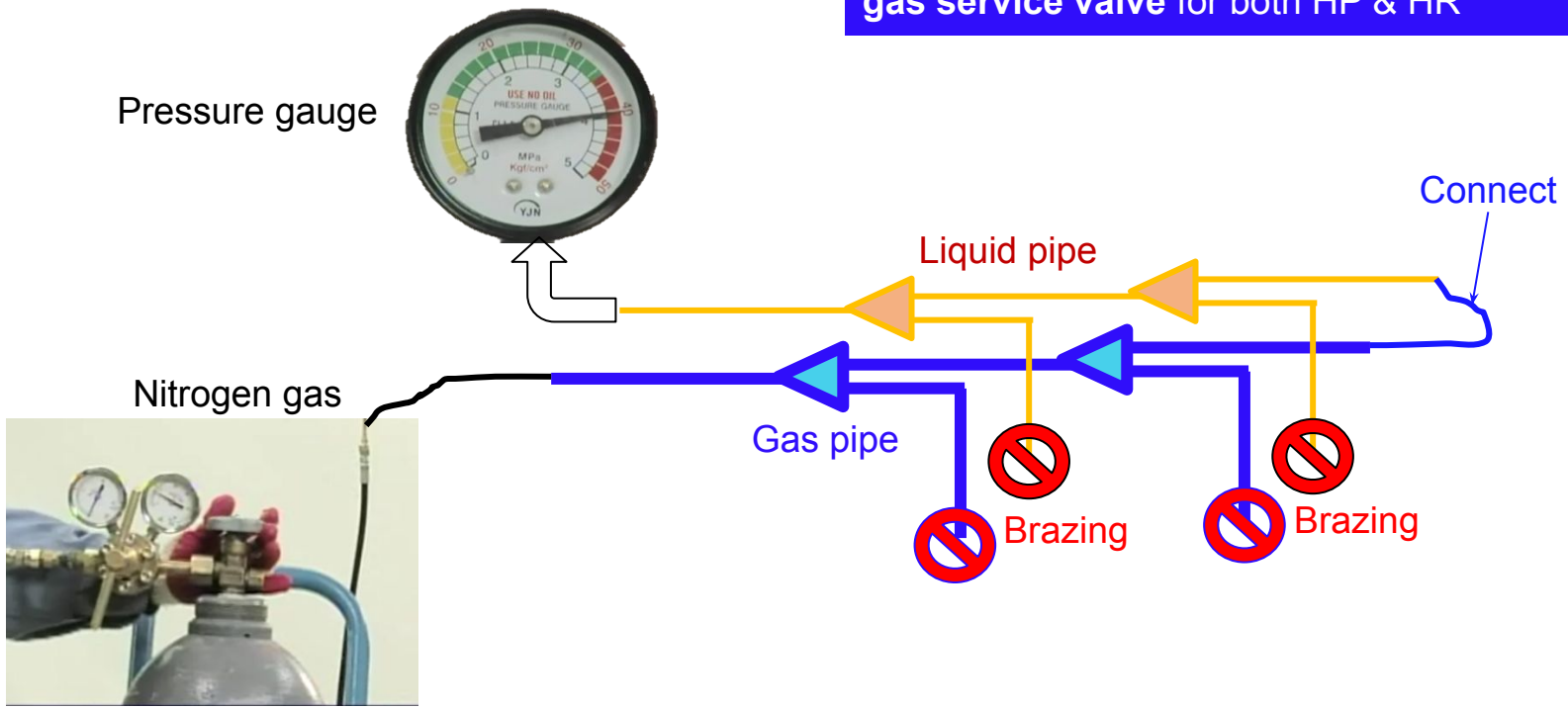
  HP : Gas & Liquid

  HR : Gas & Liquid & High pressure

❖ Factory setting

- EEV : Full Open
- Sol. valve : Normally Close

If outdoor unit is connected & manifold gauge is not enough then charge through **low pressure gas service valve** for both HP & HR



Airtight Test

■ Airtight Test

※ Test Pressure

- R-32 : 46.9kgf/cm2 = 4.6Mpa = 667.2psi

Correlation between pressure and temperature

Temp, 1℃ rising → Pres. 0.1 Kg/cm² going up

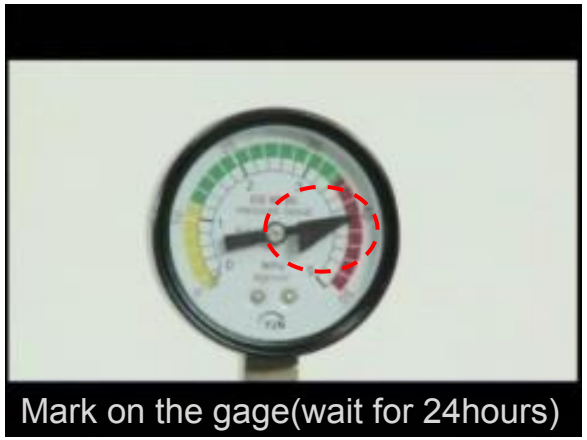
Temp, 1℃ dropping → Pres. 0.1 Kg/cm² going down

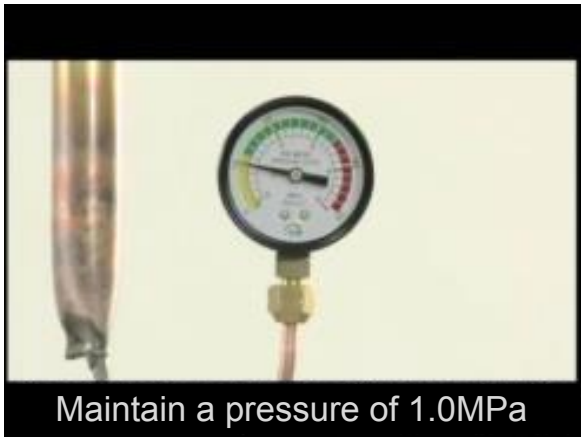
(EX): When pressurizing, its condition was 41 kg/cm² at 25℃. after 24hrs later, it shows 40.5kg/cm² at 20℃, then we can say there is no leak out of the system.

Nitrogen pressurization

1. Maintains **4.6MPa for 24 hours**. If no leakage, then pressure down to 1MPa.
2. If there is pressure drop then find leak point and
3. Maintain **1MPa**(145psi) until connecting the outdoor/indoor units to prevent corrosion in the copper pipes.


Maintain a pressure of 4.1MPa


Mark on the gage(wait for 24hours)


Maintain a pressure of 1.0MPa

Insulation

■ Insulation of pipe

1) Insulate the refrigerant pipe based on the proper thickness of insulator for each pipe size.

The standard condition is 30 °C & less than humidity 85%.

(If the condition is in high humidity, use one grade thicker)

2) Use EPDM insulation which meets the following condition.

* Seaside, Hot spring, Swimming pool, etc should be be treated as high humidity condition

Pipe	Pipe Size(mm)	Insulator(Cooling, Heating)		Remark
		Standard [30℃,85%]	High Humidity [30℃,over 85%]	
		EPDM		
Liquid	Ø6.35~Ø9.52	9mm	←	Heat resisting temperatures Over 120℃
	Ø12.70~Ø50.80	13mm	←	
Gas	Ø6.35	13mm	19mm	
	Ø9.52~Ø25.40	19mm	25mm	
	Ø28.58~Ø44.45		32mm	
	Ø50.80	25mm	38mm	

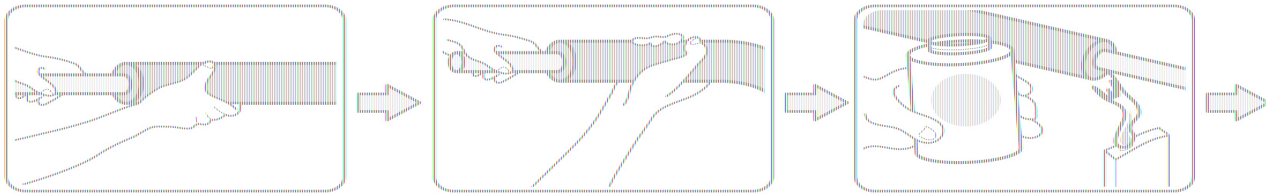
<EPDM SPEC>		
Item	**Unit**	**Standard**
Density	g/cm^3	0.048~0.096
Dimension change route by heat	%	Below -5
Water absorption rate	g/cm^3	Below 0.005
Thermal conductivity	Kcal/m·h·℃	Below 0.037
Moisture transpiration factor	$ng/(m^2 \cdot s \cdot Pa)$	Below 15
Moisture transpiration grade	$g/(m^2 \cdot 24h)$	Below 15
Formaldehyde dispersion	mg/L	There should be none
Oxygen rate	%	Over 25

Insulation

■ Insulation of pipe

- All the refrigerant pipe & Drainpipe should be insulated to prevent dewing on the pipe.

Case 1



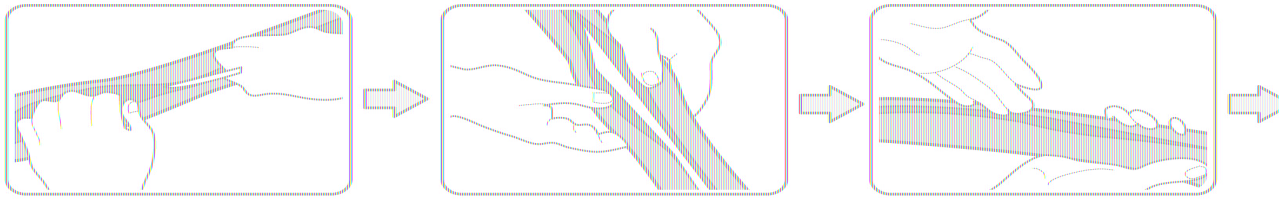
①EPDM length should be longer then pipe length. Do not extend EPDM by force

②Put the pipe in EPDM insulation carefully so that the pipe will not get damaged with EPDM.

③Apply bond on both side of cut surface. Make sure to use the correct type of bond for EPDM

④Dry it until it becomes thick, sticky and does not get detached.

Case 2



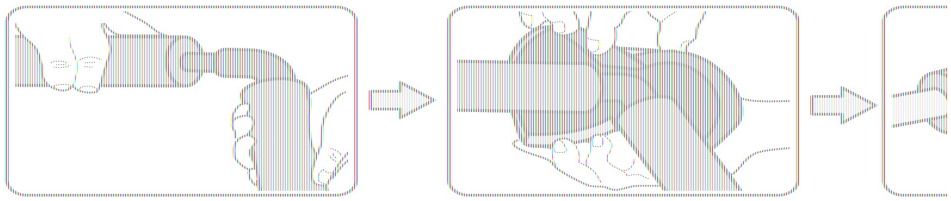
Use the original uncut insulation material.

Only in special case is the vertical cutting of the insulation allowed.

Apply bond both sides of the surface of EPDM and press them together for long lasting bonding.

Dry it until it becomes thick and sticky.

Case 3



Bring face to face the each end of EPDM on fitting connection part.

Make fitting cover to fit the EPDM insulation. Fitting cover should be overlapped with insulation min 1inch(2.5m).

Bond the both cutting sides of fitting cover.

Insulation

■ Insulation of indoor unit's pipe

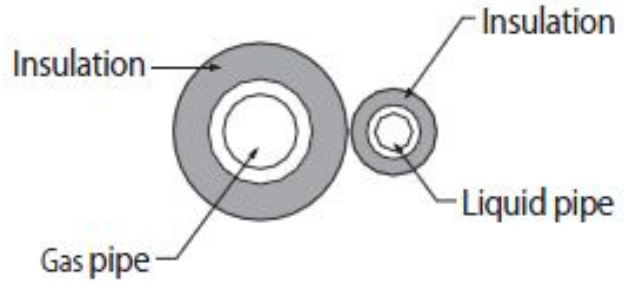
- Refrigerant pipe before EEV kit or without EEV kit

You can contact the gas side and liquid side pipes

□ The pipes should **not** be **pressed**.

When contacting the gas side and gas side pipe

□ Use 1 grade thicker insulator.

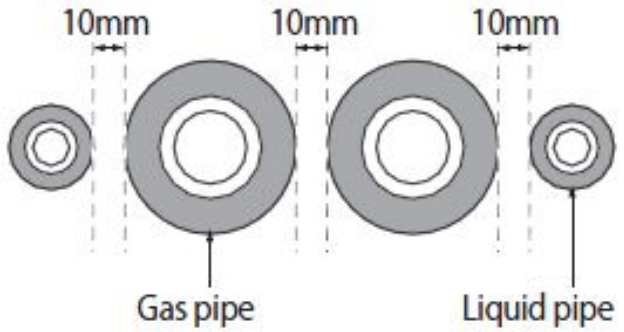


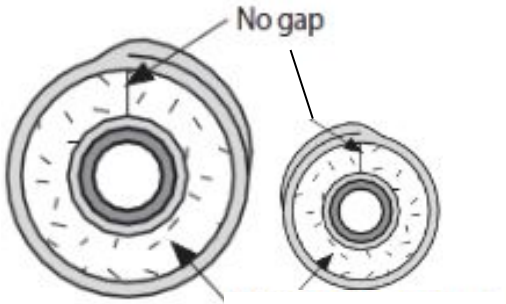
- Refrigerant pipe after EEV kit

After EEV kit leave 10mm space between gas and liquid pipe.

When contacting the gas side and liquid side pipe

□ Use 1 grade thicker insulator otherwise dewing may occur.





Selection of wire and circuit breaker

■ Wire pipe (tube)

✔ Install the pipe (tube) for power and communication wires separately.

* Piping work can be different in compliance with the regulation in local area

Example)

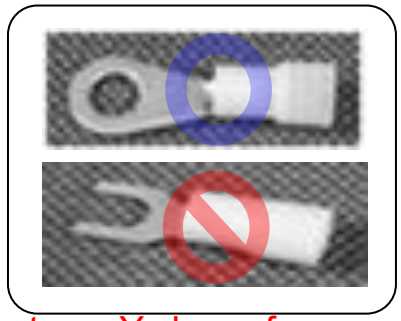
Name	Temper grade	Applicable conditions
Flexible PVC conduit	PVC	Tube is installed **indoor** and not exposed to outside Ex) it is embedded in concrete structure
Class 1 flexible conduit	Galvanized steel sheet	Tube is installed **indoor** but exposed to **outside** so there are risk of **damage** to the protection tube
Class 1 PVC coated flexible conduit	Galvanized steel sheet and Soft PVC compound	Tube is installed **outdoor** and exposed to **outside** so there are risk of **damage** to the protection tube and extra **waterproof** is needed

Selection of wire and circuit breaker

■ Solderless ring terminal

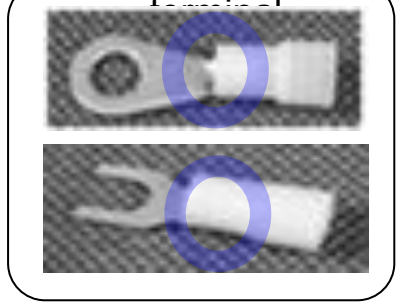
- Select a solderless ring terminal for a power cable according to the nominal dimensions of cable.
- Apply insulation coating to the connection part of the solderless ring terminal and the power cable.

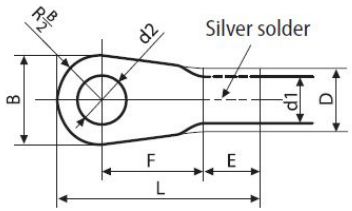
Power terminal



* Do not use Y-shape for power cable.

Communication terminal





Nominal dimensions for cable (mm²)		4/6		10	16	25		35		50	70
Nominal dimensions for screw (mm)		4	8	8	8	8	8	8	8	8	8
B	Standard dimension (mm)	9.5	15	15	16	12	16.5	16	22	22	24
	Allowance (mm)	±0.2		±0.2	±0.2	±0.3		±0.3		±0.3	±0.4
D	Standard dimension (mm)	5.6		7.1	9	11.5		13.3		13.5	17.5
	Allowance (mm)	+0.3 -0.2		+0.3 -0.2	+0.3 -0.2	+0.5 -0.2		+0.5 -0.2		+0.5 -0.2	+0.5 -0.4
d1	Standard dimension (mm)	3.4		4.5	5.8	7.7		9.4		11.4	13.3
	Allowance (mm)	±0.2		±0.2	±0.2	±0.2		±0.2		±0.3	±0.4
E	Min. (mm)	6		7.9	9.5	11		12.5		17.5	18.5
F	Min. (mm)	5	9	9	13	15	13	13	13	14	20
L	Max. (mm)	20	28.5	30	33	34		38	43	50	51
d2	Standard dimension (mm)	4.3	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
	Allowance (mm)	+0.2 0	+0.4 0	+0.4 0	+0.4 0	+0.4 0		+0.4 0		+0.4 0	+0.4 0
t	Min. (mm)	0.9		1.15	1.45	1.7		1.8		1.8	2.0

Selection of wire and circuit breaker

Wire selection

1. Let your electrical engineer the **MCA** value
   (they will care about country regulation & their knowhow)

If they have no idea

1. Check your country regulation and follow
2. Decide how to install the cable (spec of wire will be different)
3. Check the spec of each cable
4. Calculate correct factor by condition
5. Select proper cable size

Installation tip

■ Keep the installation information

Form

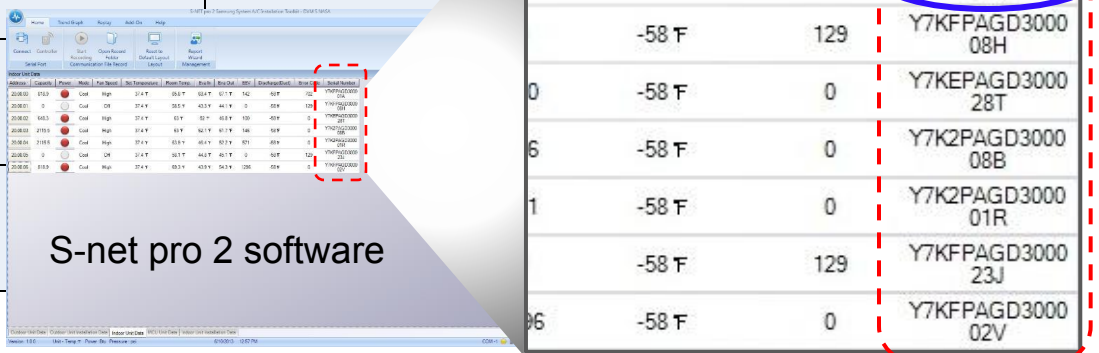
Address can be check(set) easily by following the step

Step 1. Print attached form

Step 2. Put the S/N sticker on the form with No. & Location

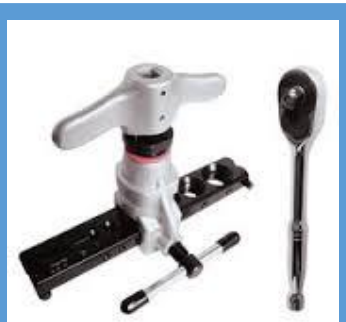
Step 3. Using S-net pro 2 set the indoor unit's address & option by matching with S/N

No.	Model code	S/N sticker	Main Address	RMC Address	Location
1	AM012FNNDCH	AM012FNNDCH/AA S/N : Y7JVPAGDB00025H	01	1A	Office 01 1st floor
2					
3					
4					



Required tool

Manifold Set (dedicated for R-32)



Flaring Tool (45º Flare)

Vacuum pump & Pressure gauge

Tube cutter & de-burring tool

Hands tools

Torque Wrench

Torch Set & brazing rod

Nitrogen and flow gauge

Scale & leakage detector

Tank intergrated Hydro unit

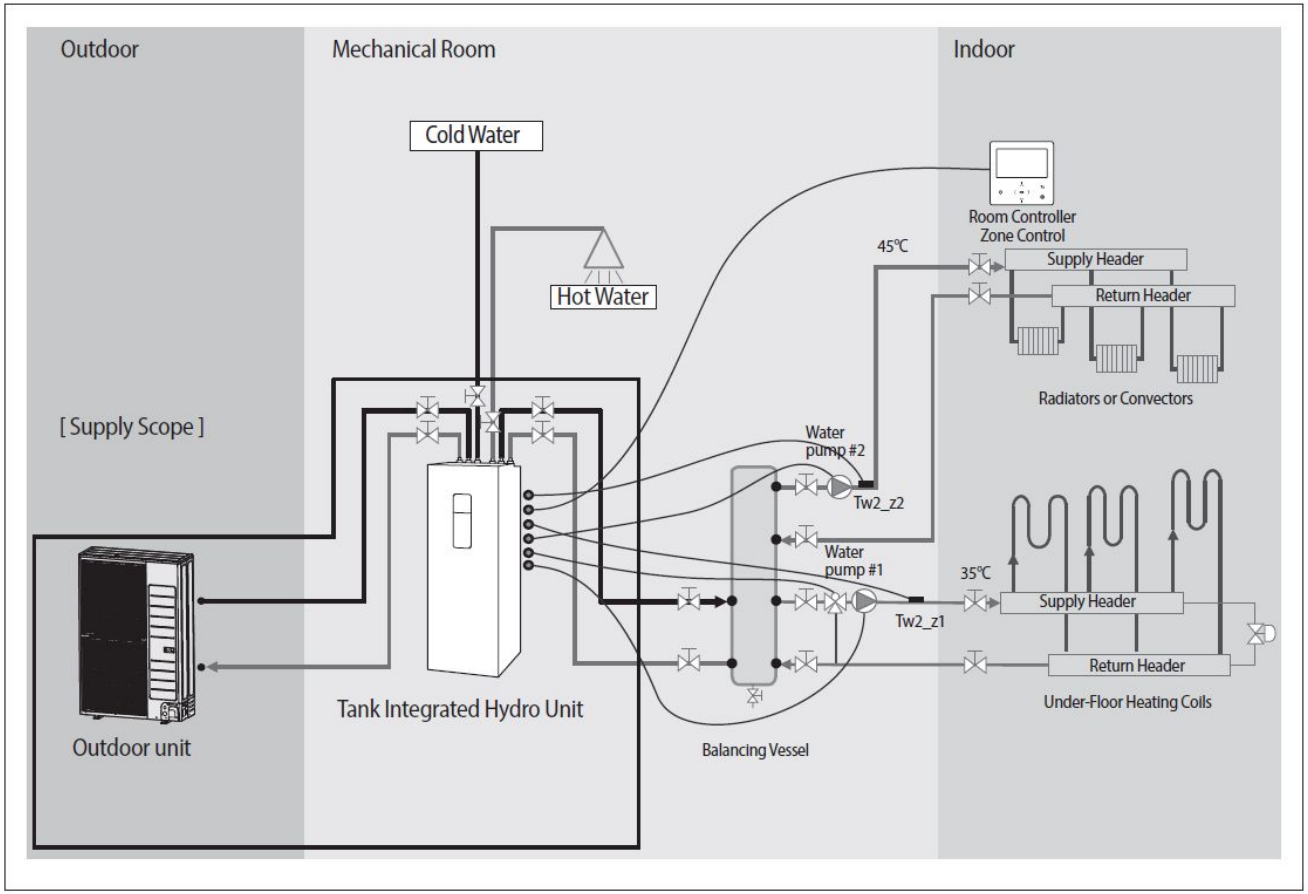
- Example of application
- Installation information
- Mounting the Hydro unit
- Charging a water into the system

Example of application

1. Space heating + Water heating

An example of field supply scope

- *space heating devices : Radiator or Fan coil unit*
- *water heating devices : Pipe*
- *control devices : Room controller, thermostat, mixing valve*

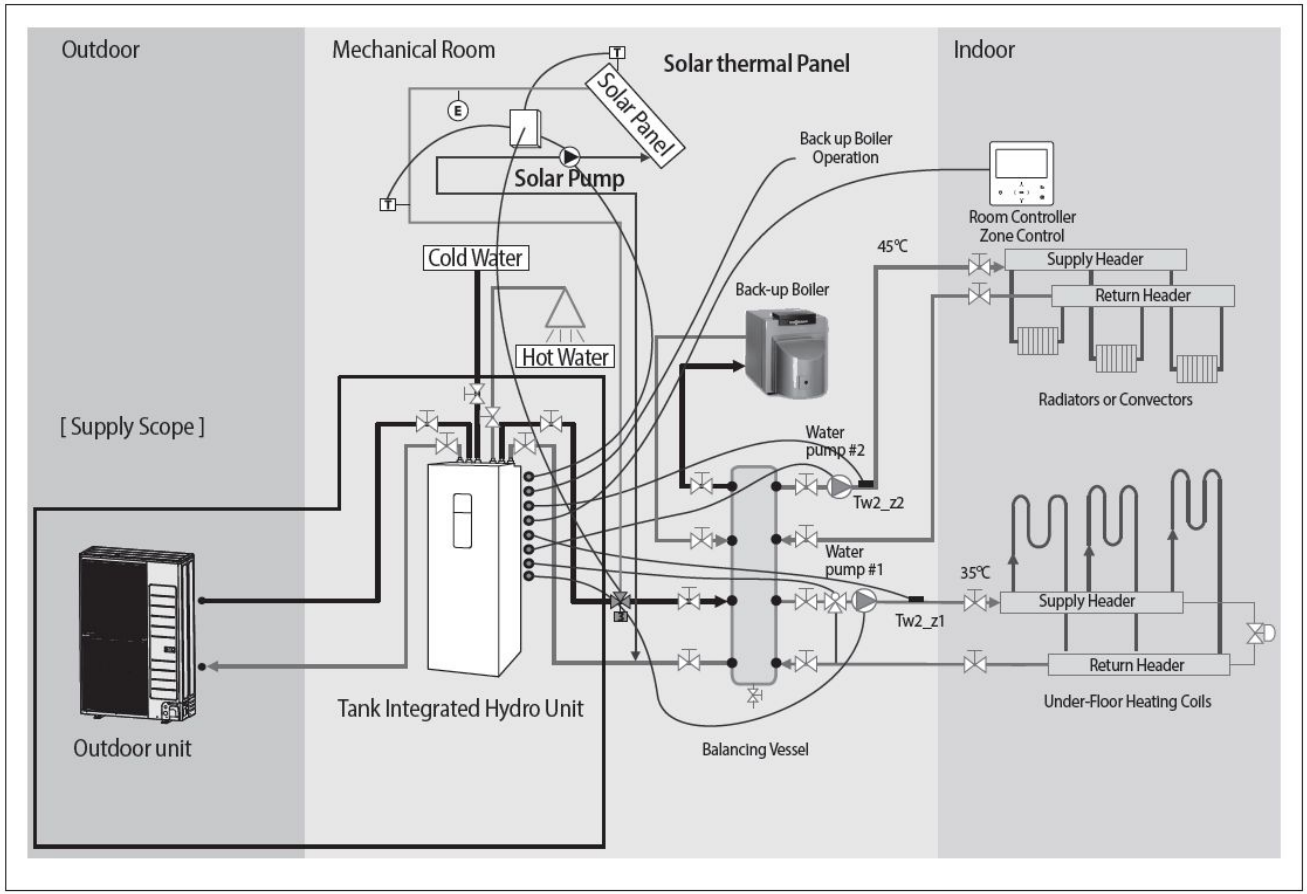


Example of application

2. Hybrid application (Back-up boiler and solar panel connected)

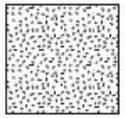
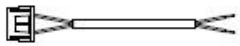
An example of field supply scope

- *space heating devices : Radiator or Fan coil unit*
- *water heating devices : Pipe*
- *control devices : Room controller, thermostat, mixing valve*
- *Solar system, Back-up boiler*



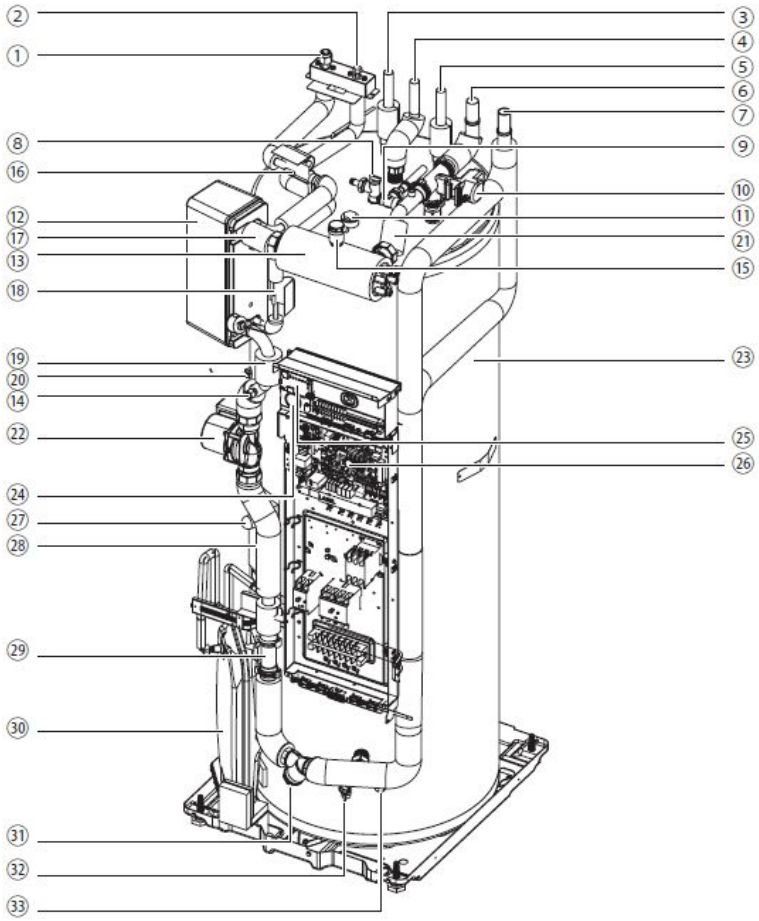
Installation information

Accessories

Installation Manual (2)	Zone sensor (1x10m, WH) (2)	Temperature Sensor for Mixing Valve (1x15m, BLU) (1)
		
Sensor holder of zone sensor and mixing valve (ID Ø6.8 mm) (3)	Sensor clip of zone sensor and mixing valve (3)	Cable-tie for zone sensor and mixing valve (6)
		
