

# Guidebook for WCCBO

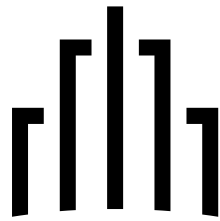
The Frist World Championship in Cybernetic Building Optimization

([www.wccbo.org](http://www.wccbo.org))

2018.10.27 version







**WCCBO**

World Championship in Cybernetic Building Optimization



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## [Appendix]

- 1) Architectural design drawing
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- 7) Calculation of energy and dissatisfaction



## 1. Introduction

### 1.1 Purpose of hosting the championship

The energy consumed by buildings during operation is extremely high, and over half of carbon dioxide emitted by buildings in their lifetime occur during the operation stage. On the other hand, as buildings are man-made, comparison of the quality of operation of different buildings is difficult. Therefore, in this championship, we will develop an extremely realistic building simulation model (hereinafter referred to as "emulator") and try to quantitatively evaluate the optimization skill of the participants competing for optimization of operation of the emulator. In other words, the purpose of this championship is to decide the No. 1 in building optimization skill. An emulator and a simple Building Automation System (BAS) are distributed to each championship participants. By operating the simple BAS, participants try adjusting the temperature setting value for each season, the operating schedule of the air conditioner, etc. to maintain the building cozy and energy efficient.

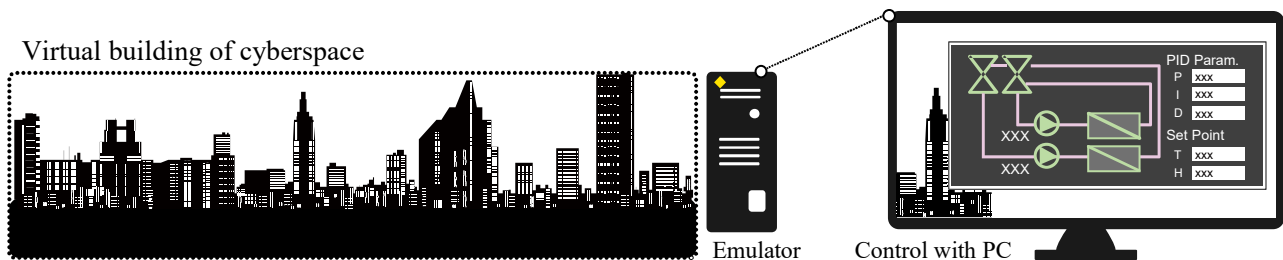


Figure 1.1 Structure of the "World Championship in Cybernetic Building Optimization"

### 1.2 Structure of this guidebook

To participate in this championship, the entire guidebook need not be read and understood. However, in chapter 2, 3, and 4, information on the implementation of this championship, distribution data, and basic rules are respectively described, which must be studied clearly.

In Chapter 5, actual optimization examples are described, and you can learn the optimization procedure by using the simple BAS. Details of the simple BAS function and operational method are described in Chapter 6.

Chapters 7 and 8 contain information on the challenging advanced optimization, and they need not be read. Chapter 7 describes the method to edit the initialization file to change the operating conditions of the emulator and the simple BAS. Chapter 8 contains reference information to be used when optimizing, by making your own BACnet communication program without using the simple BAS.

## 2. Championship schedule

Figure 2.1 shows schedule of the championship. The championship is to be held on June 7, 2019. Interested participants need to complete entry by April 12 on the website (<http://www.wccbo.org>). A set of documents (guidebook, emulators, etc.) will be mailed to the participants in early May. Participants need to check whether the emulator is compatible with their private PC during the month until the opening day.

