



## **TECHNICAL MANUAL**

### **AIR TO WATER HEAT PUMP**

**Q-ton Natural refrigerant CO<sub>2</sub> water heater  
Space heating edition**

**ESA30EH2-25**

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## ● Compatibility

### Compatibility with previous models

This model has a heating function added to the previous models, and various functions have been added or changed.

| Function      |                                          | Overview                                                                                              | This model  | Previous models |           |    |    |    |    |
|---------------|------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------|-----------------|-----------|----|----|----|----|
|               |                                          |                                                                                                       | ESA30EH2-25 | ESA30EH-25      | ESA30E-25 |    |    |    |    |
|               |                                          |                                                                                                       | -           | -               | /F        | /C | /B | /A | /1 |
| Space heating | Heating weekly timer                     | Weekly timer for heating operation                                                                    | ○           | ○               | ×         | ×  | ×  | ×  | ×  |
| Water heating | Weekly timer with HW temperature setting |                                                                                                       | ○           | ○               | ×         | ×  | ×  | ×  | ×  |
|               | Weekly timer                             |                                                                                                       | ×           | ×               | ○         | ×  | ×  | ×  | ×  |
|               | User setting memory                      |                                                                                                       | ○           | ○               | ×         | ×  | ×  | ×  | ×  |
|               | Anti-legionella control                  |                                                                                                       | ○※1         | ○               | ○         | ×  | ×  | ×  | ×  |
|               | Return hot water control                 |                                                                                                       | ○           | ×               | ×         | ×  | ×  | ×  | ×  |
| General       | Application setting                      | Usage setting function to accompany the added heating operation                                       | ○           | ○               | ×         | ×  | ×  | ×  | ×  |
|               | Priority setting                         | Priority setting of space heating and water heating function to accompany the added heating operation | ○           | ○               | ×         | ×  | ×  | ×  | ×  |
|               | Silent mode                              |                                                                                                       | ○           | ×               | ×         | ×  | ×  | ×  | ×  |

### Connectibility of remote control

Due to differences in communication specifications, the combination of remote control and heat pump unit is limited as shown in the table below.

#### Connectibility of remote control and heat pump unit

|                |          | Heat pump unit |            |           |
|----------------|----------|----------------|------------|-----------|
|                |          | ESA30EH2-25    | ESA30EH-25 | ESA30E-25 |
| Remote control | RC-Q1EH2 | ○              | ○※2        | ×         |
|                | RC-Q1EH  | ×              | ○          | ×         |
|                | RC-Q1E   | ×              | ×          | ○         |

(Notes)

1. Function available on RC-Q1EH2
2. Some functions will show as invalid when connected to ESA30EH-25

# 1. GENERAL DESCRIPTION

## 1.1 Mechanism of CO<sub>2</sub> heat pump for space heating

In addition to a conventional hot water supply system, the application to a space heating system and a combination of both was enabled in the new model (ESA30EH2-25).

On the space heating system, the temperature control circuit (external circulation pump), controls the inlet/outlet of the system.

(13) Circulation pump/smart pump - adjusts the flow rate according to the inlet and outlet temperature of the system.

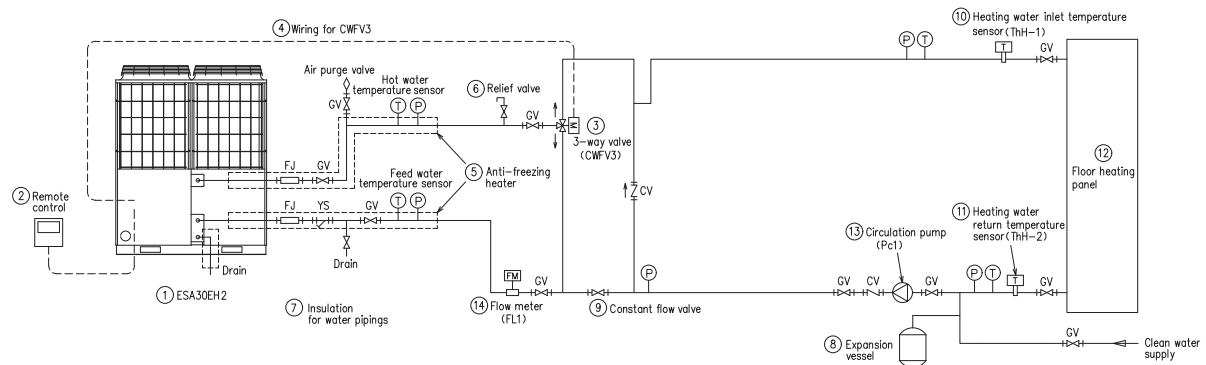
The circulation pump adjusts the deltaT according to a pre-set deltaT for the system.

In case of combined system application it is possible to change between heating and hot water application by adding an additional 3 way valve TCCV3 (15)

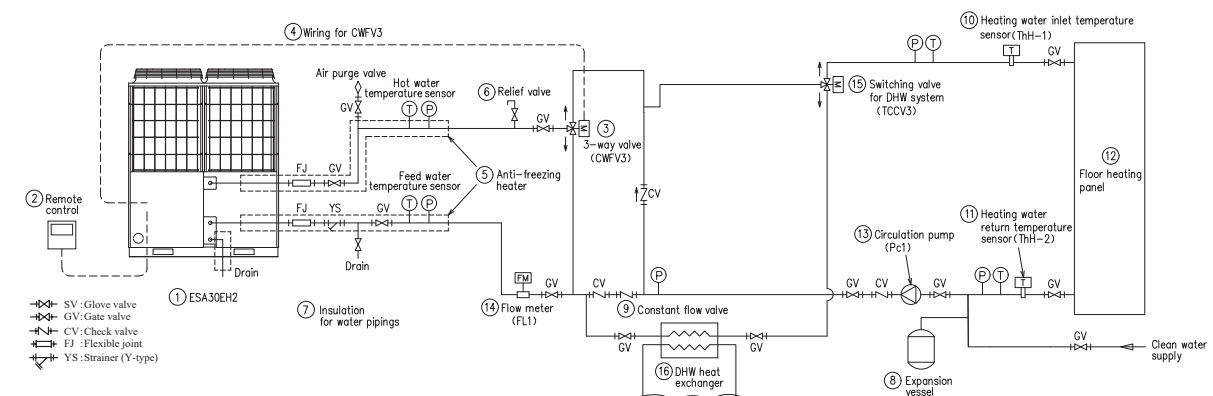
Additionally, you can set the temperature setting and the priority of heating or hot water supply with simple operation of remote control.

### Standard space heating system diagram

#### (1) For the purpose of space heating only



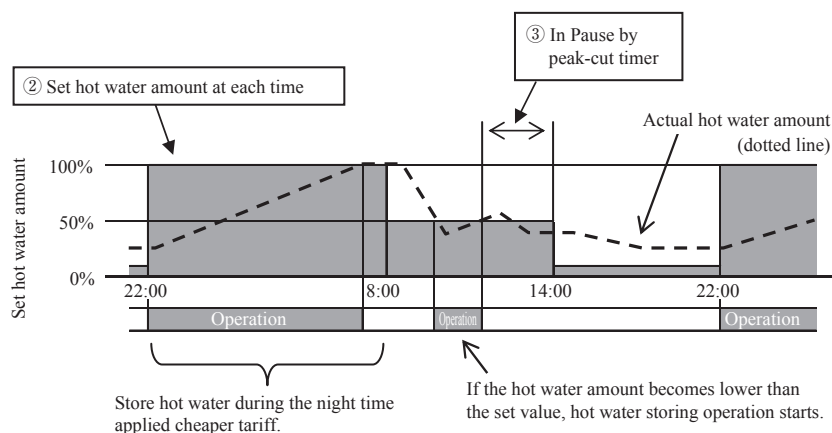
#### (2) For the purpose of combination system with space heating and DHW



## 1.2 CO<sub>2</sub> heat pump for space heating: Operation chart

### (1) Operation pattern of CO<sub>2</sub> heat pump water heater (for hot water)

This heat pump water heater is operated with the target hot water amount set at each set time.  
The typical operation pattern and setting items are explained with following figure.



Setting of hot water storage operation (Refer to the setting method in page 11.)

#### ① Hot water temperature

Store hot water in the hot water storage unit at the hot water temperature set with remote control.

The heat reserving volume of the hot water storage unit can be increased or decreased by increasing or decreasing the hot water temperature.

If multiple heat pump units are connected to one remote control, it is available to set the hot water temperature individually.

#### ② Hot water amount at each set time

Hot water amount can be set at each set time with remote control.

Set the hot water amount to meet the state of hot water usage.

#### ③ Peak-cut timer

It is available to prohibit or save operation of the heat pump unit at the designated time.

The contract amount of power can be reduced by applying peak-cut operation of heat pump unit according to the power demand.

#### ④ Hot water amount setting

The hot water amount at each set time can be increased or decreased uniformly on the day of a week basis.

In case that the usage amount of hot water may vary depending on the season or the day of a week, please use this function.

Ex. 1 In summer: More In winter: Less

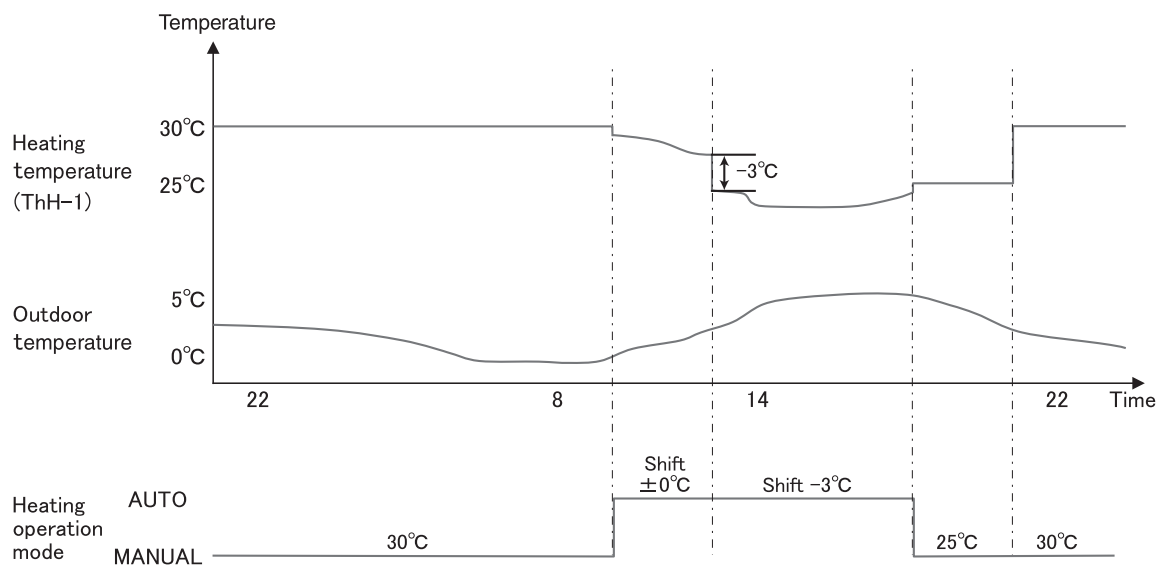
Ex. 2 From Monday to Thursday: Less Friday, Saturday: More Sunday: Normal

#### ⑤ Setting [Pause]

If it is a day off and no hot water is required to store, it can make hot water storage operation prohibited.

**(2) Operation pattern of CO<sub>2</sub> heat pump water heater (for heating)**

This heat pump can be used as space heating system also. The typical operation pattern and setting items are explained with following figure.



Different heating mode is available.

① Mode AUTO

The heating set temperature changes automatically according to the outdoor temperature.

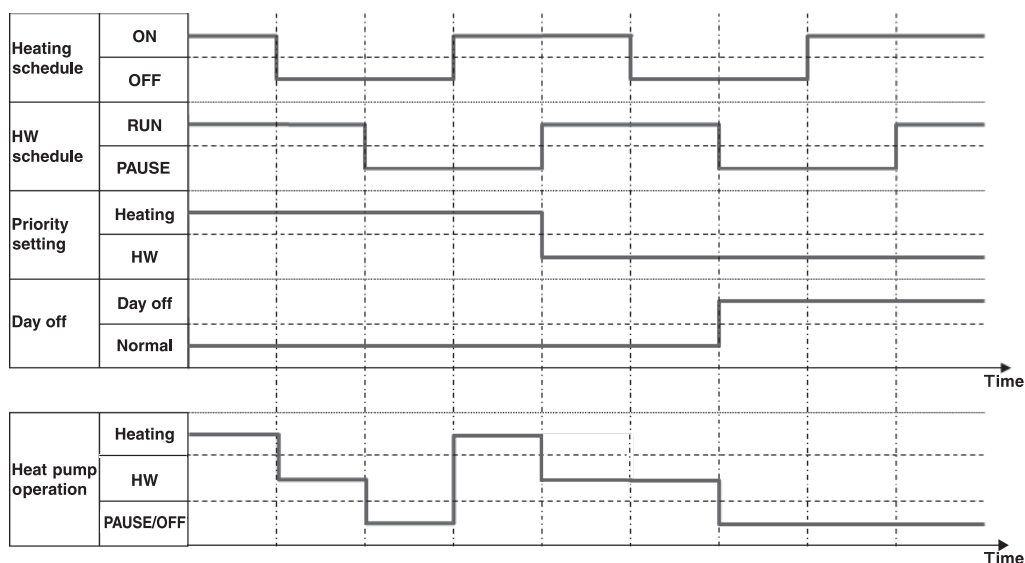
When the mode AUTO is selected, the shift temperature can be set.

② Mode MANUAL

The heating set temperature is directly set by user. It does not change with outdoor temperature.

**(3) Operation pattern of CO<sub>2</sub> heat pump water heater (for combination use)**

This heat pump can be connected to the space heating system and hot water storage tank at the same time. The typical operation pattern and setting are explained with following figure.



Setting in case of HW & heating application (Combination use)

① Priority setting (Please see user's manual for details.)

There are 2 schedules, 1 for Hot Water mode and 1 for Heating mode. When both Hot Water and Heating are required, the heat pump decides which operation mode is prioritized.

· HW priority

Every time, "HW operation" is prioritized over "Heating operation".

· Heating priority

Always the "Heating operation" is prioritized.

Notice:

Even if the Heating priority is set, there is a risk of water shortage, the heat pump unit could decide to move on the HW operation.

② Day off, Peak cut timer (Please see user's manual for details.)

For these setting, they are common for both HW operation and Heating operation.

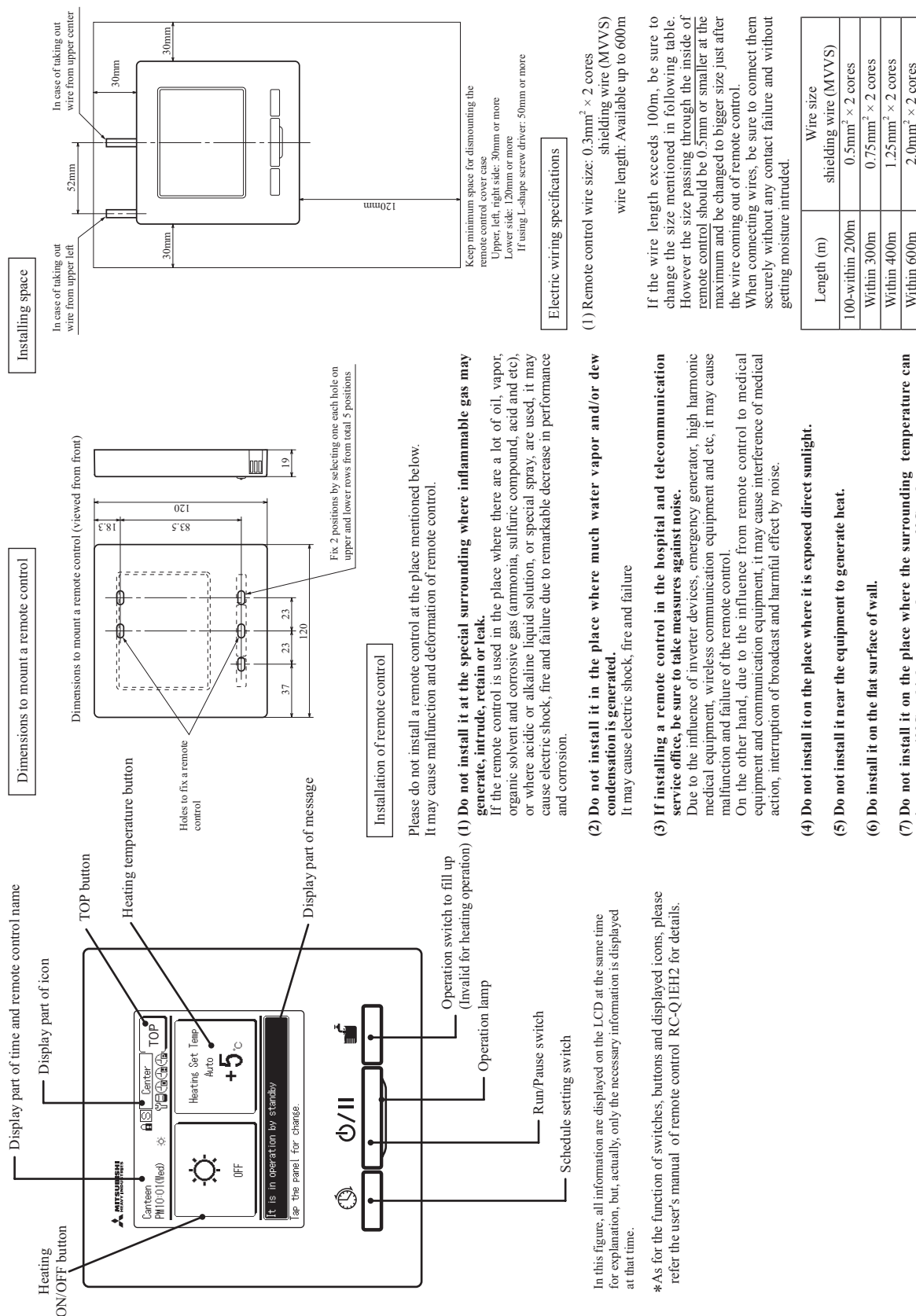
## 2. SPECIFICATIONS

## 2.1 Remote control

**(1) Remote control for heat pump water heater (Model : RC-Q1EH2)**

NOTE: Please use ESA30EH2 together with the remote control “RC-Q1EH2”.