Aluminum tape for zone sensor and mixing valve (3)	Rubber tape for zone sensor and mixing valve (3)	Insulator for zone sensor and mixing valve (3)
		
Connector wire-PV (S/G) (1x2 m, RED) (1)	Tube secondary (1) (only for 260 L Tank model)	Gasket (1) (only for 260 L Tank model)
		
Drain-plug out (1)	Cap-drain (2)	
		

Main components

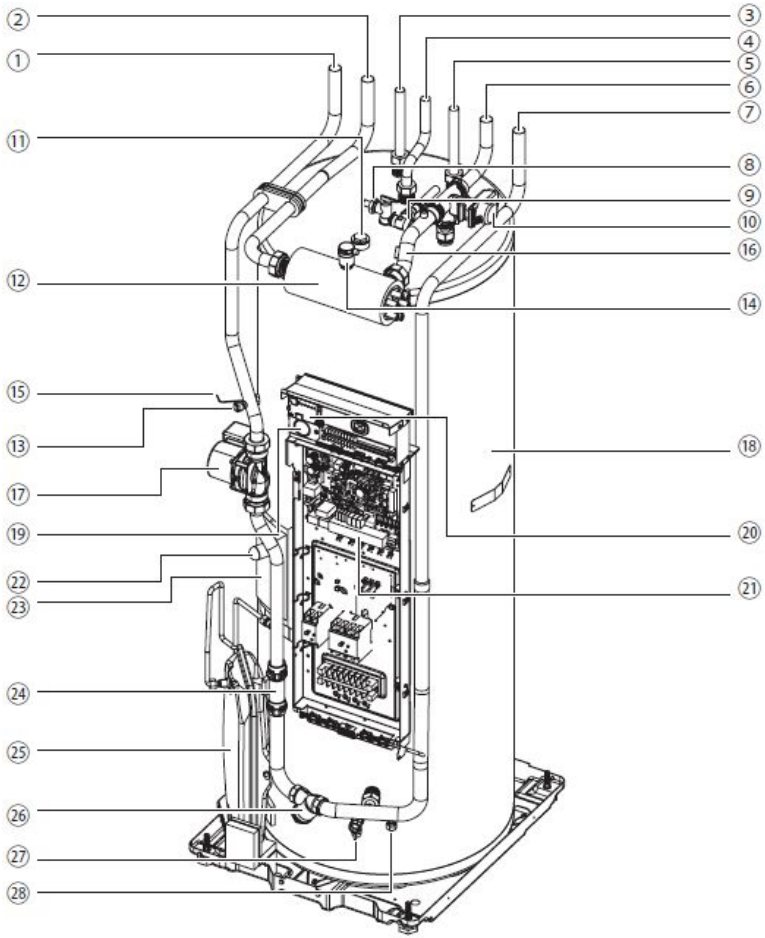
Split



No.	Part name	Note
①	Refrigerant pipe	ø15.88 (5/8"), Flare nut
②	Refrigerant pipe	ø6.35 (1/4"), Flare nut
③	Hot water outlet	ø22, Straight pipe
④	Secondary return	ø22, Straight pipe (260L option)
⑤	Cold water inlet	ø22, Straight pipe
⑥	Space heating outlet	ø28, Straight pipe
⑦	Space heating inlet	ø28, Straight pipe
⑧	T/P valve	7bar, 90 ℃
⑨	Pressure relief valve	3bar, BSPP 1/2"
⑩	3way valve	

No.	Part name	Note
⑪	Anode bar	BSPP 1"
⑫	Plate heat exchanger	
⑬	Back-up heater	
⑭	Drain port	
⑮	Air vent	BSPP 3/8"
⑯	Eva-in thermistor	
⑰	Water-out thermistor	
⑱	Eva-out thermistor	
⑲	Water-in thermistor	
⑳	Tank thermistor	
㉑	Heater thermistor	
㉒	Water pump	
㉓	Water tank	200L / 260L
㉔	Manometer	0~4bar
㉕	S/D converter	
㉖	Control box	
㉗	Booster heater	3kW
㉘	Booster heater thermostat	
㉙	Flow sensor	
㉚	Expasion vessel	8L, Pre-charge gas: 0.1MPa, N2, BSPP 3/8"
㉛	Strainer	
㉜	Tank drain valve	
㉝	Drain port	Primary circuit

Mono

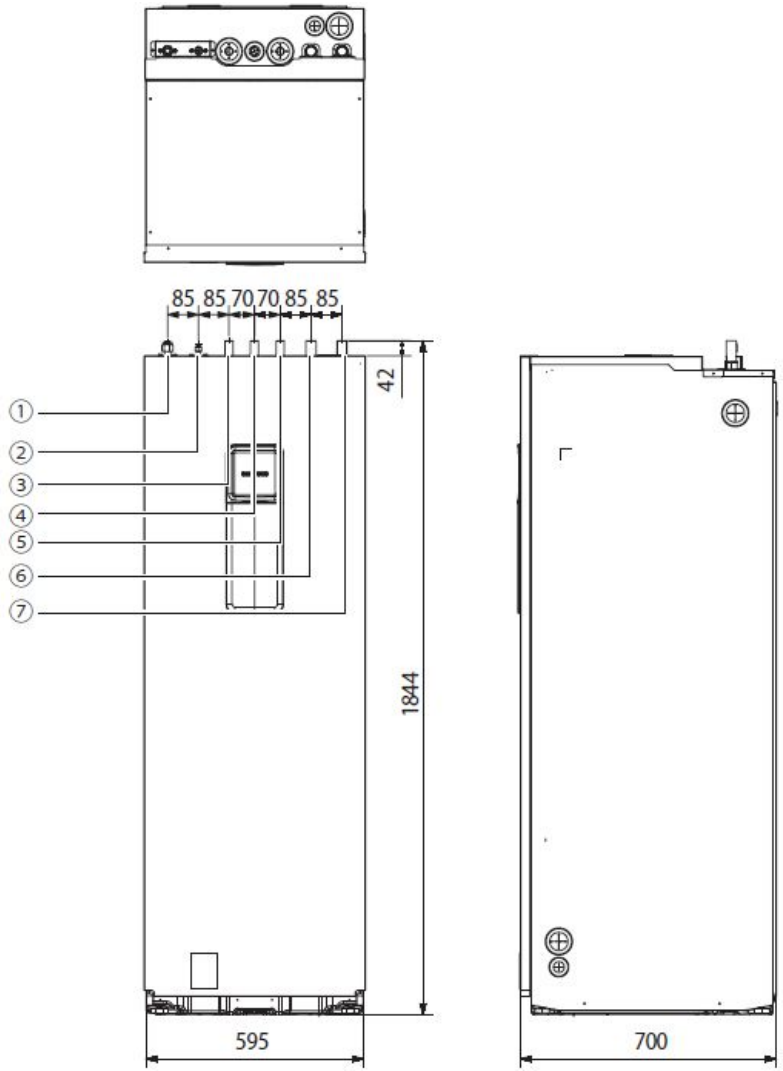


No.	Part name	Note
①	Water pipe (Return to heat pump)	ø22, Straight pipe
②	Water pipe (Flow from heat pump)	ø22, Straight pipe
③	Hot water outlet	ø22, Straight pipe
④	Secondary return	ø22, Straight pipe (260L option)
⑤	Cold water inlet	ø22, Straight pipe
⑥	Space heating outlet	ø28, Straight pipe
⑦	Space heating inlet	ø28, Straight pipe
⑧	T/P valve	7bar, 90℃
⑨	Pressure relief valve	3bar, BSPP 1/2"
⑩	3way valve	

No.	Part name	Note
⑪	Anode bar	BSPP 1"
⑫	Back-up heater	
⑬	Drain port	
⑭	Air vent	BSPP 3/8"
⑮	Tank thermistor	
⑯	Heater thermistor	
⑰	Water pump	
⑱	Water tank	200L / 260L
⑲	Manometer	0~4bar
⑳	S/D converter	
㉑	Control box	
㉒	Booster heater	3kW
㉓	Booster heater thermostat	
㉔	Flow sensor	
㉕	Expasion vessel	8L, Pre-charge gas: 0.1MPa, N2, BSPP 3/8"
㉖	Strainer	
㉗	Tank drain valve	
㉘	Drain port	Primary circuit

Installation information

■ Dimensional drawing of Hydro unit



No	Split	Size	type
①	Refrigertant (Gas)	Ø15.88	Flare nut
②	Refrigertant (Liquid)	Ø6.35	Flare nut
③	Hot water outlet	Ø22, T1.0	Straight pipe
④	Secondary return (260L option)	Ø22, T1.0	Straight pipe
⑤	Cold water inlet	Ø22, T1.0	Straight pipe
⑥	Space heating outlet	Ø28, T1.2	Straight pipe
⑦	Space heating inlet	Ø28, T1.2	Straight pipe

No	Mono	Size	type
①	Mono outdoor outlet	Ø28, T1.2	Straight pipe
②	Mono outdoor inlet	Ø28, T1.2	Straight pipe
③	Hot water outlet	Ø22, T1.0	Straight pipe
④	Secondary return (260L option)	Ø22, T1.0	Straight pipe
⑤	Cold water inlet	Ø22, T1.0	Straight pipe
⑥	Space heating outlet	Ø28, T1.2	Straight pipe
⑦	Space heating inlet	Ø28, T1.2	Straight pipe

Installation information

■ Installation of the Indoor unit

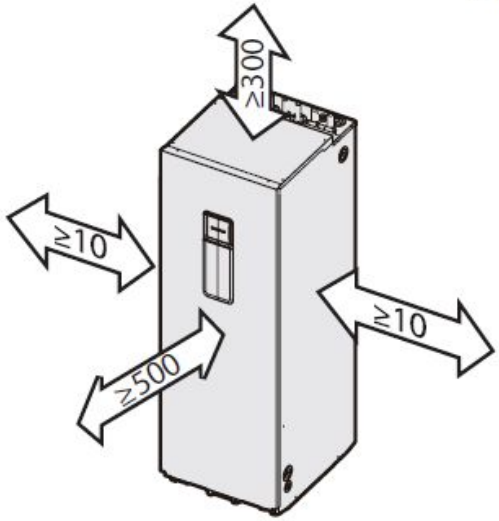
The indoor unit should be installed indoors and meet the following conditions.

- 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

■ 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)

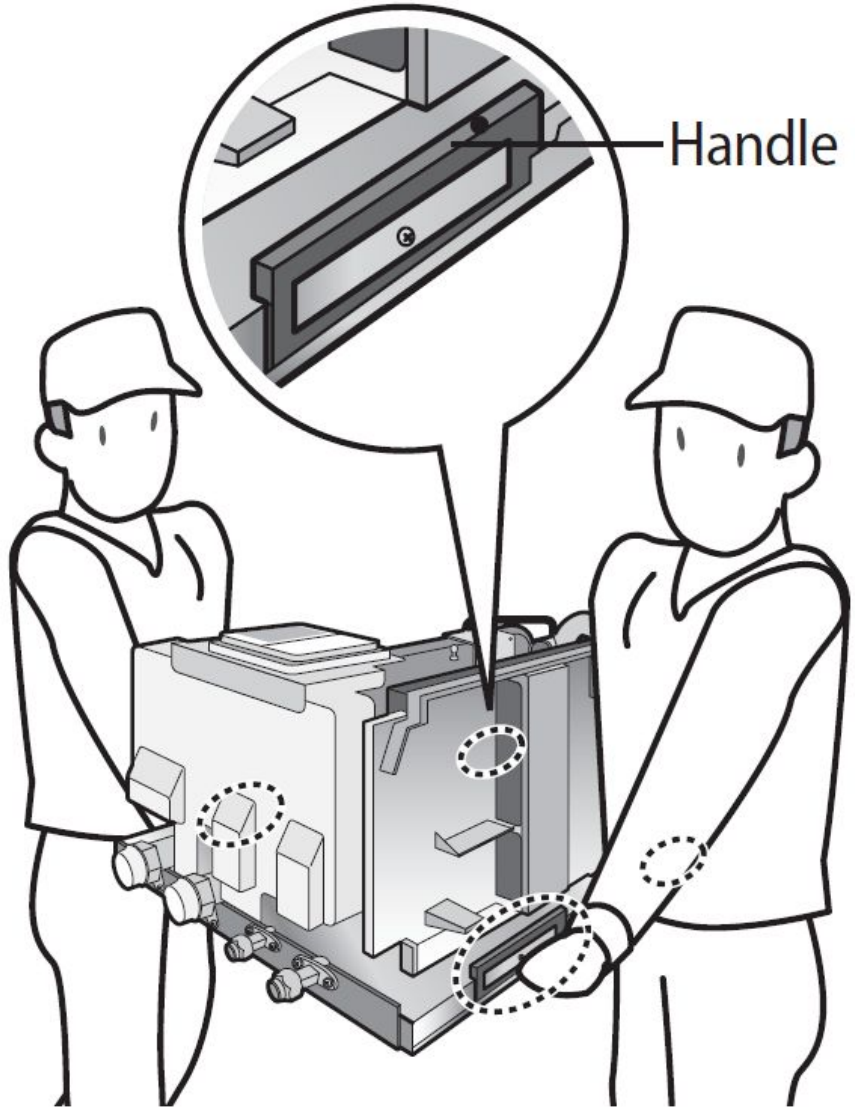


Installation information

기구작업
추가수정 필요

■ Mounting the Hydro unit

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

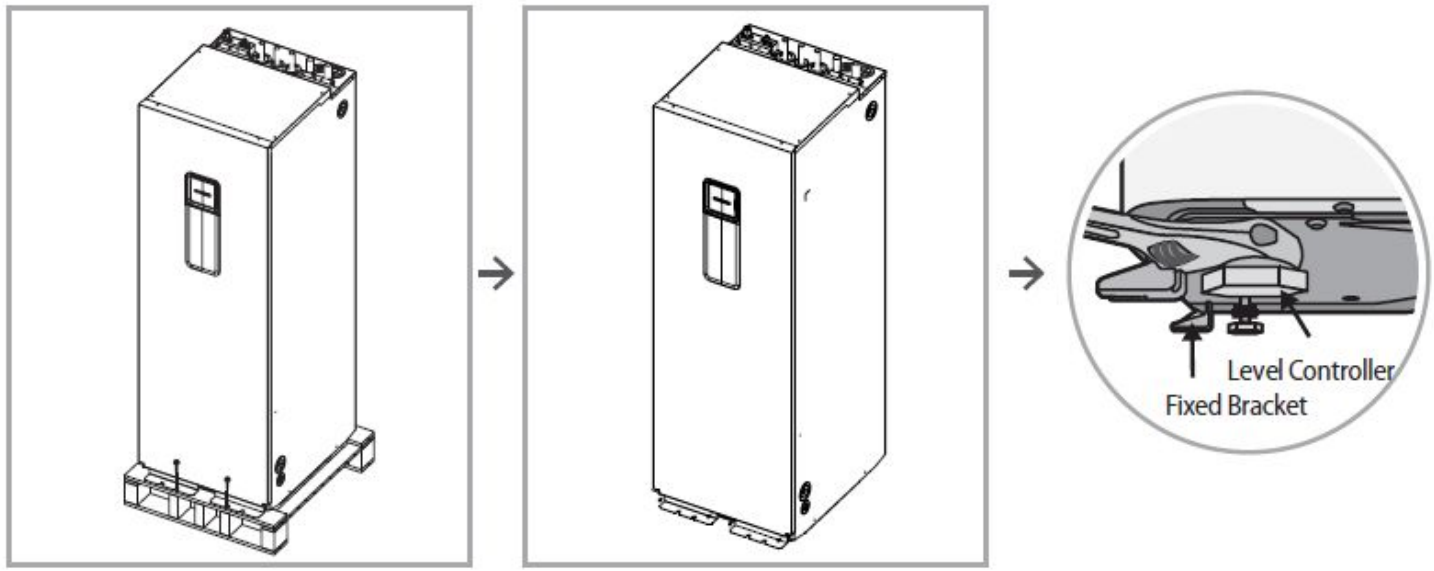


Installation information

■ Base construction and installation of the Tank hydro unit

Manufacturer is not responsible for the damage occurred by not following the installation standards.

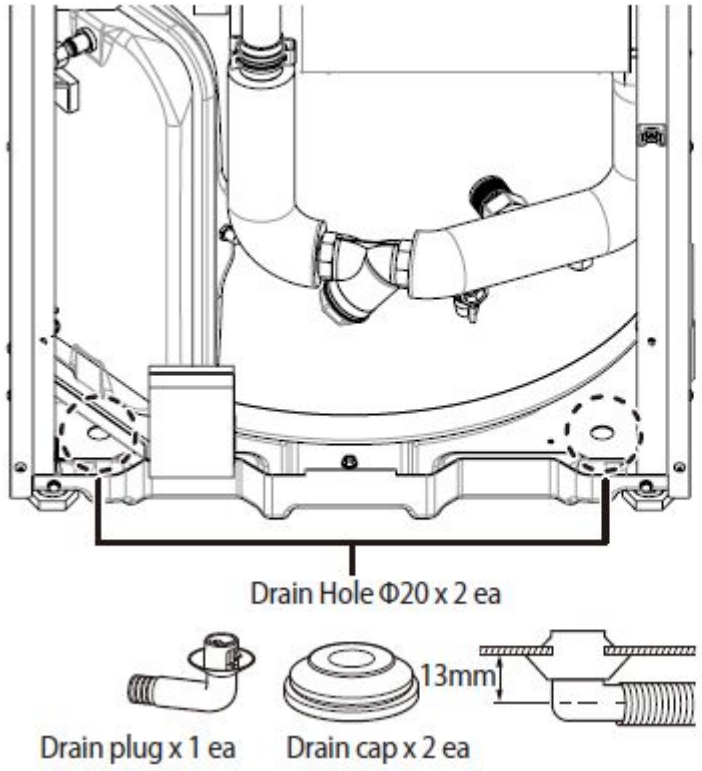
1. Considering the vibration and weight of the Tank hydro unit, strength of the base ground must be strong enough to prevent noise and the top part of the base ground has to be flat.Adjust the level controller to make fixed controller has to be min.10 mm higher than level controller.
2. Base ground should be 1.5 times larger than the bottom of the Hydro unit.
3. When concrete construction for Tank hydro unit installation is completed, install an anti-vibration pad(t=20 mm or more) or an anti-vibration frame(vibration transmissibility=5 % and below) to prevent vibration of the outdoor unit from transferring to the base ground.

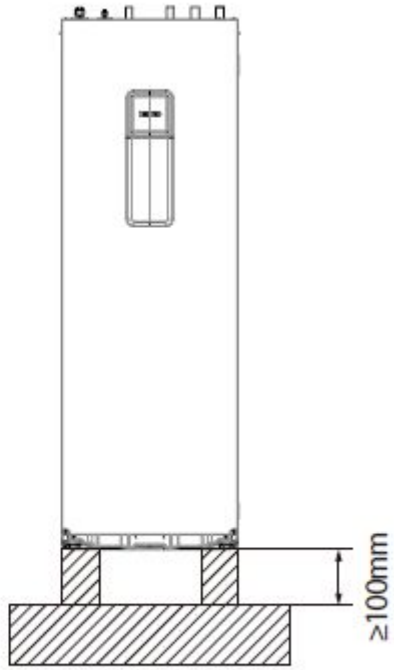


Installation information

■ Drain Work

- In the cooling operation, defrost water may be produced from the pipes or tank.
- Produced defrost water must be drained through the drain hole.
- When the drain plug is used, make sure that it is located at a height of 100 mm or more from the floor.
- When the drain plug is used, make sure to install it at one of the positions marked in the figure below.
- When the drain plug is not used, make sure to plug it with the drain cap.



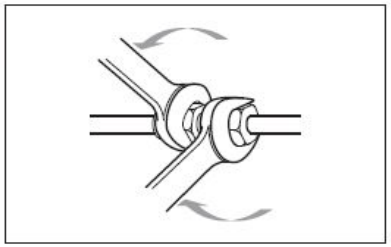


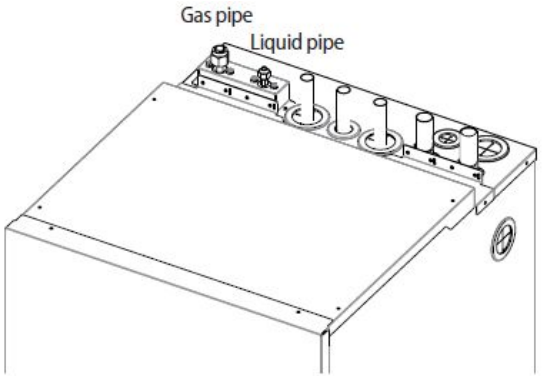
Charging a water into the system

■ Refrigerant pipe work

For all guide lines, specifications regarding refrigerant pipe work between the indoor unit and the outdoor unit,

	Gas pipe (O.D.)	Liquid pipe (O.D.)
Indoor unit	15.88 mm (5/8 inch)	6.35 mm (1/4 inch)
Outdoor unit	15.88 mm (5/8 inch)	6.35 mm (1/4 inch)





Outer diameter [mm(inch)]	Torque (N•m)
ø6.35 (1/4")	14~18
ø9.52 (3/8")	34~42
ø12.70 (1/2")	49~61
ø15.88 (5/8")	68~82
ø19.05 (3/4")	100~120

CAUTION

- When connecting the refrigerant pipes, always use 2 wrenches/spanners for tightening or loosening nuts. If not, piping connections can be damaged.

Charging a water into the system

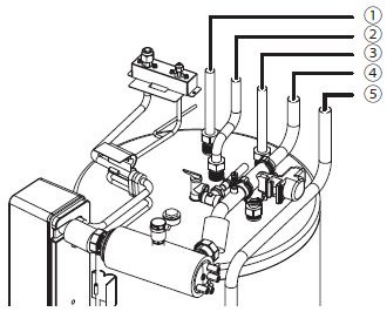
■ Water pipe work

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

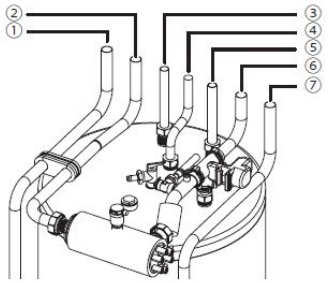
The hot and cold water supply connections are clearly marked on the unit with labels. And service valves are provided.

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 3.0 bar.
- 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.



	No.	Name	Size	Conncetions
Split Hydro unit	①	Hot water outlet	ø22, T1.0, Copper	Crimp pipe fitting or welding
	②	Sencondary return	ø22, T1.0, Copper	
	③	Cold water inlet	ø22, T1.0, Copper	
	④	Space heating outlet	ø28, T1.2, Copper	
	⑤	Space heating inlet	ø28, T1.2, Copper	



	No.	Name	Size	Conncetions
Mono Hydro unit	①	Outdoor outlet	ø28, T1.2, Copper	Crimp pipe fitting or welding
	②	Outdoor inlet	ø28, T1.2, Copper	
	③	Hot water outlet	ø22, T1.0, Copper	
	④	Sencondary return	ø22, T1.0, Copper	
	⑤	Cold water inlet	ø22, T1.0, Copper	
	⑥	Space heating outlet	ø28, T1.2, Copper	
	⑦	Space heating inlet	ø28, T1.2, Copper	

Charging a water into the system

■ Charging a water into the system

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.

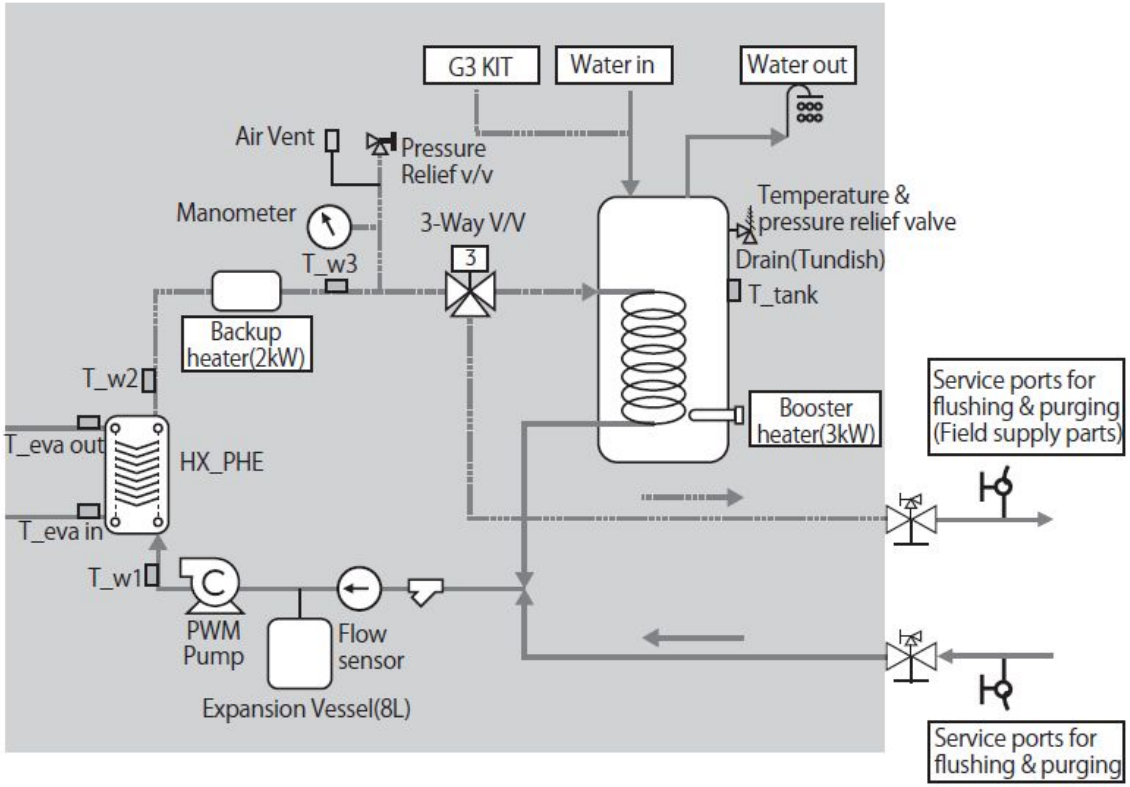
After installations, Commissioning should be performed by qualified representatives.
Unless flushing and air-purging works are performed adequately, It might result in malfunctions.

Flushing unit (or purging cart)

Charging a water into the system

■ Charging a water into the system (Caution !!)

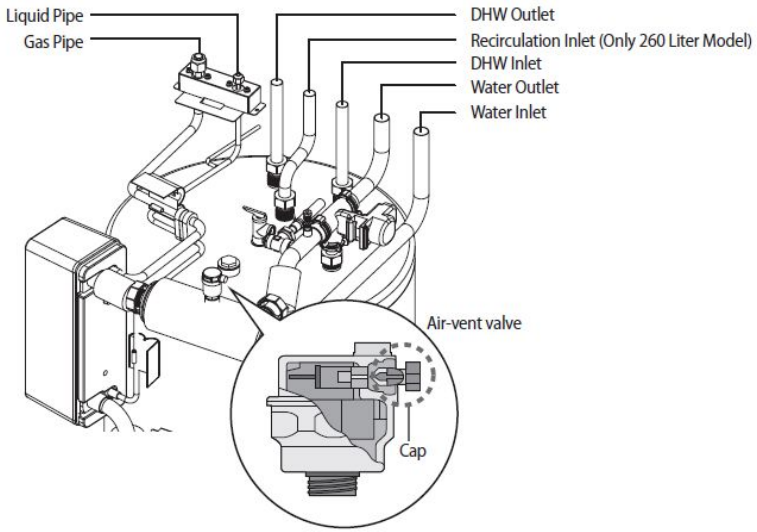
- Check and clean strainer periodically.
- Replace strainer when necessary.
- Its recommended that you flush the system for 4 hours minimum once a per annum.
- Use chemical cleaning agents(Begin with acid , finish with alkali).
- Install Air vents on the top of the system
- The complete water circuit, including all pipe must be insulated to prevent condensation forming on the surface of the pipe and heat loss to external environment.



Charging a water into the system

■ Charging a water into the system (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.



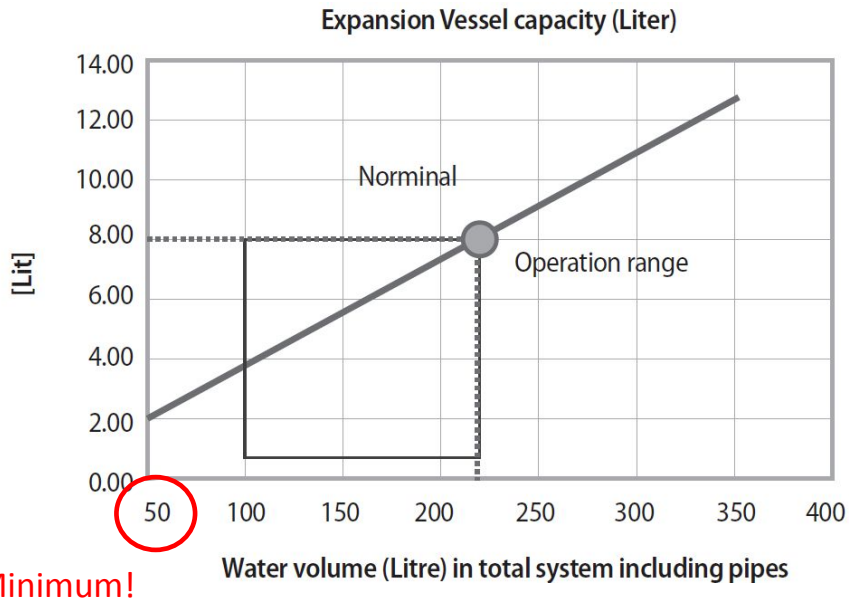
Charging a water into the system

How to choose an 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.
- Improper setting of the expansion vessel pre-pressure will make malfunction of the system.

  Therefore, the pre-pressure should be adjusted by a licensed installer.



Minimum!

Calculating the pre-pressure of the expansion vessel

$$Pg = (\frac{H}{10} + 0.3)$$

Pg:	Pre-Pressure [bar]
H:	Maximum installation height difference

Installation Height Difference	Water Volume	
	< 220 Litres	> 220 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.