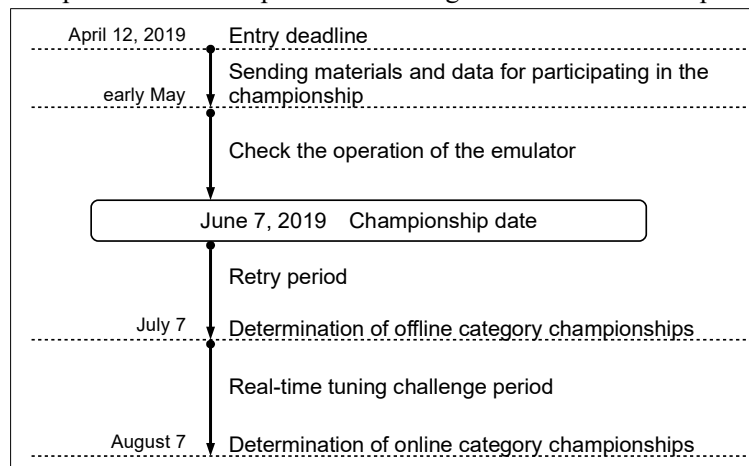


Figure 2.1 Suchedule of championship

On the date of the championship, the basic operation method of the emulator and control configurations will be explained according to the tutorial of this guidebook. Thereafter, the participants can individually change controls and challenge optimization. The control data created by the participants is uploaded to the server immediately, and the server will execute the data, considering a day's data as a year's data, for which it is preset, following which, on June 8, the ranking of all participants will be published on the web.

The server is prepared for each participant, and you can re-upload and recalculate control data any number of times, for a month from the inauguration of championship. For a month, you can try improving your grades and rankings, from your home or office, at any time. Come 7th July, which will mark a month since the beginning of the championship, the participants with the highest grades will be referred to as "offline category championships".

In the above mentioned method, calculation is done at once after all control methods have been determined. On the other hand, in actual buildings, it is possible to perform real-time tuning while monitoring the momentarily changing outdoor air condition or indoor conditions. In order to challenge such next-generation optimization, this championship also offers one-month real-time tuning challenge period. By setting the execution speed of the emulator on the server to 12 times the real time, a year's calculation is performed over a month. In this course of time, participants can remotely control the emulator in real time with BACnet communication. We are convinced that such online tuning will be an essential technology in the future, albeit participation in this challenge is purely voluntary.

### 3. Provided data

In addition to this guide, the data necessary for participating in the championship will be provided to the participants via USB memory. Table 3.1 shows the directory list of the provided data.

Table 3.1 Directory list of the provided data

Directory	Contents
Emulator	Emulator and simple BAS software
Data_BEMS	A year's operation data of the emulator
SourceCode	Source code of emulator and related programs

#### 3.1 Emulator directory

This directory stores the emulator and simple BAS software. There is no special installer and by just moving this directory to your computer desktop, installation is complete. Table 3.2 shows contents of the Emulator directory.

Table 3.2 Contents of Emulator directory

Directory / File	No.	Contents
Emulator		
backup		
buiding.bin	1	Emulator backup data for the past 5 days
controller.bin	2	Emulator controller backup data for the past 5 days
Data		Directory for storing the measured operation data
yyyy		Directory by year
m		Directory by month
d-1.csv	3	Data on the primary side system
d-2.csv	4	Data on the secondary side system
d-3.csv	5	Data on the absence information of the office workers
d-4.csv	6	Data on thermal comfort of the office workers
Questionnaire		Results of questionnaires on thermal sensation to officers
yyyyymmddAM.csv	7	Results of questionnaires (AM)
yyyyymmddPM.csv	8	Results of questionnaires (PM)
MakeHourlyData.exe	9	Program to convert 1 minute interval data to 1 hour data
initFiles		Initialization directory
FirstName_F.txt	10	Name of office workers (Female)
FirstName_M.txt	11	Name of office workers (Male)
LastName.txt	12	Family name of office workers
SpecialCharacters.txt	13	Name of special characters
setting.ini	14	Initialization file
ExclusivePort.csv	15	Port list of BACnet communication
Manual.pdf	16	PDF of this guidebook
ExcelCommunicator.exe	17	Program for controlling the emulator from Microsoft Excel
ExcelInterface.xlsm	18	Excel sheet to controll emulator
Shizuku.exe	19	Emulator
ShizukuClient.exe	20	Simple BAS software
Communicators		Directory to store original control programs by user
RemoteCommunicator	21	Software to remotely execute user's original control program
ShizukuUnity.exe	22	3D interface by Unity
ShizukuUnity_Data	23	Unity auxiliary file

The "backup" directory stores the past 5 days state of the emulator . "No.1: building.bin" is the data that saves the state of the emulator. Similarly, "No.2: controller.bin" is the data that saves the controller state of the emulator. If you move "building.bin" to the same directory as "Shizuku.exe" and restart the emulator, you can

resume calculation from the saved data. Similarly, if you move "controller.bin" to the same directory as "Shizuku.exe", the emulator will be initialized with the saved controller data.

The past operation data of the emulator are saved in the "Data" directory. For example, indoor thermal environmental information (temperature, MRT, and humidity), heat source start / stop state, temperature of heat storage tank etc. Data that is not measured by current general Building Energy Management System (BEMS) such as human absence information or thermal sensation are also stored. Data are saved in different directories by year and month, as a different CSV file every day. A summary of what kind of data are included is shown in Appendix 4.