**(a) Outline dimensional drawing**



**(b) List of setting functions**

| Setting and display items         |                                         | Detailed contents                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Remote control network         |                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 1                                 | Multiple heat pump water heater control | Max. 16 sets of heat pump water heaters in one Superlink network can be connected to one remote control and controlled by it.<br>Heat pump water heaters address needs to be set.                                                                                                                                                                                                                                                                         |
| 2                                 | Main or Sub remote control setting      | 2 remote controls can be connected to one remote control network.<br>One of them is set "Main" and the other one is set "Sub".                                                                                                                                                                                                                                                                                                                            |
| 2. TOP screen, switch operation   |                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 1                                 | Menu                                    | Set the item of control, setting, confirm and etc. (See item 4 to 10)                                                                                                                                                                                                                                                                                                                                                                                     |
| 2                                 | Heating ON/OFF                          | Set the heating ON/OFF.                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 3                                 | Heating temperature setting             | Set the heating temperature.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 4                                 | Run/Pause switch                        | Start operation or pause operation                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 5                                 | Schedule setting switch                 | Set schedule. See item 3 for details.                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 6                                 | Switch for operation to fill up         | Set the hot water amount 100% and start operation to top up . (Invalid in case of heating application)                                                                                                                                                                                                                                                                                                                                                    |
| 3. Schedule and function settings |                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 1                                 | Setting of weekly schedule              | Set the operation pattern for one week.<br>Set the valid/invalid of timer, ON/OFF of heating, time, heating setting temperature.<br>●It is possible to set 8 operation patterns per day<br>●It is possible to set time at 1 hour intervals.<br>●It is possible to set all. (Week days/ Saturday & Sunday/All days)                                                                                                                                        |
| 2                                 | Setting of day off                      | If day off is set, the operation of heat pump water heater to top up becomes invalid.<br>●It is possible to set off day in every week<br>●It is possible to set off day for specific period of time<br>●It is possible to set off day on specific day.                                                                                                                                                                                                    |
| 3                                 | Setting of peak cut                     | Reduce the power consumption by limiting the max. capacity.<br>Set the start/end time of peak-cut and the peak-cut %.<br>●It is possible to set peak-cut for whole week.<br>●It is possible to set max 4 patterns per day<br>●It is possible to set time at 5 minutes intervals<br>●It is possible to select the peak-out % from 0, 40, 60, 80%<br>●It is possible to set invalid.<br>●It is possible to set all. (Week days/ Saturday & Sunday/All days) |
| 4                                 | Setting of silent mode                  | Reduce the noise level by limiting the max. speed of compressor and fan.<br>Set the [Start time] and [End time] of the operation to limit the noise level.<br>●It is possible to set 4 patterns per day.                                                                                                                                                                                                                                                  |
| 4. Initial settings               |                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 1                                 | Clock setting                           | Set or correct the current date and time<br>●In case of power failure within 80 hours, the clock runs by the built-in battery for back-up.                                                                                                                                                                                                                                                                                                                |
| 2                                 | Date and time display                   | On/Off, 12H/24H or display position of AM/PM can be set                                                                                                                                                                                                                                                                                                                                                                                                   |
| 3                                 | Contrast                                | The contrast of LCD can be adjusted.                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 4                                 | Backlight                               | On/Off and lighting time of backlight can be set.                                                                                                                                                                                                                                                                                                                                                                                                         |
| 5                                 | Controller sound                        | On/Off of beep sound at touch panel operation can be set                                                                                                                                                                                                                                                                                                                                                                                                  |
| 6                                 | Priority setting                        | It is possible to set the priority of HW/Heating.                                                                                                                                                                                                                                                                                                                                                                                                         |
| 7                                 | Summer time                             | Enable/Disable of summer time can be set.                                                                                                                                                                                                                                                                                                                                                                                                                 |

| Setting and display items |                                 | Detailed contents                                                                                                                                                                                                                                              |
|---------------------------|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5. Administrator settings |                                 | Administrator password is required                                                                                                                                                                                                                             |
| 1                         | Enable/Disable setting          | ●Permission/prohibition setting of the following operations can be set.<br>[Run/Pause], [Setting of HW temp.], [Change amount of top up], [Manual operation to fill up], [Setting of schedule], [Select the language], [Heating operation], [Heatin set temp.] |
| 2                         | Night tariff setting            | In order to calculate the power consumption in day/night time, the time zone applied night tariff can be set.                                                                                                                                                  |
| 3                         | HP unit selection               | The heat pump water heater to be displayed on RC can be selected.                                                                                                                                                                                              |
| 4                         | RC display setting              | R/C display setting can be set.<br>[Name of R/C], [Name of HP unit], [Defrost operation display], [Status of HW amount], [HW amount display setting]                                                                                                           |
| 5                         | Step size of HW temperature     | Step size of HW temperature (at 5°C or 1°C intervals) can be set.<br>(Factory default is 5°C)                                                                                                                                                                  |
| 6                         | Change administrator password   | Administrator password can be changed                                                                                                                                                                                                                          |
| 7                         | User environment                | By selecting the operation pattern of typical business type, the detailed operation pattern can be set easily.                                                                                                                                                 |
| 8                         | Operation lamp setting          | It is possible to change the color of R/C lamp.                                                                                                                                                                                                                |
| 9                         | Upper limit setting of HW temp. | Set the upper limit value for the hot water storage temperature.                                                                                                                                                                                               |
| 10                        | Open tank information           | Display the detection temperature of open tank temperature sensor.                                                                                                                                                                                             |
| 11                        | Application setting             | Application setting can be changed. (HW, Heating, HW&heating)                                                                                                                                                                                                  |
| 12                        | Cancel weekly schedule (HW)     | This function is used when the HP unit is controlled by external control.                                                                                                                                                                                      |
| 6. Installation settings  |                                 | Service password is required.                                                                                                                                                                                                                                  |
| 1                         | Installation date               | If installation date is registered, next service date is displayed.                                                                                                                                                                                            |
| 2                         | Company information             | Contact company can be registered on the remote control.<br>●Name of contact company can be registered.<br>●Phone No. of contact company can be registered.                                                                                                    |
| 3                         | Test run                        | It is possible to start test run.                                                                                                                                                                                                                              |
|                           | Primary setting of operation    | It is possible to start [Primary setting of operation].                                                                                                                                                                                                        |
|                           | Water pump test run             | It is possible to start [Water pump test run].                                                                                                                                                                                                                 |
|                           | Compressor Hz fixed operation   | It is possible to operate at fixed compressor Hz.                                                                                                                                                                                                              |
| 7. RC function settings   |                                 | Service password is required.                                                                                                                                                                                                                                  |
| 1                         | Main/Sub of RC                  | Main or Sub remote control setting can be done.                                                                                                                                                                                                                |
| 2                         | External input                  | When multiple heat pump water heaters are connected, the applicable range of water heaters of CnT input signal can be set.                                                                                                                                     |
| 3                         | Auto-restart                    | Control contents after recovering from power failure can be set.                                                                                                                                                                                               |
| 8. Service & maintenance  |                                 | Service password is required.                                                                                                                                                                                                                                  |
| 1                         | No. display of unit             | Max. 16 sets of heat pump water heaters can be connected to a remote control.<br>The connected heat pump water heaters can be checked.                                                                                                                         |
| 2                         | Next service date               | Next service date can be registered. On the service date, contact company is displayed on RC.                                                                                                                                                                  |
| 3                         | Error display                   | Up to 14 cases of error history (error code and date of occurrence) can be displayed.                                                                                                                                                                          |
| 4                         | Save HP unit setting            | Setting contents of heat pump water heaters connected to the remote control can be saved in remote control as backup.                                                                                                                                          |
| 5                         | Special setting                 | [CPU reset] [Restore of default setting] [Touch panel calibration]                                                                                                                                                                                             |
| 6                         | System OFF                      | All heat pump water heaters in one system can be stopped.                                                                                                                                                                                                      |
| 7                         | Operation data                  | Status list of connected units and operation status of each unit can be checked.                                                                                                                                                                               |
| 9. Contact company        |                                 | Contact company and phone No. are displayed.                                                                                                                                                                                                                   |
| 10. Check of RC setting   |                                 | Current setting list of RC and HP water heater can be checked.                                                                                                                                                                                                 |
| 11. Select the language   |                                 | Select the language to be displayed on the R/C.                                                                                                                                                                                                                |

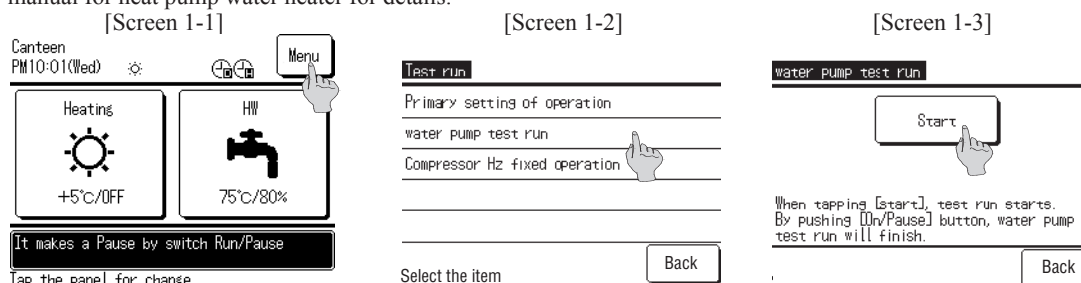
### (c) Setting method of remote control for heat pump water heater

#### [At the initial use]

- 1) After the completion of installation, check that the feed water is surely supplied to the hot water supply system firstly and then turn the power ON.

After the completion of initial setting, TOP screen (Screen 1-1) is displayed on the remote control. \*Operation mode is [Pause]  
 [Menu]→[Installation setting]→[Input the service password (9999)]→[Test run (Screen 1-2)]→[Water pump test run (Screen 1-3)]  
 From this screen please start test run of water pump.

Complement: The test run of water pump can be started from the control of heat pump water heater as well. Refer to user's manual for heat pump water heater for details.



#### [Caution 1]

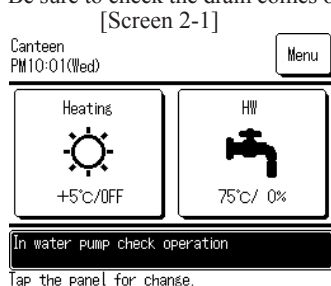
If starting operation by pushing [Run/Pause] switch before the end of water pump test run, the heat pump water heater may start the operation.

Since it may cause failure of heat pump water heater, **do not start operation until completion of water pump test run.**

- 2) When starting test run of water pump, the message of “In water pump check operation” is displayed on the TOP screen (Screen 2-1).

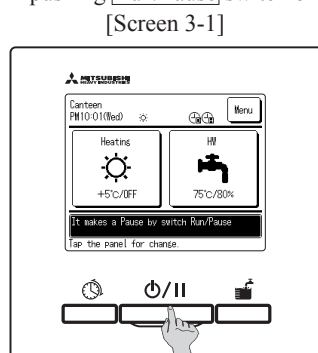
Purge air by operating test run of water pump.

Be sure to check the drain comes out by opening drain valve and air purge valve.



- 3) After completing test run of water pump, stop test run of water pump.

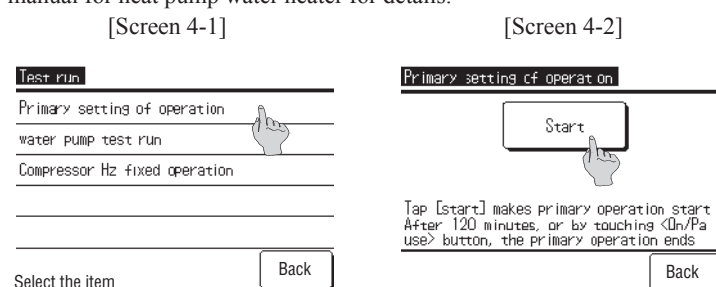
If pushing [Run/Pause] switch on the panel of remote control to stop operation, the water pump test run is stopped (Screen 3-1)



- 4) Start the “Primary setting of operation” of the heat pump water heater.

[Menu]→[Installation setting]→[Input the service password (9999)]→[Test run (Screen 4-1)]→[Primary setting of operation (Screen 4-2)]  
 According to these procedures, please start the primary setting of operation.

Complement: The primary setting of operation can be started from the control of heat pump water heater as well. Refer to user's manual for heat pump water heater for details.



- 5) When starting the primary setting of operation, the message of “In Primary operation” is displayed on the TOP screen (Screen 5-1).

When completing the primary setting of operation, the heat pump water heater is stopped and the message of “In primary operation” is disappeared (Screen 1-1).

Be sure to check the drain comes out by opening drain valve and air purge valve.

[Caution 2]

Since the heat pump unit is paused after the end of this operation, the heat pump water heater does not start the operation.

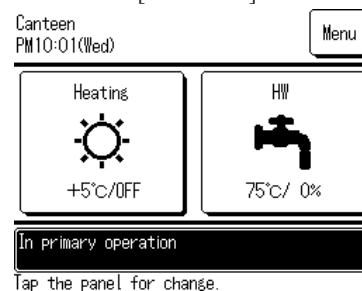
However, for anti-freezing of water in the pipe, water pump and compressor may start operation.

- 6) After completion of primary setting of operation, set the necessary items with the remote control and start operation of the heat pump water heater by pushing [Run/Pause] switch. (Screen 3-1)

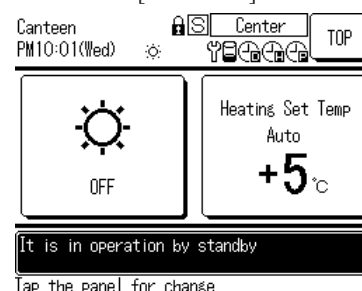
When the heat pump water heater is operating as heating, the message of “It is in operation heating” is displayed on the TOP screen (Screen 6-1).

Complement: As for the setting method by remote control, please refer to the next item [Setting example] or user’s manual.

[Screen 5-1]



[Screen 6-1]



### [Setting example]

[Setting method] and [Operation pattern of heat pump water heater] for following setting conditions are shown below.

- ① The heating temperature ThH-1 is 30°C.
- ② The heating temperature is set as Auto with shift temperature +5°C.
- ③ The heating operation is done from 8:00 to 17:00 for office use.
- ④ For combination use (HW & Heating), the heating operation is done between 8:00 to 17:00 and the operation to top up is done between 17:00 to 8:00.

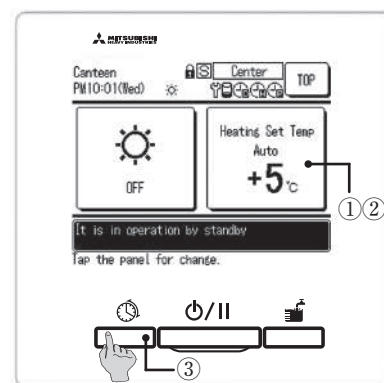
- 1) Setting method (\* Please see user’s manual for details.)

The position of buttons and switches are shown in the right figure.

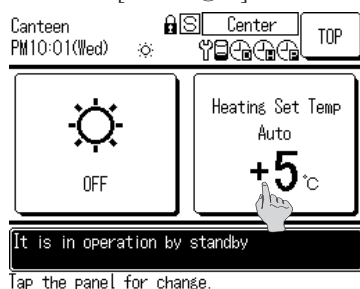
The above setting conditions ① to ③ can be set by pushing the buttons and switches shown in the right here.

#### a) Set the heating temperature ThH-1 at 30°C

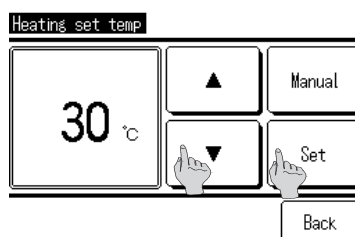
- ① When tapping [Heating temperature setting] button on Heating TOP screen (Screen ①-1), the setting of heating temperature screen is displayed.
- ② Tap Auto/Manual button to display Manual on the button. Then set the heating setting temperature (ThH-1) by tapping ▲ ▼ buttons and tap [Set] button (Screen ①-2).



[Screen ①-1]



[Screen ①-2]



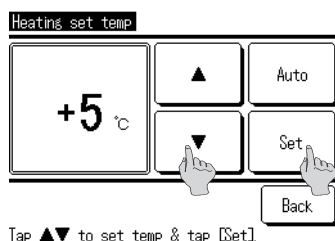
Tap ▲▼ to set temp & tap [Set].

## b) Set the shift temperature +5°C with heating mode “Auto”

- ① In case of heating mode “Auto”, the heating setting temperature (ThH-1) is determined by the outside air temperature. Set the shift temperature by tapping ▲▼ buttons and tap [Set] button (Screen ②-1).

Info: In case of heating mode “Auto”, the determination of heating setting temperature is following the commission regulation (EU) No.813/2013.

[Screen ②-1]



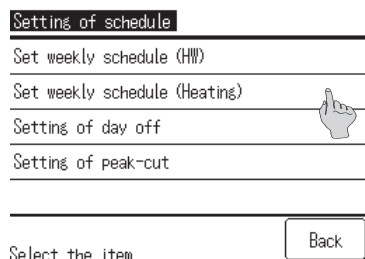
## c) Set the time period for the heating operation with “Auto” mode

- ① When pushing [Schedule setting] switch, [Setting of schedule] menu screen is displayed. (Screen ③-1)
- ② When tapping [Setting of weekly schedule (Heating)], the [Weekly timer] screen is displayed. Tap [Week days] button (Screen ③-2). The screen for confirming the set contents is displayed (Screen ③-3).

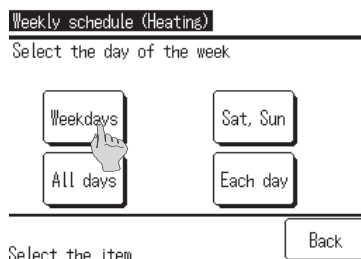
<Complement> Select the day to be set from [Week days], [Sat, Sun], [All days] and [Each day] buttons.

- [Week days] Set all days from Monday to Friday.
- [Sat, Sun] Set the days of Saturday and Sunday.
- [All days] Set all days from Monday to Sunday.
- [Each day] Set each day.

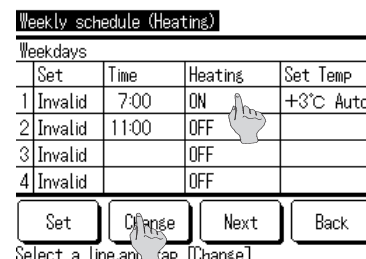
[Screen ③-1]



[Screen ③-2]



[Screen ③-3]

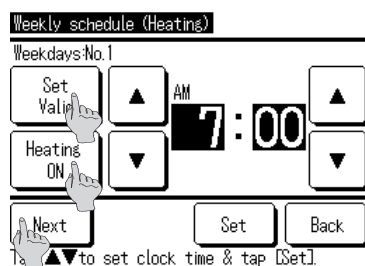


- ③ Set the timer on the item 1 to start heating operation at 8:00.

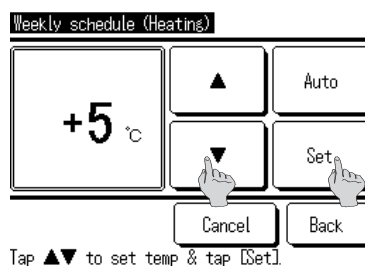
When tapping the line of item 1, this line is highlighted in reverse. Tap [Change] button.

- ④ [Heating setting screen (Screen ③-4)] is displayed. Tap [Valid/Invalid] button to display “Valid”, and tap [ON/OFF] button to display ON. [Next] button appears, and tap [Next] button.

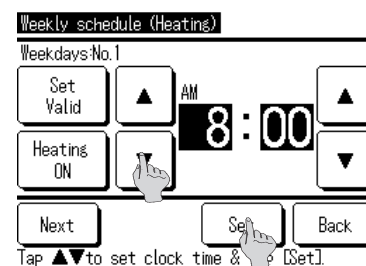
[Screen ③-4]



[Screen ③-5]



[Screen ③-6]



- ⑤ [Heating temperature setting screen (Screen ③-5)] is now displayed. Tap the **Auto/Manual** button to display “Auto” and tap **Set** button.
- ⑥ [Heating setting screen (Screen ③-6)] is again displayed. Set the time at 8:00 with ▲ ▼ button and tap **Set**.
- ⑦ In order to set OFF timer at 17:00, tap item 2 and change as ③,④ (With Set “Valid” and Heating “OFF”) and ⑥.
- ⑧ When these 2 timers are set (screen ③-7), tap **Set** button.

Since [the acknowledge screen (screen ③-8)] for confirming all contents is displayed, tap **Yes** to save all settings.