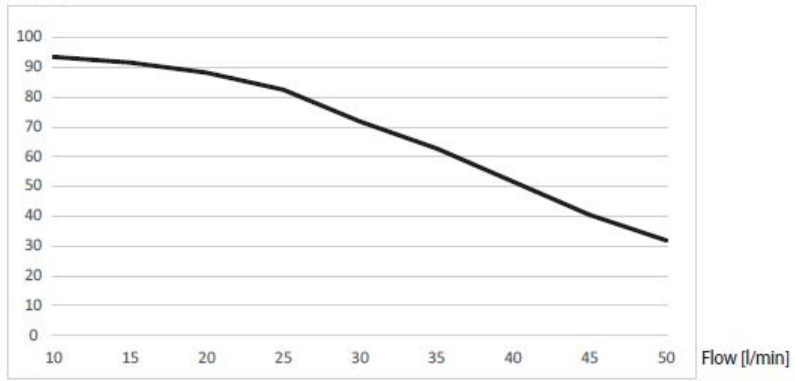
Charging a water into the system

How to choose a water pump

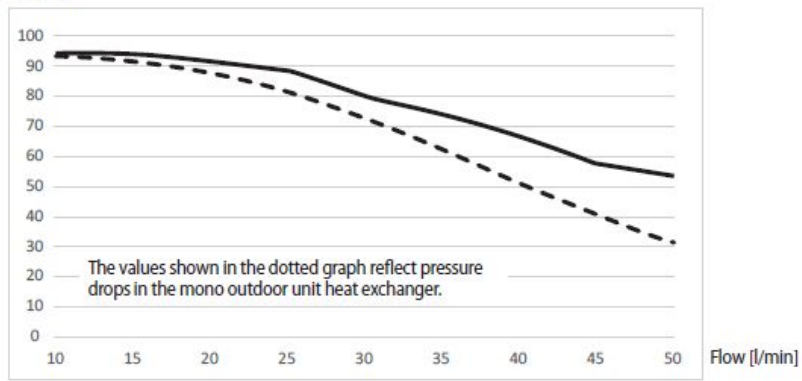
The illustration below shows the external static pressure of the unit depending on the water flow and the pump setting.

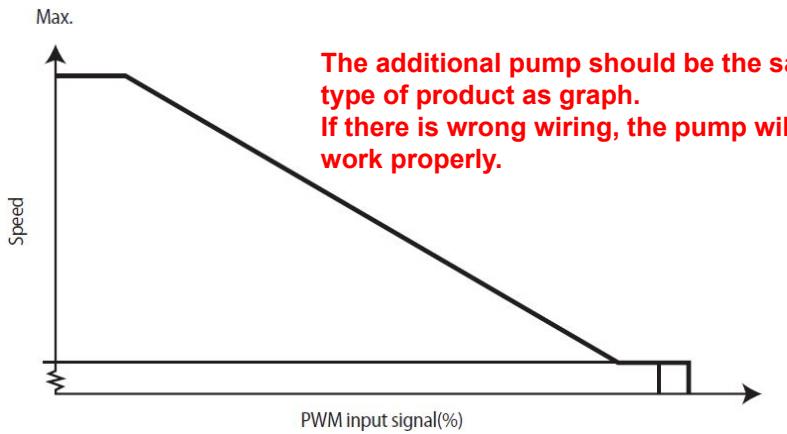
When ESP is not enough, additional pump should be installed. In this case, install the PWM control external type pump (Heating type) additionally.

AE***RNWS**



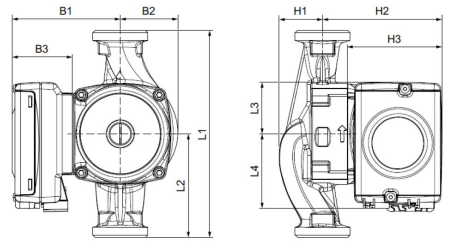
AE***RNWM**





The additional pump should be the same type of product as graph.
If there is wrong wiring, the pump will not work properly.

ALL Model : GRUNDFOS UPMM 25-9.5 (Heating Type)



UPMM 25-9.5

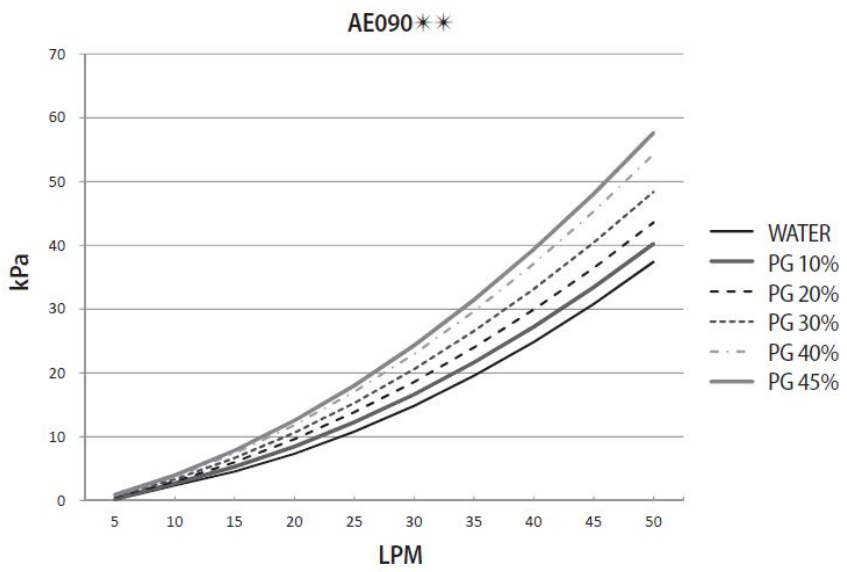
L1	L2	L3	L4	B1	B2	B3	H1	H2	H3
130	65	45	65	94	50	52	38	104	82

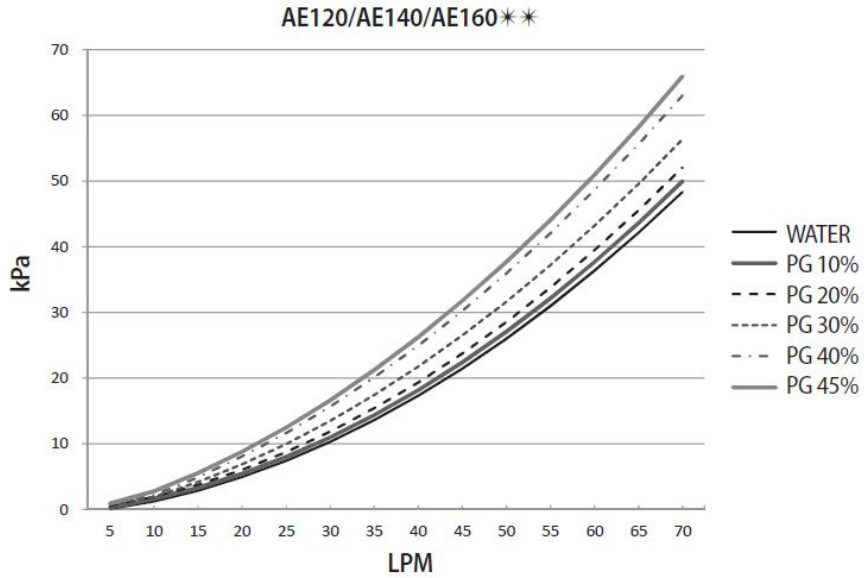
Charging a water into the system

■ Freeze protection

Freeze protection solutions must use propylene glycol with a toxicity rating of Class 1 as listed in Clinical Toxicology of Commercial Products, 5th Edition.

• Ethylene glycol is toxic and must not be used in the primary water circuit in case of any cross-contamination of the potable circuit.





※ Changing Glycol concentration can cause pressure drop of the system and it can reduce water flow rate.

Freezing Points of Propylene Glycol – Water Mixtures			
Propylene Glycol [wt. %]	Freezing Point [°C]	Propylene Glycol [wt. %]	Freezing Point [°C]
0	0	36	-18
10	-3	40	-20
20	-7	43	-23
30	-12	48	-29

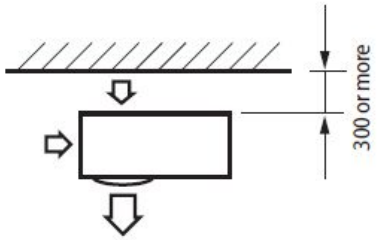
Split outdoor unit

- Installation information
- Wiring

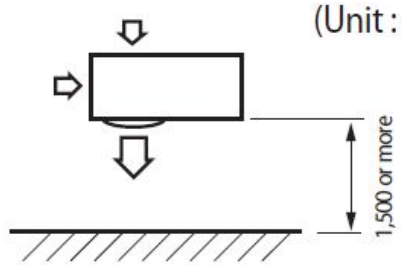
Installation information

■ Space requirements

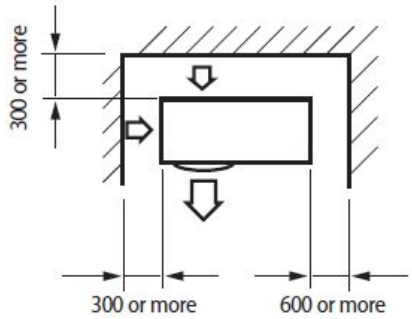
(Unit : mm)



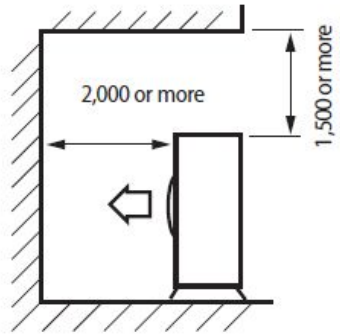
✻ When the air outlet is opposite the wall



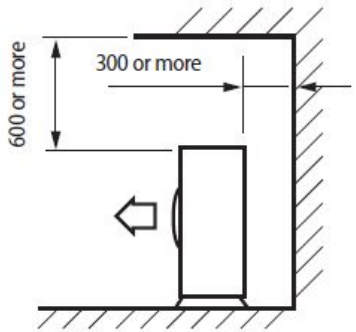
✻ When the air outlet is towards the wall



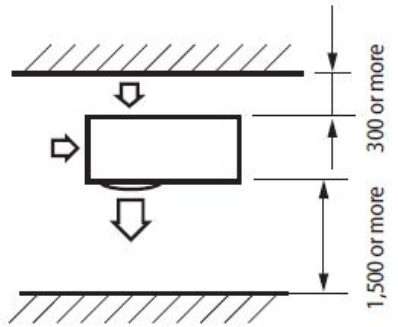
✻ When 3 sides of the outdoor unit are blocked by the wall



✻ The upper part of the outdoor unit and the air outlet is towards the wall



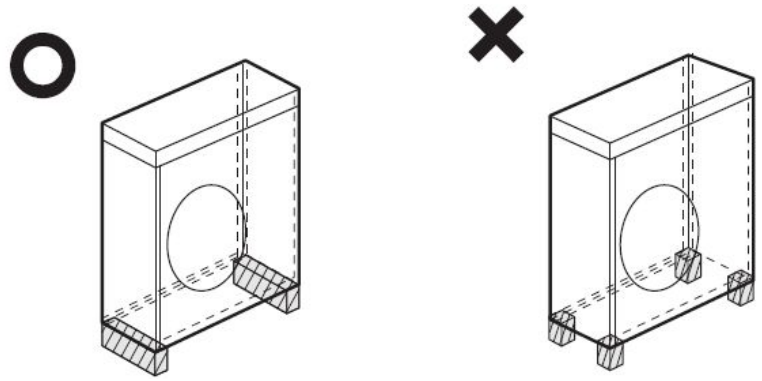
✻ The upper part of the outdoor unit and the air outlet is opposite the wall

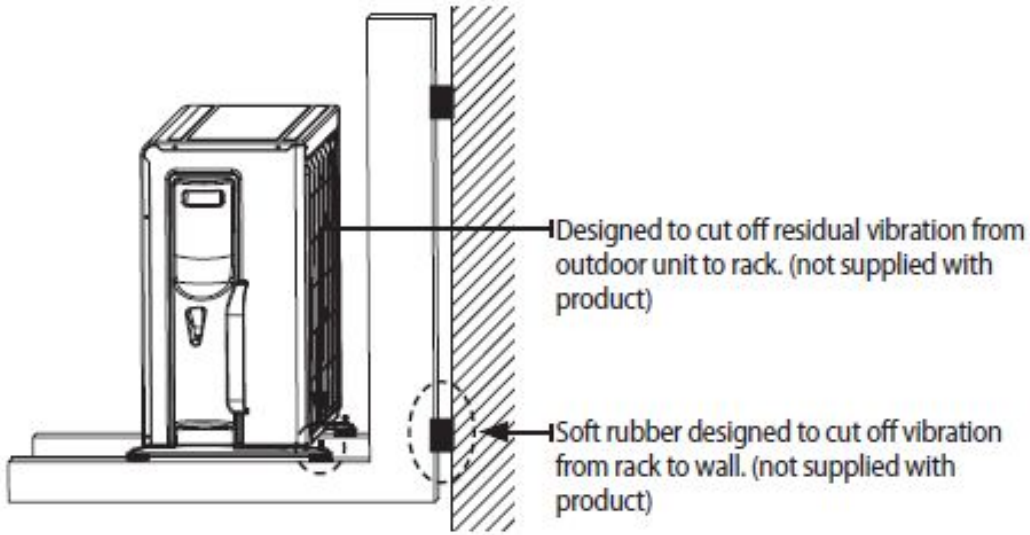


✻ When front and rear side of the outdoor unit is towards the wall

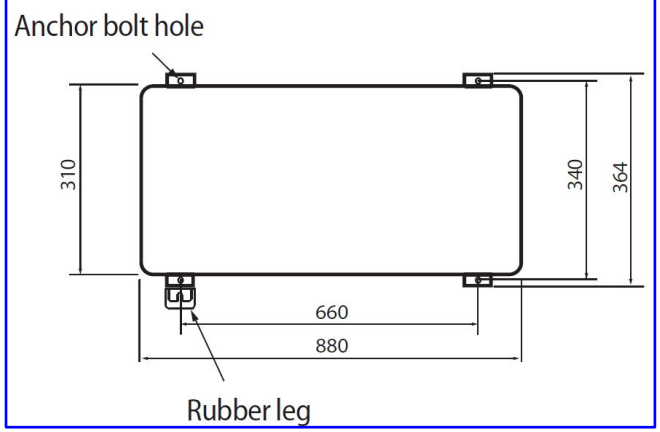
Installation information

■ Base and anchor bolts

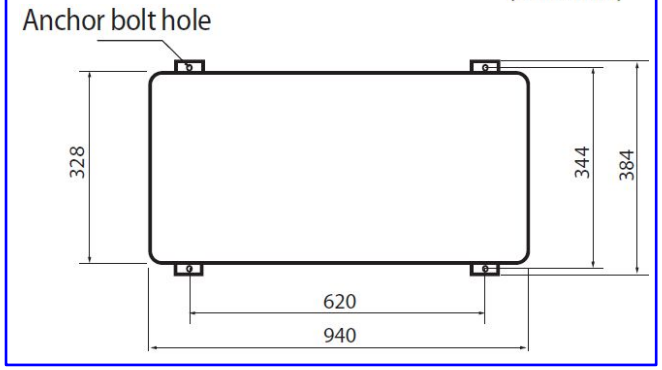


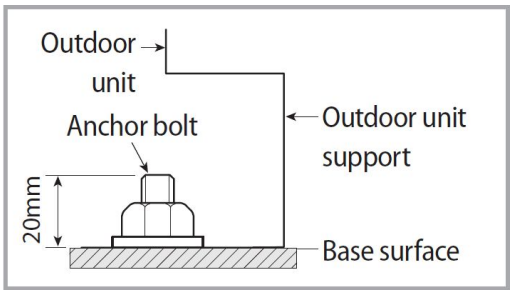


AE040/050/060RX**EG (Unit : mm)



AE080/090/120/160RXYD*G (Unit : mm)





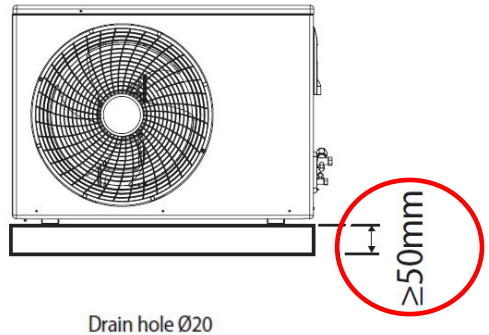
Installation information

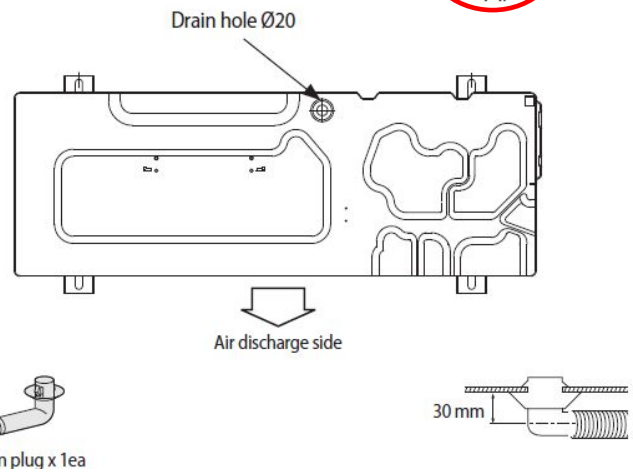
■ Drainage

In case there is not enough space for drainage of the unit, additional drain works are required.

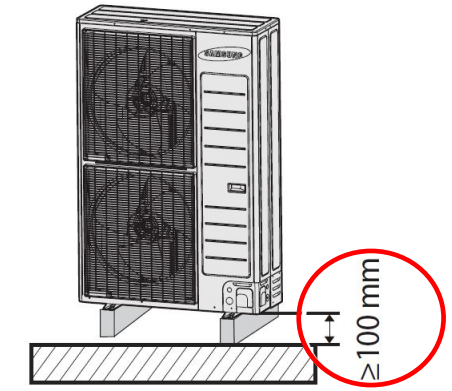
- Make space more than ** between the outdoor unit and the ground for installation of the drain hose.
- Insert the drain plug into the hole on the bottom of the outdoor unit.
- Connect the drain hose to the drain plug.
- Make sure dusts or small branches should not go into the drain hose.
- Cover other drain holes which are not connected to drain plug with drain caps.

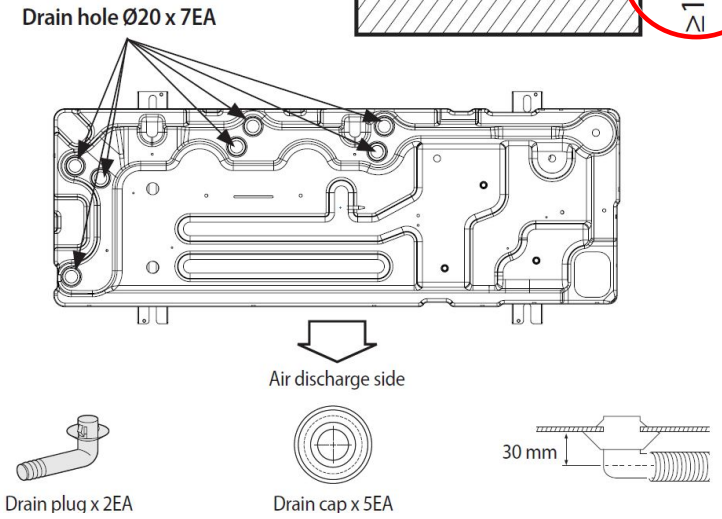
AE040/060JXEDEH





AE090/120/140/160JXED*H

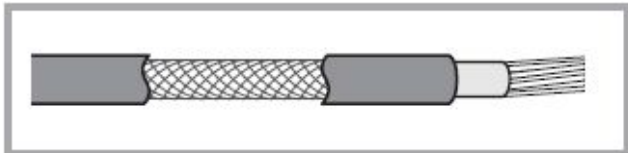




Wiring

- For Power Cable, use the grade H07RN-F or H05RN-F materials.

- When installing the indoor unit, outdoor unit use the double shielded (Tape aluminium / polyester braid + copper) cable of FROHH2R type.



Outdoor Unit	Rated		Voltage Range		MCA	MFA
	Hz	Volts	Min	Max	Min Circuit Amps	Max Fuse Amps
AE040RXEDEG	50	220-240	198	264	16A	20 A
AE060RXEDEG	50	220-240	198	264	16 A	20 A
AE090RXEDEG	50	220-240	198	264	22 A	27.5 A
AE090RXEDGG	50	380-415	342	457	10 A	16.1 A

Power supply	Max/Min (V)	Communication cable
1Φ, 220-240V, 50Hz	± 10 %	0.75 ~ 1.5 mm^2, 2 wires
3Φ, 380-415V, 50Hz		

Mono outdoor unit

- Installation information
- Wiring

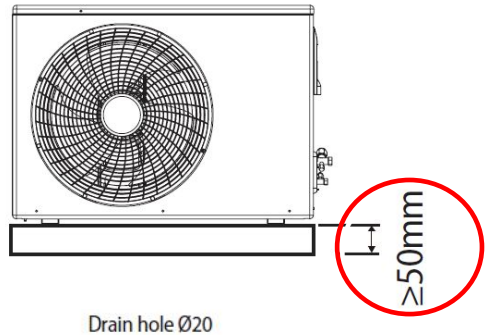
Installation information

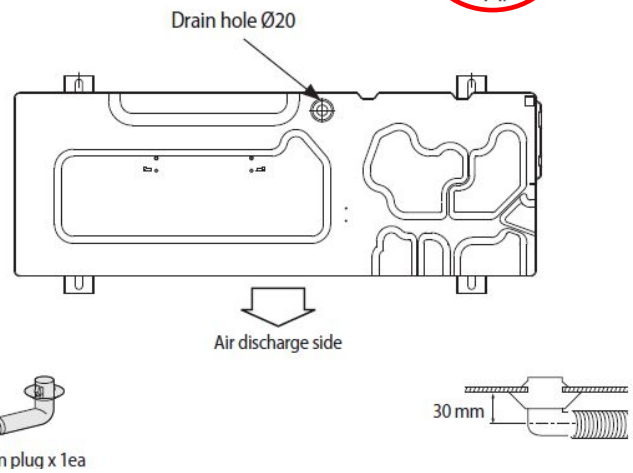
■ Drainage

In case there is not enough space for drainage of the unit, additional drain works are required.

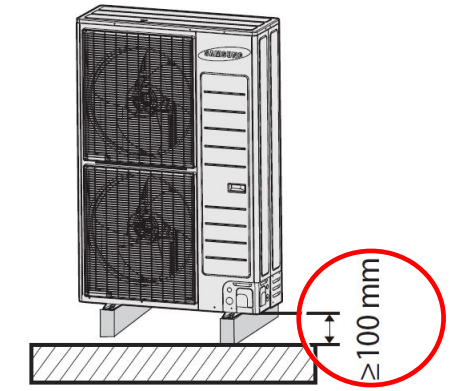
- Make space more than ** between the outdoor unit and the ground for installation of the drain hose.
- Insert the drain plug into the hole on the bottom of the outdoor unit.
- Connect the drain hose to the drain plug.
- Make sure dusts or small branches should not go into the drain hose.
- Cover other drain holes which are not connected to drain plug with drain caps.

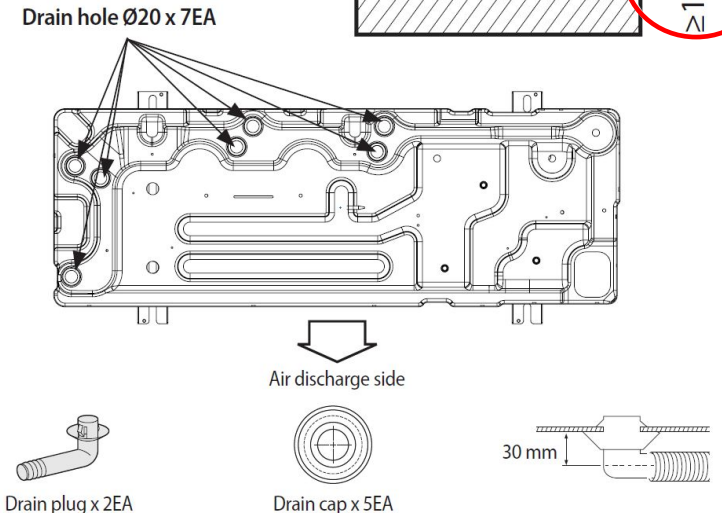
AE040/060JXEDEH





AE090/120/140/160JXED*H

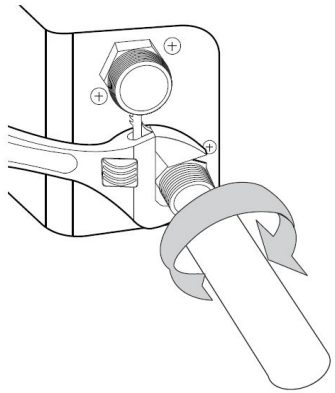




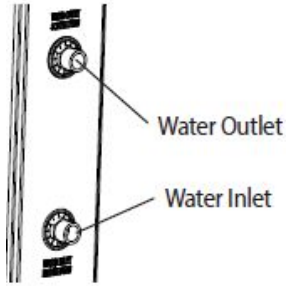
Installation information

■ Water pipe connection

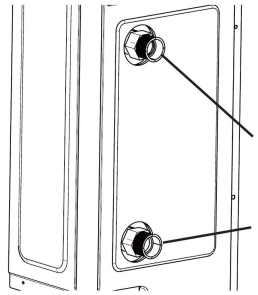
- Allowable water pressure of outdoor unit is maximum 3.0 bar (static Pressure).
- Be careful not to deform the unit piping by using excessive force when connecting the piping. Deformation of the piping can cause the unit to malfunction.
- Always use two wrenches (spanners) for tightening or loosening the water connections, and tighten connections with a torque wrench as specified in below table. If not, connections and parts can be damaged and leaks.

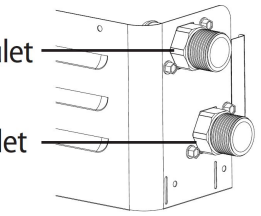


Name	Tightening Torque	
BSPP1	350~380 kgf•cm	34 ~ 37 N•m
Flow Switch	72~82 kgf•cm	7 ~ 8 N•m



AE090✳✳





AE120/140/160✳✳

Charging a water into the system

■ Charging a water into the system (Caution !!)

- Installation of Filter / Strainer is mandatory for water system. The Filter or Strainer shall be located in front of inlet pipe of PHE. (Filter mesh : #50) The strainer must be cleaned after flushing the pipes, and it should be cleaned periodically. Replace strainer when necessary.
- In case that the water piping would be located in a higher position than the air vent of the unit, it is necessary to add additional ones in the highest position of water circuit. The air vent should be located both where water temperatures are the highest and where the height of pipes are the highest.
- 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, as well as prevention of freezing of the outside water piping during winter time. The thickness of the sealing materials must be at least 9 mm (0.035 W/mK).
- MONO Unit does not have a pressure relief valve. The valve shall prevent abnormal water pressure from damaging the system by opening at 3.0 bar.

Strainer
Filter mesh
#50

Air vent
for water
piping

Water Pipe
Insulation

Pressure Relief
Valve

Charging a water into the system

■ Flow Sensor

 Flow sensor is not an integrated part of ODU. But the installation is essential to operate MONO Unit.

 Mono type tank integrated hydro unit is basically installed it.

 Flow sensor is provided by Samsung control kit (MIM-E03CN) as a sub component.

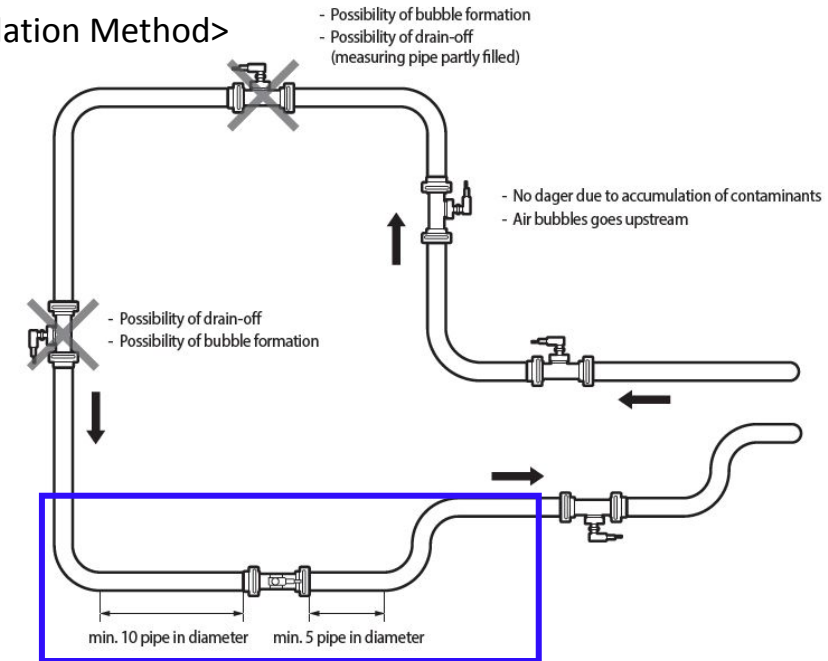
 Flow sensor shall be installed described by installation manual of Mono unit or Control kit.

 All electric wiring works shall be implemented by manuals which Samsung provided.

Before completing the installation works, make sure to check if the flow switch is installed in horizontal and if flow direction is in parallel with pipe direction.