Although the data measurement interval is 1 min, 1-min interval data is inconvenient to analyze the long-term trend. If you use "No. 9: MakeHourlyData.exe", integration or averaging processing is performed based on the 1-min data, and 1-h data is created.

In the emulator, an office workers questionnaire will be held on the opening day. As shown in Appendix 3, there are about 1,000 workers in the building. "Tenant number" "sex" "age" "clo value" "thermal sensation value," and "satisfied or not" are recorded those present. The results of this questionnaire are saved in the "Questionnaire" directory.

The "initFiles" directory contains the files related to emulator initial settings. The specific setting method is explained in Chapter 7.

"No.15: ExclusivePort.csv" is a file to be edited when BACnet communication is remotely performed. You do not need to edit it if you want to adjust only the controls on the local computer. When remotely controlling the emulator running on the server, it is necessary to replace the file, which will be explained in Chapter 8.

"No.17: PresentValueWriter.exe" and "No.18: PresentValueWriter.xlsm" are programs for controlling the emulator using Excel. Their usage is explained in Chapter 5, Section 5.4.

"No. 19: Shizuku.exe" and "No. 20: ShizukuClient.exe" are emulator and simple BAS, respectively, which can be started by double-click. Their usage is explained in Chapter 5 and Chapter 6.

### 3.2 Data\_BEMS directory

This directory contains data for when you run the emulator for one year with standard control. This is the "Data" directory in Table 3.2. Appendix 6 is the result of analysis based on this data.

### 3.3 SourceCode directory

This directory contains all the source codes such as those of emulator, simple BAS, sample program for communication, and optimization with BACnet (explained in Chapter 8).



#### 4. Definition of "Optimization"

To decide the championship, it is necessary to integrate indoor thermal environment and energy saving performance of the building into one index. This is an evaluation index that combines comfort and physical quantity, and we cannot make a definitive version that convinces everyone. In this championship, we will preliminarily evaluate it using Equation 4.1. This is called Effective Energy Reduction Rate (E2R2). E2R2 is the product of Energy Reduction Rate (ERR) and Dissatisfied Occupant Reduction Rate (DRR). Figure 4.1 shows E2R2 contours depending on the combination of ERR and DRR. When both are negative, E2R2 is negative, and vice versa. However, E2R2 becomes 0 when the both signs are not the same. Therefore, in this championship, only when the energy performance and indoor thermal environment are improved, E2R2 will be a positive value and will be evaluated as "good operation".

ERR and DRR are calculated by Equation 4.2 and Equation 4.3. E and D are primary energy consumption [GJ] and dissatisfied occupant rate [-], respectively. The emulator simultaneously calculates buildings with changed control and buildings with standard control. The subscript R represents the buildings with standard control, and the subscript opt represents the buildings that were tried to be optimized by changing the control. By calculating the difference between the two for both energy reduction rate and dissatisfied occupant rate, the effect of control change is displayed in real time.

$$E2R2 = \text{sgn}(ERR) \times \max(0, ERR \times DRR) \quad (4.1)$$

$$ERR = \frac{E_R - E_{opt}}{E_R} \quad (4.2)$$

$$DRR = \frac{D_R - D_{opt}}{D_R} \quad (4.3)$$

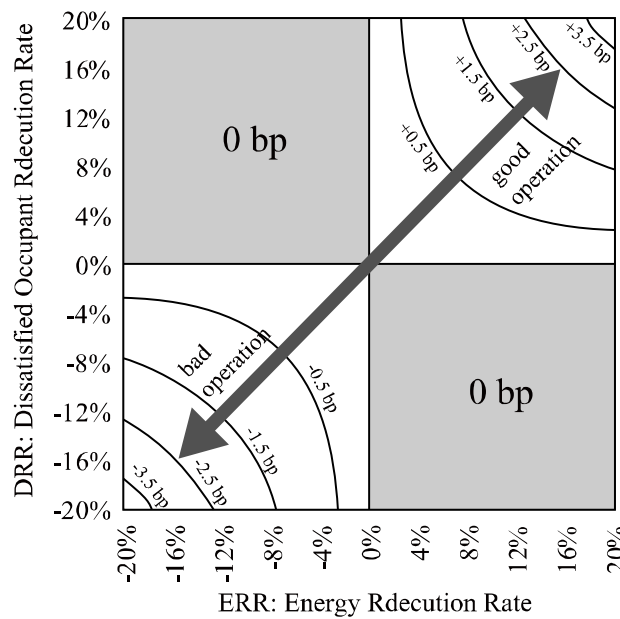


Figure 4.1 Relation between ERR, DRR, and E2R2

## 5. Tutorial

In this chapter, the procedures for using the emulator, simplified BAS, and changing the operation are explained. Because it is the main object to experience the use of software, the detailed explanation of each control will be skipped here. Please refer to Chapter 6 for details of simple BAS software.