[Screen ③-7]

**Weekly schedule (Heating)**

| Weekdays | Set     | Time  | Heating | Set Temp  |
|----------|---------|-------|---------|-----------|
| 1        | Valid   | 8:00  | ON      | +5°C Auto |
| 2        | Valid   | 17:00 | OFF     |           |
| 3        | Invalid |       |         |           |
| 4        | Invalid |       |         |           |

Select a line, and tap [Change].

[Screen ③-8]

**Weekly schedule (Heating)**

Do you want to apply group setting?

d) Set the heating operation “Auto” (+5°C) between 8:00 to 17:00, and the operation to top up (75°C) between 17:00 to 8:00.

- ① If the application is not “HW & Heating”, please set the application.

[Menu]→[Administrator setting (Screen ④-1)]→[Application setting (screen ④-2)]

Notice: Before setting application, tap Run/Pause switch and tap **Pause** button. If the unit is not in Pause, the application cannot be changed.

[Screen ④-1]

**Administrator settings**

Application setting

Cancel weekly schedule (HW)

Select the item.

[Screen ④-2]

**Application setting**

Select the application

- ② Set the priority as “Heating”.

[Menu]→[Initial setting(Screen ④-3)]→[Priority setting(screen ④-4)]

Notice: When the priority is set as “Heating”, the heating operation takes precedence even if the target HW amount is not achieved.

[Screen ④-3]

**Initial settings**

Priority setting

Summer time

Select the item.

[Screen ④-4]

**Priority setting**

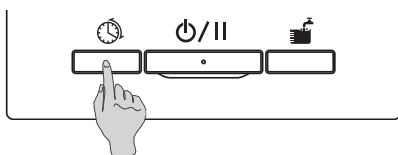
Select the priority

- ③ Set the heating schedule as c) above.

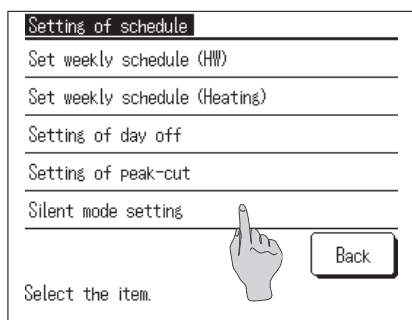
- ④ Set the HW schedule with HW amount 100% between 17:00 and 8:00, with HW target temperature 75°C. (For more detail, please see the user’s manual and technical manual for hot water.)

## e) Silent mode

Silent mode on weekly basis can be set

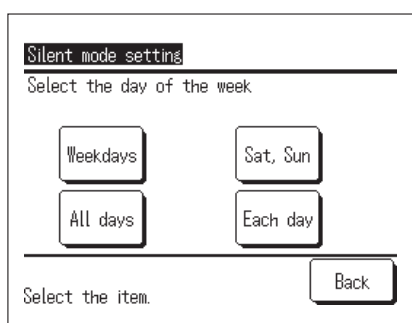


1. Push the **Schedule setting** switch on the panel.



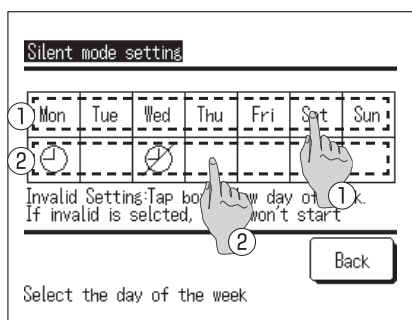
2. The menu screen of [Setting of schedule] is displayed.

Tap the [Silent mode setting]



3. The selection screen of [Silent mode setting] is displayed. Tap the item of setting day.

- |                                              |             |
|----------------------------------------------|-------------|
| ① Weekdays: From Monday to Friday            | } (Go to 6) |
| ② Sat, Sun: Saturday and Sunday              |             |
| ③ All days: From Monday to Sunday            |             |
| ④ Each day: Go to the [Day selection] screen | (Go to 4)   |



4. Tap the day to be set on the display ①.

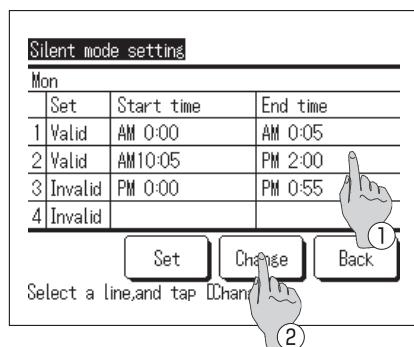
The current setting contents of the day tapped are displayed (Go to 6)

5. For the setting Valid/Invalid, tap the blank column on the display ② just below the day.

Switch Valid : [⊕] ⇔ Invalid [⊖]

On the day set invalid, the Silent mode operation is not done.

Multiple selections of invalid settings are available.

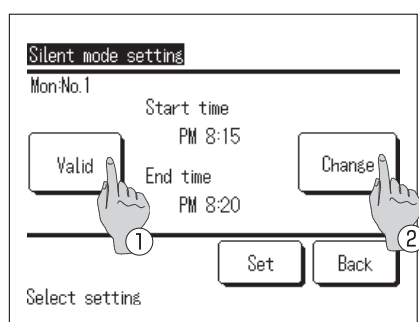


## 6. The [Checking of current set contents] screen is displayed.

When changing or adding the setting contents, ① select the column of the setting No. to be changed ② and tap [Change] button.

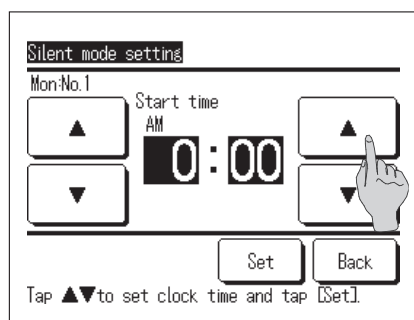
- The setting contents displayed may differ depending on the set day selected (☞ Go to 3)

- ① Weekdays: Set Silent mode on Monday
- ② Sat, Sun: Set Silent mode on Saturday
- ③ All days in a week: Set Silent mode on Monday
- ④ Each day: Set Silent mode on the day selected



## 7. The detail screen of [Timer set contents] is displayed.

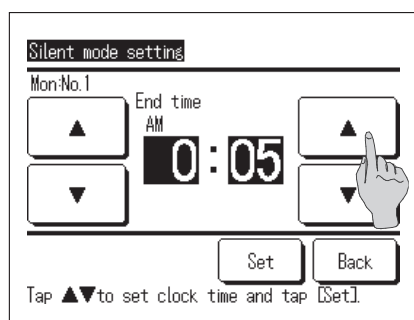
- ① Switch the setting [Valid] ⇔ [Invalid] by tapping [Valid/Invalid] button
- ② Tap [Change] button. and set [Start time] and [End time]. (☞ Go to 8)



## 8. Set the [Start time].

Set the Hour/Minute by tapping ▲ ▼ buttons. The [Start time] can be set at 5-minute intervals

After setting the time, tap [Set] button. (☞ Go to 9)



## 9. Set the [End time].

Set the Hour/Minute by tapping ▲ ▼ buttons. The [End time] can be set at 5-minute intervals from 5 minutes after the [Start time] up to 24:00.

After setting the time, tap [Set] button. (☞ Go to 10)

**Silent mode setting**

Mon:No.1

Start time PM 8:15

End time PM 8:20

Valid Change

Select setting Set Back



**Silent mode setting**

Mon

|   | Set     | Start time | End time |
|---|---------|------------|----------|
| 1 | Valid   | AM 0:00    | AM 0:05  |
| 2 | Valid   | AM 10:05   | PM 2:00  |
| 3 | Invalid | PM 0:00    | PM 0:55  |
| 4 | Invalid |            |          |

Select a line, and tap [Change].

Set Change Back



**Silent mode setting**

Do you want to apply group setting?

Yes

Back



# 10. The [Checking of set contents] screen is displayed

(☞ Go to 7 )

When tapping **Set** button, the set contents are confirmed and [Checking of set contents on the day] screen is displayed. (☞ Go to 6 )

# 11. If changing or adding the setting contents on the same day continuously, please start the work from 6 .

# 12. The [Checking of setting contents] on the day is displayed. (☞ Go to 6 )

When saving the setting, tap **Set** button.

## ① In case of setting all

It shifts to the [All set contents acknowledge] screen (☞ Go to 13 )

## ② In case of individual setting

Save the setting and shift to the [Day selection] screen (☞ Go to 4 )

# 13. [All set contents acknowledge] screen is displayed

Tap **Yes** and save the setting

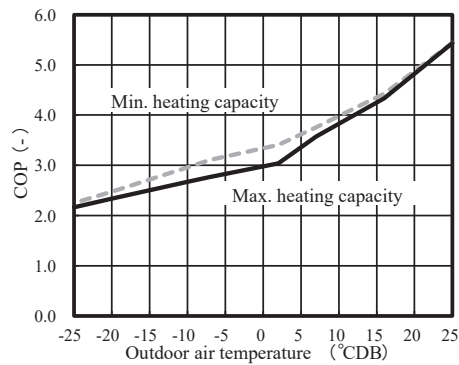
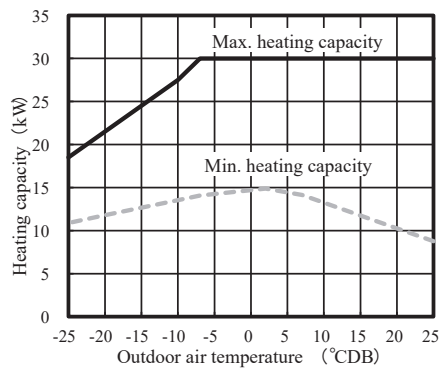
After saving, it returns to the [Day selection] screen

# 14. If the setting is done by changing the day, please start setting from 4 .

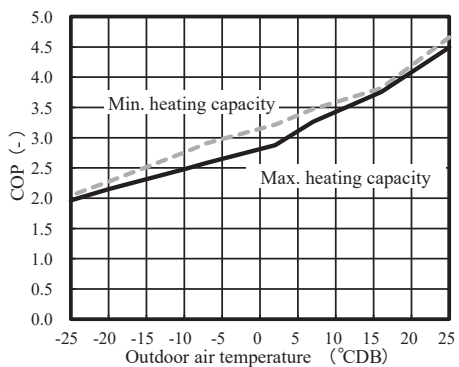
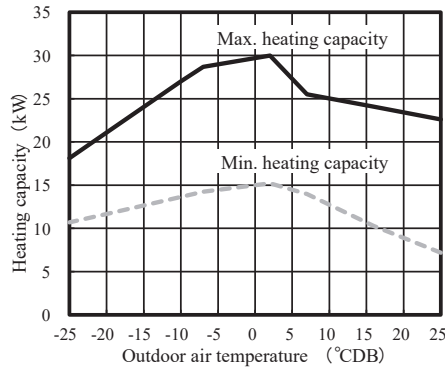
## 2.2 Heating performance characteristics

### (1) $\Delta t=5$ degree

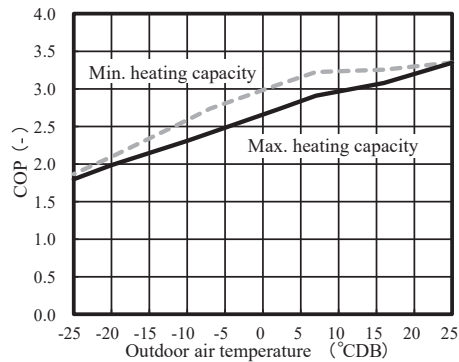
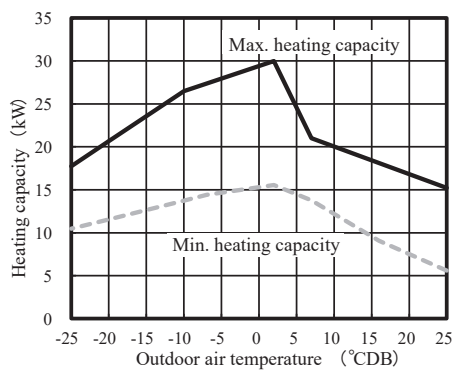
Q-ton inlet temperature 20°C / Inlet temperature of floor heating panel (R/C setting) 25°C



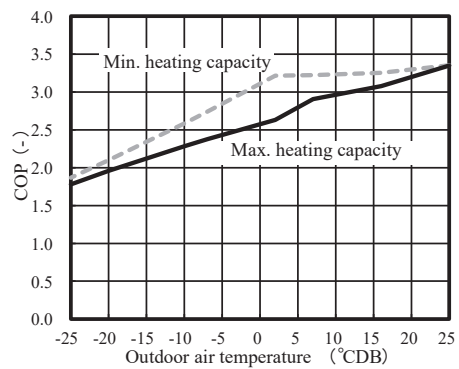
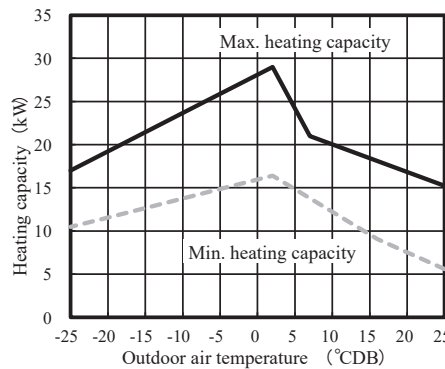
Q-ton inlet temperature 25°C / Inlet temperature of floor heating panel (R/C setting) 30°C



Q-ton inlet temperature 30°C / Inlet temperature of floor heating panel (R/C setting) 35°C

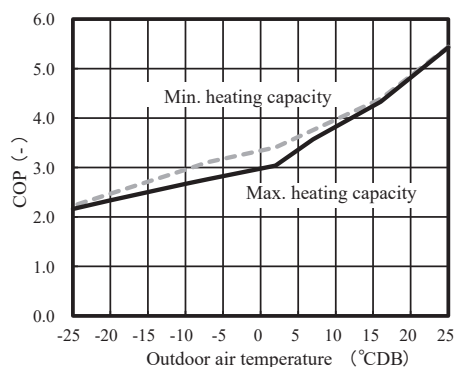
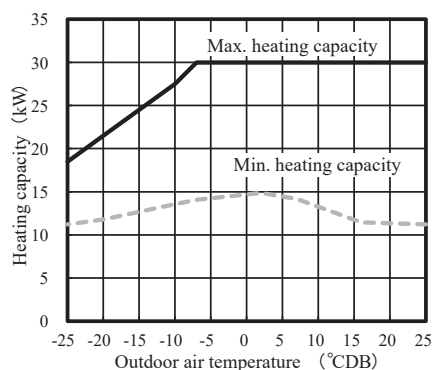


Q-ton inlet temperature 35°C / Inlet temperature of floor heating panel (R/C setting) 40°C

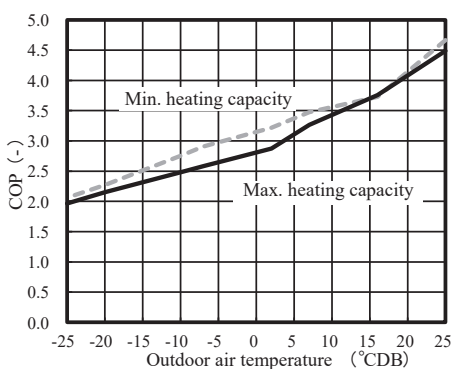
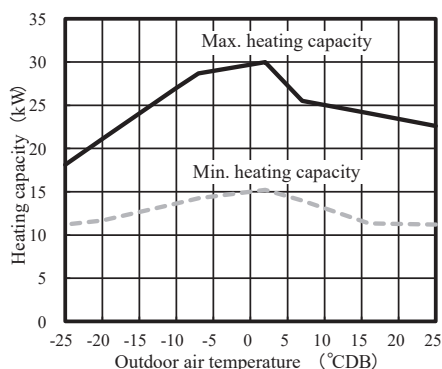


(2)  $\Delta t=10$  degree

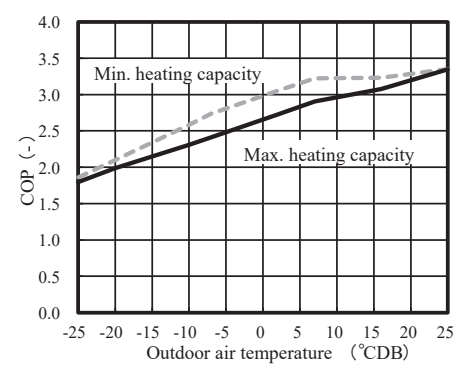
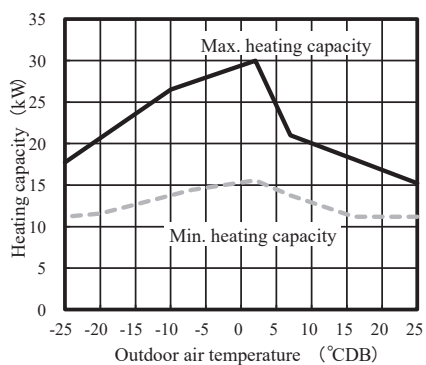
Q-ton inlet temperature 20°C / Inlet temperature of floor heating panel (R/C setting) 30°C



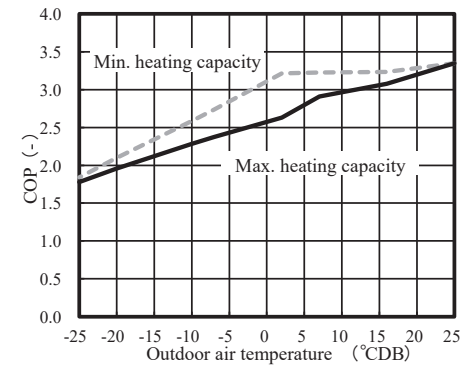
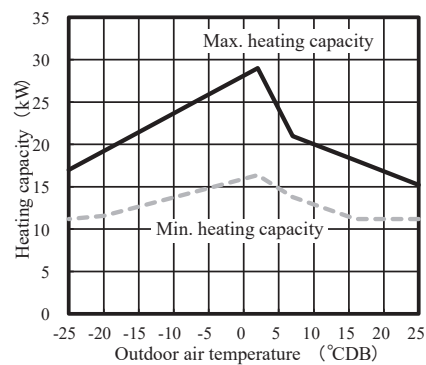
Q-ton inlet temperature 25°C / Inlet temperature of floor heating panel (R/C setting) 35°C



Q-ton inlet temperature 30°C / Inlet temperature of floor heating panel (R/C setting) 40°C

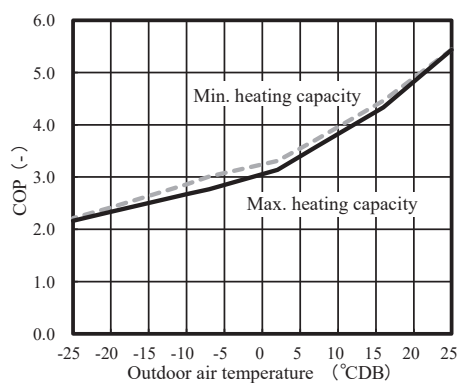
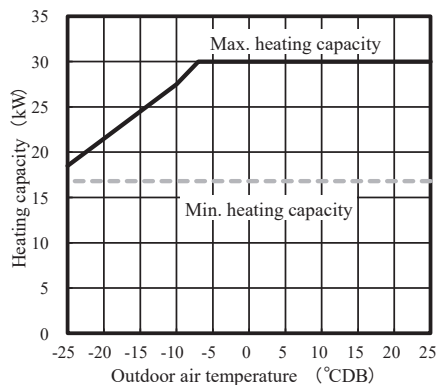


Q-ton inlet temperature 35°C / Inlet temperature of floor heating panel (R/C setting) 45°C

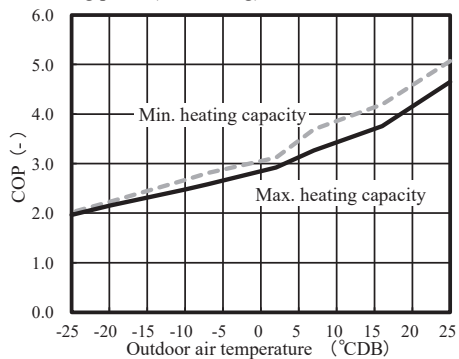
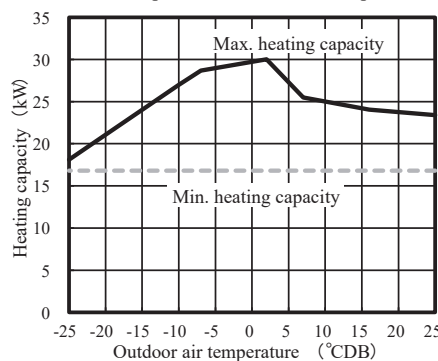


**(3)  $\Delta t=15$  degree**

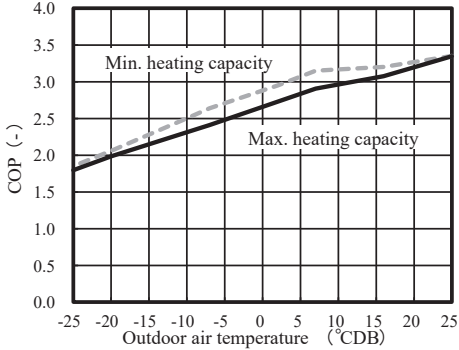
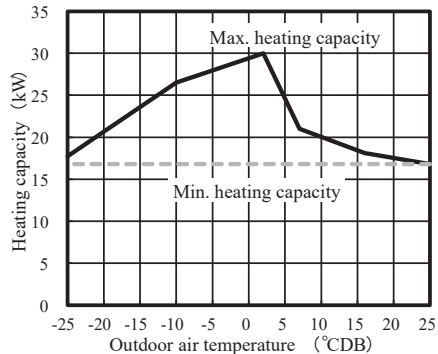
Q-ton inlet temperature 20°C / Inlet temperature of floor heating panel (R/C setting) 35°C



Q-ton inlet temperature 25°C / Inlet temperature of floor heating panel (R/C setting) 40°C



Q-ton inlet temperature 30°C / Inlet temperature of floor heating panel (R/C setting) 45°C

\*  $\Delta T$  is differential temperature between inlet and outlet of floor heating panel.