(Straight length of In pipe of flow sensor shall have 10 times length in diameter and Straight length of Out pipe of flow sensor shall have 5 times length in diameter)

<Installation Method>



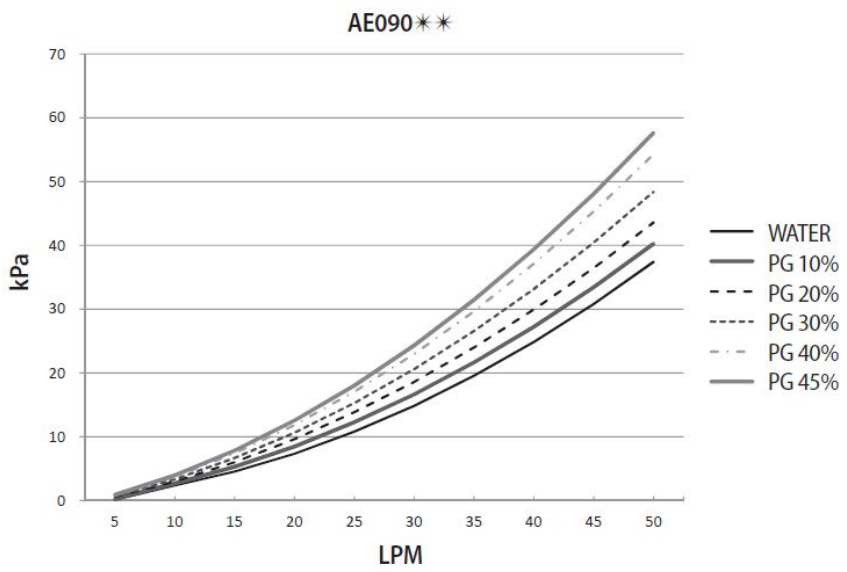
Flow Sensor

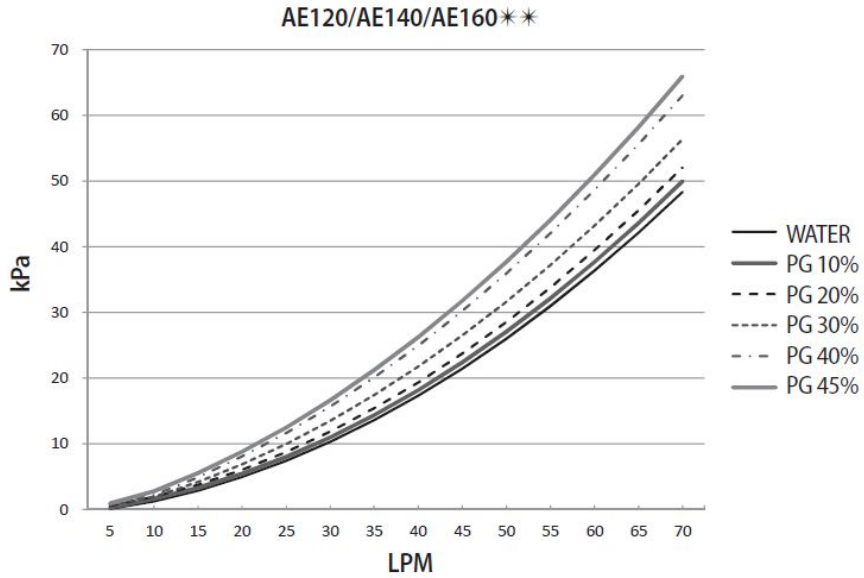
Charging a water into the system

■ Freeze protection

Freeze protection solutions must use propylene glycol with a toxicity rating of Class 1 as listed in Clinical Toxicology of Commercial Products, 5th Edition.

• Ethylene glycol is toxic and must not be used in the primary water circuit in case of any cross-contamination of the potable circuit.





※ Changing Glycol concentration can cause pressure drop of the system and it can reduce water flow rate.

Freezing Points of Propylene Glycol – Water Mixtures			
Propylene Glycol [wt. %]	Freezing Point [°C]	Propylene Glycol [wt. %]	Freezing Point [°C]
0	0	36	-18
10	-3	40	-20
20	-7	43	-23
30	-12	48	-29

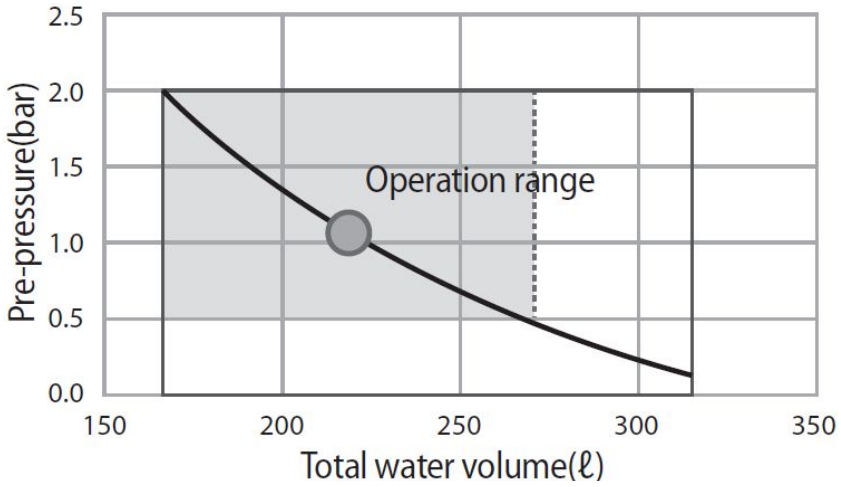
Charging a water into the system

How to choose a 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.
- Improper setting of the expansion vessel pre-pressure will make malfunction of the system.

  Therefore, the pre-pressure should be adjusted by a licensed installer.



When Expansion vessel has a capacity 8 liters and 1bar pre-charged:

Water volume of total system for reliable performance is minimum 50liters.

Calculating the pre-pressure of the expansion vessel

$$Pg = (\frac{H}{10} + 0.3)$$

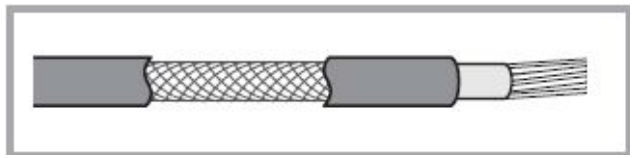
Pg:	Pre-Pressure [bar]
H:	Maximum installation height difference

Installation Height Difference	Water Volume	
	< 220 Litres	> 220 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.

Wiring

 For Power Cable, use the grade H07RN-F or H05RN-F materials.

 When installing the indoor unit, outdoor unit use the double shielded (Tape aluminium / polyester braid + copper) cable of FROHH2R type.



Outdoor Unit	Rated		Voltage Range		MCA	MFA
	Hz	Volts	Min	Max	Min Circuit Amps	Max Fuse Amps
AE050RXYDEG	50	220-240	198	264	16A	20 A
AE080RXYDEG	50	220-240	198	264	22 A	27.5 A
AE120RXYDEG	50	220-240	198	264	28 A	35 A
AE160RXYDEG	50	220-240	198	264	32 A	40 A
AE080RXYDGG	50	380-415	342	457	10 A	16.1 A
AE120RXYDGG	50	380-415	342	457	10 A	16.1 A
AE160RXYDGG	50	380-415	342	457	12 A	16.1 A

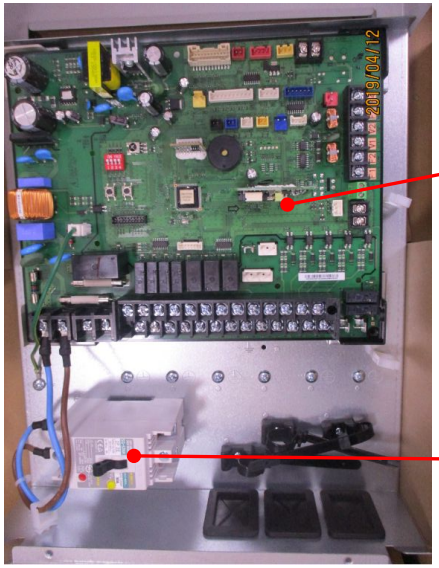
Power supply	Max/Min (V)	Communication cable
1Φ, 220-240V, 50Hz	± 10 %	0.75 ~ 1.5 mm^2, 2 wires
3Φ, 380-415V, 50Hz		

External wiring and set up with Hydro unit, Control kit

- Board features
- Information of connecting terminal block
- External contact information

Control box features

- Control kit control panel (Mono)



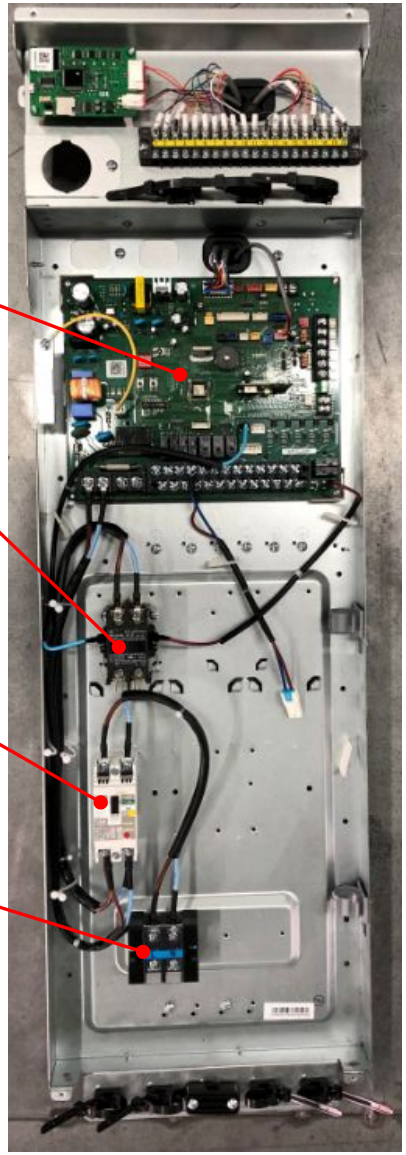
Main board

Magnet contactor for Backup heater

ELCB

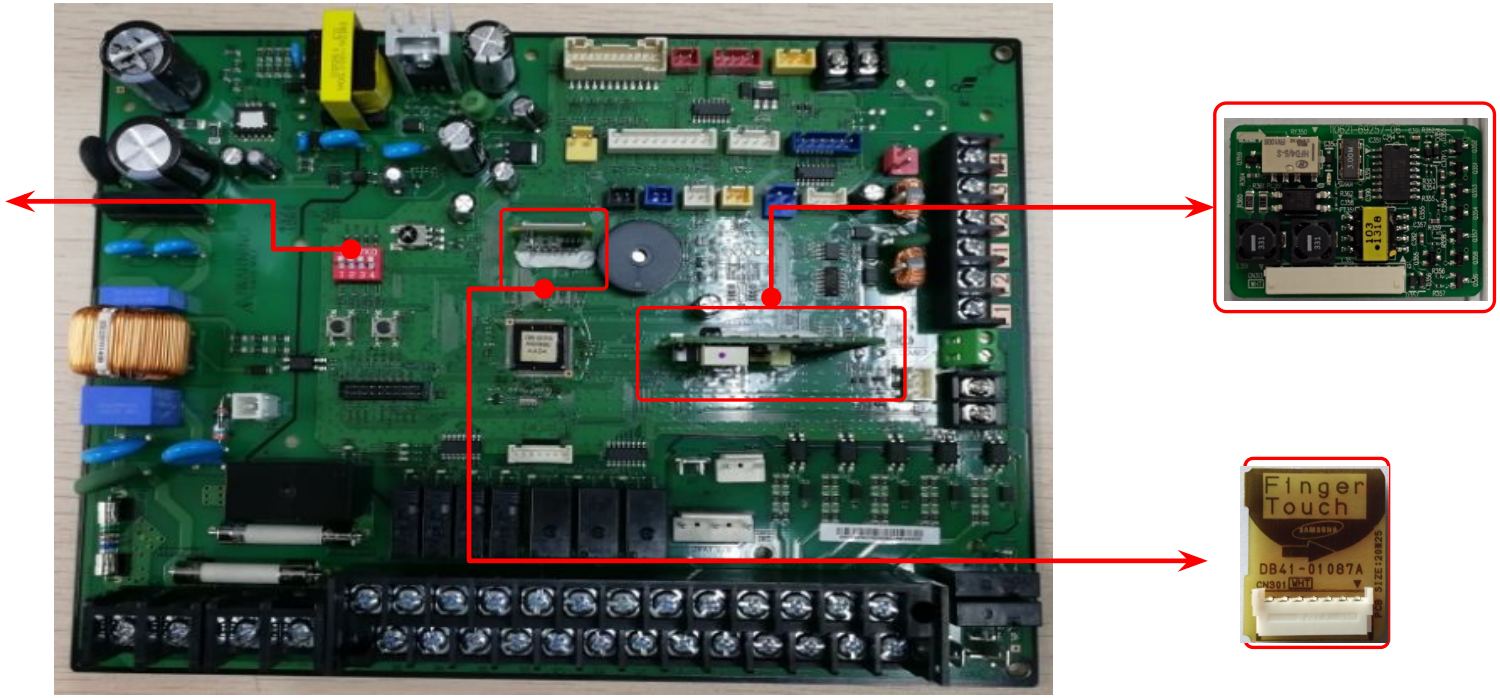
Power in/out terminal

- Hydro unit control panel (Split/Mono)



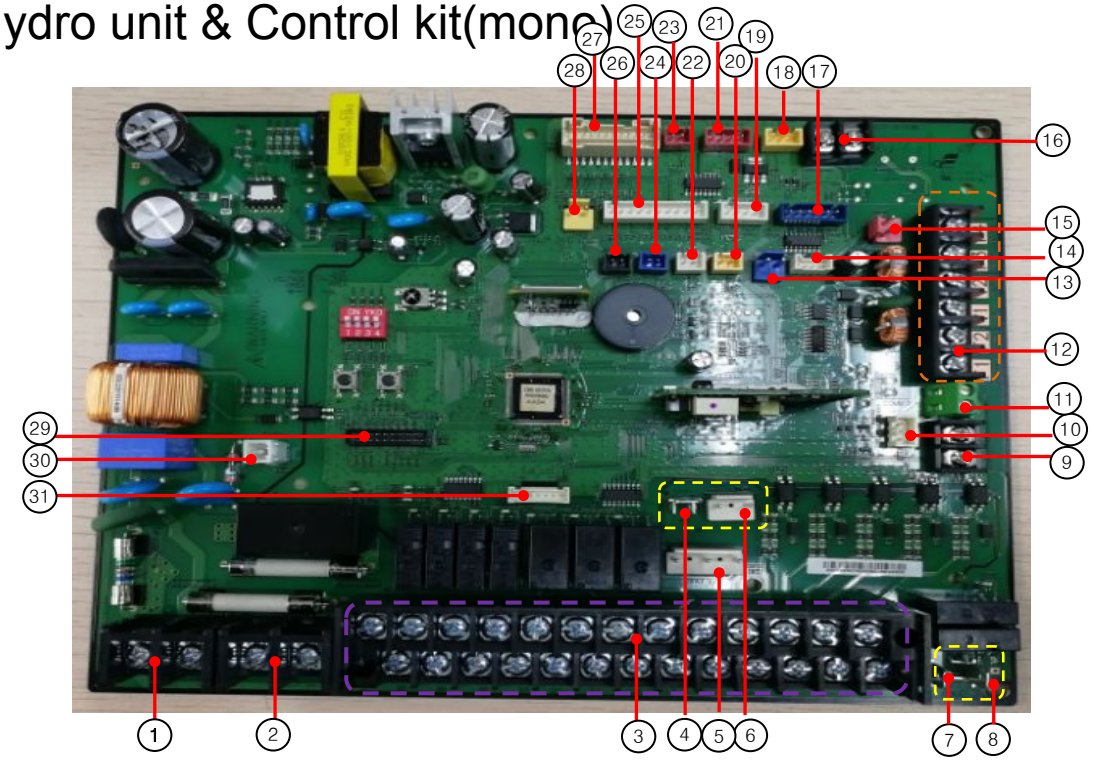
Board features

- Hydro unit / Control kit board



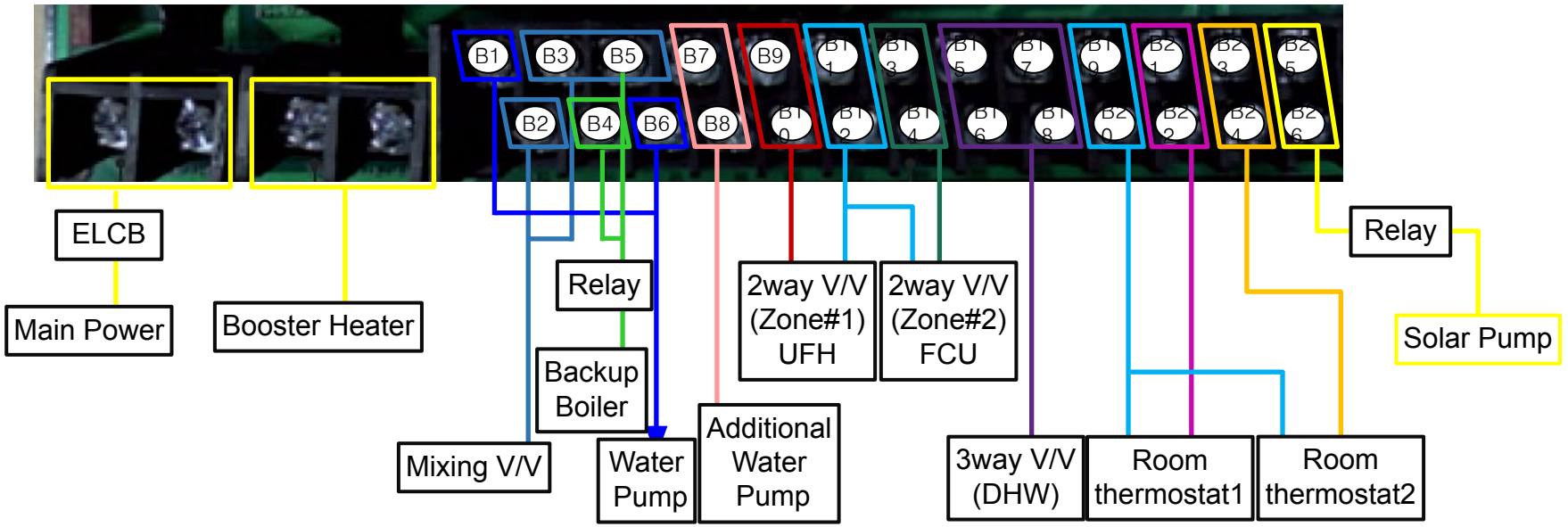
Board features

Main board of Hydro unit & Control kit(mono)



No.	Connector Description	No.	Connector Description	No.	Connector Description	No.	Connector Description
1	**Main Power** (TB-A)	9	**Water Pump SIG/GND** (CNS002)	17	**EEV** (CNS062, BLU)	25	**BUH/EVA-out/EVA-in/WTR-out/ WTR-in Temp Sensor** (CNS043, WHT)
2	**Booster Heater** (TB-A1)	10	**Water Pump SIG/GND** (CNS001,WHT)	18	**DC FAN** (CNS808, YEL)	26	**Backup heater sensor** (CNS047, BLK)
3	**External Control** (TB-B)	11	**FR Control** (CNS003,GRN)	19	**Flow sensor** (CNS057, WHT)	27	**Sensor/External Control** (CNS051, WHT)
4	**MC-COMMON** (CNP003)	12	**F1/F2, DC12V/GND, F3/F4** (TB-C)	20	Water tank sensor (CNS042, YEL)	28	**Flow switch** (CNS041, YEL)
5	**3way Valve** (CNP501)	13	**DC12V** (CNS012, BLU)	21	**Error/Comp check** (CNS081, RED)	29	**Download** (CNS301, BLK)
6	**Heater Thermostat** (CNP401, WHT)	14	**EHS Converter** (CNS202, WHT)	22	**Room sensor** (CNS044, WHT)	30	**Earth** (CNP101, WHT)
7	**MC2-A** (CNP002)	15	**Wired Remocon F3/F4** (CNS304, RED)	23	**External Control** (CNS083, RED)	31	**Sub LED PBA connection** (CNS201, WHT)
8	**MC1-A** (CNP001)	16	**PV Signal(S/G)** (CNS046)	24	**Mixing valve sensor** (CNS045, BLU)		

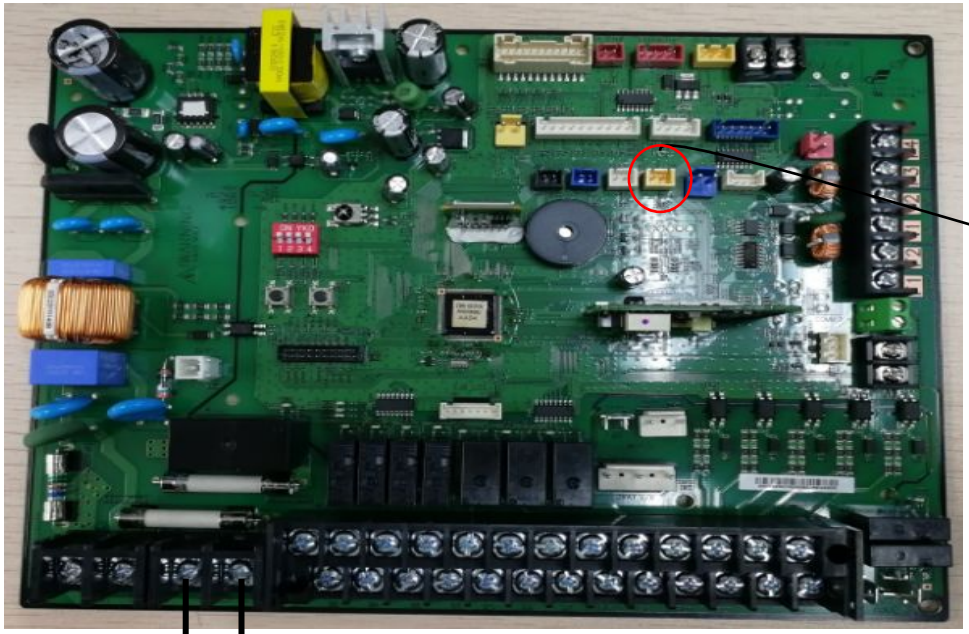
Information of connecting terminal block



Terminal No.	Function	Input /output	Max. current	Description	Remark
B1/B6	Water Pump	AC 230V output	0.5 A	Water pump operation (maximum input power of pump 100W)	Mandatory
B2/B3/B5	Mixing valve	AC 230V output	22 mA	Mixing Valve operation	Option
B4/B5	Backup Boiler	AC 230V output	10 mA	Signal output for Backup Boiler	Option
B7/B8	Water Pump	AC 230V output	0.5 A	Additional Water pump operation (maximum input power of pump 100W)	Option
B9/B10/B11/B12	2Way valve #1	AC 230V output	22 mA	2 Way Valve operation for Zone#1 (UFH)	Option
B13/B14/B11/B12	2Way valve #2	AC 230V output	22 mA	2 Way Valve operation for Zone#2 (FCU)	Option
B15/B16/B17/B18	3Way valve	AC 230V output	22 mA	3 Way Valve operation for DHW	Option
B19/B20	Thermostats	AC 230V output	22 mA	Power to external thermostat(s)	Option
B21/B22	Thermostat 1	AC 230V input	22mA	Thermostat for zone#1 (UFH) Cooling/Heating Signal	Option
B23/B24	Thermostat 2	AC 230V input	22mA	Thermostat for zone#2 (FCU) Cooling/Heating Signal	Option
B25/B26	Solar Pump	AC 230V input	10 mA	Signal input from Solar Pump / DHW Tank Thermostat	Option

External contact of Hydro unit and Control kit

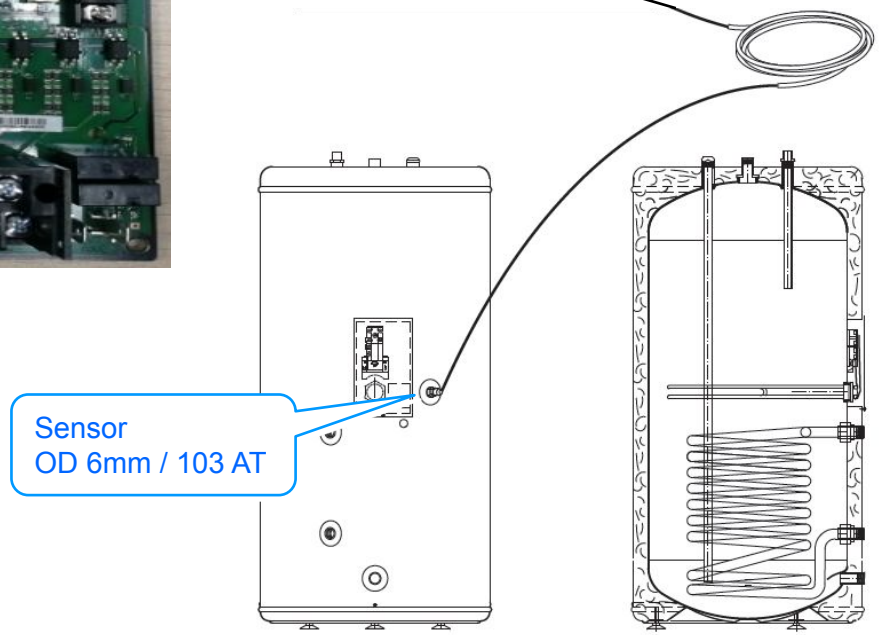
■ Booster heater (Inside of DHW tank)



Booster heater power out

Part	Specification
Terminal Block (output)	N, L of TB-A1
Connection load	Direct connection a booster heater
Output (N, L)	AC 230V (MAX 20A)

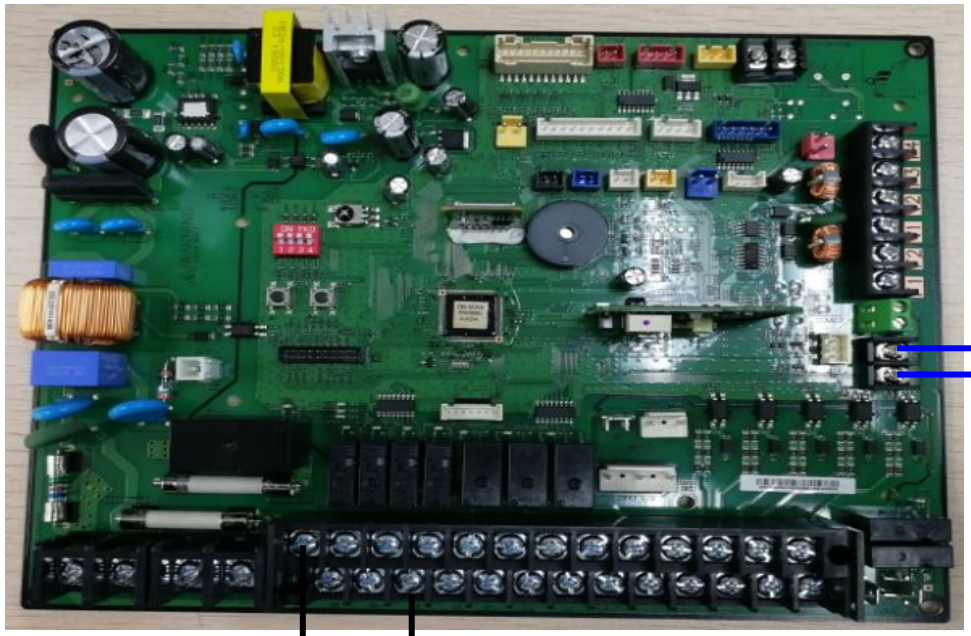
DHW Tank Temp. (15m)
CNS042(YEL)

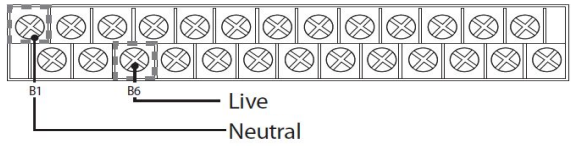


✻ Use a correct sensor pocket which is fit for the DHW tank sensor(OD Ø6).
If the gap between the supplied sensor and DHW tank sensor pocket is big, use thermal grease.

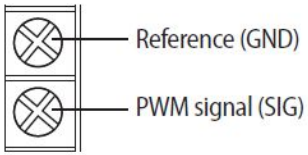
External contact of Hydro unit and Control kit

Inverter water pump and PWM





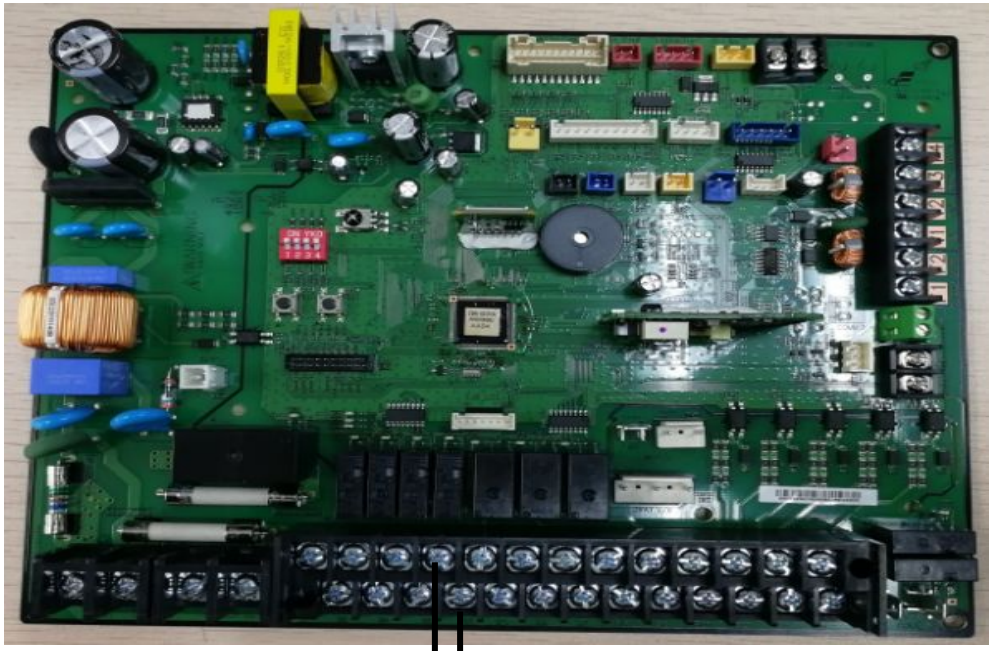
PWM signal (Inverter pump only)



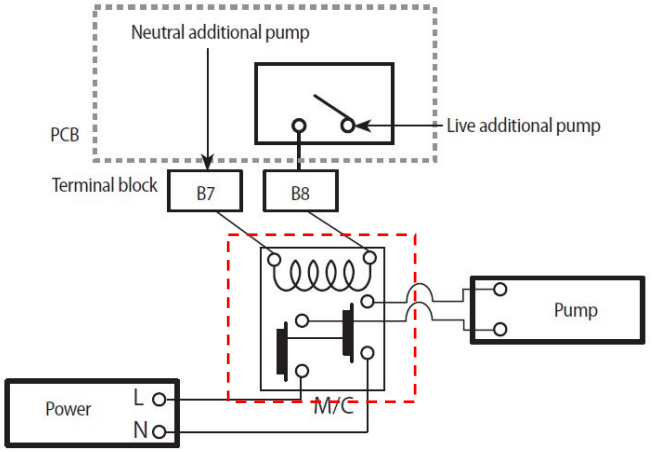
1. Inverter pump inside of Hydro unit
2. Only 1 Inverter pump can be controlled
3. Inverter pump

External contact information

■ Additional pump (Fixed)



※ When connect multi water pump to 1 port, Magnet contactor must be used to prevent electrical failure what happened in the port.