### 5.1 Installation

If you move the "Emulator" directory saved in the recording media to desktop, installation is complete. However, .NET Framework must be installed in your PC.

### 5.2 Execution of the emulator software

Double-click "Shizuku.exe" to start the emulator. Depending on the version of Windows, a warning as shown in Figure 5.1 may be displayed. Please click on the detailed information and select "execute".

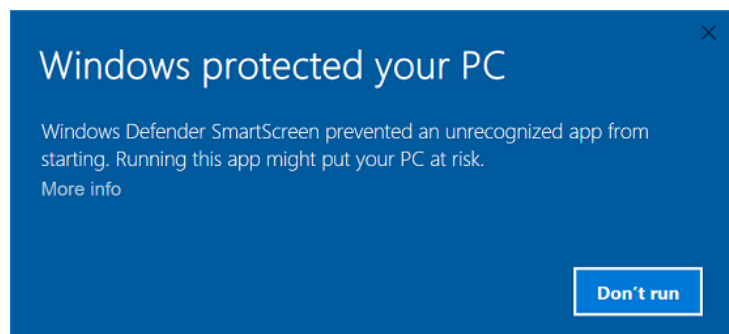


Figure 5.1 Warning indication at emulator startup

Figure 5.2 shows the execution window of the emulator. The emulator is a console application and does not have a graphical user interface. In the emulator, various processes such as calculation of heat load, equipment system, movement of office worker, BACnet communication, etc. are performed, but on the console screen, as shown in Fig. 5.2, only the date and time of the emulator are displayed.

In order to check the calculation status in the emulator and change the control value, it is necessary to communicate with the emulator using BACnet using simple BAS as described below. To exit the emulator, click "x" at the upper right corner of the window or press "Ctrl" + "C" in the keyboard.