Notes 1) The data in this table don't include the power consumption of anti-freezing heater (191W).

In case outdoor air temperature  $\leq 3^\circ\text{C}$ , please consider the power consumption of anti-freezing heater.

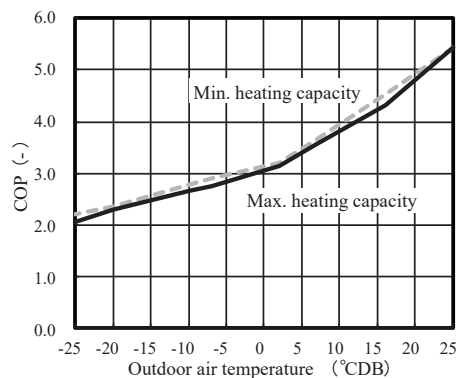
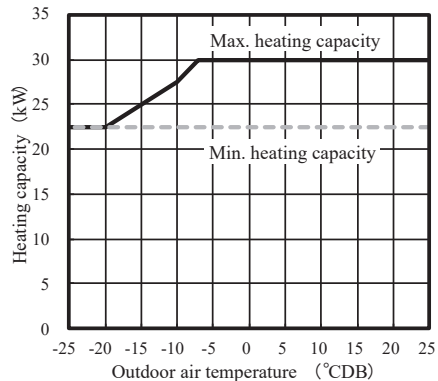
2) The performance decrement of defrost operation are considered in this figure.

But heating performance may change in the climate condition and the installation environment.

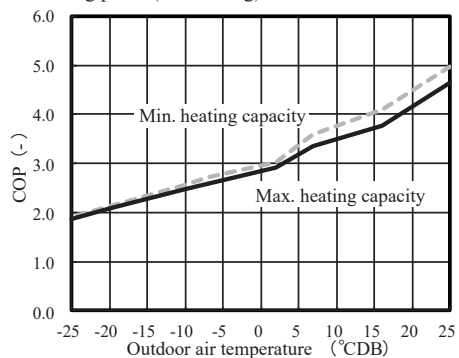
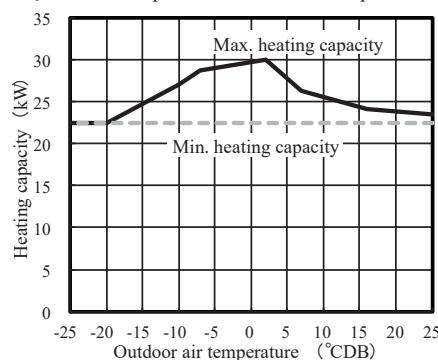
3) In case of floor heating panel inlet temperature  $> 35^\circ\text{C}$ , set the differential temperature between inlet and outlet temperature at  $10^\circ\text{C}$  or more to ensure heating capacity. Set with 7-segment P08 in software setting. Please see 3.1 (8) for more detail of software setting.

(4)  $\Delta t=20$  degree

Q-ton inlet temperature 20°C / Inlet temperature of floor heating panel (R/C setting) 40°C



Q-ton inlet temperature 25°C / Inlet temperature of floor heating panel (R/C setting) 45°C

\*  $\Delta T$  is differential temperature between inlet and outlet of floor heating panel.

Notes 1) The data in this table don't include the power consumption of anti-freezing heater (191W).

In case outdoor air temperature  $\leq 3^{\circ}\text{C}$ , please consider the power consumption of anti-freezing heater.

2) The performance decrement of defrost operation are considered in this figure.

But heating performance may change in the climate condition and the installation environment.

3) In case of floor heating panel inlet temperature  $> 35^{\circ}\text{C}$ , set the differential temperature between inlet and outlet temperature at  $10^{\circ}\text{C}$  or more to ensure heating capacity. Set with 7-segment P08 in software setting.

Please see 3.1 (8) for more detail of software setting.

Maximum heating capacity at  $\Delta t=5$  degree

| Q-ton inlet temperature / Inlet temperature of floor heating panel (RC setting) | Outdoor air temperature °C | Heating capacity kW | Power consumption kW | COP  |
|---------------------------------------------------------------------------------|----------------------------|---------------------|----------------------|------|
| 20°C / 25°C                                                                     | 25                         | 30.0                | 5.5                  | 5.43 |
|                                                                                 | 16                         | 30.0                | 6.9                  | 4.33 |
|                                                                                 | 7                          | 30.0                | 8.4                  | 3.57 |
|                                                                                 | 2                          | 30.0                | 9.9                  | 3.04 |
|                                                                                 | -7                         | 30.0                | 10.8                 | 2.77 |
|                                                                                 | -10                        | 27.5                | 10.3                 | 2.67 |
|                                                                                 | -20                        | 21.5                | 9.2                  | 2.34 |
|                                                                                 | -25                        | 18.5                | 8.6                  | 2.16 |
| 25°C / 30°C                                                                     | 25                         | 22.6                | 5.0                  | 4.49 |
|                                                                                 | 16                         | 24.1                | 6.4                  | 3.76 |
|                                                                                 | 7                          | 25.5                | 7.8                  | 3.26 |
|                                                                                 | 2                          | 30.0                | 10.4                 | 2.88 |
|                                                                                 | -7                         | 28.7                | 11.1                 | 2.58 |
|                                                                                 | -10                        | 27.0                | 10.9                 | 2.48 |
|                                                                                 | -20                        | 21.1                | 9.8                  | 2.15 |
|                                                                                 | -25                        | 18.1                | 9.2                  | 1.97 |
| 30°C / 35°C                                                                     | 25                         | 15.2                | 4.5                  | 3.35 |
|                                                                                 | 16                         | 18.1                | 5.9                  | 3.08 |
|                                                                                 | 7                          | 21.0                | 7.2                  | 2.91 |
|                                                                                 | 2                          | 30.0                | 11.0                 | 2.73 |
|                                                                                 | -7                         | 27.4                | 11.4                 | 2.41 |
|                                                                                 | -10                        | 26.5                | 11.5                 | 2.31 |
|                                                                                 | -20                        | 20.7                | 10.4                 | 1.99 |
|                                                                                 | -25                        | 17.7                | 9.9                  | 1.80 |
| 35°C / 40°C                                                                     | 25                         | 15.2                | 4.5                  | 3.35 |
|                                                                                 | 16                         | 18.1                | 5.9                  | 3.08 |
|                                                                                 | 7                          | 21.0                | 7.2                  | 2.91 |
|                                                                                 | 2                          | 29.0                | 11.0                 | 2.63 |
|                                                                                 | -7                         | 25.0                | 10.5                 | 2.37 |
|                                                                                 | -10                        | 23.7                | 10.4                 | 2.28 |
|                                                                                 | -20                        | 19.2                | 9.8                  | 1.96 |
|                                                                                 | -25                        | 17.0                | 9.6                  | 1.78 |

Minimum heating capacity at  $\Delta t=5$  degree

| Q-ton inlet temperature / Inlet temperature of floor heating panel (RC setting) | Outdoor air temperature °C | Heating capacity kW | Power consumption kW | COP  |
|---------------------------------------------------------------------------------|----------------------------|---------------------|----------------------|------|
| 20°C / 25°C                                                                     | 25                         | 8.8                 | 1.6                  | 5.44 |
|                                                                                 | 16                         | 11.5                | 2.6                  | 4.43 |
|                                                                                 | 7                          | 14.2                | 3.8                  | 3.76 |
|                                                                                 | 2                          | 14.9                | 4.4                  | 3.41 |
|                                                                                 | -7                         | 14.1                | 4.5                  | 3.11 |
|                                                                                 | -10                        | 13.5                | 4.6                  | 2.96 |
|                                                                                 | -20                        | 11.8                | 4.8                  | 2.47 |
|                                                                                 | -25                        | 10.9                | 4.9                  | 2.25 |
| 25°C / 30°C                                                                     | 25                         | 7.2                 | 1.5                  | 4.66 |
|                                                                                 | 16                         | 10.3                | 2.7                  | 3.82 |
|                                                                                 | 7                          | 14.0                | 4.0                  | 3.47 |
|                                                                                 | 2                          | 15.2                | 4.7                  | 3.22 |
|                                                                                 | -7                         | 14.2                | 4.9                  | 2.91 |
|                                                                                 | -10                        | 13.7                | 5.0                  | 2.76 |
|                                                                                 | -20                        | 11.7                | 5.1                  | 2.27 |
|                                                                                 | -25                        | 10.7                | 5.2                  | 2.04 |
| 30°C / 35°C                                                                     | 25                         | 5.6                 | 1.7                  | 3.35 |
|                                                                                 | 16                         | 9.1                 | 2.8                  | 3.25 |
|                                                                                 | 7                          | 13.8                | 4.3                  | 3.22 |
|                                                                                 | 2                          | 15.6                | 5.1                  | 3.05 |
|                                                                                 | -7                         | 14.4                | 5.3                  | 2.74 |
|                                                                                 | -10                        | 13.8                | 5.3                  | 2.58 |
|                                                                                 | -20                        | 11.6                | 5.5                  | 2.10 |
|                                                                                 | -25                        | 10.5                | 5.6                  | 1.87 |
| 35°C / 40°C                                                                     | 25                         | 5.6                 | 1.7                  | 3.35 |
|                                                                                 | 16                         | 9.1                 | 2.8                  | 3.25 |
|                                                                                 | 7                          | 13.8                | 4.3                  | 3.22 |
|                                                                                 | 2                          | 16.4                | 5.1                  | 3.22 |
|                                                                                 | -7                         | 14.4                | 5.3                  | 2.74 |
|                                                                                 | -10                        | 13.8                | 5.3                  | 2.58 |
|                                                                                 | -20                        | 11.6                | 5.5                  | 2.10 |
|                                                                                 | -25                        | 10.5                | 5.6                  | 1.87 |

Maximum heating capacity at  $\Delta t=10$  degree

| Q-ton inlet temperature / Inlet temperature of floor heating panel (RC setting) | Outdoor air temperature °C | Heating capacity kW | Power consumption kW | COP  |
|---------------------------------------------------------------------------------|----------------------------|---------------------|----------------------|------|
| 20°C / 30°C                                                                     | 25                         | 30.0                | 5.5                  | 5.43 |
|                                                                                 | 16                         | 30.0                | 6.9                  | 4.33 |
|                                                                                 | 7                          | 30.0                | 8.4                  | 3.57 |
|                                                                                 | 2                          | 30.0                | 9.9                  | 3.04 |
|                                                                                 | -7                         | 30.0                | 10.8                 | 2.77 |
|                                                                                 | -10                        | 27.5                | 10.3                 | 2.67 |
|                                                                                 | -20                        | 21.5                | 9.2                  | 2.34 |
|                                                                                 | -25                        | 18.5                | 8.6                  | 2.16 |
| 25°C / 35°C                                                                     | 25                         | 22.6                | 5.0                  | 4.49 |
|                                                                                 | 16                         | 24.1                | 6.4                  | 3.76 |
|                                                                                 | 7                          | 25.5                | 7.8                  | 3.26 |
|                                                                                 | 2                          | 30.0                | 10.4                 | 2.88 |
|                                                                                 | -7                         | 28.7                | 11.1                 | 2.58 |
|                                                                                 | -10                        | 27.0                | 10.9                 | 2.48 |
|                                                                                 | -20                        | 21.1                | 9.8                  | 2.15 |
|                                                                                 | -25                        | 18.1                | 9.2                  | 1.97 |
| 30°C / 40°C                                                                     | 25                         | 15.2                | 4.5                  | 3.35 |
|                                                                                 | 16                         | 18.1                | 5.9                  | 3.08 |
|                                                                                 | 7                          | 21.0                | 7.2                  | 2.91 |
|                                                                                 | 2                          | 30.0                | 11.0                 | 2.73 |
|                                                                                 | -7                         | 27.4                | 11.4                 | 2.41 |
|                                                                                 | -10                        | 26.5                | 11.5                 | 2.31 |
|                                                                                 | -20                        | 20.7                | 10.4                 | 1.99 |
|                                                                                 | -25                        | 17.7                | 9.9                  | 1.80 |
| 35°C / 45°C                                                                     | 25                         | 15.2                | 4.5                  | 3.35 |
|                                                                                 | 16                         | 18.1                | 5.9                  | 3.08 |
|                                                                                 | 7                          | 21.0                | 7.2                  | 2.91 |
|                                                                                 | 2                          | 29.0                | 11.0                 | 2.63 |
|                                                                                 | -7                         | 25.0                | 10.5                 | 2.37 |
|                                                                                 | -10                        | 23.7                | 10.4                 | 2.28 |
|                                                                                 | -20                        | 19.2                | 9.8                  | 1.96 |
|                                                                                 | -25                        | 17.0                | 9.6                  | 1.78 |

Minimum heating capacity at  $\Delta t=10$  degree

| Q-ton inlet temperature / Inlet temperature of floor heating panel (RC setting) | Outdoor air temperature °C | Heating capacity kW | Power consumption kW | COP  |
|---------------------------------------------------------------------------------|----------------------------|---------------------|----------------------|------|
| 20°C / 30°C                                                                     | 25                         | 11.2                | 2.1                  | 5.44 |
|                                                                                 | 16                         | 11.5                | 2.6                  | 4.39 |
|                                                                                 | 7                          | 14.2                | 3.8                  | 3.76 |
|                                                                                 | 2                          | 14.9                | 4.4                  | 3.41 |
|                                                                                 | -7                         | 14.1                | 4.5                  | 3.11 |
|                                                                                 | -10                        | 13.5                | 4.6                  | 2.96 |
|                                                                                 | -20                        | 11.8                | 4.8                  | 2.47 |
|                                                                                 | -25                        | 11.2                | 4.9                  | 2.23 |
| 25°C / 35°C                                                                     | 25                         | 11.2                | 2.4                  | 4.66 |
|                                                                                 | 16                         | 11.3                | 3.0                  | 3.73 |
|                                                                                 | 7                          | 14.0                | 4.0                  | 3.47 |
|                                                                                 | 2                          | 15.2                | 4.7                  | 3.22 |
|                                                                                 | -7                         | 14.2                | 4.9                  | 2.91 |
|                                                                                 | -10                        | 13.7                | 5.0                  | 2.76 |
|                                                                                 | -20                        | 11.7                | 5.1                  | 2.27 |
|                                                                                 | -25                        | 11.2                | 5.4                  | 2.06 |
| 30°C / 40°C                                                                     | 25                         | 11.2                | 3.3                  | 3.35 |
|                                                                                 | 16                         | 11.2                | 3.5                  | 3.23 |
|                                                                                 | 7                          | 13.8                | 4.3                  | 3.22 |
|                                                                                 | 2                          | 15.6                | 5.1                  | 3.05 |
|                                                                                 | -7                         | 14.4                | 5.3                  | 2.74 |
|                                                                                 | -10                        | 13.8                | 5.3                  | 2.58 |
|                                                                                 | -20                        | 11.6                | 5.5                  | 2.10 |
|                                                                                 | -25                        | 11.2                | 6.0                  | 1.86 |
| 35°C / 45°C                                                                     | 25                         | 11.2                | 3.3                  | 3.35 |
|                                                                                 | 16                         | 11.2                | 3.5                  | 3.23 |
|                                                                                 | 7                          | 13.8                | 4.3                  | 3.22 |
|                                                                                 | 2                          | 16.4                | 5.1                  | 3.22 |
|                                                                                 | -7                         | 14.4                | 5.3                  | 2.74 |
|                                                                                 | -10                        | 13.8                | 5.3                  | 2.58 |
|                                                                                 | -20                        | 11.6                | 5.5                  | 2.10 |
|                                                                                 | -25                        | 11.2                | 6.1                  | 1.84 |

Maximum heating capacity at  $\Delta t=15$  degree

| Q-ton inlet temperature / Inlet temperature of floor heating panel (RC setting) | Outdoor air temperature °C | Heating capacity kW | Power consumption kW | COP  |
|---------------------------------------------------------------------------------|----------------------------|---------------------|----------------------|------|
| 20°C / 35°C                                                                     | 25                         | 30.0                | 5.5                  | 5.43 |
|                                                                                 | 16                         | 30.0                | 6.9                  | 4.33 |
|                                                                                 | 7                          | 30.0                | 8.4                  | 3.57 |
|                                                                                 | 2                          | 30.0                | 9.6                  | 3.14 |
|                                                                                 | -7                         | 30.0                | 10.8                 | 2.77 |
|                                                                                 | -10                        | 27.5                | 10.3                 | 2.67 |
|                                                                                 | -20                        | 21.5                | 9.2                  | 2.34 |
| 25°C / 40°C                                                                     | -25                        | 18.5                | 8.6                  | 2.16 |
|                                                                                 | 25                         | 23.4                | 5.0                  | 4.65 |
|                                                                                 | 16                         | 24.1                | 6.4                  | 3.76 |
|                                                                                 | 7                          | 25.5                | 7.8                  | 3.26 |
|                                                                                 | 2                          | 30.0                | 10.3                 | 2.92 |
|                                                                                 | -7                         | 28.7                | 11.1                 | 2.58 |
|                                                                                 | -10                        | 27.0                | 10.9                 | 2.48 |
| 30°C / 45°C                                                                     | -20                        | 21.1                | 9.8                  | 2.15 |
|                                                                                 | -25                        | 18.1                | 9.2                  | 1.97 |
|                                                                                 | 25                         | 16.8                | 4.5                  | 3.35 |
|                                                                                 | 16                         | 18.1                | 5.9                  | 3.08 |
|                                                                                 | 7                          | 21.0                | 7.2                  | 2.91 |
|                                                                                 | 2                          | 30.0                | 11.0                 | 2.73 |
|                                                                                 | -7                         | 27.4                | 11.4                 | 2.41 |
|                                                                                 | -10                        | 26.5                | 11.5                 | 2.31 |
|                                                                                 | -20                        | 20.7                | 10.4                 | 1.99 |
|                                                                                 | -25                        | 17.7                | 9.9                  | 1.80 |