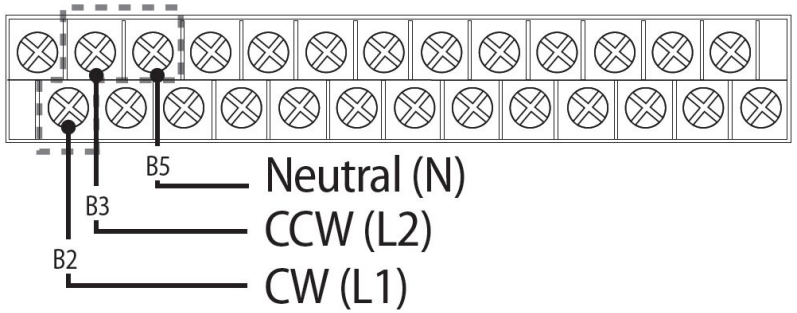
CAUTION

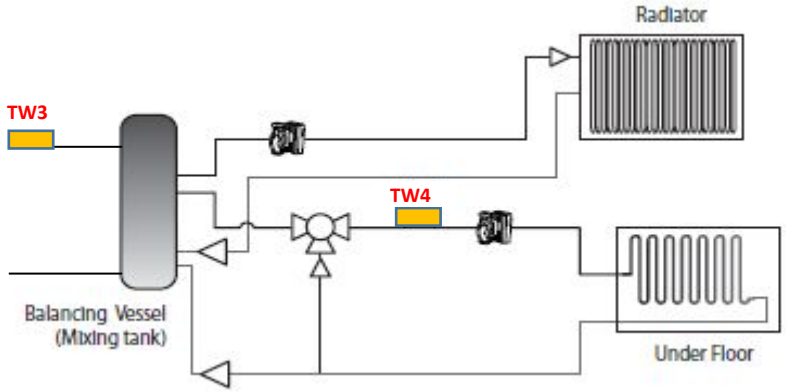
- Terminal of this product is for additional water pump and the maximum allowable current is 0.5 A.

External contact information

■ Mixing valve

※ Hydro unit or Control kit power should be turned off before the installation.





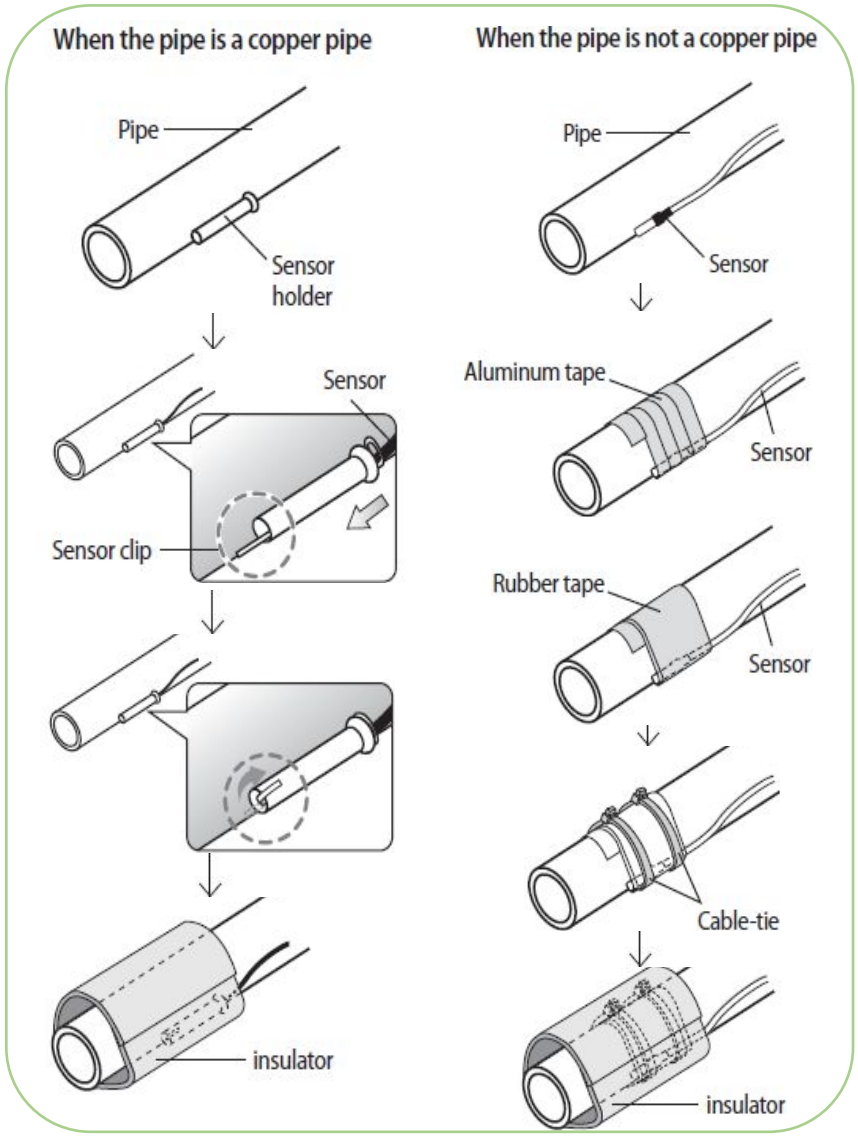
Description	No. of wires	Max. A	Thickness	Supply Scope
Mixing valve	4	22 mA	> 0.75 mm², H05RN-F or H07RH-F	Field supply (230 V~, Input)

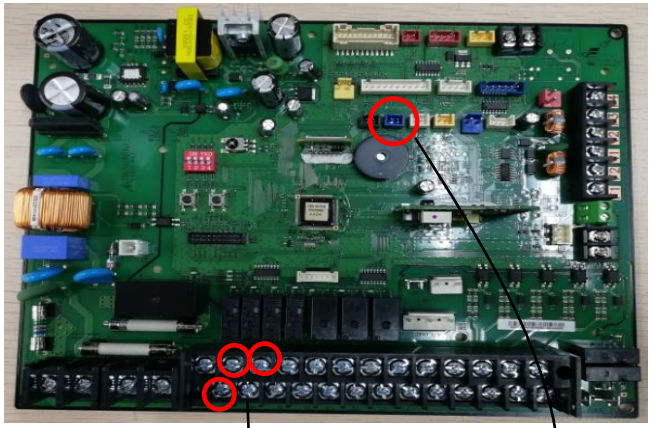
Select a mixing valve as recommended and install at the entrance position of each zone

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

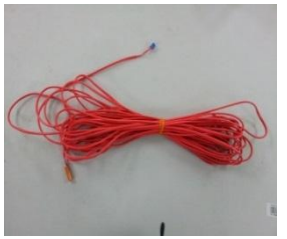
External contact information

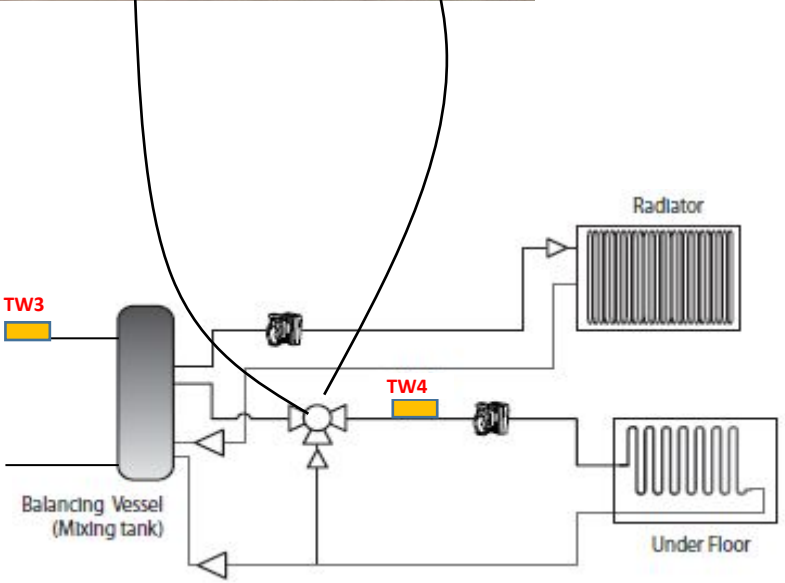
■ Mixing valve temperature sensor





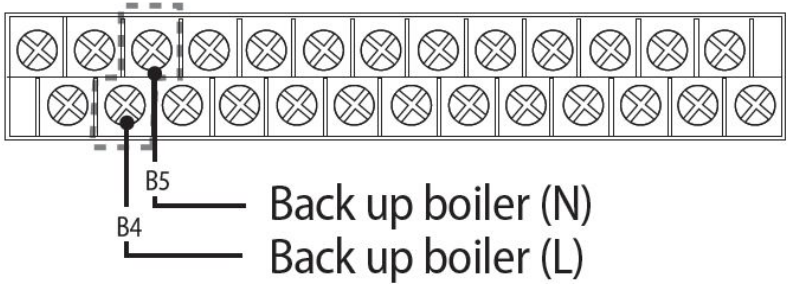
Mixing Senser
(Default, 15 m) CNS045(BLU)



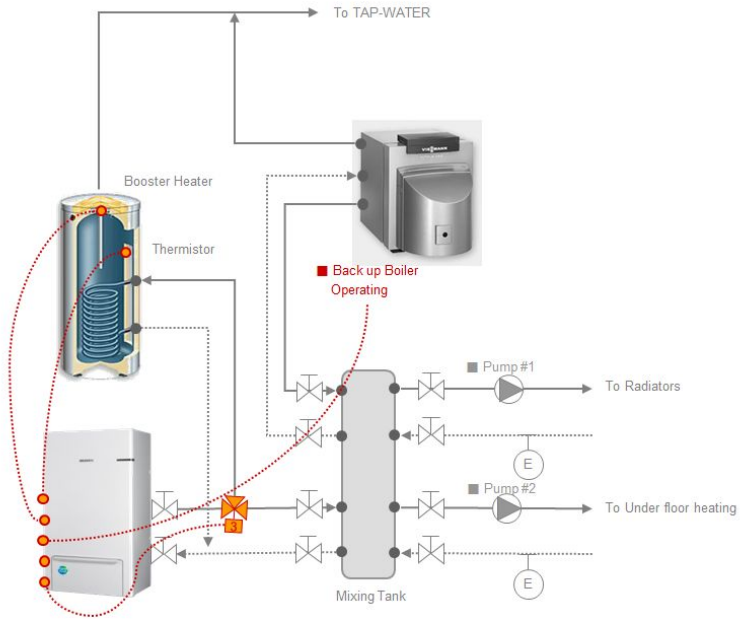


External contact information

■ Backup boiler



Description	No. of wires	Max. A	Thickness	Supply Scope
Back-up Boiler	2+ground	10 mA	0.75mm² H05RN-F or H07RN-F	Field supply (230 V~, Input)



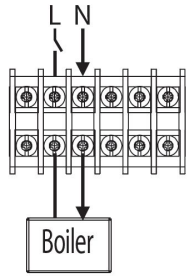
※ Control kit power should be turned off before the installation.

※ Make sure external control signal of backup boiler must be 230 Vac.

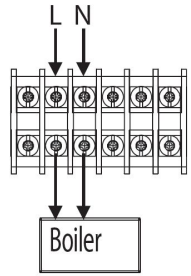
※ Heat pump does not work when the back-up boiler operate.

※ Heat pump product only supply a power which can operate the on/off switch

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

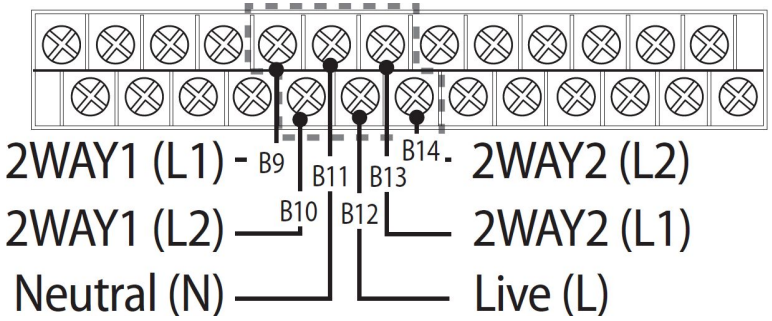


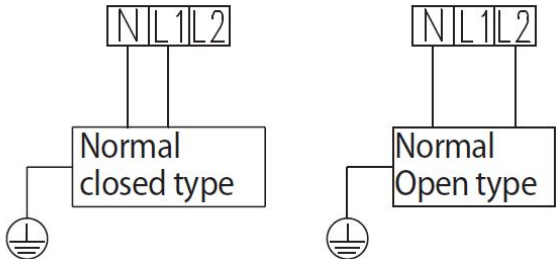
When it order to back up boiler operates (relay on)

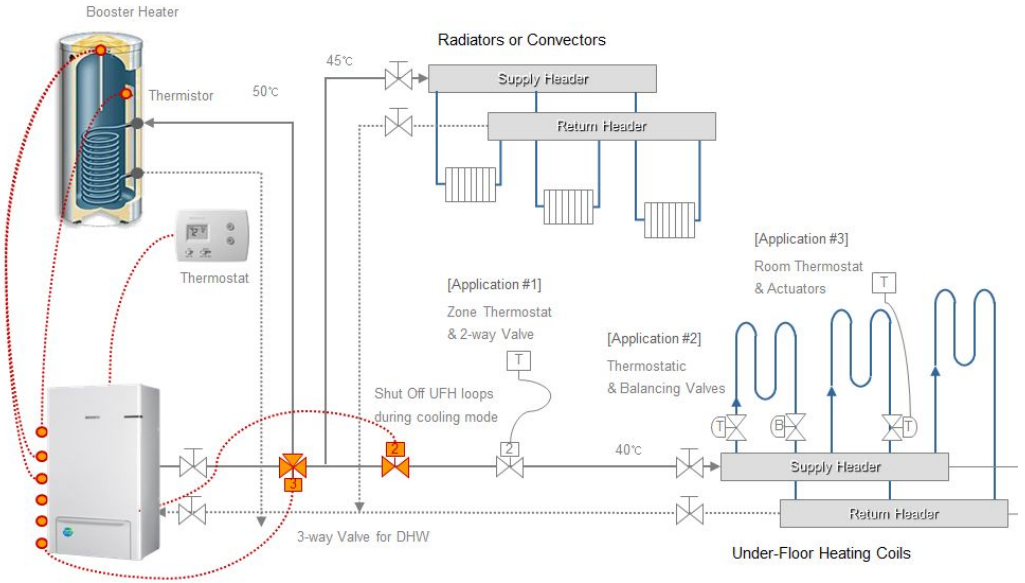


External contact information

■ 2 way valves

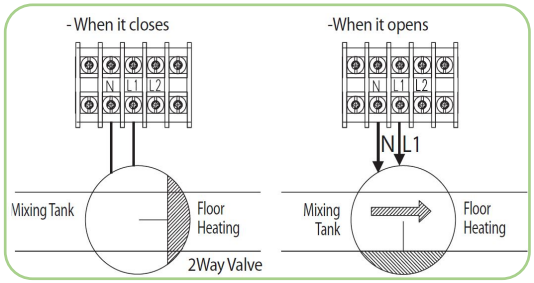




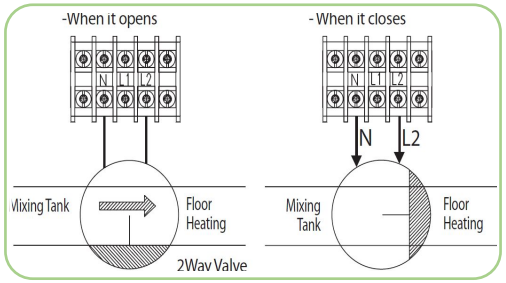


※ When outlet water temperature reach to lower than 16 °C in cooling mode, UFH loops will be close

Description	No. of wires	Max. A	Thickness	Supply Scope
Motorized 2-way valve to shut off UFH loops during cooling.	2+ground	22 mA	> 0.75 mm², H05RN-F or H07RH-F	Field supply (230 V~, Output)



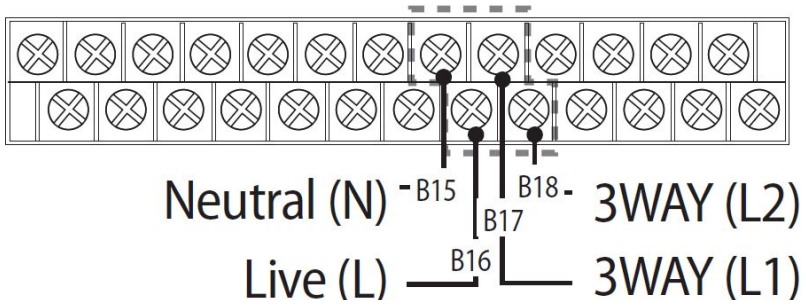
Normal Close Type



Normal Open Type

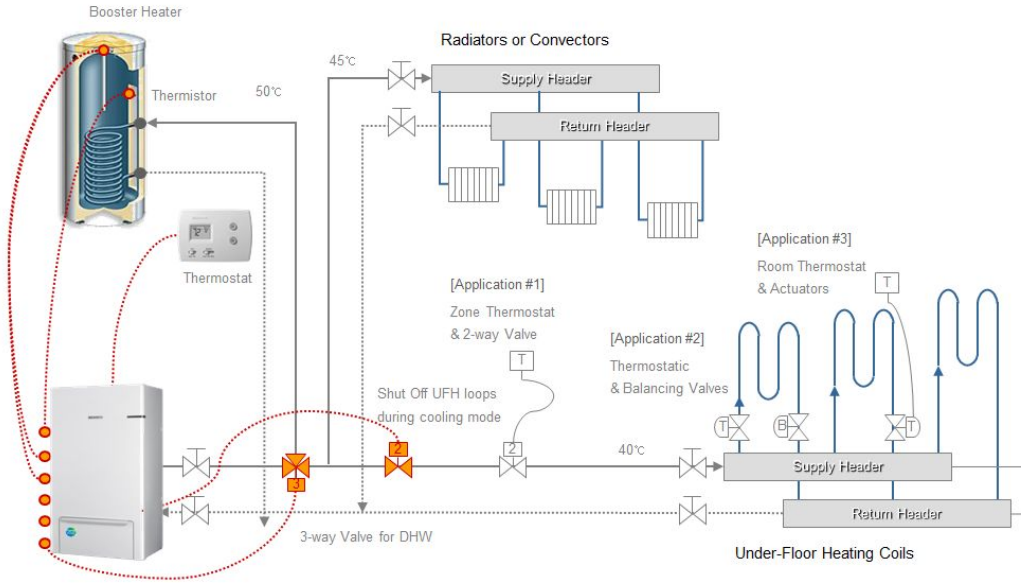
External contact information

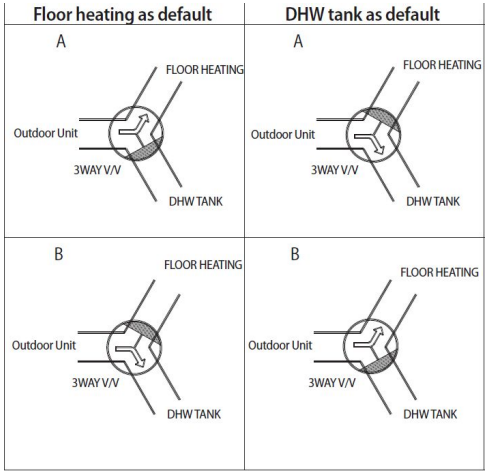
■ 3 way valve for DHW



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

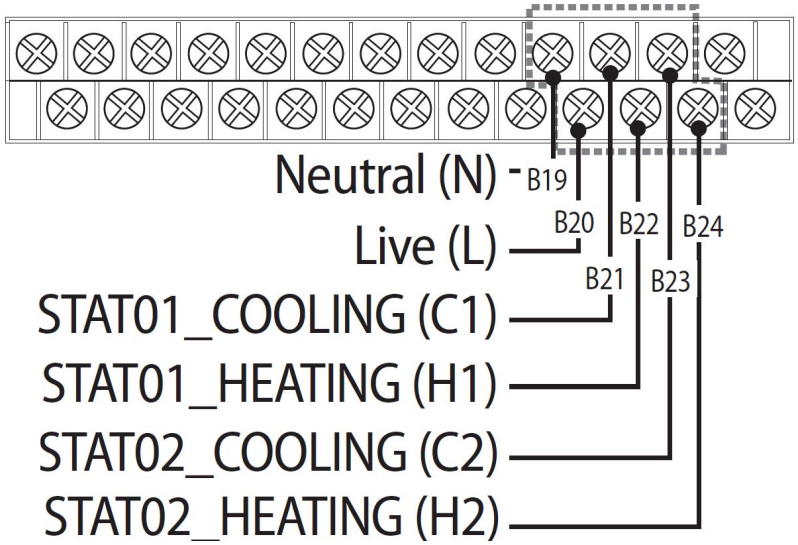
Description	No. of wires	Max. A	Thickness	Supply Scope
Diverting type 3way valve	4	22 mA	> 0.75 mm², H05RN-F or H07RN-F	Field supply (230 V~, Input)





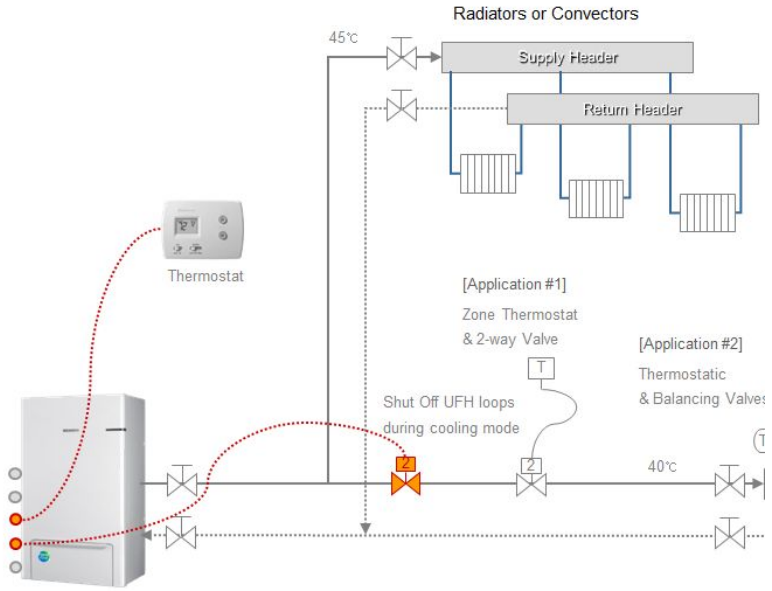
External contact information

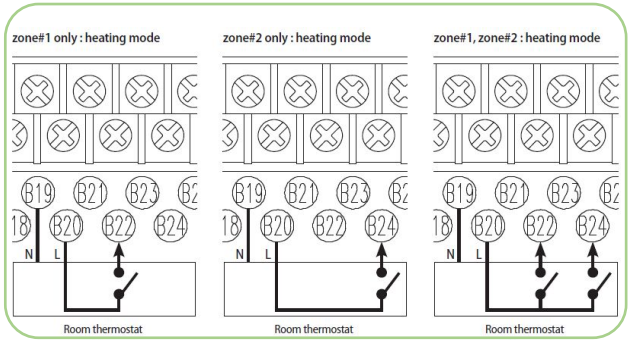
■ Thermostats

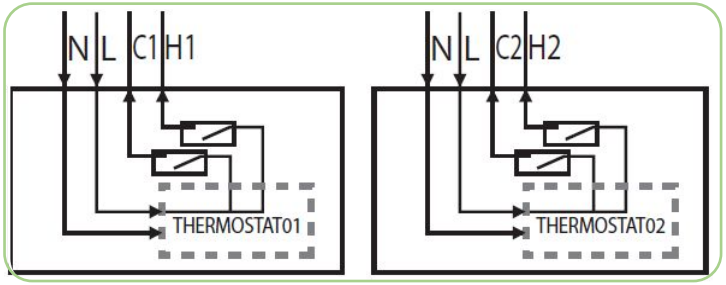


escription	No. of wires	Max. A	Thickness	Supply Scope
Room Thermostat for weather control	4	22 mA	> 0.75 mm², H05RN-F or H07RH-F	Field supply (230 V~, Input)

※ Contact signal must be “L“.
If you install two thermostats,
thermostat2 is prior to thermostat1.

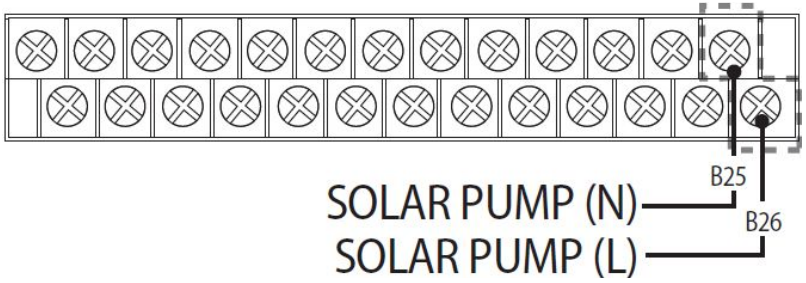






External contact information

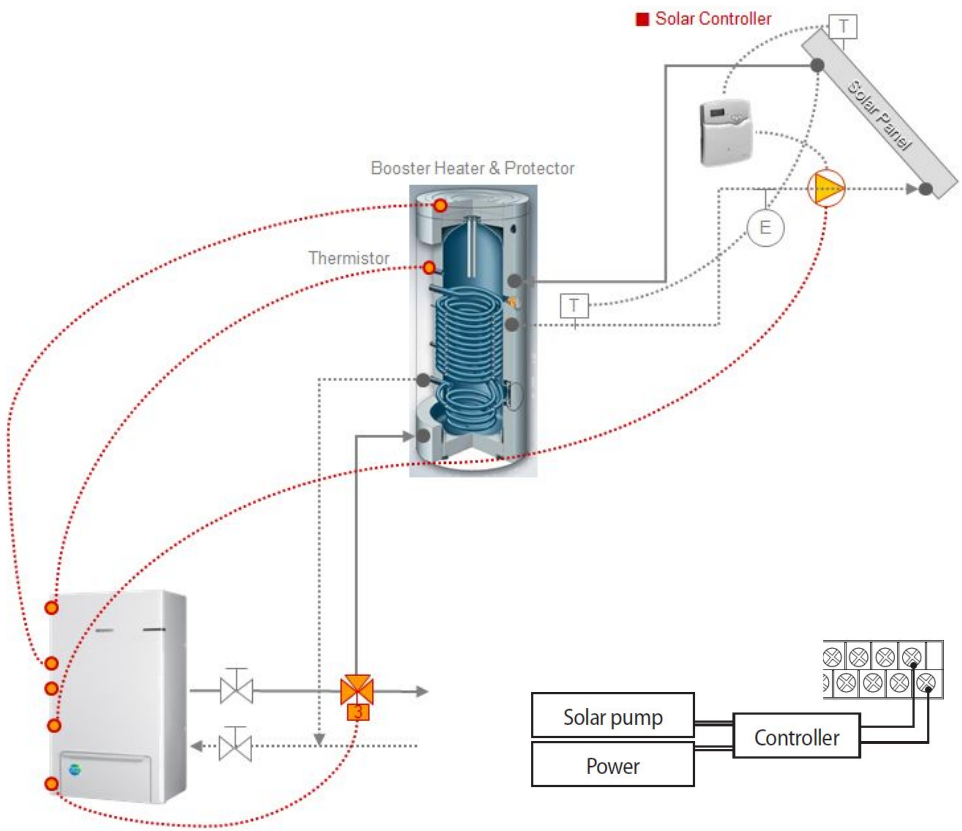
■ Solar pump signal for DHW



In operating mode,
signal shall be around 230Vac B/W N&L.

In non-operating mode,
signal shall be around 0Vac B/W N&L.