Minimum heating capacity at  $\Delta t=15$  degree

| Q-ton inlet temperature / Inlet temperature of floor heating panel (RC setting) | Outdoor air temperature °C | Heating capacity kW | Power consumption kW | COP  |
|---------------------------------------------------------------------------------|----------------------------|---------------------|----------------------|------|
| 20°C / 35°C                                                                     | 25                         | 16.8                | 1.6                  | 5.44 |
|                                                                                 | 16                         | 16.8                | 3.8                  | 4.46 |
|                                                                                 | 7                          | 16.8                | 3.8                  | 3.71 |
|                                                                                 | 2                          | 16.8                | 5.1                  | 3.31 |
|                                                                                 | -7                         | 16.8                | 5.6                  | 3.01 |
|                                                                                 | -10                        | 16.8                | 5.9                  | 2.86 |
|                                                                                 | -20                        | 16.8                | 6.9                  | 2.42 |
| 25°C / 40°C                                                                     | -25                        | 16.8                | 7.6                  | 2.21 |
|                                                                                 | 25                         | 16.8                | 3.3                  | 5.07 |
|                                                                                 | 16                         | 16.8                | 4.0                  | 4.19 |
|                                                                                 | 7                          | 16.8                | 4.6                  | 3.69 |
|                                                                                 | 2                          | 16.8                | 5.4                  | 3.12 |
|                                                                                 | -7                         | 16.8                | 6.0                  | 2.81 |
|                                                                                 | -10                        | 16.8                | 6.3                  | 2.67 |
| 30°C / 45°C                                                                     | -20                        | 16.8                | 7.5                  | 2.23 |
|                                                                                 | -25                        | 16.8                | 8.3                  | 2.01 |
|                                                                                 | 25                         | 16.8                | 5.0                  | 3.35 |
|                                                                                 | 16                         | 16.8                | 5.2                  | 3.20 |
|                                                                                 | 7                          | 16.8                | 5.3                  | 3.15 |
|                                                                                 | 2                          | 16.8                | 5.7                  | 2.95 |
|                                                                                 | -7                         | 16.8                | 6.4                  | 2.64 |
|                                                                                 | -10                        | 16.8                | 6.7                  | 2.50 |
|                                                                                 | -20                        | 16.8                | 8.2                  | 2.06 |
|                                                                                 | -25                        | 16.8                | 9.1                  | 1.85 |

Maximum heating capacity at  $\Delta t=20$  degree

| Q-ton inlet temperature / Inlet temperature of floor heating panel (RC setting) | Outdoor air temperature °C | Heating capacity kW | Power consumption kW | COP  |
|---------------------------------------------------------------------------------|----------------------------|---------------------|----------------------|------|
| 20°C / 40°C                                                                     | 25                         | 30.0                | 5.5                  | 5.43 |
|                                                                                 | 16                         | 30.0                | 6.9                  | 4.33 |
|                                                                                 | 7                          | 30.0                | 8.4                  | 3.57 |
|                                                                                 | 2                          | 30.0                | 9.6                  | 3.14 |
|                                                                                 | -7                         | 30.0                | 10.8                 | 2.77 |
|                                                                                 | -10                        | 27.5                | 10.3                 | 2.67 |
|                                                                                 | -20                        | 22.4                | 9.7                  | 2.30 |
| 25°C / 45°C                                                                     | -25                        | 22.4                | 10.9                 | 2.06 |
|                                                                                 | 25                         | 23.4                | 5.0                  | 4.65 |
|                                                                                 | 16                         | 24.1                | 6.4                  | 3.76 |
|                                                                                 | 7                          | 26.3                | 7.8                  | 3.36 |
|                                                                                 | 2                          | 30.0                | 10.3                 | 2.92 |
|                                                                                 | -7                         | 28.7                | 11.1                 | 2.58 |
|                                                                                 | -10                        | 27.0                | 10.9                 | 2.48 |
|                                                                                 | -20                        | 22.4                | 10.1                 | 2.09 |
|                                                                                 | -25                        | 22.4                | 10.4                 | 1.87 |

Minimum heating capacity at  $\Delta t=20$  degree

| Q-ton inlet temperature / Inlet temperature of floor heating panel (RC setting) | Outdoor air temperature °C | Heating capacity kW | Power consumption kW | COP  |
|---------------------------------------------------------------------------------|----------------------------|---------------------|----------------------|------|
| 20°C / 40°C                                                                     | 25                         | 22.5                | 1.6                  | 5.44 |
|                                                                                 | 16                         | 22.5                | 3.8                  | 4.53 |
|                                                                                 | 7                          | 22.5                | 3.8                  | 3.66 |
|                                                                                 | 2                          | 22.5                | 5.1                  | 3.22 |
|                                                                                 | -7                         | 22.5                | 5.6                  | 2.92 |
|                                                                                 | -10                        | 22.5                | 5.9                  | 2.77 |
|                                                                                 | -20                        | 22.5                | 6.9                  | 2.37 |
| 25°C / 45°C                                                                     | -25                        | 22.5                | 7.6                  | 2.19 |
|                                                                                 | 25                         | 22.5                | 3.3                  | 4.97 |
|                                                                                 | 16                         | 22.5                | 4.0                  | 4.09 |
|                                                                                 | 7                          | 22.5                | 4.6                  | 3.59 |
|                                                                                 | 2                          | 22.5                | 5.4                  | 3.02 |
|                                                                                 | -7                         | 22.5                | 6.0                  | 2.71 |
|                                                                                 | -10                        | 22.5                | 6.3                  | 2.57 |
|                                                                                 | -20                        | 22.5                | 7.5                  | 2.13 |
|                                                                                 | -25                        | 22.5                | 8.3                  | 1.91 |

## 2.3 Control

### (1) Functional components for refrigerant cycle

For functional components other than those listed below, please see the **TECHNICAL MANUAL for DHW system**.

|   | Symbol | Name of component                         | Function                                                                                                                                                                                                                                                                                                                                                      | Details |
|---|--------|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 1 | CM1    | Inverter scroll compressor                | The compressor speed is controlled to maintain nominal heating capacity according to the outdoor air temperature, return water temperature and heating temperature set by remote control.<br>Control range of compressor speed: 42-104rps<br>The target speed of compressor can be checked with Mente PC.                                                     | -       |
| 3 | EEVG1  | Electronic expansion valve for gas cooler | EEVG1 is used for discharge pipe temperature control.<br>The target temperature of discharge pipe is decided by outdoor air temperature, return water inlet temperature and heating temperature set by remote control.<br>Control range of target discharge pipe temperature: 77-125°C<br>The target discharge pipe temperature can be checked with Mente PC. | -       |

### (2) Functional components for water cycle

Please see the **TECHNICAL MANUAL for DHW system**.

### (3) Control of refrigerant piping system

Control of refrigerant piping system is same as DHW operation. Please see the **TECHNICAL MANUAL for DHW system**.

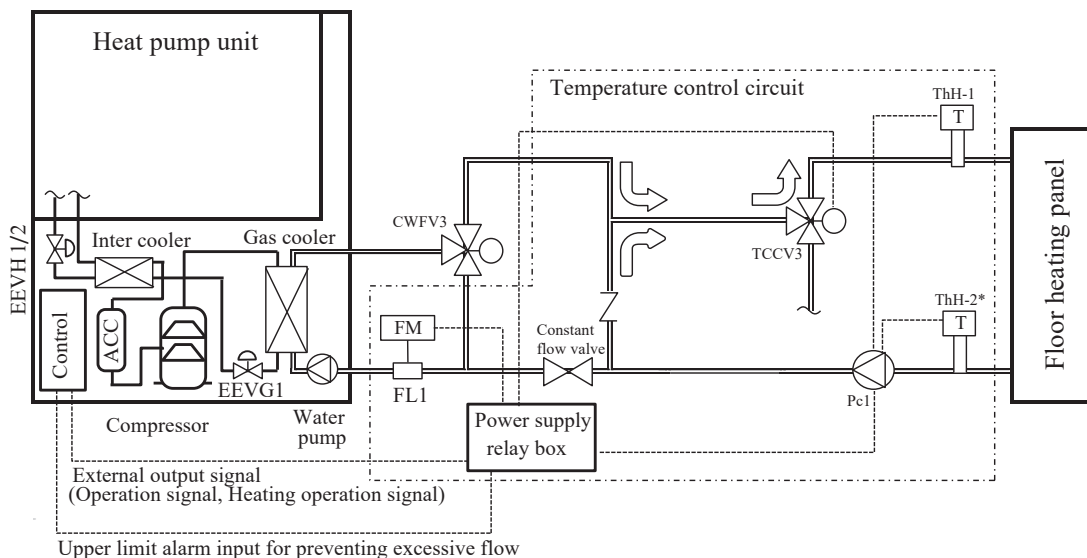
### (4) Water circuit system control

For water circuit system control in DHW operation (water heater operation), please see the **TECHNICAL MANUAL for DHW system**.

#### (4)-1 Water circuit system control at heating operation

In heating mode, the water pump in the heat pump unit runs at constant speed.

Water flow volume and inlet/outlet temperature on the floor heating panel (heating circuit) are controlled by the "Temperature control circuit" (external control)



\*not required if Pc1 has an internal temperature sensor

**(4)-2 Water flow volume and temperature control (Temperature control circuit)**

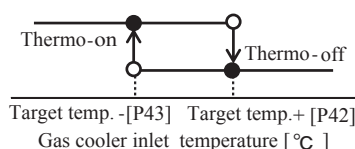
The water flow volume is controlled by the smart pump (PC1) and a constant flow valve. The constant flow valve ensures that the flow rate to Q-ton is always 16L/min.

The smart pump adjusts the flow rate according to the target deltaT between ThH-1 and ThH-2 (sensor integrated on the smart pump)

Be sure to provide an excessive flow alarm output for the external control. Do not continue using the floor heating system with the alarm.

**(4)-3 Thermo off control**

When the gas cooler inlet temperature becomes higher than the specified temperature, the heat pump unit is thermo-off as shown below. The compressor stops while thermo-off.



Target temp. = The target inlet temperature of the heating panel - [P08]

[P08] : Differential temperature between inlet/outlet of heating panel  
(default: 5°C , setting range 0 - 40°C )

[P42], [P43] : Differential temperature set by software switch setting.  
(default: 0.5°C , setting range 0 - 5°C )

**(4)-4 Operation priority in case of Combination system (DHW and space heating)**

The priority of hot water operation and heating operation is decided by setting in remote control as follows.

- When the priority setting of the remote control is "HW".  
(Priority: High) Fill up > Anti-legionella > Top up > Keep warm > **Heating** > Night defrost > Anti-freeze (Priority: Low)
- When the priority setting of the remote control is "Heating".  
(Priority: High) Fill up > Anti-legionella > **Heating** > Top up > Keep warm > Night defrost > Anti-freeze (Priority: Low)

Even the priority setting is "Heating", top up is operated if the HW amount is below the lower limit HW amount set by software setting [P07].

**(4)-5 External output signal**

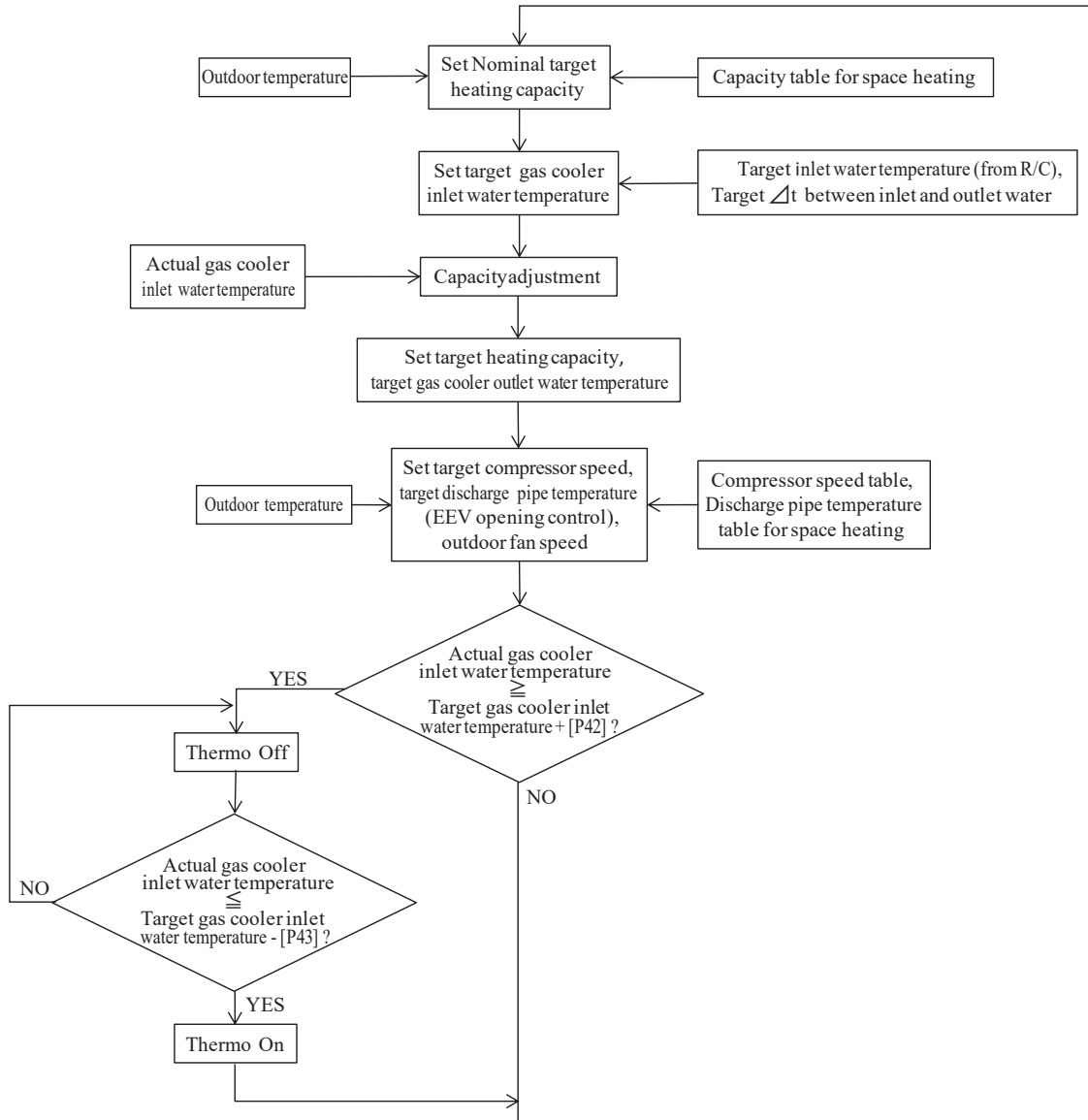
External output terminal CnZ1 and CnZ2 can be assigned "Heating operation output". Set value "16" of software setting and connect to the external control. For details, see 3.1(7)7-2.

Address of 7-segment LED is below

CnZ1 : [P23] (Factory default "0": Operation output)

CnZ2 : [P24] (Factory default "1": Error output)

## (4)-7 Outline of heating operation



## 2.4 Technical information of European regulations

### (1) Lot1

#### (a) Summary

This document is intended to clarify that the water heater manufactured by us is adapted to European ErP (Ecodesign requirements for energy-related Products) directive Lot1 (space heater and combination heater) and Lot2 (water heater and water storage tanks).

These units are electric mains-operated heat pump combination heaters with a rated heating capacity of 30kW and less and are assessed on the basis of the above-mentioned directive.

#### (b) Applied Directives and Standard

##### DIRECTIVE

“DIRECTIVE 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products”

“DIRECTIVE 2010/30/EU of the European Parliament and of the Council of 19 May 2010 on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products”

##### REGULATION

“COMMISSION DELEGATED REGULATION (EU) No.811/2013 of 18 February 2013 ” supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to the energy labelling of space heaters, combination heaters, packages of spec heater, temperature control and solar device and packages of combination heater, temperature control and solar device

“COMMISSION DELEGATED REGULATION (EU) No. 813/2013 of 2 August 2013”

Implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for space heaters and combination heaters

#### (c) Target Model

|                              |                                   |
|------------------------------|-----------------------------------|
| Heat Pump Combination Heater | ESA30EH2-25                       |
| Hot Water Storage Tank       | GXM-R-500 × 2<br>or<br>GX-1000-RB |

## (d) Specification of the apparatus

## 1) The name and address of the supplier

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Manufacture's name and address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| MITSUBISHI HEAVY INDUSTRIES THERMAL SYSTEMS, LTD.<br>2-3, Marunouchi 3-chome, Chiyoda-ku, Tokyo, 100-8332, Japan<br><a href="http://www.mhi-mth.co.jp">http://www.mhi-mth.co.jp</a>                                                                                                                                                                                                                                                                                                                                        |
| Branch name and address                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| MITSUBISHI HEAVY INDUSTRIES AIR-CONDITIONING EUROPE, LTD.<br>5 The Square, Stockley Park, Uxbridge, Middlesex, UB11 1ET, UK<br>Tel : +44-333-207-4072 Fax : +44-333-207-4089<br><a href="http://www.mhiae.com">http://www.mhiae.com</a><br>MHIAE SERVICES B.V.<br>(Wholly-owned subsidiary of MITSUBISHI HEAVY INDUSTRIES AIR-CONDITIONING EUROPE,LTD.)<br>Herikerbergweg 238,Luna ArenA,1101 CM Amsterdam,Netherlands<br>Tel : +31-20-406-4535<br><a href="http://www.mhieservices.com/">http://www.mhieservices.com/</a> |

## 2) Heating energy efficiency

|                                                |         |                |
|------------------------------------------------|---------|----------------|
| Model name                                     |         | ESA30EH2-25    |
| Water heater load profile                      |         | XXL            |
| Seasonal space heating energy efficiency class |         | A <sup>+</sup> |
| Water heating energy efficiency class          |         | A              |
| Rated heat output                              | Average | 27kW           |
|                                                | Warmer  | 30kW           |
|                                                | Colder  | 19kW           |
| Annual energy consumption for space heating    | Average | 14822kWh       |
|                                                | Warmer  | 9199kWh        |
|                                                | Colder  | 15499kWh       |
| Annual energy consumption for water heating    | Average | 1909kWh        |
|                                                | Warmer  | 1683kWh        |
|                                                | Colder  | 3467kWh        |
| Seasonal space heating energy efficiency       | Average | 146%           |
|                                                | Warmer  | 174%           |
|                                                | Colder  | 127%           |
| Water heating energy efficiency                | Average | 114%           |
|                                                | Warmer  | 130%           |
|                                                | Colder  | 63%            |
| Off peak operation                             |         | Correspond     |
| Sound power level                              |         | 77 dB(A)       |

## Storage tank

|                                |                           |
|--------------------------------|---------------------------|
| Lapesa Grupo Empresarial, S. L |                           |
| Model name                     | GXM-R-500×2 or GX-1000-RB |
| Energy efficiency class        | C                         |
| Standing loss                  | 100W×2 or 125 W           |
| Storage volume                 | 500L×2 or 1000 L          |

PCM011B023

## (e) Technical Information

## 1) Function

Manufacturer's specification for intended use;

The appliance is with an outdoor unit and indoor unit. The outdoor unit is an air/water heat pumps including electrical-ly driven compressor. The indoor unit is a domestic hot water storage tank and floor heating panel.