Description	No. of wires	Max. A	Thickness	Supply Scope
Solar pump	2+ground	10 mA	0.75mm² H05RN-F or H07RN-F	Field supply (230 V~, Input)

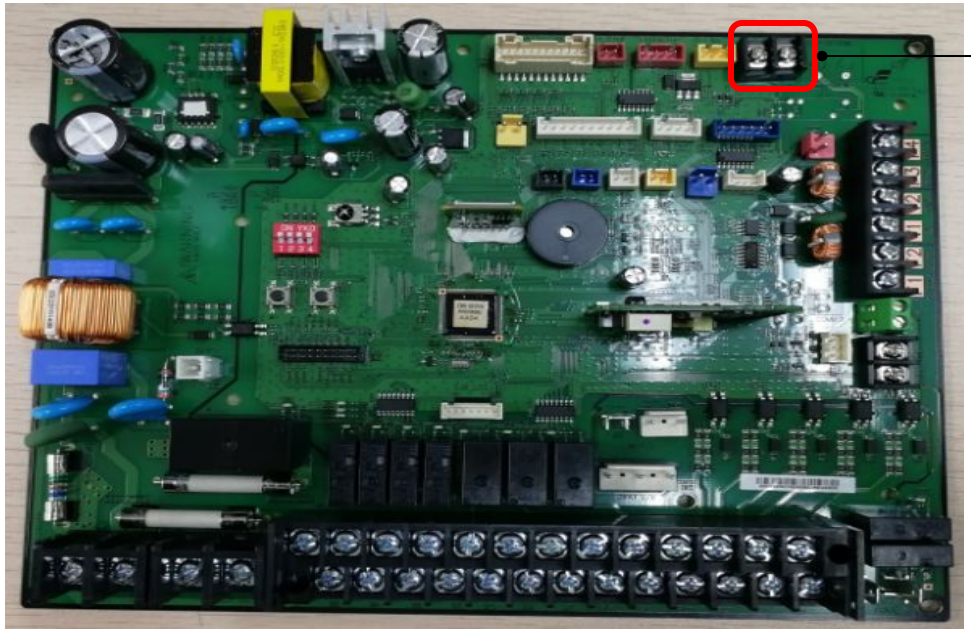


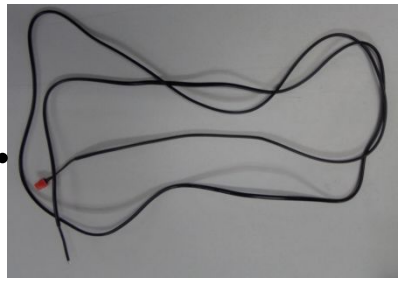
CAUTION

- Maximun allwable current of each terminal is below 10 mA.
- Ports number B25, B26 are for input port for detection and they do not supply power to a solar pump.

External contact information

■ Peak Control (FSV 5041 = “1”)





※ Smart grid signal input connector (2m)

Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
Others Code 50**	Power Peak Control	Application	**41	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
		Select forced off parts	**42	1	-	0 (All)	0	3	0 (All)	0	3
		Using input voltage	**43	-	-	1 (High)	0 (Low)	1	1 (High)	0 (Low)	1
	Frequency Ratio Control		**51	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
	PV Control	Application	**81	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
		Setting Temp Shift Value(Cooling)	**82	0.5	˚C	1	0	5	1	0	5
		Setting Temp Shift Value(Heating)	**83	0.5	˚C	1	0	5	1	0	5
	Smart Grid Control	Application	**91	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
		Setting Temp Shift Value(Heating)	**92	0.5	˚C	2	2	5	2	2	5
		Setting Temp Shift Value(DHW)	**93	0.5	˚C	2	2	5	2	2	5
		DHW Mode	**94	-	-	0	0 (Standard)	1 (Power)	0	0 (Standard)	1 (Power)

. According to FSV (#5042),

If input is “0 (default)”, Back up heater (BUH) is unavailable while external contact is high.

If input is “ 1”, Only Compressor(Heat Pump) is available.

If input is “ 2”, Only Booster Heater (BSH) is available.

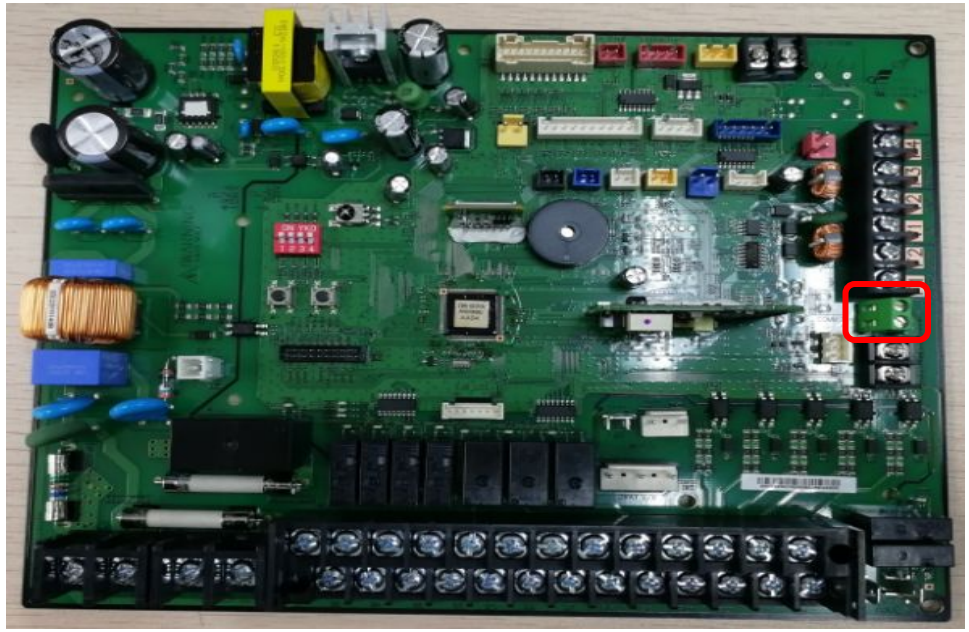
If input is “3”, nothing is available.

. Applying the control when power voltage of input contact is high is default. According to FSV (#5043), it is available to adopt this logic in low condition exceptionally.

. When applying to this logic, SAMSUNG controller come to get “Thermo off” condition for all operation.

External contact information

■ Frequency Ratio Control (FSV 5051 = “1”)



Main Menu & Code	Sub Menu Function	Description	Sub Code	Default	Min	Max	Step	Unit
Others Code 50**	Outing	Water Out Temp for Cooling	**11	25	5	25	1	˚C
		Room Temp for Cooling	**12	30	18	30	1	˚C
		Water Out Temp for Heating	**13	15	15	55	1	˚C
		Room Temp for Heating	**14	16	16	30	1	˚C
		Auto Cooling WL1 Temp	**15	25	5	25	1	˚C
		Auto Cooling WL2 Temp	**16	25	5	25	1	˚C
		Auto Heating WL1 Temp	**17	15	15	55	1	˚C
		Auto Heating WL2 Temp	**18	15	15	55	1	˚C
		Target Tank Temp	**19	30	30	70	1	˚C
	DHW Saving Mode	Temp Difference	**21	5	0	40	1	˚C
	TDM Variable (TDM product Only)	Priority Max. Operation Time	**31	30	10	90	5	min
		Non Priority Min. Operation Time	**32	5	3	60	1	min
		A2A / DHW Priority	**33	0	0 (A2A)	1 (DHW)	1	-
	Power Peak Control	Application	**41	0 (No)	0	1 (Yes)	-	-
		Select forced off parts	**42	0 (All)	0	3	1	-
		Using input voltage	**43	1 (High)	0 (Low)	1	-	-
	Frequency Ratio Control		**51	0 (No)	0	1 (Yes)	-	-

This is to limit the maximum frequency of the outdoor unit compressor. (if #5051 = 1 “use”)

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

The minimum ~ maximum frequency section being divided with 11 steps of 10%

Switches of unit

- Switch configuration (Outdoor unit / Hydro unit / Control kit)
- Hydro unit / Control kit option setting
- External contact information

Switch configuration

■ Outdoor unit main board feature

Optional item	Case I	Case II
Picture	 1 main PCB	 1 main PCB
Applied model	AE 080, 090, 120, 160** (outdoor unit)	AE 040, 050, 060** (outdoor unit)

Switch configuration

■ Outdoor unit main board – Tact switches

KEY	KEY operation	7-segment display
K1	Press once : Heating test run	"H" "1" "BLANK" "BLANK"
	Press twice : Defrost test run	"H" "3" "BLANK" "BLANK"
	Press 3times : Finishing test mode	-
K2	Press once : Cooling test run(Heating Only : skip)	"H" "2" "BLANK" "BLANK"
	Press twice : Output signal test run	"H" "4" "BLANK" "BLANK"
	Press 3 times : Finishing test mode	-
K3	Reset	
K4	View mode	Refer to View mode display

Case study)

K2 x 2 = The inverter checker mode.

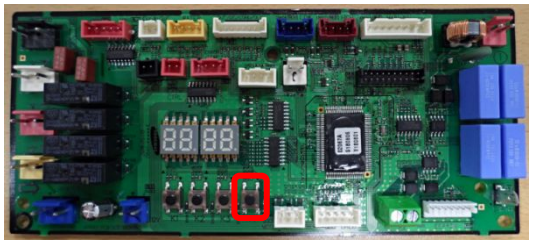
Sequence is as follows.

Wait 10 seconds -> During 5 second, the checked mode transmission with the inverter -> wait 5 seconds

(The checked mode transmission release) -> key operation release

Switch configuration

■ Outdoor unit main board – View mode by k4 tact switch

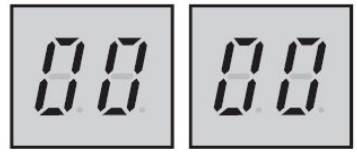


Number of press	Display contents	Display				Units
		Segment1	Segment2	Segment3	Segment4	
0	Communication State	10s digit of Tx	1s digit of Tx	10s digit of Rx	1s digit of Rx	-
1	Order frequency	1	100s digit	10s digit	1s digit	Hz
2	Current frequency	2	100s digit	10s digit	1s digit	Hz
3	Inverter Pump output	3	100s digit	10s digit	1s digit	%
4	Outdoor air sensor	4	+/-	10s digit	1s digit	℃
5	Discharge sensor	5	100s digit	10s digit	1s digit	℃
6	Eva in sensor	6	+/-	10s digit	1s digit	℃
7	Inlet water sensor	7	+/-	10s digit	1s digit	℃
8	Outlet water sensor	8	+/-	10s digit	1s digit	℃
9	Cond sensor	9	+/-	10s digit	1s digit	℃
10	Current	A	10s digit	1s digit	First decimal	A
11	Fan RPM	B	1000s digit	100s digit	10s digit	rpm
12	Target discharge temperature	C	100s digit	10s digit	1s digit	℃
13	EEV	D	1000s digit	100s digit	10s digit	step
14	Protective control	E	0 : Cooling 1 : Heating	Protective control 0 : No protective control 1 : Freezing 2 : Defrosting 3 : Over-load 4 : Discharge 5 : Total current	Frequency status 0 : Normal 1 : Hold 2 : Down 3 : Up_limit 4 : Down_limit	-
15	IPM temp.	F	+/-	10s digit	1s digit	℃
long-1	Main Micom version	Year(Hex)	Month(Hex)	Day(two digit)	Day(One digit)	-
long-1 and 1	Inverter Micom version	Year(Hex)	Month(Hex)	Day(two digit)	Day(One digit)	-
long-1 and 2	EEPROM version	Year(Hex)	Month(Hex)	Day(two digit)	Day(One digit)	-

Option setting

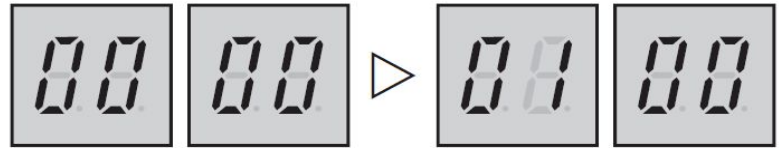
■ Outdoor unit option setting by Tact switches

1. Press the K2 switch for 2 seconds, only if compressor stop.

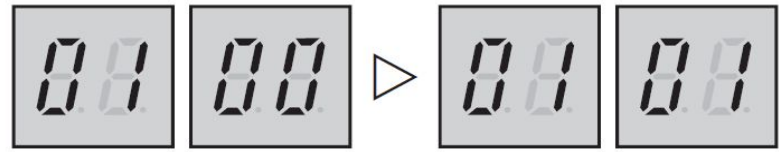


2. Press the **K1** switch shortly to change the **option number** (SEG1, SEG2)

3. Press the **K2** switch shortly to change the **option value** (SEG3, SEG4)



4. Press the **K2** switch for **2 seconds to store** the changed option



All the segments blink to indicate the changed option has been stored

- Press **K1 for 2 seconds to return to the original option**. (Before option change store)
- Press **K4 to set all the option values to the factory default**. And then press K2 for 2 seconds
- Press K2 for 2 seconds to store the factory setting values to EEPROM.

Option setting

■ Outdoor option table

Optional item	SEG1	SEG2	SEG3	SEG4	Function of the option
Channel address	0	0	A	U	Automatic setting (Default)
			0	0	Manual setting for channel (0~15)
Base heater	0	1	0	0	Use (Default)
			0	1	Not use
Operation mode	0	2	0	0	Heat Pump (Default)
			0	1	Heating Only
Snow accumulation prevention control	0	3	0	0	Not use (Default)
			0	1	Use
Quiet mode	0	4	0	0	Quiet Mode 1 (-3 dB)
			0	1	Quiet Mode 2 (-5 dB)
			0	2	Quiet Mode 3 (-7 dB)
			0	3	Quiet Mode 4 (-3 dB)
			0	4	TA LARM mode (Default)
Power improvement mode	0	5	0	0	Not use (Default)
			0	1	Use

Option setting

■ Hydro unit / Control kit – Dip switches

KEY	ON (Default)	OFF	Remark
DIP 1	Normal Operation	Emergency Heating Operation	When both DIP 1 and 2 are OFF at the same time, EHS operate emergency heating mode
DIP 2	Normal Operation	Emergency DHW Operation	
DIP 3	Normal Operation	Concrete Curing Function	-
DIP 4	Normal Operation	Outdoor unit power off ->on Error code modification	If you set **Dip S/W #4 off in the hydro unit**, then the Error E101 still there but After outdoor unit power get back the error will go away. -> **can run**

Option setting

■ Hydro unit / Control kit – Dip switches (Emergency space heating operation)

	Space Heating
Activation	Dip S/W #1 OFF (Control PBA) FSV #4031 =1 (Backup heater available)
Heat Source	Back up Heater 2nd stage
Display	Show 'E-op' on the Schedule Display
3way valve	Room Direction Only
2way valve	No Zone Control, always open
Water Pump	Following water pump logic under TW2 Control. (ex. 3min-ON, 2min OFF after Thermo off)
Thermo OFF	Tw3 ≥ Ts + 2.0°C
Thermo ON	Tw3 < Ts – 2.0°C
Allowed	E911,E912, Outing Mode, Water Pump, Flow Switch, Anti Freeze, Antipump lock, Electricity failure recovery
Not Allowed or ignoring	Auto, Schedule, Silence, urgent DHW, Disinfection, Tr Control, Thermostat Control, Outdoor unit communication, Back up Boiler, Smart Grid, Eco Level, Viewing Outdoor temperature, Zone Control

Option setting

■ Hydro unit / Control kit – Dip switches (Emergency DHW operation)

	DHW
Activation	Dip S/W #2 OFF (Control PBA) FSV #3031 =1 (Booster Heater available)
Heat Source	Booster Heater
Display	Show ‘E-op’ on the Schedule Display
3way valve	Room Direction Only
2way valve	No Zone Control, always open
Water Pump	Following water pump logic under TW2 Control. (ex. 3min-ON, 2min OFF after Thermo off)
Thermo OFF	Same as default DHW Control
Thermo ON	Same as default DHW Control
Allowed	E911,E912, Outing Mode, Water Pump, Flow Switch, Anti Freeze, Antipump lock, Electricity failure recovery
Not Allowed or ignoring	Auto, Schedule, Silence, urgent DHW, Disinfection, Tr Control, Thermostat Control, Outdoor unit communication, Back up Boiler, Smart Grid, Eco Level, Viewing Outdoor temperature, Zone Control

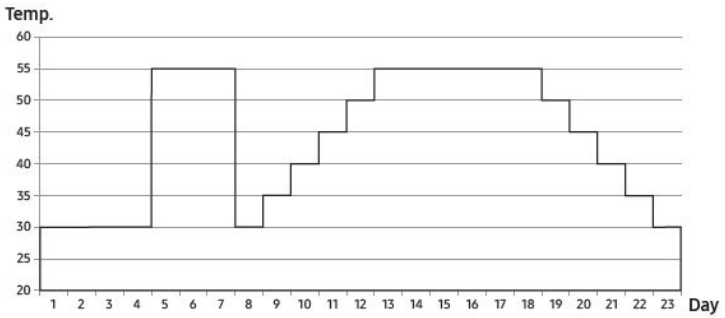
Option setting

■ Hydro unit (Concrete curing function)

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

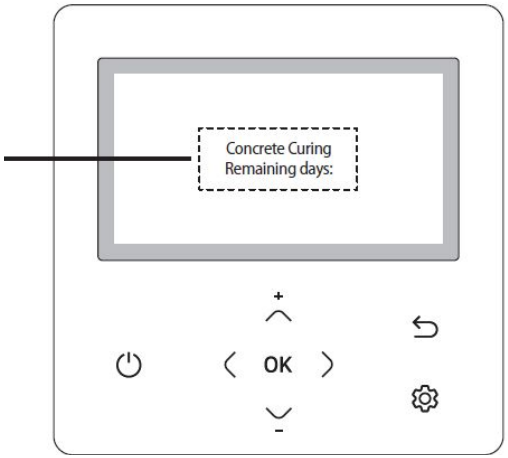
Entering procedure

1. After turning off the DIP switch K3 of indoor unit (Default ON), power off and on the indoor unit. The operation for concrete curing starts automatically.
   (If blackout occurs and communictation restarts later, operation will continue.)
2. Temperature of discharge water is controlled as time goes on like below.
3. Remaining days are displayed on the wired remote controller during operation but key operation is unavailable.



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	-

Remaining days are displayed.



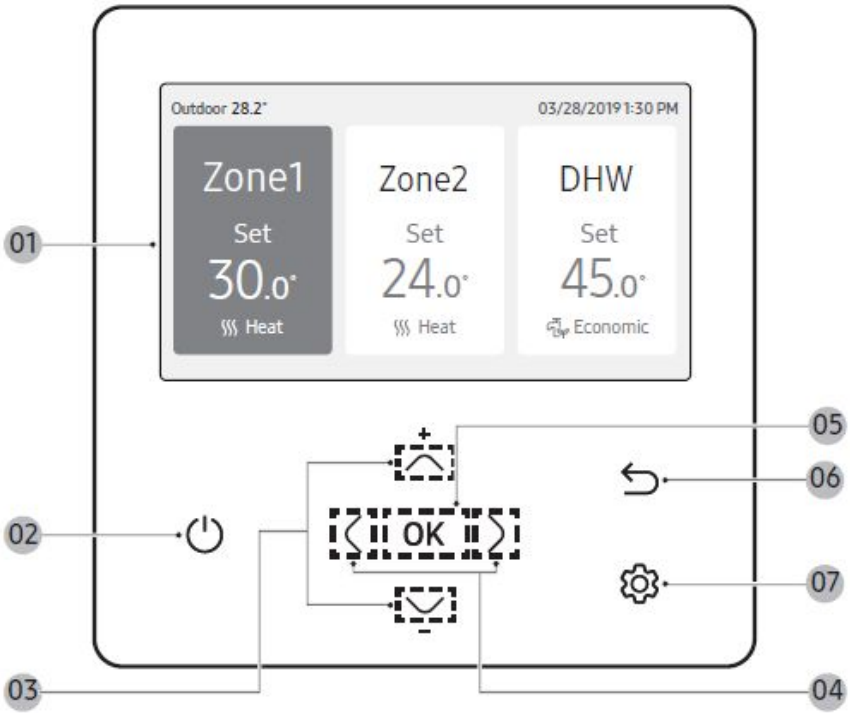
* If an error is displayed, concrete curing function does not work.

Field Setting Value

- Service Mode Setting
- Field Setting Value

Service mode Setting

■ Remote controller Overview (MWR-WW00N)



01 Operation status display

- Displays the operation/function settings and statuses.

02 Operation On/Off button (LED display)

- Turns the Air to Water Heat Pump power On/Off

03 Up/Down button

- Moves between items vertically or changes the set temperature.

04 Left/Right button

- Moves between items horizontally or changes the item value.

05 OK button

- Saves your new settings.

06 Save & Return button

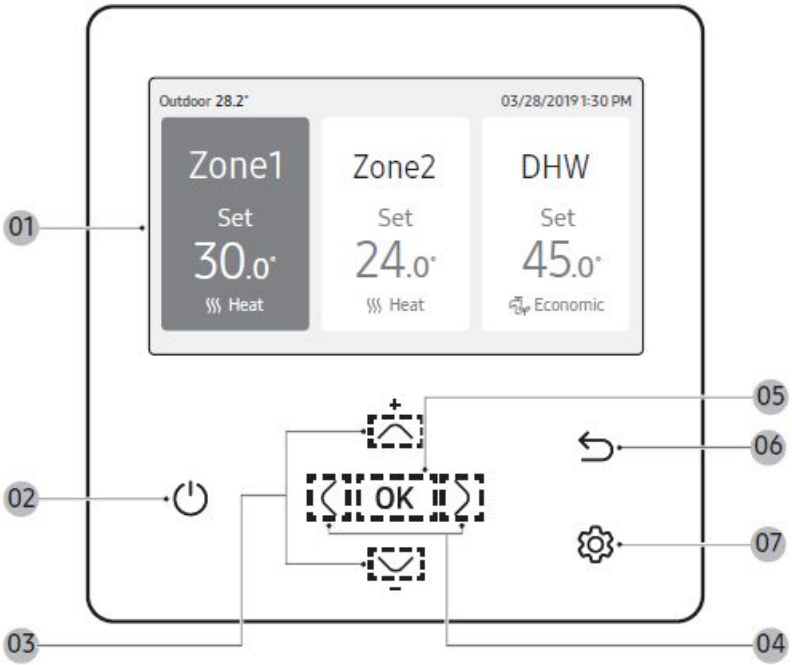
- Saves your new settings and returns to the previous step.

07 Option button

- Selects the detailed setting function.

Service mode Setting

■ How to set the service mode with wired remote controller (MWR-WW00N)



1. If you want to use the various additional functions for your Wired Remote Controller, press the ∧ and ∨ buttons at the same time for more than 3 seconds.
   - The password entry screen appears.
2. Enter the password, 0202, and then press **OK** the button.
   - The settings screen for installation/service mode appears.
3. See the list of additional functions for the Wired Remote Controller on the next page, and then select the desired menu.
   - Once you have entered the setting screen, the current setting appears.
   - Refer to the chart for data setting.
   - Using the ∧ / ∨ buttons, change the settings and press the > button to move to the next setting.
   - Press the **OK** button to save the new setting.
   - Press the ↩ button to move to the Home screen.

NOTE

- While setting the data, you can press the ↩ button to move to the Home screen after checking the saving status at a pop-up screen.

Service mode Setting

■ Service mode table

1. Unavailable functions are marked inactive and they cannot be set.
2. If communication initialization is needed after the setting, the system will reset automatically and communication will be initialized.

Step 1	Step 2	Step 3	Description	Default
Service Timer	Service Call Number		16-digit phone number Input: Blank, -, 0-9	-
	Last Inspection		Year, Month, Day	-
	Installation Data		Year, Month, Day	-
Quiet Mode Automatic Time			Enable/Disable	Disable
			Entry time to Exit time	PM 10:00 ~ AM 06:00
Indoor Zone Option	Cooling/Heating Selection		Cooling & Heating/ Heating only	Cooling & Heating
	Master/Slave Wired Remote		Master/Slave	Master
	Zone Selection		Zone1/Zone2	Zone1
	Standard Temperature		Water Outlet/Indoor	Water Outlet
	Temperature Unit		Celsius(℃): 1℃/0.5℃/0.1℃	0.5℃
	Temperature Sensor Selection		Wired Remote Controller/External Temperature Sensor	Wired Remote Controller
	Room Temperature Calibration	Reference Temperature	-9 to 40℃	-
		Calibration Value	-9 to 40℃	0℃

Service mode Setting

■ Service mode table

Step 1	Step 2	Step 3	Description	Default
Indoor Zone Option	Indoor Zone Status Information	Central :	ON/OFF	-
		Normal Power :	ON/OFF	-
		Mode :	Heat/Cool/Auto	-
		DHW Power :	ON/OFF	-
		DHW Mode :	Economic/Standard/ Power/Forced	-
		Water Pump :	ON/OFF	-
		BUH :	ON/OFF	-
		BSH :	ON/OFF	-
		Flow sensor :	lpm	-
		Inverter Pump :	0% ~ 100%	-
		EEV Step :	0~2000Step	-
		Thermostat 1 :	ON/OFF	-
		Thermostat 2 :	ON/OFF	-
		DHW Thermostat :	ON/OFF	-

Service mode Setting

■ Service mode table

Step 1	Step 2	Step 3	Description	Default
Connection Information	Number of Connection		0 to 16	-
	View Master Indoor Unit		Address	-
	Master Indoor Zone Information	Serial No. :	-	-
		Indoor Unit Eva In Temp.(Teva_in) :	Temperature	-
		Indoor Unit Eva Out Temp.(Teva_out) :	Temperature	-
		Indoor Unit PHE IN(Tw1) :	Temperature	-
		Indoor Unit PHE OUT(Tw2) :	Temperature	-
		DHW Tank Temp.(Tt) :	Temperature	-
		DHW Mode :	Economic/Standard/ Power/Forced	-

Service mode Setting

■ Service mode table

Step 1	Step 2	Step 3	Description	Default
Device Information	Micom Code :		Micom code	-
	Program Version :		Modified date	-
	Touch Code :		Touch IC code	-
	Program Version :		Modified date	-
	Graphic Image :		Graphic image code	-
	Program Version :		Modified date	-
Reset All Service Modes	Erase All Service mode data		-	-
	Initialize a remote controller		-	-
Power Master Reset [1]*			-	-
ODU K3 Reset			-	-
Field Setting Value	10**		-	-
	20**		-	-
	30**		-	-
	40**		-	-
	50**		-	-
	Simple Setting		-	-
	FSV Upload/ Download		-	-

Service mode Setting

Service mode table

Step 1	Step 2	Step 3	Description	Default
Self-Test Mode	Self-Test Mode Display	Water Inlet Temp. :	Temperature	-
		Water Outlet Temp. :	Temperature	-
		Backup Heater Outlet Temp. :	Temperature	-
		Mixing Valve Outlet Temp. :	Temperature	-
		Tank Temp. :	Temperature	-
		Indoor Ambient Temp. :	Temperature	-
		Indoor Ambient Temp.(Zone 2) :	Temperature	-
		Water Outlet Temp. (Zone 1) :	Temperature	-
		Water Outlet Temp. (Zone 2) :	Temperature	-
		Thermostat #1(Zone 1) :	Heat/Cool	-
		Thermostat #2(Zone 2) :	Heat/Cool	-
		Solar Panel	ON/OFF	-

Service mode Setting

Service mode table

Step 1	Step 2	Step 3	Description	Default
Self-Test Mode	Water Pump		ON/OFF	OFF
	Booster Heater		ON/OFF	OFF
	DHW Valve(3Way Valve)		ON/OFF	OFF
	Zone 1 Valve		ON/OFF	OFF
	Backup Heater 1 + Water Pump		ON/OFF	OFF
	Backup Heater 2 + Water Pump		ON/OFF	OFF
	Backup Boiler		ON/OFF	OFF
	Zone 2 Valve		ON/OFF	OFF
	Mixing Valve		ON/OFF	OFF

Service mode Setting

■ Service mode table

Step 1	Step 2	Step 3	Description	Default
Indoor Unit Option	Address	Main address	00 to 4F	-
		RMC address	00 to FE	-
	Product Option 2)*		Refer to the installation manual of the connected indoor unit or ventilator.	-
	Installation Option 1 2)*			-
	Installation Option 2 2)*			-
	MCU Port	MCU address	00 to 15	-
		MCU Port	A to F	-

1)* Power Master Reset is a setting needed to supply optimized power to wired remote controller when multiple indoor units are connected to wired remote controller in a group.

2)* The total option codes are 24 digits. You can set six digits at a time and it is distinguished by page number. Press the XX button to move to the next page.

Field Setting Value

■ FSV : Menus 10**

: New

Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
Remote Controller Setting Range Code 10✳✳	Water Out Temp for Cooling	Max	✳✳11	1	˚C	25	18	25	25	18	25
		Min	✳✳12	1	˚C	16	5	18	16	5	18
	Room Temp for Cooling	Max	✳✳21	1	˚C	30	28	30	30	28	30
		Min	✳✳22	1	˚C	18	18	28	18	18	28
	Water Out Temp for Heating	Max	✳✳31	1	˚C	65	37	65	65	37	65
		Min	✳✳32	1	˚C	25	15	37	25	15	37
	Room Temp for heating	Max	✳✳41	1	˚C	30	18	30	30	18	30
		Min	✳✳42	1	˚C	16	16	18	16	16	18
	DHW Tank Temp	Max	✳✳51	1	˚C	55	50	70	55	50	70
		Min	✳✳52	1	˚C	40	30	40	40	30	40

✔ Operation range expansion by exchanging to the compressor for R-32

. Max water out temp. for heating : 55 → **65℃**

. Max DHW Tank temp **by Heat pump** : 50 → **55℃**

* New compressor for R-32 : The operation range was expanded more than previous one.

Field Setting Value

■ FSV : Menus 10**

Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
Remote Controller Setting Range Code 10**	Water Out Temp for Cooling	Max	**11	1	℃	25	18	25	25	18	25
		Min	**12	1	℃	16	5	18	16	5	18
	Room Temp for Cooling	Max	**21	1	℃	30	28	30	30	28	30
		Min	**22	1	℃	18	18	28	18	18	28
	Water Out Temp for Heating	Max	**31	1	℃	65	37	65	65	37	65
		Min	**32	1	℃	25	15	37	25	15	37
	Room Temp for heating	Max	**41	1	℃	30	18	30	30	18	30
		Min	**42	1	℃	16	16	18	16	16	18
	DHW Tank Temp	Max	**51	1	℃	55	50	70	55	50	70
		Min	**52	1	℃	40	30	40	40	30	40

Space Cooling

* Target water outlet temperature : Upper limit(#1011, Default 25ºC, Range : 18 ~ 25ºC), Lower limit(#1012, Default 16ºC, Range : 5 ~ 18ºC)

With this default FSV settings, user can change the target water outlet temperature within the range of 5 ~ 25ºC for cooling

* Target room temperature : Upper limit(#1021, Default 30ºC), Lower limit(#1022, Default 18ºC) With this default FSV settings, user can change the target room temperature within the range of 18 ~ 30ºC for cooling.

Space Heating

* Target water outlet temperature : Upper limit(#1031, Default 55ºC, Range : 37 ~ 65ºC), Lower limit(#1032, Default 25ºC, Range : 15 ~ 37ºC)

With this default FSV settings, user can change the target water outlet temperature within the range of **15** ~ 65ºC for heating.

* Target room temperature : Upper limit(#1041, Default 30ºC), Lower limit(#1042, Default 16ºC) With this default FSV settings, user can change the target room temperature within the range of 16 ~ 30ºC for heating.

DHW Heating

* Target DHW tank temperature : Upper limit(#1051, Default **55ºC**, Range : 50 ~ 70ºC), Lower limit(#1052, Default 40ºC, Range : 30 ~ 40ºC)

With this default FSV settings, user can change the target tank temperature within the range of **30 ~ 70ºC** for DHW heating.

Field Setting Value

■ FSV : Menus 20**

: New

Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
Water Law Code 20✳✳	Outdoor Temp for Water Law (Heating)	Point ①	✳✳11	1	˚C	-10	-20	5	-10	-20	5
		Point ②	✳✳12	1	˚C	15	10	20	15	10	20
	Water Out Temp for WL1 Heating (WL1-Floor)	Point ①	✳✳21	1	˚C	40	17	65	40	17	65
		Point ②	✳✳22	1	˚C	25	17	65	25	27	65
	Water Out Temp for WL2 Heating (WL2-Fan Coil Unit)	Point ①	✳✳31	1	˚C	50	17	65	50	17	65
		Point ②	✳✳32	1	˚C	35	17	65	35	17	65
	Heating Water Law for Auto Mode	WL Type	✳✳41	-	-	1(WL1)	1	2	1(WL1)	1	2
	Outdoor Temp for Water Law (Cooling)	Point ①	✳✳51	1	˚C	30	25	35	30	25	35
		Point ②	✳✳52	1	˚C	40	35	45	40	35	45
	Water Out Temp for WL1 Cooling (WL1-Floor)	Point ①	✳✳61	1	˚C	25	5	25	25	5	25
		Point ②	✳✳62	1	˚C	18	5	25	18	5	25
	Water Out Temp for WL2 Cooling (WL2-Fan Coil Unit)	Point ①	✳✳71	1	˚C	18	5	25	18	5	25
		Point ②	✳✳72	1	˚C	5	5	25	5	5	25
	Cooling Water Law for Auto Mode	WL Type	✳✳81	-	-	1(WL1)	1	2	1(WL1)	1	2
	External Thermostat Application	#1(Floor)	✳✳91	1	-	0(No)	0	4	0(No)	0	4
		#2(FCU)	✳✳92	1	-	0(No)	0	4	0(No)	0	4
	WL interworking control by Wired RC	#3(Wired RC)	✳✳93	1	-	4	1	4	4	1	4

Field Setting Value

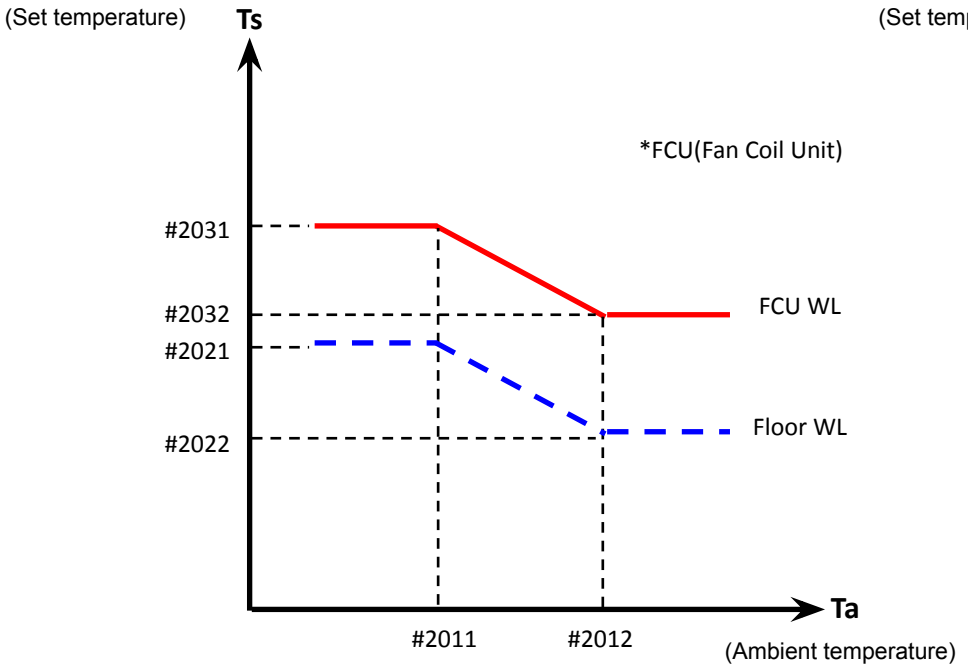
■ FSV : Menus 20**

Water Law

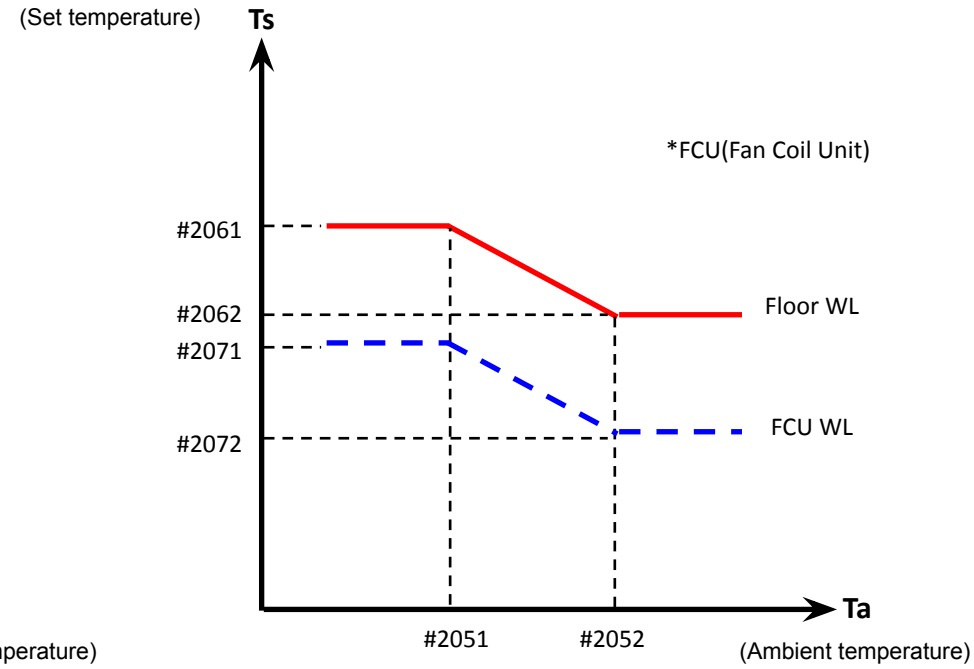
- This function is used by room sensor of wired remote controller or Thermostat control.

 * Only heating mode can use this function during auto mode.

<Heating WL>



<Cooling WL>



Field Setting Value

■ FSV : Menus 2091/2092

Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
Water Law Code 20✳✳	Outdoor Temp for Water Law (Heating)	Point ①	✳✳11	1	℃	-10	-20	5	-10	-20	5
		Point ②	✳✳12	1	℃	15	10	20	15	10	20
	Water Out Temp for WL1 Heating (WL1-Floor)	Point ①	✳✳21	1	℃	40	17	65	40	17	65
		Point ②	✳✳22	1	℃	25	17	65	25	27	65
	Water Out Temp for WL2 Heating (WL2-Fan Coil Unit)	Point ①	✳✳31	1	℃	50	17	65	50	17	65
		Point ②	✳✳32	1	℃	35	17	65	35	17	65
	Heating Water Law for Auto Mode	WL Type	✳✳41	-	-	1(WL1)	1	2	1(WL1)	1	2
	Outdoor Temp for Water Law (Cooling)	Point ①	✳✳51	1	℃	30	25	35	30	25	35
		Point ②	✳✳52	1	℃	40	35	45	40	35	45
	Water Out Temp for WL1 Cooling (WL1-Floor)	Point ①	✳✳61	1	℃	25	5	25	25	5	25
		Point ②	✳✳62	1	℃	18	5	25	18	5	25
	Water Out Temp for WL2 Cooling (WL2-Fan Coil Unit)	Point ①	✳✳71	1	℃	18	5	25	18	5	25
		Point ②	✳✳72	1	℃	5	5	25	5	5	25
	Cooling Water Law for Auto Mode	WL Type	✳✳81	-	-	1(WL1)	1	2	1(WL1)	1	2
	External Thermostat Application	#1(Floor)	✳✳91	1	-	0(No)	0	4	0(No)	0	4
		#2(FCU)	✳✳92	1	-	0(No)	0	4	0(No)	0	4
	WL interworking control by Wired RC	#3(Wired RC)	✳✳93	1	-	4	1	4	4	1	4

External Room Thermostat (Field Option)

(#2091 = 1, #2092 = 1)

Judgment for “Thermo On” or “Thermo Off” : According to **thermostat signal only.**

(#2091 = 2~4, #2092 = 2~4)

Judgement for “Thermo On” or Thermo Off” : According to **thermostat signal** or ***WL follow target outlet temperature (TW2)**.

Thermostat status		Signal On	Signal On	Signal Off	Signal Off	Pump status during “Thermo Off”
Status by *WL		Thermo On	Thermo Off	Thermo On	Thermo Off	
Value of #2091, #2092	1	On	On	Off	Off	Off (1min delay)
	2	On	Off	Off	Off	Off (1min delay)
	3					On
	4					Repeat 3min On / 7min Off

* WL : Water Law

Field Setting Value

■ FSV : Menus 2093

Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
Water Law Code 20✳✳	Outdoor Temp for Water Law (Heating)	Point ①	✳✳11	1	℃	-10	-20	5	-10	-20	5
		Point ②	✳✳12	1	℃	15	10	20	15	10	20
	Water Out Temp for WL1 Heating (WL1-Floor)	Point ①	✳✳21	1	℃	40	17	65	40	17	65
		Point ②	✳✳22	1	℃	25	17	65	25	27	65
	Water Out Temp for WL2 Heating (WL2-Fan Coil Unit)	Point ①	✳✳31	1	℃	50	17	65	50	17	65
		Point ②	✳✳32	1	℃	35	17	65	35	17	65
	Heating Water Law for Auto Mode	WL Type	✳✳41	-	-	1(WL1)	1	2	1(WL1)	1	2
	Outdoor Temp for Water Law (Cooling)	Point ①	✳✳51	1	℃	30	25	35	30	25	35
		Point ②	✳✳52	1	℃	40	35	45	40	35	45
	Water Out Temp for WL1 Cooling (WL1-Floor)	Point ①	✳✳61	1	℃	25	5	25	25	5	25
		Point ②	✳✳62	1	℃	18	5	25	18	5	25
	Water Out Temp for WL2 Cooling (WL2-Fan Coil Unit)	Point ①	✳✳71	1	℃	18	5	25	18	5	25
		Point ②	✳✳72	1	℃	5	5	25	5	5	25
	Cooling Water Law for Auto Mode	WL Type	✳✳81	-	-	1(WL1)	1	2	1(WL1)	1	2
	External Thermostat Application	#1(Floor)	✳✳91	1	-	0(No)	0	4	0(No)	0	4
		#2(FCU)	✳✳92	1	-	0(No)	0	4	0(No)	0	4
	WL interworking control by Wired RC	#3(Wired RC)	✳✳93	1	-	4	1	4	4	1	4

Wired Remote Controller

(#2093 = 1)

Judgment for “Thermo On” or “Thermo Off” : According to **room temp. sensor of wired remote controller only.**

(#2093 = 2~4)

Judgement for “Thermo On” or Thermo Off” : According to **room temp. sensor of wired remote controller** or ***WL follow target outlet temperature (TW2)**.

Status by wired remote controller		Thermo On	Thermo On	Thermo Off	Thermo Off	Pump status during “Thermo Off”
Status by *WL		Thermo On	Thermo Off	Thermo On	Thermo Off	
Value of #2093	1	On	On	Off	Off	Off (1min delay)
	2	On	Off	Off	Off	Off (1min delay)
	3					On
	4					Repeat 3min On / 7min Off

* WL : Water Law

Field Setting Value

■ FSV : Menus 30**

: New

Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
DHW Code 30✶✶	Domestic Hot Water Tank	Application	✶✶11	-	-	1(Yes)	0	2	0(No)	0	2
	Heat Pump	Max Temp	✶✶21	1	˚C	55	45	55	55	45	55
		Stop	✶✶22	1	˚C	0	0	10	2	0	10
		Start	✶✶23	1	˚C	5	5	30	5	5	30
		Min. Space heating Operation time	✶✶24	1	min	5	1	20	5	1	20
		Max. DHW operation time	✶✶25	5	min	30	5	95	30	5	95
		Max. Space heating Operation time	✶✶26	0.5	hour	3	0.5	10	3	0.5	10
	Booster Heater	Application	✶✶31	-	-	1(On)	0(Off)	1	1(On)	0(Off)	1
		Delay Time	✶✶32	5	min	20	20	95	20	20	95
		Overshoot	✶✶33	1	˚C	0	0	4	0	0	4
	Disinfection	Application	✶✶41	-	-	1(On)	0(Off)	1	1(On)	0(Off)	1
		Interval	✶✶42	1	day	Fri(5)	Sun(0)	All(7)	Fri(5)	Sun(0)	All(7)
		Start Time	✶✶43	1	o'clock	23	0	23	23	0	23
		Target Temp	✶✶44	5	˚C	70	40	70	70	40	70
		Duration	✶✶45	5	min	10	5	60	10	5	60
		Max time	✶✶46	1	hour	8	1	24	8	1	24
	Forced DHW operation	Timer OFF Function	✶✶51	-	-	0(No)	0	1(Yes)	0(No)	0	1(Yes)
		Timer Duration	✶✶52	1	(x10) min	6	3	30	6	3	30
	Solar Panel/DHW Thermostat	H/P Combination	✶✶61	1	-	0(No)	0	2	0(No)	0	2
	Direction of DHW valve	DHW Tank	✶✶71	-	-	0(Room)	0	1(Tank)	0(Room)	0	1(Tank)
	Energy metering	BUH 1 step capacity	✶✶81	1	kW	2	1	6	2	1	6
		BUH 2 step capacity	✶✶82	1	kW	2	0	6	2	0	6
		BSH capacity	✶✶83	1	kW	3	1	6	3	1	6

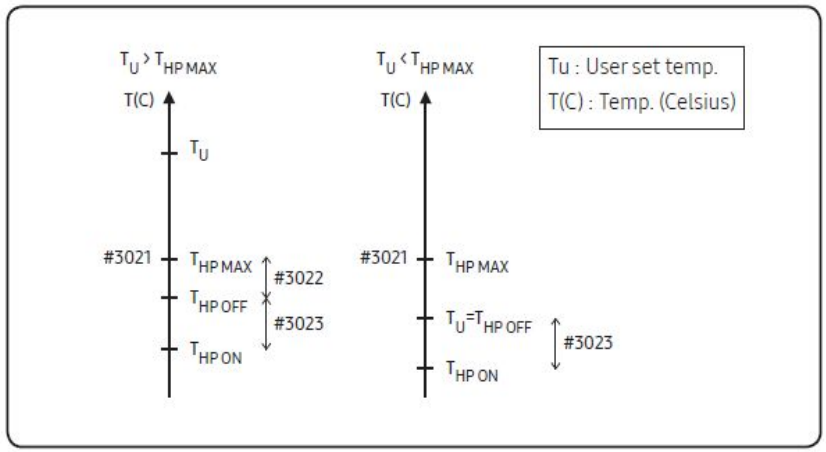
Field Setting Value

■ FSV : Menus 302* / 303*

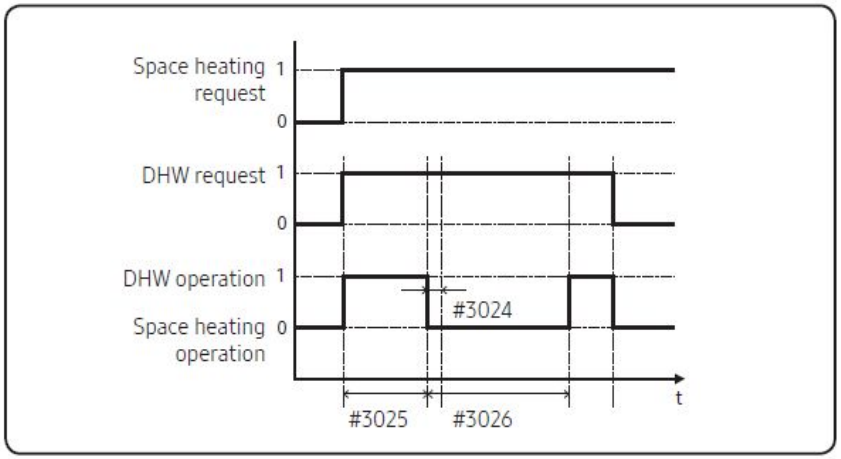
Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
DHW Code 30✳✳	Heat Pump	Max Temp	✳✳21	1	℃	55	45	55	55	45	55
		Stop	✳✳22	1	℃	0	0	10	2	0	10
		Start	✳✳23	1	℃	5	5	30	5	5	30
		Min. Space heating Operation time	✳✳24	1	min	5	1	20	5	1	20
		Max. DHW operation time	✳✳25	5	min	30	5	95	30	5	95
		Max. Space heating Operation time	✳✳26	0.5	hour	3	0.5	10	3	0.5	10
	Booster Heater	Application	✳✳31	-	-	1(On)	0(Off)	1	1(On)	0(Off)	1
		Delay Time	✳✳32	5	min	20	20	95	20	20	95
		Overshoot	✳✳33	1	℃	0	0	4	0	0	4

- 302✳ : Heat pump variables for tank temp. control and combination with booster heater
- 303✳ : Booster heater variables for combination with heat pump

[DHW Tank water temperature thermo on/off control]



[Time variation control of DHW and space heating mode]



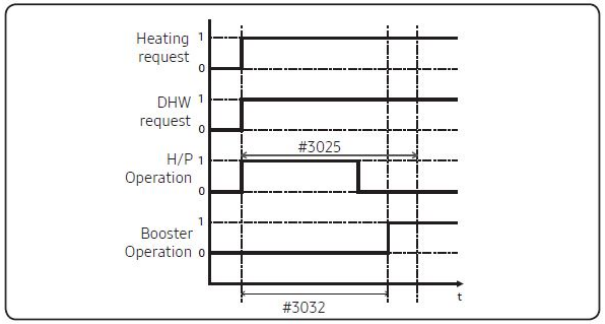
Field Setting Value

■ FSV : Menus 302* / 303*

Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
DHW Code 30∗∗	Heat Pump	Max Temp	∗∗21	1	℃	55	45	55	55	45	55
		Stop	∗∗22	1	℃	0	0	10	2	0	10
		Start	∗∗23	1	℃	5	5	30	5	5	30
		Min. Space heating Operation time	∗∗24	1	min	5	1	20	5	1	20
		Max. DHW operation time	∗∗25	5	min	30	5	95	30	5	95
		Max. Space heating Operation time	∗∗26	0.5	hour	3	0.5	10	3	0.5	10
	Booster Heater	Application	∗∗31	-	-	1(On)	0(Off)	1	1(On)	0(Off)	1
		Delay Time	∗∗32	5	min	20	20	95	20	20	95
		Overshoot	∗∗33	1	℃	0	0	4	0	0	4

- 302∗ : Heat pump variables for tank temp. control and combination with booster heater
- 303∗ : Booster heater variables for combination with heat pump

[Time variation control of Heat pump and booster heater of DHW]

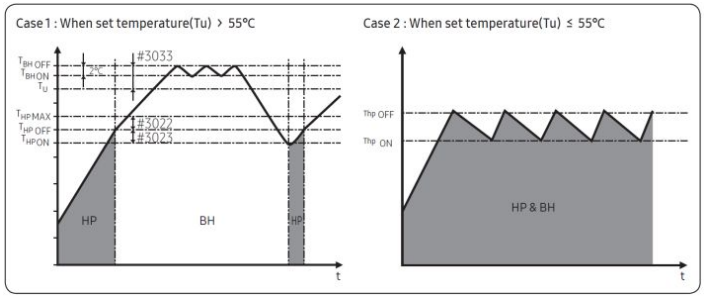


[Thermo on/off control of Heat pump and Booster Heater]

Condition	Operation
Setting temp. of DHW > 50℃	① BSH Thermo Off ≥ Setting temp. BSH Thermo On < Thermo Off temp. – 2℃ ② H/P Thermo Off ≥ Setting temp. H/P Thermo On < Setting temp. – FSV #3023 (5℃)
Setting temp. of DHW ≤ 50℃	① BSH Thermo Off ≥ Setting temp. BSH Thermo On < Setting temp. – FSV #3023 (5℃) ② H/P Thermo Off ≥ Setting temp. H/P Thermo On < Setting temp. – FSV #3023 (5℃)

※ FSV #3031 should be set as “1(On)” to use Booster Heater.

※ FSV #4022 should be set as “0(both) or 2(booster heater) to use booster heater otherwise the booster heater can be operated in case of no Backup Heater demand.



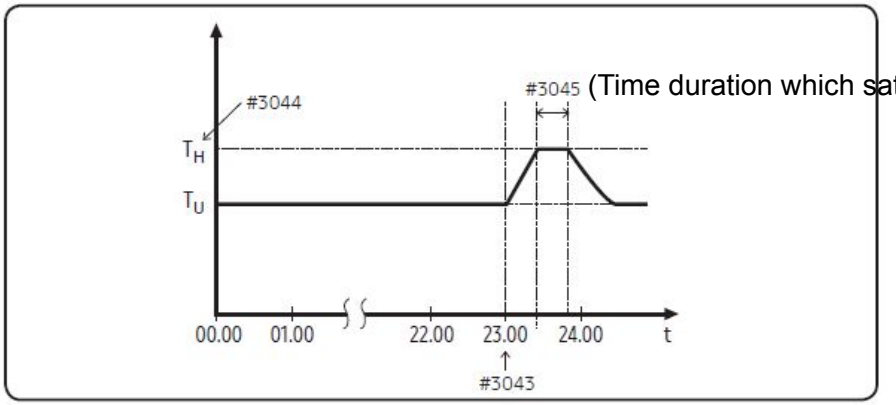
Field Setting Value

■ FSV : Menus 304*

- 304∗ : Periodical disinfection heating of water tank

Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
DHW Code 30∗∗	Disinfection	Application	∗∗41	-	-	1(On)	0(Off)	1	1(On)	0(Off)	1
		Interval	∗∗42	1	day	Fri(5)	Sun(0)	All(7)	Fri(5)	Sun(0)	All(7)
		Start Time	∗∗43	1	o'clock	23	0	23	23	0	23
		Target Temp	∗∗44	5	°C	70	40	70	70	40	70
		Duration	∗∗45	5	min	10	5	60	10	5	60
		Max time	∗∗46	1	hour	8	1	24	8	1	24

[Time variation control of Heat pump and booster heater of DHW]



#3045 (Time duration which satisfy the Disinfection target temperature.)

* If the temp. doesn't rise during disinfection, it will occur the E919.

※ FSV #3041 should be set to use Disinfection mode.

※ FSV #3031 setting and DHW thermo on signal is ignored in case of disinfection mode.

Field Setting Value

■ FSV : Menus 30**

Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
DHW Code 30∗∗	Forced DHW operation	Timer OFF Function	∗∗51	-	-	0(No)	0	1(Yes)	0(No)	0	1(Yes)
		Timer Duration	∗∗52	1	(x10) min	6	3	30	6	3	30
	Solar Panel/DHW Thermostat	H/P Combination	∗∗61	1	-	0(No)	0	2	0(No)	0	2
	Direction of DHW valve	DHW Tank	∗∗71	-	-	0(Room)	0	1(Tank)	0(Room)	0	1(Tank)
	Energy metering	BUH 1 step capacity	∗∗81	1	kW	2	1	6	2	1	6
		BUH 2 step capacity	∗∗82	1	kW	2	0	6	2	0	6
		BSH capacity	∗∗83	1	kW	3	1	6	3	1	6

- 305∗ : Forced DHW operation

. FSV #3011, should be set ”1” (**Yes**) to use Forced DHW operation .

. Forced DHW mode shall be working depending on Timer setting (#3051, #3052).

- 3061 : Solar panel Forced DHW operation

. #3061 “0” : Solar panel is not used.

. #3061 “1” : Solar panel is used

* Whenever solar panel on signal input -> Comp. off(only in DHW mode), Booster Heater off

* Solar panel and heat pump are able to operate simultaneously except DHW mode.

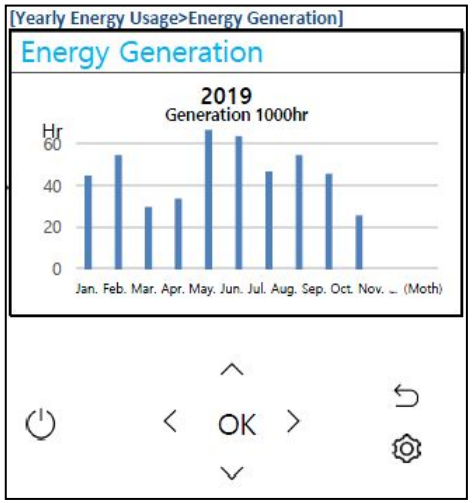
. #3061 “2” : Solar panel is not used and DHW thermostat is used.

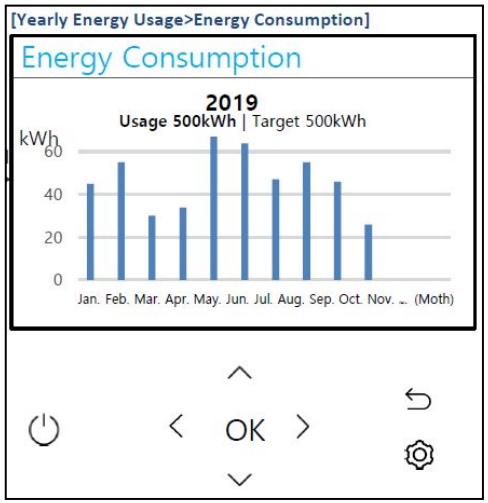
Field Setting Value

■ FSV : Menus 308*

Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
DHW Code 30∗∗	Forced DHW operation	Timer OFF Function	∗∗51	-	-	0(No)	0	1(Yes)	0(No)	0	1(Yes)
		Timer Duration	∗∗52	1	(x10) min	6	3	30	6	3	30
	Solar Panel/DHW Thermostat	H/P Combination	∗∗61	1	-	0(No)	0	2	0(No)	0	2
	Direction of DHW valve	DHW Tank	∗∗71	-	-	0(Room)	0	1(Tank)	0(Room)	0	1(Tank)
	Energy metering	BUH 1 step capacity	∗∗81	1	kW	2	1	6	2	1	6
		BUH 2 step capacity	∗∗82	1	kW	2	0	6	2	0	6
		BSH capacity	∗∗83	1	kW	3	1	6	3	1	6

- 308∗ : Energy metering





- To check energy information of system, user should set to FSV #308* according to heater (BUH, BSH) capacity.

. In order to get the exact value, this should be set.

* The FSV #4021 should be set to BUH (Back Up Heater) use.

Field Setting Value

■ FSV : Menus 40**

: New

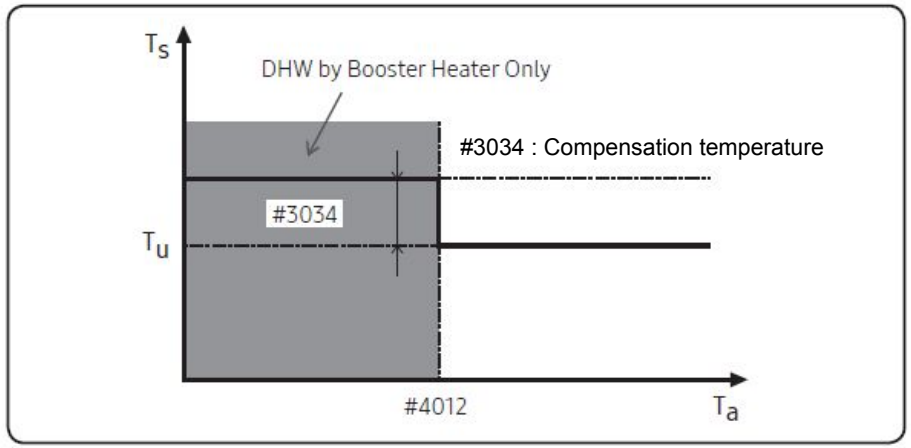
Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
Heating Code 40✶✶	Heat Pump	Heating/DHW Priority	✶✶11	-	-	0(DHW)	0	1(Heat)	0(DHW)	0	1(Heat)
		Outdoor Temp for Priority	✶✶12	1	˚C	0	-15	20	0	-15	20
		Heating Off	✶✶13	1	˚C	35	14	35	35	14	35
	Backup Heater	Application	✶✶21	-	-	0(No)	0	2	0(No)	0	2
		BUH/BSH Priority	✶✶22	1	-	2(BSH)	0(Both)	2(BSH)	0(Both)	0(Both)	2(BSH)
		Cold weather compensation	✶✶23	-	-	1(Yes)	0(No)	1	1(Yes)	0(No)	1
		Threshold Temp	✶✶24	1	˚C	0	-25	35	0	-25	35
		Defrost Backup Temp.	✶✶25	5	˚C	15	10	55	15	10	55
	Backup Boiler	Application	✶✶31	-	-	0(No)	0	1(Yes)	0(No)	0	1(Yes)
		Boiler Priority	✶✶32	-	-	0(No)	0	1(Yes)	0(No)	0	1(Yes)
		Threshold Temp	✶✶33	1	˚C	-15	-20	5	-15	-20	5
	Mixing Valve	Application	✶✶41	1	-	0(No)	0	2	0(No)	0	2
		Target ΔT(Heating)	✶✶42	1	˚C	10	5	15	10	5	15
		Target ΔT(Cooling)	✶✶43	1	˚C	10	5	15	10	5	15
		Control factor	✶✶44	1	-	2	1	5	2	1	5
		Control interval	✶✶45	1	min	2	1	30	2	1	30
		Running Time	✶✶46	3	(x10)sec	9	6	24	9	6	24
	Inverter Pump	Application	✶✶51	-	-	1(Yes)	0	2	1(Yes)	0	2
		Target ΔT	✶✶52	1	˚C	5	2	8	5	2	8
		Control factor	✶✶53	1	-	2	1	3	2	1	3
	Zone Control	Application	✶✶61	-	-	0(No)	0	1(Yes)	0(No)	0	1(Yes)

Field Setting Value

■ FSV : Menus 401*

Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
Heating Code 40＊＊	Heat Pump	Heating/DHW Priority	＊＊11	-	-	0(DHW)	0	1(Heat)	0(DHW)	0	1(Heat)
		Outdoor Temp for Priority	＊＊12	1	℃	0	-15	20	0	-15	20
		Heating Off	＊＊13	1	℃	35	14	35	35	14	35

- 401＊ : Heat pump variables for space heating



FSV #4011 for DHW priority is set to “0(DHW)” (Default) as a default. Space heating gets a priority by setting FSV #4011 “1”, but this is only valid when the outdoor temperature is lower than the specified temperature defined by FSV #4012.