## 2) Technical data of water heater

|                             |                         |
|-----------------------------|-------------------------|
| Model name                  | ESA30EH2-25             |
| Rated voltage (V)           | 3N~, 380 / 400 / 415    |
| Rated frequency (Hz)        | 50 / 60                 |
| Rated heating capacity (kW) | 30                      |
| Net weight (kg)             | 375                     |
| Refrigerant                 | R744 (CO <sub>2</sub> ) |
| Mass of refrigerant (kg)    | 8.5                     |

|                   |          |           |
|-------------------|----------|-----------|
| Sound power level | Criteria | Judgement |
| 77                | ≤78      | ○         |

※The sound power level is measured under heating conditions at outdoor air temperature 7°CDB/6°CWB, and water inlet temperature 30°C.

## 3. APPLICATION DATA

### 3.1 Installation work for air to water heat pump water heater

- ⊙ This instruction shows for the installation work of the space heating system with Q-ton.  
 ⊙ Please read this manual carefully to install the space heating system before starting the installation work.

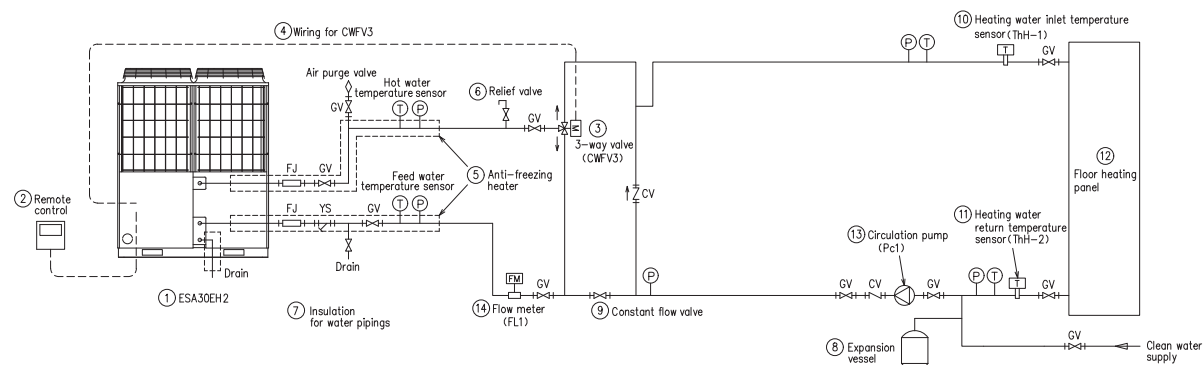
- ⊙ About general part of the installation procedure, please also read "INSTALLATION MANUAL for DHW system".  
 ⊙ Safety precautions are described in "INSTALLATION MANUAL for DHW system", so be sure to read them.

#### (1) Before installation

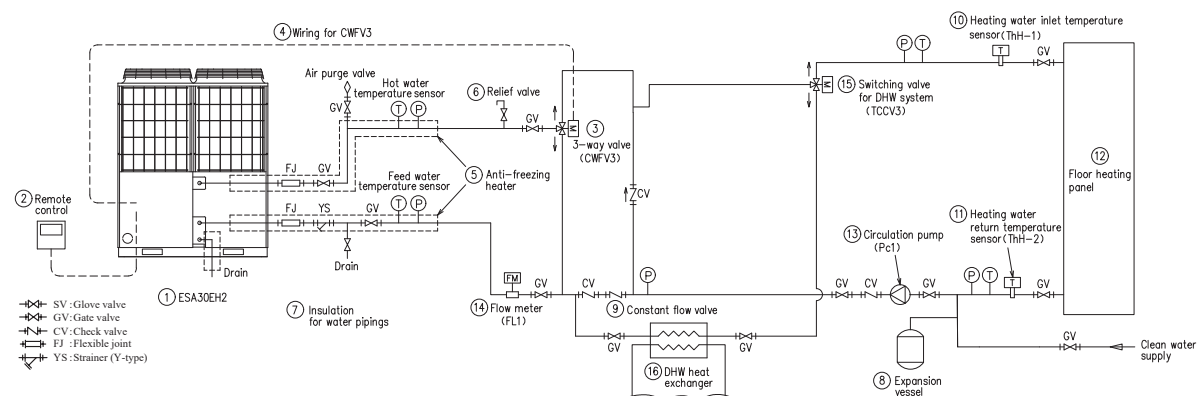
**Check the model, electrical specifications, piping, necessary option parts and etc, and install properly.**

#### 1-1 Standard space heating system diagram

(1) For the purpose of space heating only



(2) For the purpose of combination system with space heating and DHW



#### 1-2 Component list of space heating system

| Part name                                                 | Model                                                  | General description                                                                                               |
|-----------------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| ① Heat pump unit                                          | ESA30EH2-25                                            | For outdoor temperature -25°C.                                                                                    |
| ② Remote control for heat pump water heater (Option part) | RC-Q1EH2                                               | For setting hot water temperature.                                                                                |
| ③ 3-way valve, CWFV3 (Option part)                        | MTH-Q4E                                                | For switching to anti-freezing circuit. (wiring length 0.7m, AC200V, 50mA) IP56 (Indoor specifications)           |
| ④ Wiring kit for CWFV3 (Option part)                      | MTH-Q6E (20m length wire) or MTH-Q7E (10m length wire) | For connecting heat pump. (Connect to the 3-way valve, CWFV3, switching to anti-freezing circuit and control it). |

#### Locally procured parts

| Part name                                 | Model | General description                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ⑤ Anti-freezing water heater              | —     | When outdoor air temperature becomes below 0°C, please install the trace heating on the water pipe. (10W/m)                                                                                                                                                                                                                                                                                      |
| ⑥ Relief valve                            | —     | For preventing from increasing pressure in the system during heating up the water. (Working pressure: 450±30kPa or lower.)                                                                                                                                                                                                                                                                       |
| ⑦ Insulation                              | —     | Heat resistance ≥ 120°C (30mm or thicker glass wool whose density is 48kg/m³)                                                                                                                                                                                                                                                                                                                    |
| ⑧ Expansion vessel                        | —     | —                                                                                                                                                                                                                                                                                                                                                                                                |
| ⑨ Constant flow valve                     | —     | To keep the flow rate to the heat pump unit constant. Set flow rate : 16 L/min<br>Example: CALEFFI FLOWMATIC®(PICV) 145 series                                                                                                                                                                                                                                                                   |
| ⑩ Heating water inlet temperature sensor  | —     | The type required by the smart pump used.                                                                                                                                                                                                                                                                                                                                                        |
| ⑪ Heating water return temperature sensor | —     | The type required by the smart pump used.                                                                                                                                                                                                                                                                                                                                                        |
| ⑫ Floor heating panel                     | —     | —                                                                                                                                                                                                                                                                                                                                                                                                |
| ⑬ Circulation pump, Pc1                   | —     | Smart pump (inverter pump with external control) for space heating.<br>Flow rate : 5,160L/h or more,<br>Head : More than pressure loss between floor heating panel and temperature control circuit<br>It must have temperature difference constant control (delta T constant)<br>Example: Wilo Stratos MAXO series. Please confirm that sensor ThH-1 and ThH-2 are supplied with the smart pump. |
| ⑭ Flow meter, FL1                         | —     | To monitor and control the flow rate to the heat pump unit.<br>With upper alarm output. Set flow rate alarm: 17L/min<br>Piping size: 20A                                                                                                                                                                                                                                                         |
| ⑮ Switching valve, TCCV3                  | —     | For switching between space heating and DHW.                                                                                                                                                                                                                                                                                                                                                     |
| ⑯ DHW heat exchanger                      | —     | This is only used for the combination system with space heating and DHW.                                                                                                                                                                                                                                                                                                                         |

## (2) Installation location

See the installation manual for hot water supply.

## (3) Carrying in and installation of unit

See the installation manual for hot water supply.

## (4) Water piping work

### 4-1 General description

See the installation manual for hot water supply.

### 4-2 Water piping work

- When doing piping work of the space heating, be sure not to interfere the service space of the heat pump unit. Regarding the service space, please refer to (2).

#### 4-2.1 Limitation of piping length between the heat pump unit and temperature control circuit and indirected heat exchanger for DHW system

Be sure to install the heat pump unit and temperature control circuit and indirected heat exchanger for DHW system in the shortest piping length from the view point of saving energy. Piping length and height difference shall be within a following range.

Limitation of piping length

- Piping length: Within 15m one way (equivalent length for pipe size 20A)
- Height difference: Within  $\pm 5\text{m}$

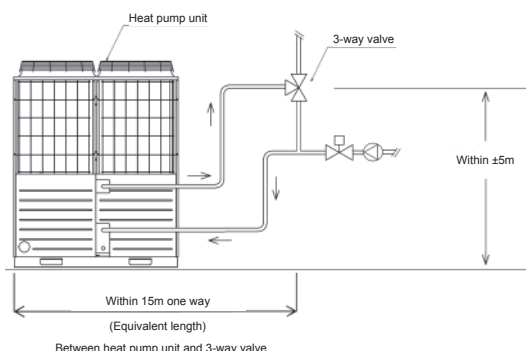
- When the heat pump unit is installed below the unvented cylinder and the height difference exceeds 2m, be sure to install relief valve (setting pressure: 400kPa) in the vicinity of the inlet port of the heat pump unit.

#### 4-2.2 Pressure loss of the pipe and joint

See the installation manual for hot water supply.

### 4-3 System diagram

See the installation manual for hot water supply.



## (5) Insulation work and water proofing work unit

See the installation manual for hot water supply.

## (6) Electrical wiring work for the heat pump unit

See the installation manual for hot water supply.

## (7) Electrical wiring work for temperature control circuit

In this chapter, only the connection method for space heating system is described. About wire connecting method for hot water supply system, please see the installation manual for hot water supply.

- In the area where the outdoor air temperature becomes below 0°C, it is necessary to apply the anti-freeze pipe heater on the water pipe in which water may freeze. Please prepare the exclusive power source for the anti-freeze pipe heater.
  - \* As a guide, the anti-freeze pipe heater output is 10W per 1m of piping length (In case of enough insulation thickness) After checking the specifications of heater, please select the breaker size and wire size.
- Electrical instruction work must be performed by an electrical service provider qualified by a power provider of the country.
- Electrical installation work must be executed according to the technical standard and other regulations applicable to electrical installation in the countries.

**⚠ Please install an earth leakage breaker without fail.** The installation of an earth leakage breaker is compulsory in order to prevent electric shocks or fire accidents. (Please use an **impulse withstanding type one** to prevent an earth leakage breaker's false activation.)

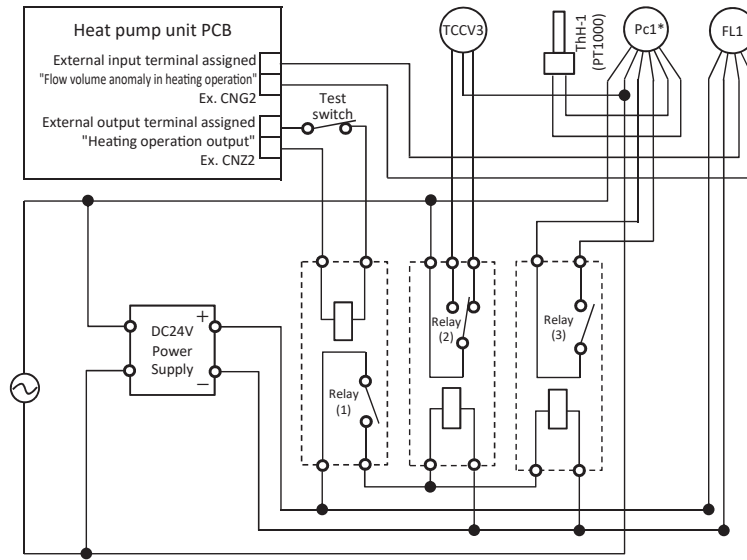
### Please note

- Use only copper wires.
  - Do not use any supply cord other than the one specified in parenthesis for each type of cord mention below.
    - Braided cord (Cord designation 60245 IEC 51), if allowed in the relevant part 2.
    - Ordinary tough rubber sheathed cord (Cord designation 60245 IEC 53)
    - Flat twin tinsel cord (Cord designation 60227 IEC 41)
    - Ordinary polyvinyl chloride sheathed cord (Cord designation 60227 IEC 53)
  - Please do not use any cord other than polychloroprene sheathed flexible cord (Cord designation 60245 IEC 57) for heat pump unit use.
- A grounding wire must be connected before connecting the power cable. Provide a grounding wire longer than the power cable.
- Be sure to do grounding work. Do not connect the grounding wire to a gas pipe, water pipe, lightning rod or telephone grounding wire. Improper grounding may cause electric shocks or malfunction.
  - Never connect the grounding wire to a gas pipe, because, if gas leaks, it could cause explosion or ignition.
- The installation of an impulse withstanding type earth leakage breaker is necessary.** A fail to install an earth leakage breaker may cause electric shocks or fire accident. Do not turn on the power until the electrical work is completed.
- Please do not use a phase advance capacitor for power factor improvement under any circumstances. (It does not improve power factor, while it can cause an anomalous overheat accident.)
- For power cables, be sure to use conduits
- Please **do not lay electronic control wires (signal wire) and other high current cables together.** Laying them together may cause malfunction or failure due to affection of electric noise.
- Power cables and signal wires must always be connected to the terminal blocks respectively and secured them with cable fastening clamps provided in the unit.
- Clamp cables so that they may not touch the pipe, etc.
- When cables are connected, please make sure to check no loose connection or disconnection at connecting coupling of all electrical components in the control box and then attach the cover to control box securely. (Improper cover attachment can result in malfunction or a failure of the unit, if water penetrates into the control box)
- Make sure to use circuit breakers (earth leakage breaker and circuit breaker) of proper capacity. Use of breakers with larger capacity may result in trouble on components or fire accident. The circuit breaker should isolate all poles under over current.
- Install an isolator or a cut-off switch on the power line in accordance with the local codes and regulations. The isolator shall be locked to keep the power line in OFF state in conformity with EN60204-1.
- After maintenance service, be sure to restore all wiring, bundling wire and wiring route to their original state in order for them not to touch to the metal parts.

## 7-1 Electrical wiring work

### [Heat pump unit and temperature control circuit diagram]

The below diagram shows the wiring connections for combination mode using the smart pump Wilo Stratos MAXO as PC1.  
If combination mode is not used (hot water), TCCV3 (3 way valve heating-hot water) can be avoided.

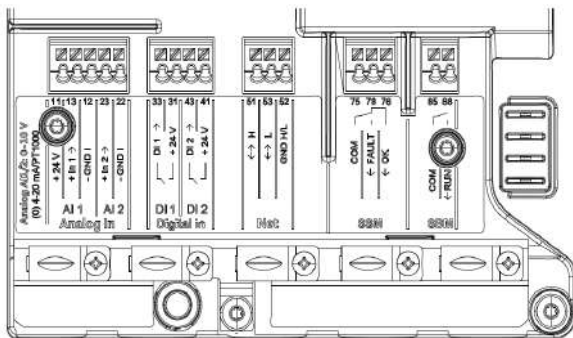


Use a flow meter with upper limit flow volume alarm and connect to the external input of heat pump unit.  
The smart pump requires PT1000 sensor for the temperature sensor ThH-1.  
\*In case of Wilo Stratos MAXO ThH-2 sensor comes connected from factory.

### [Smart pump communication interfaces overview]

Example: Wilo Stratos MAXO

The below diagram shows the overview for the recommended smart pump -

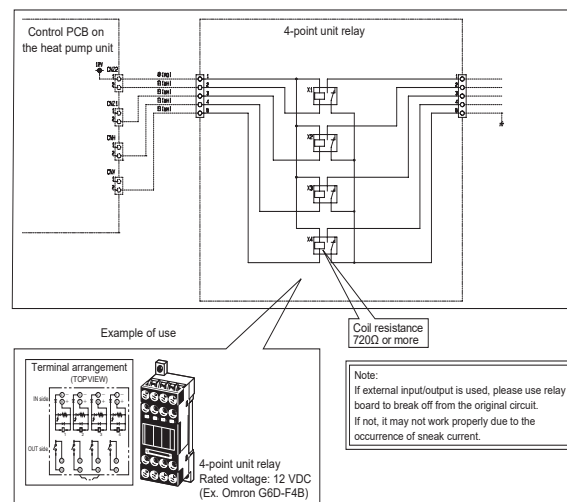


## (8) Control setting

### 8-1 Setting procedure of the heat pump water heater

This setting procedure needs to be done on the heat pump water heater - 7-Segment display.  
7-segment display setting procedure is described on the databook Z2-HM-T-419, chapter (8) Control setting  
Before doing any external input/output setting please confirm the specifications of the external relays

| Code No. | Data display                                     |                                 | Minimum unit | Remark                                                                                        |
|----------|--------------------------------------------------|---------------------------------|--------------|-----------------------------------------------------------------------------------------------|
|          | Contents                                         | Display range                   |              |                                                                                               |
| P01      | No. tank water temperature sensor                | 9:(Factory default)<br>0 - 9    | 1 piece      | Heating only : 0<br>Combination : actual number                                               |
| P07      | Lower limit of hot water storage                 | 10:(Factory default)<br>0 - 100 | 5%           | Stop heating operation if HW storage is lower than this value.<br>Heating only - P07 : 0      |
| P08      | Differential temperature between ThH-1 and ThH-2 | 5:(Factory default)<br>0 - 40   | 1°C          |                                                                                               |
| P09      | Differential temperature between ThX-1 and ThX-2 | 0:(Factory default)<br>0 - 15   | 1°C          |                                                                                               |
| P23      | Function assignment of CNZ1                      | 0:(Factory default)<br>0 - 20   | 1            | Either CNZ1 or CNZ2 must be assigned to (16) heating operation output.<br>See 7-2 for detail. |
| P24      | Function assignment of CNZ2                      | 1:(Factory default)<br>0 - 20   | 1            |                                                                                               |



## 8-2 Setting procedure of the smart pump

These settings are for the recommended smart pump (Wilo Stratos MAXO).  
If you use a smart pump from another manufacturer please refer to their instructions.

### Setting of pump (summary)

|                     | Item                         | Setting                      |
|---------------------|------------------------------|------------------------------|
| Set auto control    | Settings assistant           | Application                  |
|                     |                              | System type                  |
|                     |                              | Control mode                 |
|                     | Setpoints                    | Temperature ( $\Delta T$ -c) |
|                     | Options                      | -                            |
| External interfaces | Function control input (DI1) | External OFF                 |
|                     | Function Analog input (AI1)  | PT1000                       |

\* Set to the temperature set by 7-segment P08 in software setting.