Field Setting Value

■ FSV : Menus 402*

- 402∗ : Backup Heater variables for space heating

Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
Heating Code 40∗∗	Backup Heater	Application	∗∗21	-	-	0(No)	0	2	0(No)	0	2
		BUH/BSH Priority	∗∗22	1	-	2(BSH)	0(Both)	2(BSH)	0(Both)	0(Both)	2(BSH)
		Cold weather compensation	∗∗23	-	-	1(Yes)	0(No)	1	1(Yes)	0(No)	1
		Threshold Temp	∗∗24	1	˚C	0	-25	35	0	-25	35
		Defrost Backup Temp.	∗∗25	5	˚C	15	10	55	15	10	55

. **FSV #4021 should be set to 1 (Use both BUH 1 and BUH 2) or 2 (Use a BUH 1) to use electric backup heater in hydro unit as an additional heat source**.

. To compensate the lowered heat pump heating performance under very cold weather conditions,
the FSV #4023 should be set to “1(On, Default)”.
The threshold temperature to use backup heater for cold weather compensation: FSV #4024, Default “0˚C”, Range -25 ~ 35˚C
The backup heater operation is restricted to save energy in the threshold temperature range.

. The FSV #4022 for backup heater priority should be set to “2 (BSH, Default)” or “0” (Both), or “1” (backup) to use backup heater.
If not (Booster heater priority), the backup heater can be operated in case of no booster heater demand.

. The threshold temperature for backup heater operation during defrost mode to prevent cold draft because of chilled water can be controlled by adjusting FSV #4025. Under FSV #4025 of water outlet temperature, backup heater Will be turned on.

Field Setting Value

■ FSV : Menus 403*

- 403∗ : External Backup Boiler for space heating

Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
Heating Code 40∗∗	Backup Boiler	Application	∗∗31	-	-	0(No)	0	1(Yes)	0(No)	0	1(Yes)
		Boiler Priority	∗∗32	-	-	0(No)	0	1(Yes)	0(No)	0	1(Yes)
		Threshold Temp	∗∗33	1	˚C	-15	-20	5	-15	-20	5
	Mixing Valve	Application	∗∗41	1	-	0(No)	0	2	0(No)	0	2
		Target ΔT(Heating)	∗∗42	1	˚C	10	5	15	10	5	15
		Target ΔT(Cooling)	∗∗43	1	˚C	10	5	15	10	5	15
		Control factor	∗∗44	1	-	2	1	5	2	1	5
		Control interval	∗∗45	1	min	2	1	30	2	1	30
		Running Time	∗∗46	3	(x10)sec	9	6	24	9	6	24

. **FSV #4031 should be set to “1 (Yes)” to use a backup boiler as an additional heat source**. (default: “0 (No installation)”)

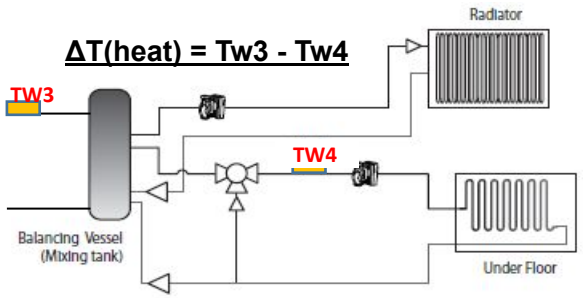
. Priority of backup boiler and heat pump is defined by FSV #4032 (default: “0 (OFF)”)

. To compensate the lowered heat pump heating performance under very cold weather conditions, the backup boiler operates instead of heat pump under the threshold temperature (FSV #4033, Default “-15˚C”, Range -20 ~ 5˚C).

Field Setting Value

■ FSV : Menus 404*

- 404∗ : Mixing valve installation

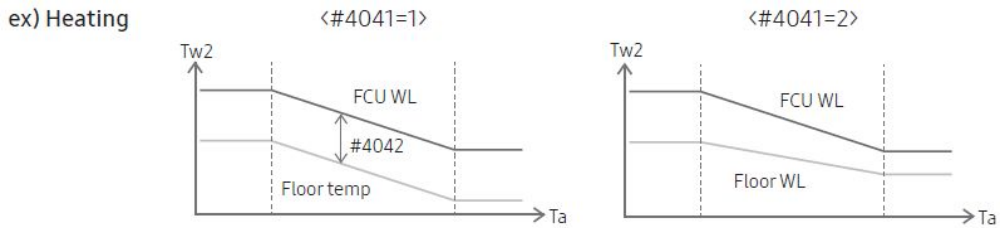


Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
Heating Code 40∗∗	Backup Boiler	Application	∗∗31	-	-	0(No)	0	1(Yes)	0(No)	0	1(Yes)
		Boiler Priority	∗∗32	-	-	0(No)	0	1(Yes)	0(No)	0	1(Yes)
		Threshold Temp	∗∗33	1	℃	-15	-20	5	-15	-20	5
	Mixing Valve	Application	∗∗41	1	-	0(No)	0	2	0(No)	0	2
		Target ΔT(Heating)	∗∗42	1	℃	10	5	15	10	5	15
		Target ΔT(Cooling)	∗∗43	1	℃	10	5	15	10	5	15
		Control factor	∗∗44	1	-	2	1	5	2	1	5
		Control interval	∗∗45	1	min	2	1	30	2	1	30
		Running Time	∗∗46	3	(x10)sec	9	6	24	9	6	24

. **The FSV #4041 should be set to “1 or 2” to use mixing valve.**

※ #4041 =1 : Controlled based on the temperature difference (4042, 4043)

※ #4041 =2 : Controlled based on the temperature difference of the WL value



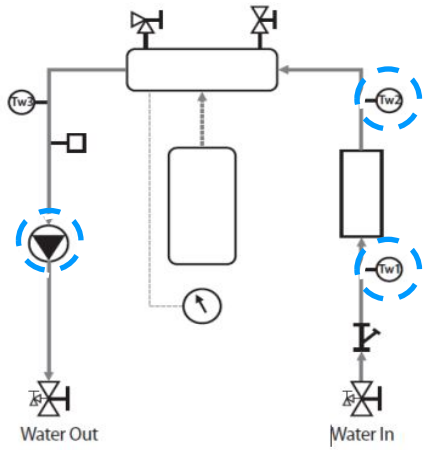
•• The mixing valve is controlled based on the FCU WL value.
•• As the #4044 value increases and the #4045 value decreases, the control speed increases.
(Temperature hunting may occur if the control speed increases depending on the load.)
•• The additional pump and mixing valve should be purchased separately. TW4 sensor is included in the product accessories.
•• TW3 : Water temp. sensor 3

Field Setting Value

■ FSV : Menus 405*

Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
Heating Code 40＊＊	Inverter Pump	Application	＊＊51	-	-	1(Yes)	0	2	1(Yes)	0	2
		Target ΔT	＊＊52	1	℃	5	2	8	5	2	8
		Control factor	＊＊53	1	-	2	1	3	2	1	3
	Zone Control	Application	＊＊61	-	-	0(No)	0	1(Yes)	0(No)	0	1(Yes)

- 405＊ : Inverter pump control



The FSV #4051 should be set to “1 or 2” to use inverter pump control.

※ **#4051** =1 : Use (Max 100%)

※ **#4051** =2 : Use (Max 70%)

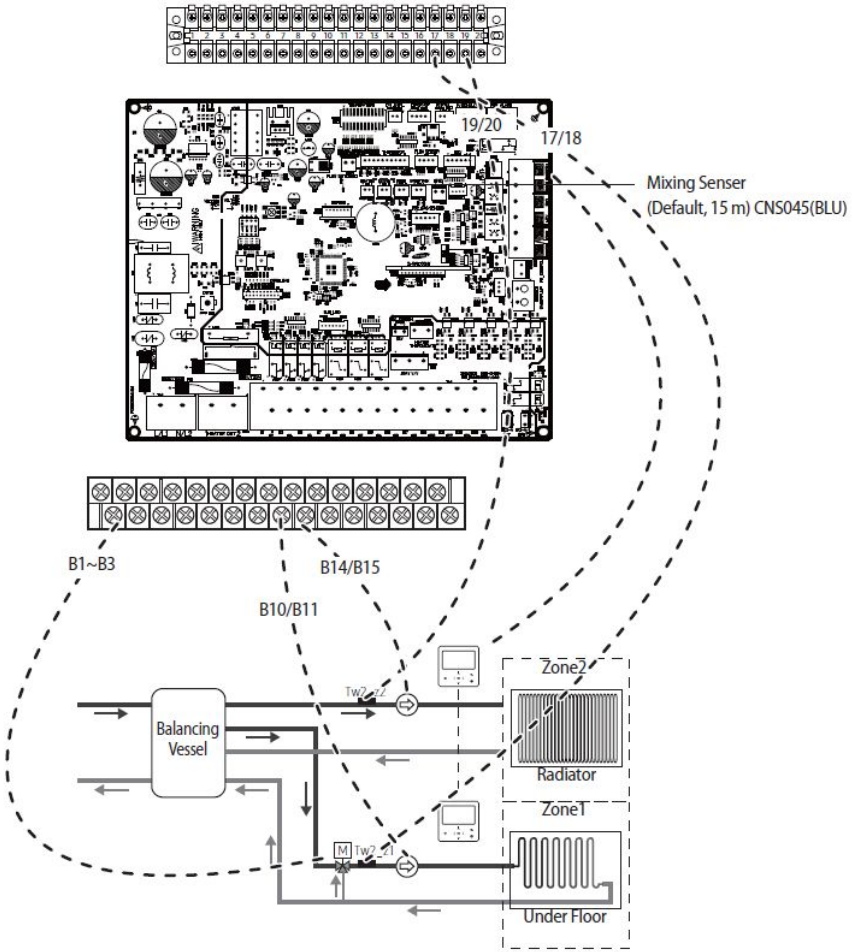
The FSV #4052 is for adjusting temperature difference between Tw2 and Tw1.

* Output signal of Inverter pump(%) = Current Inverter pump output (%) + ((Tw2-Tw1- FSV #4052) * FSV 4053

Field Setting Value

■ FSV : Menus 4061

- 4061 : Zone control



Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
Heating Code 40＊＊	Inverter Pump	Application	＊＊51	-	-	1(Yes)	0	2	1(Yes)	0	2
		Target ΔT	＊＊52	1	℃	5	2	8	5	2	8
		Control factor	＊＊53	1	-	2	1	3	2	1	3
	Zone Control	Application	＊＊61	-	-	0(No)	0	1(Yes)	0(No)	0	1(Yes)

The FSV #4061 should be set to “1(Yes)” to zone control.

Field Setting Value

■ FSV : Menus 50**

: New

Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
Others Code 50**	Outing	Water Out Temp for Cooling	✶✶11	1	˚C	25	5	25	25	5	25
		Room Temp for Cooling	✶✶12	1	˚C	30	18	30	30	18	30
		Water Out Temp for Heating	✶✶13	1	˚C	15	15	55	15	15	55
		Room Temp for Heating	✶✶14	1	˚C	16	16	30	16	16	30
		Auto Cooling WL1 Temp	✶✶15	1	˚C	25	5	25	25	5	25
		Auto Cooling WL2 Temp	✶✶16	1	˚C	25	5	25	25	5	25
		Auto Heating WL1 Temp	✶✶17	1	˚C	15	15	55	15	15	55
		Auto Heating WL2 Temp	✶✶18	1	˚C	15	15	55	15	15	55
		Target Tank Temp	✶✶19	1	˚C	30	30	70	30	30	70
	DHW Saving Mode	Temp Difference	✶✶21	1	˚C	5	0	40	5	0	40
		Saving Mode	✶✶22	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
		Thermo On Temp during Saving Mode	✶✶23	1	˚C	25	0	40	25	0	40
	Power Peak Control	Application	✶✶41	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
		Select forced off parts	✶✶42	1	-	0 (All)	0	3	0 (All)	0	3
		Using input voltage	✶✶43	-	-	1 (High)	0 (Low)	1	1 (High)	0 (Low)	1
	Frequency Ratio Control		✶✶51	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
	PV Control	Application	✶✶81	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
		Setting Temp Shift Value(Cooling)	✶✶82	0.5	˚C	1	0	5	1	0	5
		Setting Temp Shift Value(Heating)	✶✶83	0.5	˚C	1	0	5	1	0	5
	Smart Grid Control	Application	✶✶91	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
		Setting Temp Shift Value(Heating)	✶✶92	0.5	˚C	2	2	5	2	2	5
		Setting Temp Shift Value(DHW)	✶✶93	0.5	˚C	2	2	5	2	2	5
		DHW Mode	✶✶94	-	-	0	0 (Standard)	1 (Power)	0	0 (Standard)	1 (Power)

Field Setting Value

■ FSV : Menus 502*

Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
Others Code 50**	DHW Saving Mode	Temp Difference	**21	1	°C	5	0	40	5	0	40
		Saving Mode	**22	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
		Thermo On Temp during Saving Mode	**23	1	°C	25	0	40	25	0	40

- 502* : DHW Saving mode

Economic DHW Heating

. DHW heating only by the heat pump to save energy.

Target DHW temperature is lower than the temperature set by user.

The temperature difference is defined by FSV #5021. (default: 5°C) If user sets the temperature 45°C, the system sets the target temperature 40°C with the default setting.

If user want additional energy saving, use a “Saving mode” (#5022, default : 0, OFF)

The user can set the “Thermo On” temperature during “Saving mode” using FSV #5023.

Field Setting Value

■ FSV : Menus 504*

- 504* : Power peak control

Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
Others Code 50**	Power Peak Control	Application	**41	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
		Select forced off parts	**42	1	-	0 (All)	0	3	0 (All)	0	3
		Using input voltage	**43	-	-	1 (High)	0 (Low)	1	1 (High)	0 (Low)	1
	Frequency Ratio Control		**51	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
	PV Control	Application	**81	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
		Setting Temp Shift Value(Cooling)	**82	0.5	℃	1	0	5	1	0	5
		Setting Temp Shift Value(Heating)	**83	0.5	℃	1	0	5	1	0	5
	Smart Grid Control	Application	**91	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
		Setting Temp Shift Value(Heating)	**92	0.5	℃	2	2	5	2	2	5
		Setting Temp Shift Value(DHW)	**93	0.5	℃	2	2	5	2	2	5
		DHW Mode	**94	-	-	0	0 (Standard)	1 (Power)	0	0 (Standard)	1 (Power)

Peak Power Control (FSV 5041 = 1)

. 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”.

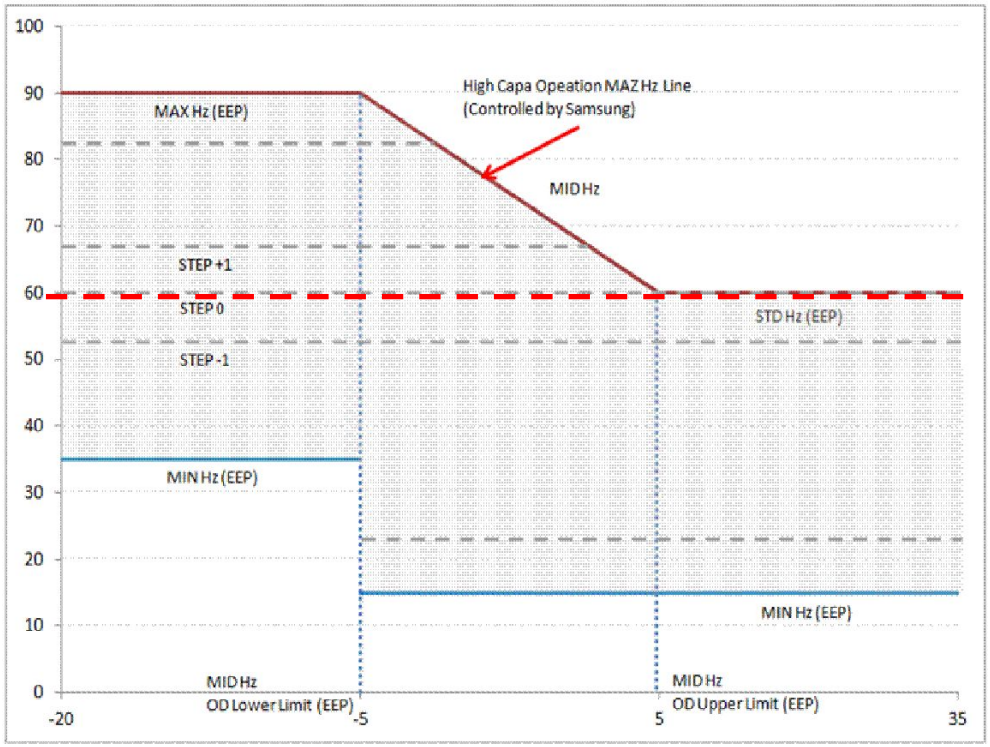
. And According to FSV (#5042), If input is “0 (default)”, Back up heater (BUH) is unavailable while external contact is high.
If input is “ 1”, Only Compressor(Heat Pump) is available.
If input is “ 2”, Only Booster Heater (BSH) is available.
If input is “3”, nothing is available.

. Applying the control when power voltage of input contact is high is default. According to FSV (#5043), it is available to adopt this logic in low condition exceptionally.

. When applying to this logic, SAMSUNG controller come to get “Thermo off” condition for all operation.

Field Setting Value

■ FSV : Menus 5051 (FR control)



※ ex) Normal operation
-10℃ Max Hz : 90
0℃ Max Hz : 75
10℃ Max Hz : 60

※ ex) FR 100% Control
-10℃ Max Hz : 60
0℃ Max Hz : 60
10℃ Max Hz : 60

※ ex) FR 80% Control
-10℃ Max Hz : 48
0℃ Max Hz : 48
10℃ Max Hz : 48

Voltage (V)	FR	Hz
0.0 ≤ V≤ 1.0	50%	min
1.0 ≤ V≤ 2.0	60%	
2.0 ≤ V≤ 3.0	70%	
3.0 ≤ V≤ 4.0	80%	
4.0 ≤ V≤ 5.0	90%	
5.0 ≤ V≤ 6.0	100%	
6.0 ≤ V≤ 7.0	110%	
7.0 ≤ V≤ 8.0	120%	
8.0 ≤ V≤ 8.5	130%	
8.5 ≤ V≤ 9.0	140%	
9.0 ≤ V≤ 10.0	150%	max

This is to limit the maximum frequency of the outdoor unit compressor. (if #5051 = 1 “use”)
External DC signal Control uses a DC voltage of 0 ~ 10V (0v = 50%, ~ 10v = 150%)
The minimum ~ maximum frequency section being divided with 11 steps of 10%

Field Setting Value

■ FSV : Menus 508*

Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
Others Code 50**	Power Peak Control	Application	✱✱41	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
		Select forced off parts	✱✱42	1	-	0 (All)	0	3	0 (All)	0	3
		Using input voltage	✱✱43	-	-	1 (High)	0 (Low)	1	1 (High)	0 (Low)	1
	Frequency Ratio Control		✱✱51	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
	PV Control	Application	✱✱81	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
		Setting Temp Shift Value(Cooling)	✱✱82	0.5	°C	1	0	5	1	0	5
		Setting Temp Shift Value(Heating)	✱✱83	0.5	°C	1	0	5	1	0	5
	Smart Grid Control	Application	✱✱91	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
		Setting Temp Shift Value(Heating)	✱✱92	0.5	°C	2	2	5	2	2	5
		Setting Temp Shift Value(DHW)	✱✱93	0.5	°C	2	2	5	2	2	5
		DHW Mode	✱✱94	-	-	0	0 (Standard)	1 (Power)	0	0 (Standard)	1 (Power)

- 508* : PV Control (Photovoltaics control)
- This is for energy saving by using the solar energy.
- The FSV #5081 should be set to “1(Yes)” for PV control.

FSV	0	1
#5081 (New)	Disable (Default)	Activation

*** Except for how water mode, This function is activated only for the outing mode.**

✔ Cooling mode (FSV #5082 = 2℃, Default)

① Room sensor setting : Current setting value - **FSV #5082** (Min = FSV #1022)

② Water outlet setting : Current setting value - **FSV #5082** (Min = FSV #1012)

③ Water law setting : Current setting value - **FSV #5082** (Min = FSV #2061, #2062, #2071, #2072)

✔ Heating mode (FSV #5083 = 2℃, Default)

① Room sensor setting : Current setting value + **FSV #5083** (Max = FSV #1041)

② Water outlet setting : Current setting value + **FSV #5083** (Max = FSV #1031)

③ Water law setting : Current setting value + **FSV #5083** (Max = FSV #2021, #2022, #2031, #2032)

✔ Hot water mode

- **Forced thermo on regardless of outing mode** : Setting temperature = Max temperature of hot water mode (FSV #1051)

Field Setting Value

■ FSV : Menus 509*

Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
Others Code 50**	Power Peak Control	Application	✱✱41	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
		Select forced off parts	✱✱42	1	-	0 (All)	0	3	0 (All)	0	3
		Using input voltage	✱✱43	-	-	1 (High)	0 (Low)	1	1 (High)	0 (Low)	1
	Frequency Ratio Control		✱✱51	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
	PV Control	Application	✱✱81	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
		Setting Temp Shift Value(Cooling)	✱✱82	0.5	°C	1	0	5	1	0	5
		Setting Temp Shift Value(Heating)	✱✱83	0.5	°C	1	0	5	1	0	5
	Smart Grid Control	Application	✱✱91	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
		Setting Temp Shift Value(Heating)	✱✱92	0.5	°C	2	2	5	2	2	5
		Setting Temp Shift Value(DHW)	✱✱93	0.5	°C	2	2	5	2	2	5
		DHW Mode	✱✱94	-	-	0	0 (Standard)	1 (Power)	0	0 (Standard)	1 (Power)

- 509* : Smart Grid Control
- The FSV #5091 should be set to “1(Yes)” for PV control.

FSV	0	1
#5081 (New)	Disable (Default)	Activation

✔ Operation mode for Smart Grid

Operation Mode	Terminal 1	Terminal 2
Mode 1	Short	Open
Mode 2	Open	Open
Mode 3	Open	Short
Mode 4	Short	Short

1) **Mode 1** : **Forced thermo off of all system**

2) **Mode 2** : **Normal operation**

→ Normal control is performed.

(normal determination of operation ON / OFF, Thermo ON / OFF)

Field Setting Value

■ FSV : Menus 50**

Field Setting Value						Tank integrated type			Wall-mounted type		
Main Menu & Code	Sub Menu Function	Description	Sub Code	Step	Unit	Default	Min	Max	Default	Min	Max
Others Code 50**	Power Peak Control	Application	✳✳41	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
		Select forced off parts	✳✳42	1	-	0 (All)	0	3	0 (All)	0	3
		Using input voltage	✳✳43	-	-	1 (High)	0 (Low)	1	1 (High)	0 (Low)	1
	Frequency Ratio Control		✳✳51	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
	PV Control	Application	✳✳81	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
		Setting Temp Shift Value(Cooling)	✳✳82	0.5	℃	1	0	5	1	0	5
		Setting Temp Shift Value(Heating)	✳✳83	0.5	℃	1	0	5	1	0	5
	Smart Grid Control	Application	✳✳91	-	-	0 (No)	0	1 (Yes)	0 (No)	0	1 (Yes)
		Setting Temp Shift Value(Heating)	✳✳92	0.5	℃	2	2	5	2	2	5
		Setting Temp Shift Value(DHW)	✳✳93	0.5	℃	2	2	5	2	2	5
		DHW Mode	✳✳94	-	-	0	0 (Standard)	1 (Power)	0	0 (Standard)	1 (Power)

3) Mode 3 : When operating on, the setting temperature is reflected as follows (FSV #5092 =2℃, #5093 = 5℃, Default)

→ The heating and hot water setting temperature are set by the FSV setting value.

① Heating mode (Room sensor setting) : Current setting value + **FSV #5092** (Max = FSV #1041)

② Heating mode (Water outlet setting) : Current setting value + **FSV #5092** (Max = FSV #1031)

③ Heating mode (Water law setting) : Current setting value + **FSV #5092** (Max = FSV #2021, #2022, #2031, #2032)

④ How water mode : Current setting value + **FSV #5093** (Max = FSV #1051)

4) Mdoe 4 : When operating on, the setting temperature is reflected as follows

✔ Hot water mode

① #5094=0 : Normal operation (Heat pump is operated.) : Target setting temperature is **55℃**.

② #5094=1 : Power/Forced hot water operation (Heat pump + Booster heater are operated.) : Target setting temperature is **70℃**.

✔ Heating mode

① Heating mode (Room sensor setting) : Current setting value + **FSV #5092 + 3℃** (Max = FSV #1041)

② Heating mode (Water outlet setting) : Current setting value + **FSV #5092 + 5℃** (Max = FSV #1031)

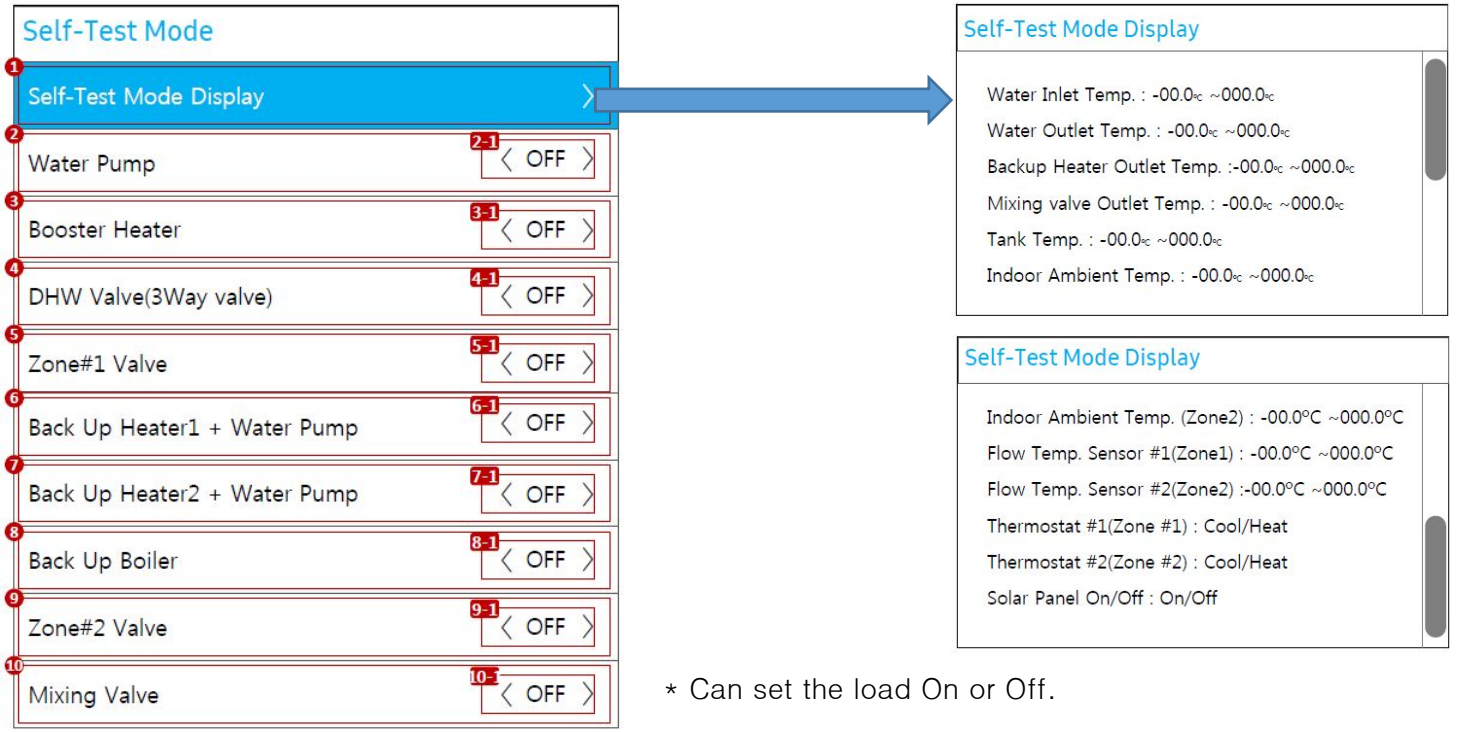
③ Heating mode (Water law setting) : Current setting value + **FSV #5092 + 5℃** (Max = FSV #2021, #2022, #2031, #2032)

Special mode

■ Self-Test mode

- Enter the self-test mode using wired remote controller,

* Load list : When pressing the corresponding button, you can set the load On or Off.



* Can set the load On or Off.

Samsung Electronics

THANK