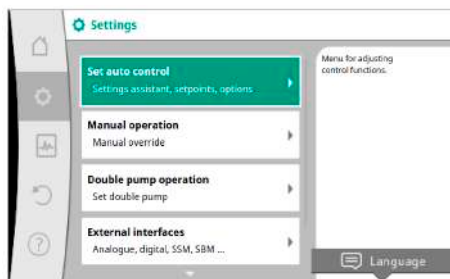
### Wiring connection on the smart pump

| Item                               | Assignment | Terminal | Remark                                   |
|------------------------------------|------------|----------|------------------------------------------|
| External input (Heating operation) | DI 1       | 31,33    | Digital input for potential-free contact |
| External input (Temperature ThH-1) | AI 1       | 12,13    | PT1000                                   |

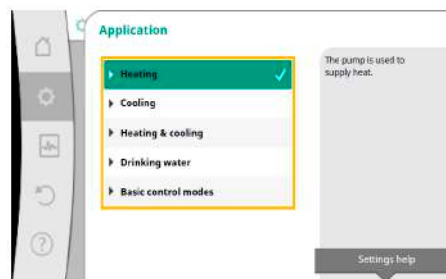
### Detailed setting procedure

#### [Set auto control]

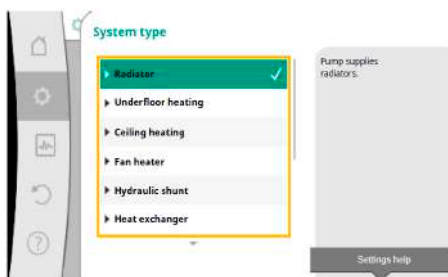
- 1) Rotate control knob to settings
- 2) Select "Set auto control"



- 3) Select "Settings assistant" and set application as "Heating"

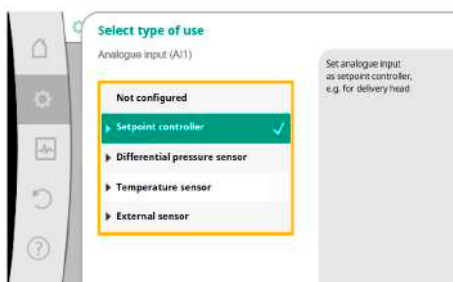


- 4) Select "Basic control modes" under "Heating application menu" (last selection, not shown on image) and set as "Temperature  $\Delta T$ -const"

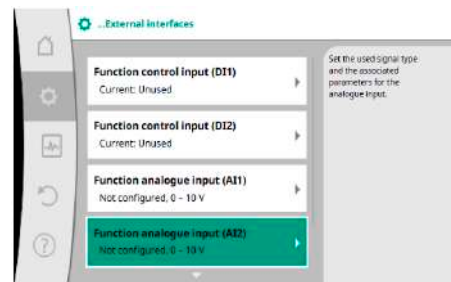


#### [Set external inputs/interfaces]

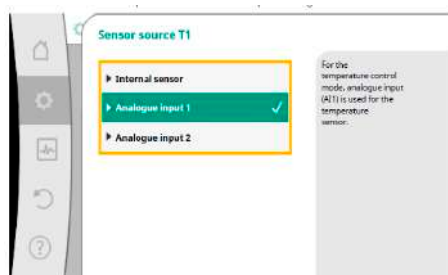
- 1) For ThH-1, set analogue input AI1 as "Temperature sensor" and select "PT1000"



- 2) Set "Function control input DI1" as "External OFF"



- 3) For ThH-2 set sensor source T2 as "Internal sensor".



## (9) Commissioning and handover

### (1) Before test run

- (a) Be sure to check whether **1MΩ or bigger of insulation resistance can be detected by measuring with 500V meggar tester between power terminal and grounding.**
- (b) Before turning the power on, if the resistance between A and B of signal wiring terminal is **100Ω or lower**, the power cables may be connected to the signal wiring terminal. Be sure to check resistance of signal wiring terminal.
- (c) Be sure to **turn the power on 6 hours before starting operation in order to supply power to the crankcase heater.**
- (d) Be sure to check **the bottom of the compressor becomes warm.** (Outdoor air temperature + 5 °C or higher)

### (2) Test run

#### (a) Test run procedure

**In case of the operation for the first time, [Water pump test run], [Primary setting of operation] and [Valve open/close check operation] are required. Please proceed test operation according to following procedure.**

- After completion of installation work, be sure to check water is fed to the hot water supply system and then turn the power on.
- Start water pump test run and purge air from the hot water supply system.  
[In case of space heating system]  
Set application setting of remote control to "Heating" at first (refer to installation manual of remote control)  
Set P07 on 7-segment display as "0".  
Water pump test run can be done from the menu of remote control.  
Menu→Installation setting→Service password (9999)→Test run→Water pump test run  
\* Water pump will start several 10 seconds later. Please make sure that all the air is removed from the installation.  
[In case of combination system]  
Change application setting from "Combination" to "DHW".  
Menu→Installation setting→Service password (9999)→Application setting→DHW  
Water pump test run can be done from the menu of remote control. (same as in case of space heating)
- After completion of water pump test run, please proceed primary setting operation of heat pump unit.  
[In case of space heating system]  
Primary setting operation can be done from the menu of remote control.  
Menu→Installation setting→Service password (9999)→Test run→Primary setting of operation  
\* Primary setting operation will start several minutes later. During primary setting operation, the message of "In Primary operation" is displayed on the TOP screen of remote control.

[In case of combination system]

Change application setting from "DHW" to "Heating".

Primary setting operation can be done from the menu of remote control.

(same as in case of space heating)

After completion of primary setting operation, please change application setting from "Heating" to "Combination".

- After completion of primary setting operation, please proceed to start test run by pushing Run/Pause switch.  
When starting operation, the message of "It is in operation to top up" is displayed on the TOP screen of remote control.  
Please check operation status of heat pump unit by MentePC and check whether the each function is actuated normally.
- After completion of test run, be sure to clean up the strainer.  
After cleaning the strainer, check no leak from hot water supply system and then purge air again.

#### Complement

Water pump test run and primary setting operation can be done by switching ON the DIP switch (SW5-2) on the control PCB of heat pump unit.

#### CAUTION

Before completion of water pump test run, anti-freezing operation does not start in spite of pausing. Therefore if there is a risk to freeze water in the piping or if keeping the system without operating for long term, be sure to drain off the water from the hot water supply system.

#### (b) Contents of primary setting operation

In order to decide the opening of flow regulator appropriate to the external pump head, the following operations are done.

- In order to decide the initial opening of flow regulator (CWFV1), it is operated by changing the hot water outlet temperature automatically.  
In this case, it may be operated with different temperature from the hot water temperature set by remote control.
- Primary setting operation will end within 60 minutes ordinarily.

## (10) Inspection report

The check list below is specific to space heating system and combination system.

### (1) Project information

| Project name | Heat pump unit | Checker    | Hot water storage tank | Date       | Remarks |
|--------------|----------------|------------|------------------------|------------|---------|
| Unit No.     | Model name     | Serial No. | Model Name             | Serial No. |         |
| ①            |                |            |                        |            |         |
| ②            |                |            |                        |            |         |
| ③            |                |            |                        |            |         |

### (2) Check list for installation

○:OK △:shall be revised —:No item

| 2. Check list for installation                                                                                                                        |                                             | 2-1. Shall be revised |   | 2-2. No item |        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|-----------------------|---|--------------|--------|
| Check items                                                                                                                                           | Standard                                    | Checked result        |   |              | Remark |
|                                                                                                                                                       |                                             | ①                     | ② | ③            |        |
| Installation work                                                                                                                                     |                                             |                       |   |              |        |
| In case of combination use, is the indirect heat exchanger installed between the heat pump and the HW ?                                               | Check technical manual (System diagram)     |                       |   |              |        |
| There enough service spaces for the temperature control circuit and circulation pump ?                                                                | Check technical manual (Installation space) |                       |   |              |        |
| Water piping work                                                                                                                                     |                                             |                       |   |              |        |
| Is the expansion vessel installed ?                                                                                                                   | Check technical manual (System diagram)     |                       |   |              |        |
| Electric work                                                                                                                                         |                                             |                       |   |              |        |
| Is the "Heating operation output" (16) assigned for CNZ1 or CNZ2 output and is this output connected to the temperature control circuit (smart pump)? | Check technical manual (System diagram)     |                       |   |              |        |

### (3) Check list for commissioning

○:OK △:shall be revised —:No item

| Check list for commissioning                                                                                                                     |  | Check items                                                           |  | Standard | Checked result |   |   | Remark                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------|--|----------|----------------|---|---|-----------------------------------------------|
|                                                                                                                                                  |  |                                                                       |  |          | ①              | ② | ③ |                                               |
| Before start commissioning                                                                                                                       |  |                                                                       |  |          |                |   |   |                                               |
| Is the initial setting of remote control set as "Heating" or "Combination" ?                                                                     |  | Heating system only : "Heating"<br>Combination system : "Combination" |  |          |                |   |   | See the installation manual of remote control |
| Is the setting of P08 on PCB of heat pump unit set as the correct temperature designed for floor heating panel ?                                 |  | Refer the technical manual of floor heating panel (can adjust 0~40°C) |  |          |                |   |   | Initial setting : 5°C*                        |
| In case of combination use, is the setting of P09 on PCB of heat pump unit set as the correct temperature designed for indirect heat exchanger ? |  | Adjust to designed temperature.<br>(can adjust 0~15°C)                |  |          |                |   |   | Initial setting : 0°C*                        |
| Temperature control circuit                                                                                                                      |  |                                                                       |  |          |                |   |   |                                               |
| Does the flow rate at FL1 conform with the set value?                                                                                            |  | Same as set temperature                                               |  |          |                |   |   | Initial setting : 16 L/min*                   |
| Does the circulation pump (Pc1) start and stop in conjunction with the heating operation?                                                        |  | Check operation                                                       |  |          |                |   |   |                                               |
| Floor heater panel                                                                                                                               |  |                                                                       |  |          |                |   |   |                                               |
| Does the ThH-1 temperature conform with the set temp by remote control ?                                                                         |  | Same as set temperature                                               |  |          |                |   |   |                                               |
| Does the differential temperature between ThH-1 and ThH-2 conform with the set temperature by software setting of P08 ?                          |  | Same as set temperature                                               |  |          |                |   |   |                                               |
| Indirect heat exchanger (in case of combination system)                                                                                          |  |                                                                       |  |          |                |   |   |                                               |
| Does the differential temperature between ThH-1 and ThH-2 conform with the set temperature by software setting of P08 ?                          |  | Same as set temperature                                               |  |          |                |   |   |                                               |
| Does the circulation pump start and stop in conjunction with the tapping operation?                                                              |  | Check operation                                                       |  |          |                |   |   |                                               |

ThH-1 : Inlet temperature of floor heating panel

ThH-2 : Outlet temperature of floor heating panel

ThX-1 : Inlet temperature of indirect heat exchanger (heat pump side)

ThX-2 : Outlet temperature of indirect heat exchanger (HW storage unit side)

\* See the "INSTALLATION MANUAL for DHW system" 8-(4) for detail.

#### Operation data of the heat pump unit (Should attach Mente PC data)

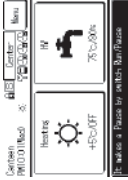
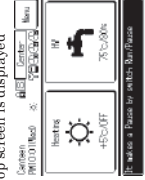
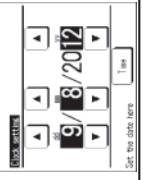
[Date of acquisition : ]

| Operation data of the heat pump unit (Should attach with PC data) |                                                                                      |      | Date of acquisition : |   |   |
|-------------------------------------------------------------------|--------------------------------------------------------------------------------------|------|-----------------------|---|---|
| Measured items                                                    |                                                                                      |      | Measured result       |   |   |
|                                                                   | Items                                                                                | Unit | ①                     | ② | ③ |
| Water circuit                                                     | Hot water outlet temperature                                                         | °C   |                       |   |   |
|                                                                   | Inlet temp of floor heating panel                                                    | °C   |                       |   |   |
|                                                                   | Heating temperature set with remote control                                          | °C   |                       |   |   |
|                                                                   | Differential temperature between inlet and outlet temperature of floor heating panel | °C   |                       |   |   |
|                                                                   | Differential temperature set with software setting of P08                            | °C   |                       |   |   |
| Refrigerant circuit                                               | High pressure                                                                        | MPa  |                       |   |   |
|                                                                   | Intermediate pressure                                                                | MPa  |                       |   |   |
|                                                                   | Low pressure                                                                         | MPa  |                       |   |   |
|                                                                   | Compressor speed                                                                     | rps  |                       |   |   |
|                                                                   | Operating current                                                                    | A    |                       |   |   |
|                                                                   | Discharge pipe temperature                                                           | °C   |                       |   |   |
|                                                                   | Suction pipe temperature                                                             | °C   |                       |   |   |
|                                                                   | Under-dome temperature                                                               | °C   |                       |   |   |
|                                                                   | Suction superheat                                                                    | °C   |                       |   |   |
| Outdoor fan                                                       | Outdoor air temperature                                                              | °C   |                       |   |   |
|                                                                   | Outdoor fan speed                                                                    | rpm  |                       |   |   |

In case of DHW operation in combination system, please use table of "INSTALLATION MANUAL of DHW system".

## (11) The behavior after power recovery

- \* The behavior after power reset (earth leakage breaker turns ON) is same as the behavior after power recovery.
- \* The behavior after CPU reset, and Initializing is described as well.

| * The behavior after CPU reset, and Initializing is described as well. |      |                                       |                         |                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                        |                        |                          |                         |                       |               |                                                                         |                                                                         |                                                                         |
|------------------------------------------------------------------------|------|---------------------------------------|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------|--------------------------|-------------------------|-----------------------|---------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------|
| Behavior                                                               | Case | Power failure backup function<br>(*)1 | Period of power failure | Remote control display<br>(After the end of control after power recovery)                                                                                                                  | Behavior                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Date and time<br>(**2) | HW temperature setting | Target HW amount setting | Setting of off time day | Peak-cut time setting | Run/Pause(*5) |                                                                         |                                                                         |                                                                         |
| After power recovery<br>recovery (After power ON)                      | A    | Valid<br>(Factory default)            | < 80Hr                  | Remote control display is displayed<br><br>This image is when the application setting is "Combination". | The unit is recovered as same status as before power failure.<br>① If in operation before power failure<br>It is in [Run] mode after power recovery and if the current HW amount is less than the set amount, the heat pump water heater starts operation to top up.<br>* If the day of power recovery is off day, it is recovered in [Pause] mode and when it becomes working day, it starts operation.<br>② If it is in [Pause] before power failure<br>It is in [Pause] mode after power recovery and the heat pump water heater does not start operation.<br>If you want to start operation, please push [Run/Pause] switch. | ○                      | ○                      | ○                        | ○                       | ○                     | ○             |                                                                         |                                                                         |                                                                         |
|                                                                        | B    |                                       | ≥ 80Hr                  | Date setting screen is displayed<br><br>This image is when the application setting is "Combination".    | After setting date, time and application, TOP screen is displayed.<br>The unit is recovered as same status as before power failure, but until date and time setting is done, the heat pump water heater does not start operation to top up.<br>* The behavior after power recovery is same as case A.<br>* Since the set date and time is lost, it is necessary to set date and time again.                                                                                                                                                                                                                                      | ×                      | ○                      | ○                        | ○                       | ○                     | ×             | It becomes in [Pause]. If you want to operate, push [Run/Pause] switch. |                                                                         |                                                                         |
|                                                                        | C    |                                       |                         | Top screen is displayed<br><br>This image is when the application setting is "Combination".             | Since the power failure backup function is invalid, the unit is recovered in [Pause] mode, despite of the operation status before power failure.<br>The unit does not start operation due to [Pause] mode.<br>If you want to start operation, please push [Run/Pause] switch.                                                                                                                                                                                                                                                                                                                                                    | ○                      | ○                      | ○                        | ○                       | ○                     | ○             | ×                                                                       | It becomes in [Pause]. If you want to operate, push [Run/Pause] switch. |                                                                         |
|                                                                        | D    |                                       |                         | Date setting screen is displayed<br><br>This image is when the application setting is "Combination".   | After setting date, time and application, TOP screen is displayed.<br>Since the power failure backup function is invalid, the unit is recovered in [Pause] mode, despite of the operation status before power failure.<br>The unit does not start operation due to [Pause] mode.<br>If you want to start operation, please push [Run/Pause] switch.<br>* Since the set date and time is lost, it is necessary to set date and time again.                                                                                                                                                                                        | ×                      | ○                      | ○                        | ○                       | ○                     | ○             | ×                                                                       | It becomes in [Pause]. If you want to operate, push [Run/Pause] switch. |                                                                         |
| CPU reset<br>(**3)                                                     | E    | Valid                                 | -                       | Same as case A                                                                                                                                                                             | Unit is recovered as same status as before<br>* The behavior after power recovery is same as case A.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ○                      | ○                      | ○                        | ○                       | ○                     | ○             | ○                                                                       | ×                                                                       | It becomes in [Pause]. If you want to operate, push [Run/Pause] switch. |
|                                                                        | F    | Invalid                               | -                       | Same as case C                                                                                                                                                                             | Since the power failure backup function is invalid, the unit is recovered in [Pause] mode, despite of the operation status before CPU reset.<br>The unit does not start operation due to [Pause] mode.<br>If you want to start operation, please push [Run/Pause] switch.                                                                                                                                                                                                                                                                                                                                                        | ○                      | ○                      | ○                        | ○                       | ○                     | ○             | ○                                                                       | ×                                                                       | It becomes in [Pause]. If you want to operate, push [Run/Pause] switch. |
| Initializing<br>(**4)                                                  | G    | Despite of Valid/Invalid              | -                       | Main/Sub setting screen is displayed<br>                                                              | Despite of the operation status before initializing, R/C and all heat pump water heaters connected becomes factory default.<br>Since the date and time setting is retained, the unit is recovered in [Pause] mode, after Mam/Sub setting of R/C.<br>The unit does not start operation due to [Pause] mode.<br>If you want to start operation, please push [Run/Pause] switch.                                                                                                                                                                                                                                                    | ×                      | ×                      | ×                        | ×                       | ×                     | ×             | ×                                                                       | ×                                                                       | It becomes in [Pause]. If you want to operate, push [Run/Pause] switch. |

[Remarks]

- \*1 Power failure backup function  
It is the function to make the unit recovered to the operation status before power failure automatically, after power recovery, by memorizing the operation status before power failure. For example, in case of [Run] before power failure, the unit starts operation automatically after power recovery.
- \*2 Time setting  
The set time is memorized in the memory of R/C with built-in battery. With battery it is memorized for 80 hours after power failure.
- \*3 CPU reset  
R/C and all heat pump water heaters can be reset.
- \*4 Initializing  
R/C and all heat pump water heaters are back to the factory default except the (date and time) setting.
- \*5 Pause  
[Pause] is the status that the operation to top up is stopped. The operation to top up is stopped, but the unit may start operation for anti-freeze of water.

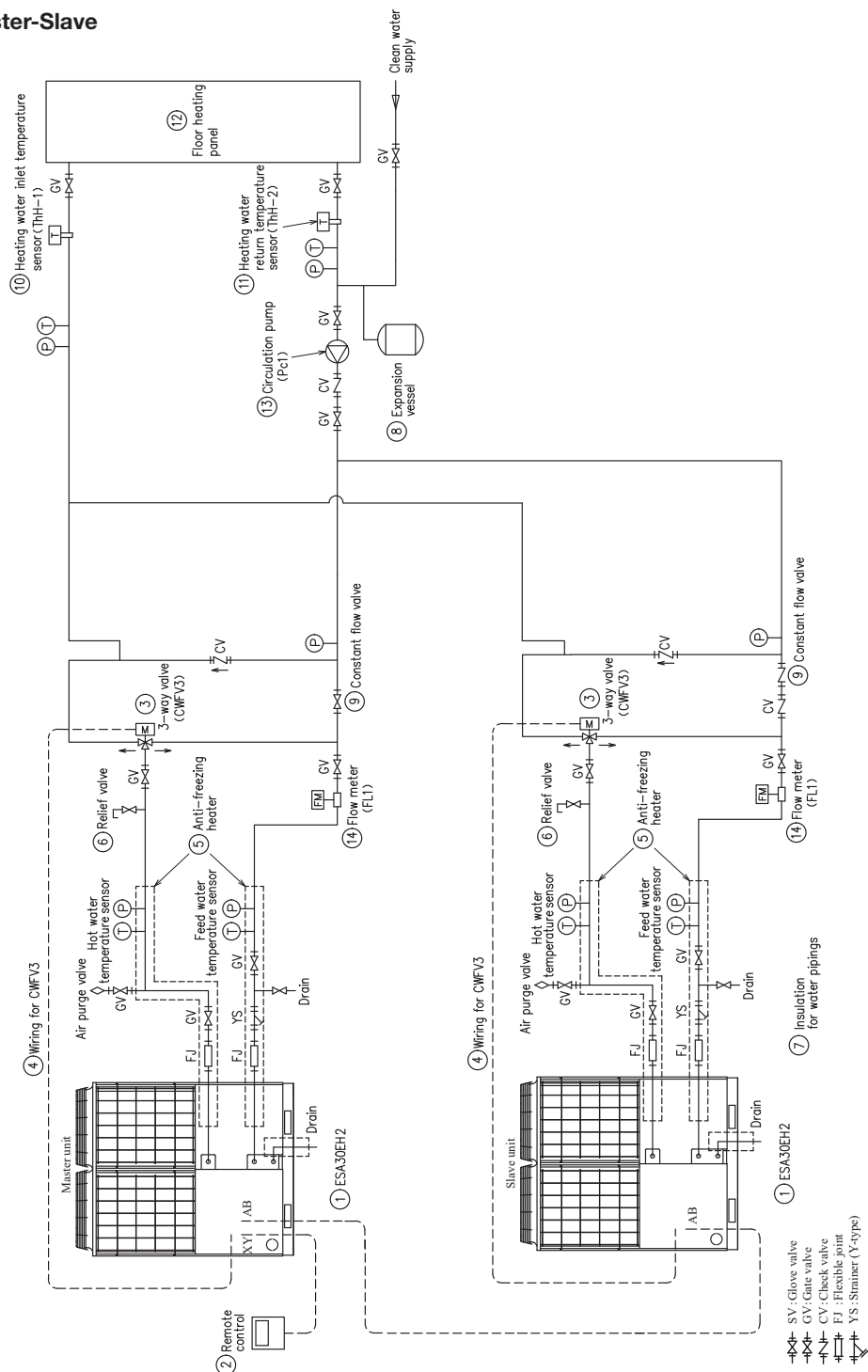
## 3.2 Setting and operation models for space heating and configuration of master-slave units

### (1) Introduction

With a master-slave connection, a heat pump water heater is set as the master unit for a floor heating panel, and up to 3 heat pump water heaters are connected as slave units to the master unit. Where two or more heat pump water heaters can be connected as master units to a floor heating panel, each master heat pump water heater starts or stops independently depending on the inlet water temperature of the floor heating panel, set by the remote controller (RC-Q1EH2). With the master-slave connection, however, the master unit controls collectively the start and stop of its slave units. In this case, project design, installation and maintenance is simplified compared to the case where two or more master units are connected to a single floor heating panel.

### (2) System diagram

#### Example: Master-Slave



**(3) Component list**

|   | Part name                                                  | Model                                                              | General description                                                                                                                                                                                                                                                                                                                                                               |
|---|------------------------------------------------------------|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ① | Heat pump water heater                                     | ESA30EH2-25                                                        | For outdoor air temperature -25°C                                                                                                                                                                                                                                                                                                                                                 |
| ② | Remote control for heat pump water heater (Option part)    | RC-Q1EH2                                                           | For setting the inlet temperature of the floor heating panel.                                                                                                                                                                                                                                                                                                                     |
| ③ | 3-way valve, CWFV3 (Option part)                           | MTH-Q4E                                                            | For switching to anti-freezing circuit (wiring length 0.7m, AC200V,50mA)                                                                                                                                                                                                                                                                                                          |
| ④ | Wiring kit for CWFV3 (Option part)                         | MTH-Q6E<br>(20m length of wire)<br>MTH-Q7E<br>(10m length of wire) | MTH-Q1E or -Q2E has only one set of relay wiring for CWFV3 (MTH-Q4E). For the master-slave connection, provide an MTH-Q6E or MTH-Q7E for each slave unit.                                                                                                                                                                                                                         |
| ⑤ | Anti-freezing water heater (Locally procured)              | —                                                                  | When outdoor air temperature becomes below 0°C, be sure to install this heater on the water pipe (10W/m).                                                                                                                                                                                                                                                                         |
| ⑥ | Relief valve (Locally procured)                            | —                                                                  | For preventing from increasing pressure in the system during heating up the water. (Working pressure: 450±30kPa or lower.)                                                                                                                                                                                                                                                        |
| ⑦ | Insulation (Locally procured)                              | —                                                                  | Heat resistance ≥ 120°C<br>For the water piping: 30mm or thicker glass wool whose density is 48kg/m <sup>3</sup> .                                                                                                                                                                                                                                                                |
| ⑧ | Expansion vessel (Locally procured)                        | —                                                                  | —                                                                                                                                                                                                                                                                                                                                                                                 |
| ⑨ | Constant flow valve (Locally procured)                     | —                                                                  | To keep the flow rate to the heat pump unit constant. Set flow rate: 16 L/min<br>Example: Caleffi Flowmatic (PICV) 145 Series                                                                                                                                                                                                                                                     |
| ⑩ | Heating water inlet temperature sensor (Locally procured)  | —                                                                  | The type required by the smart pump used.                                                                                                                                                                                                                                                                                                                                         |
| ⑪ | Heating water return temperature sensor (Locally procured) | —                                                                  | The type required by the smart pump used.                                                                                                                                                                                                                                                                                                                                         |
| ⑫ | Floor heating panel (Locally procured)                     | —                                                                  | —                                                                                                                                                                                                                                                                                                                                                                                 |
| ⑬ | Circulation pump, Pc1 (Locally procured)                   | —                                                                  | Smart pump (inverter pump with external control for space heating.<br>Flow rate: 5160L/h or more<br>Head: More than pressure loss between floor heating panel and temperature control circuit. It must have temperature difference constant control (deltaT constant)<br>Example: Wilo Stratos MAXO series. Please confirm that ThH-1 and ThH-2 are supplied with the smart pump. |
| ⑭ | Flow meter, FL1 (Locally procured)                         | —                                                                  | To monitor and control the flow rate to the heat pump unit.<br>With upper alarm output. Set flow rate alarm: 17 L/min<br>Piping size: 20A                                                                                                                                                                                                                                         |

**(4) Address setting**

Please see the technical document for DHW system.

### 3.3 External input and output

#### (1) Additional external input terminal for space heating operation

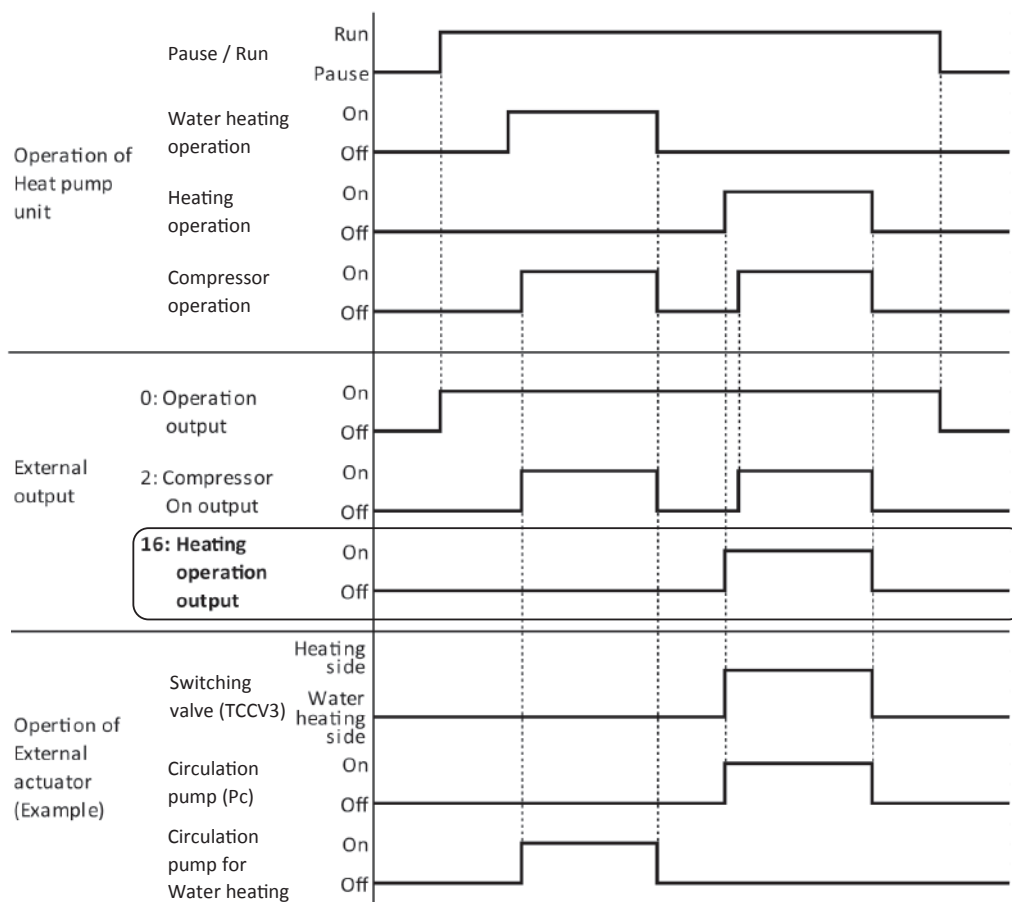
In addition to conventional functions, the output shown in the table below has been added for space heating.

| Name            |      | Usage (★Factory default)        | Specification         | Remarks                                                     |
|-----------------|------|---------------------------------|-----------------------|-------------------------------------------------------------|
| External output | CnH  | Operation output                | DC12V<br>output(10mA) | Operation signal also output during antifreezing operation. |
|                 | CnY  | Error output                    |                       | —                                                           |
|                 | CnZ1 | Set with 7-segment control (*1) |                       | ★0: Operation output                                        |
|                 | CnZ2 |                                 |                       | ★1: Error output                                            |

(\*1) 0: Operation output, 1: Error output, 2: Compressor On output, 3: Fan On output, 4: Dry-up water output, 5: Water pump (DCWP) operation command output, 6: Anti-freezing water circuit output, 7: Defrost operation output, 8: Output of operation to top up, (9: Output of operation to keep warm) 13: Auto-backup operation output, 14: Remote control On output, 15: Hot water amount output 16: Heating operation output (Added for space heating)

( ) for open tank only

#### (2) Transition of external output and operation statuses



## 4. Additional 7-segment display for space heating

| Code No. | Data display                                     |                                        | Minimum unit | Remark                                                                                                                                         |
|----------|--------------------------------------------------|----------------------------------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------|
|          | Contents                                         | Display range                          |              |                                                                                                                                                |
| P01      | Number of tank water temperature sensor          | <u>9:(Factory default)</u><br>0 - 9    | 1 piece      | Heating only : 0<br>Combination : actual number                                                                                                |
| P07      | Lower limit of hot water strage                  | <u>10:(Factory default)</u><br>0 - 100 | 5%           | Stop heating operation if hot water strage is lower than this value<br>*For heating dedicated usage, P07 should be set as "0".                 |
| P08      | Differential temperature between ThH-1 and ThH-2 | <u>5:(Factory default)</u><br>0 - 40   | 1°C          |                                                                                                                                                |
| P09      | Differential temperature between ThX-1 and ThX-2 | <u>0:(Factory default)</u><br>0 - 15   | 1°C          |                                                                                                                                                |
| P23      | Function assignment of CNZ1                      | <u>0:(Factory default)</u><br>0 - 20   | 1            | Either CNZ1 or CNZ2 must be assinged to (16) Heating operation output.<br>See 3.1 (7) 7-2 Setting procedure of digital control TIC 1 and TIC 2 |
| P24      | Function assignment of CNZ2                      | <u>1:(Factory default)</u><br>0 - 20   | 1            |                                                                                                                                                |

ThH-1 : Inlet temperature of floor heating panel

ThH-2 : Outlet temperature of floor heating panel

ThX-1 : Inlet temperature of indirect heat exchanger (heat pump side)

ThX-2 : Outlet temperature of indirect heat exchanger (HW strage unit side)

## 5. Option part : Modbus interface

### (1) Specifications

|                                 |                                    |
|---------------------------------|------------------------------------|
| Description                     | INTERFACE KIT                      |
| Model name                      | RCI-MDQE2                          |
| Operation temperature           | 0 °C to 40 °C                      |
| Operation humidity              | less than 90 % RH, non-condensing  |
| Stock temperature               | -20 °C to +70 °C                   |
| Stock humidity                  | 40 % RH to 90 % RH, non-condensing |
| Power source                    | DC 18 V (XY Line)                  |
| External dimensions (H x W x D) | 100 x 85 x 35 mm (Metal box)       |
| Weight                          | 350 g                              |

Modbus communication parameters (DIP switch settings)

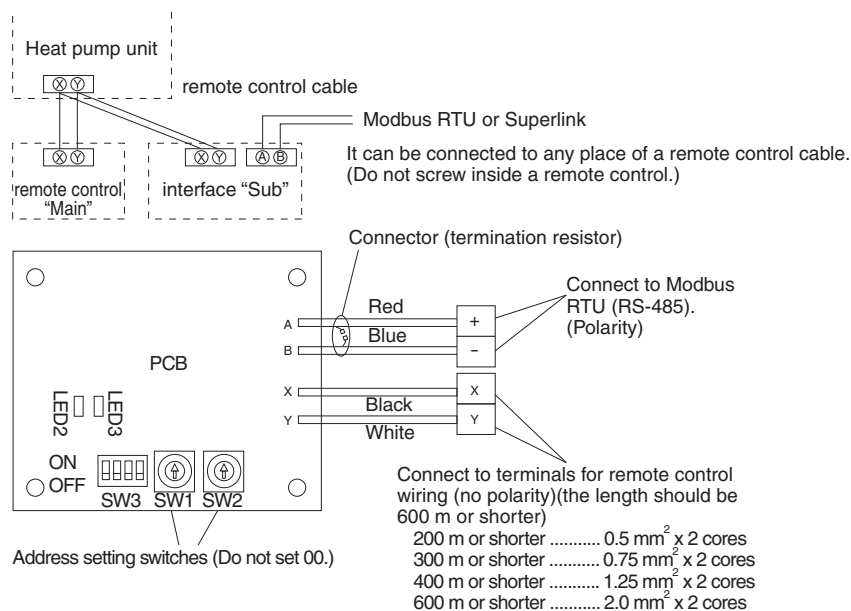
|                   |                                                                  |
|-------------------|------------------------------------------------------------------|
| Baud rate         | 9600 bps (Default), 19200 bps                                    |
| Stop bit (Parity) | Stop Bit 1 (Even/Odd parity), Stop Bit 2 (No polarity) (Default) |

### (2) Modbus Functions

|                   |                                                                                       |
|-------------------|---------------------------------------------------------------------------------------|
| Device type       | Slave                                                                                 |
| Transmission mode | RTU                                                                                   |
| Control           | Send the setting from Modbus master device to the Heat pump water heater.             |
| Supervision       | Send the data or the abnormal condition of a Heat pump water heater to Modbus master. |

### (3) Connection

- The device must be installed in accordance with national wiring regulations.
- Please do the grounding work. Please do not connect earth line with gas pipes, water pipes, lightning rods and grounding line of telephone.
- Please do not turn on the power source (local switch) until all of the works are completed.



Signal line specification

|               |                             |
|---------------|-----------------------------|
| Line type     | MVVS                        |
| Line diameter | 0.75 – 1.25 mm <sup>2</sup> |
| Line length   | Up to 1200 m                |

Ground both ends of the shielded wire.

**(4) Installation work**

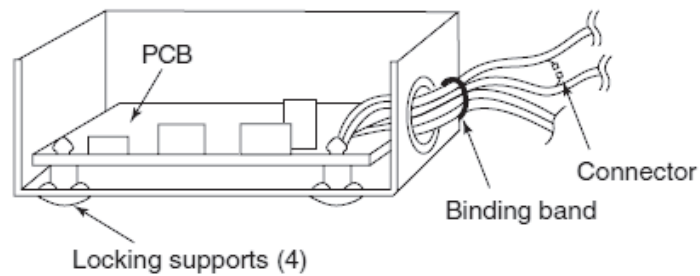
Please install in an indoor location that is not exposed to electromagnetic waves, water, dust, or other foreign substances.

The operating temperature range of this product is from 0 °C to 40 °C.

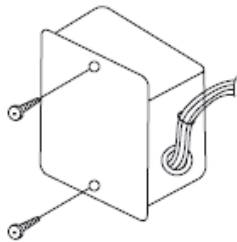
Install in a location where the ambient temperature remains within the operating temperature range.

However, if the operating temperature range is exceeded, be sure to implement corrective measures such as installation of a cooling fan.

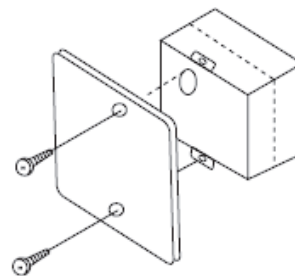
Be aware that continued usage of this device outside the operating temperature range can result in operation problems.



▲ Put the metal cover on.



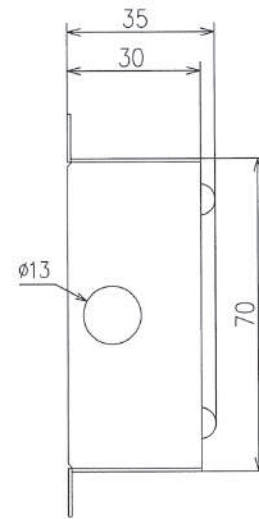
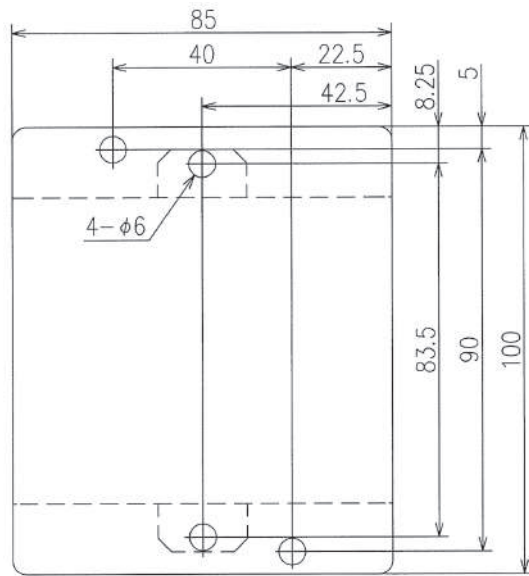
▲ When installed on the back of the remote control, mount it directly on the remote control bottom case.



Connect the connector in case of termination as shown in the below figure.



(5) Outline drawing (Metal box)



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## **AIR TO WATER HEAT PUMP**

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