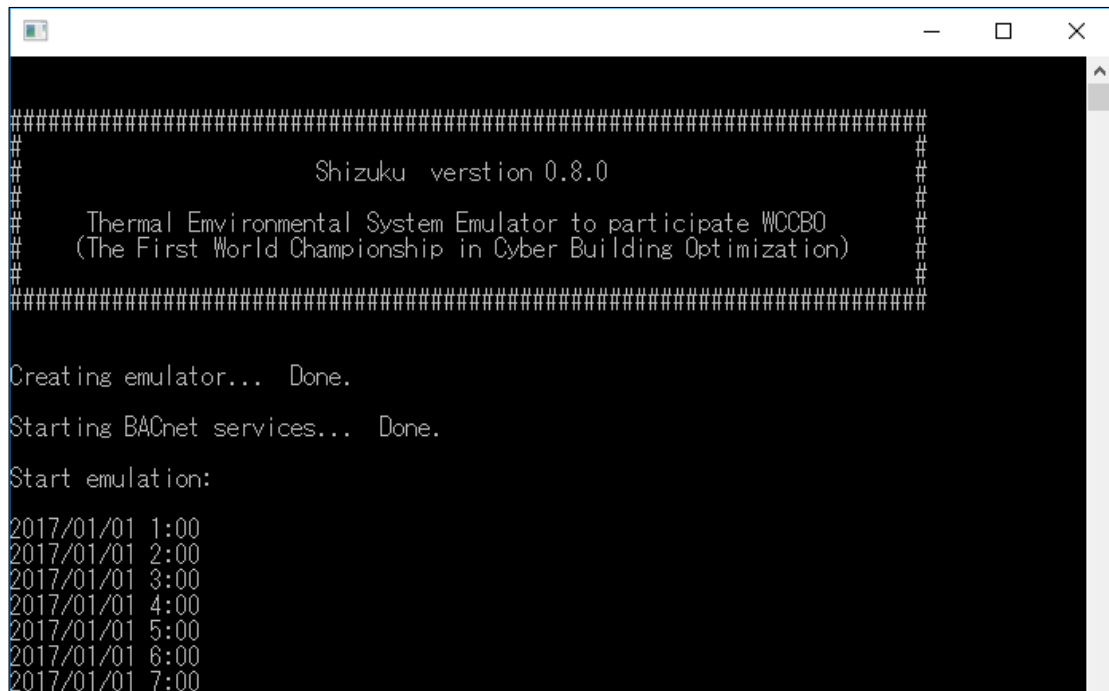


Figure 5.2 Execution window of the emulator

The emulator outputs the operation data in CSV format in the "Data" directory (Figure 5.3). Although they are data with 1-min intervals in the standard setting, they can be changed by editing the initial setting file (see Chapter 7, Initial setting of emulator and simple BAS). Opening the operation data in a spreadsheet program is shown in Figure 5.4. Different data are arranged in columns, and data of 1-min interval are arranged in rows. Please refer to Appendix 4 for the list of output data.

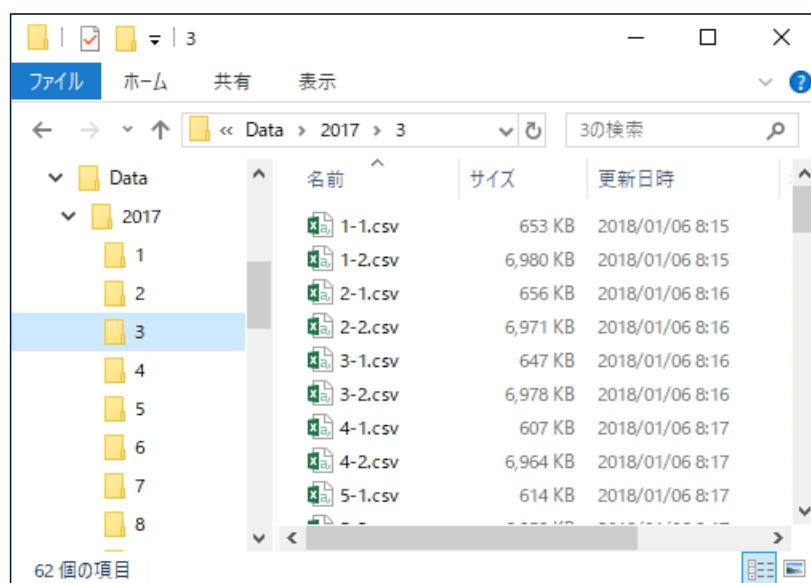


Figure 5.3 Operation data of CSV format outputted by the emulator

	A	B	C	D	E	F	G	H	I
1	Time	Outdoor air Drybulb	Outdoor air Relative	Electricity of heat sc	Electricity of heat sc	Electricity of air con	Electricity of air con	Chilled Water Supp	Chilled W
2	0:00	19.6	52	0	0	0	0	20.9	20.9
3	0:01	17.3	57	0	0	0	0	23.8	23.8
4	0:02	15.5	58	0	0	0	0	24.6	24.6
5	0:03	14	59	0	0	0	0	24.9	24.9
6	0:04	12.9	59	0	0	0	0	25	25
7	0:05	11.9	58	0	0	0	0	25	25
8	0:06	11.2	58	0	0	0	0	25	25
9	0:07	10.6	58	0	0	0	0	25	25
10	0:08	10.1	58	0	0	0	0	25	25
11	0:09	9.7	58	0	0	0	0	25	25
12	0:10	9.4	57	0	0	0	0	25	25
13	0:11	9.1	57	0	0	0	0	25	25
14	0:12	8.9	57	0	0	0	0	25	25
15	0:13	8.7	57	0	0	0	0	25	25
16	0:14	8.6	56	0	0	0	0	25	25
17	0:15	8.5	56	0	0	0	0	25	25
18	0:16	8.4	56	0	0	0	0	25	25

Figure 5.4 Example of operation data

### 5.3 Controlling emulator with simple BAS

#### 5.3.1 Execution of simple BAS and viewing operating state

Double-click "ShizukuClient.exe" to start simple BAS. The simple BAS startup screen is shown in Figure 5.5. We have not yet connected to the emulator. Therefore, the system status is not displayed on the screen. Thus, click "Connect to emulator (Figure 5.6)" tool button on the upper left corner. Make sure the emulator (Shizuku.exe) is running too. When connection with the emulator succeeds, screen begins updating with information (Figure 5.7).

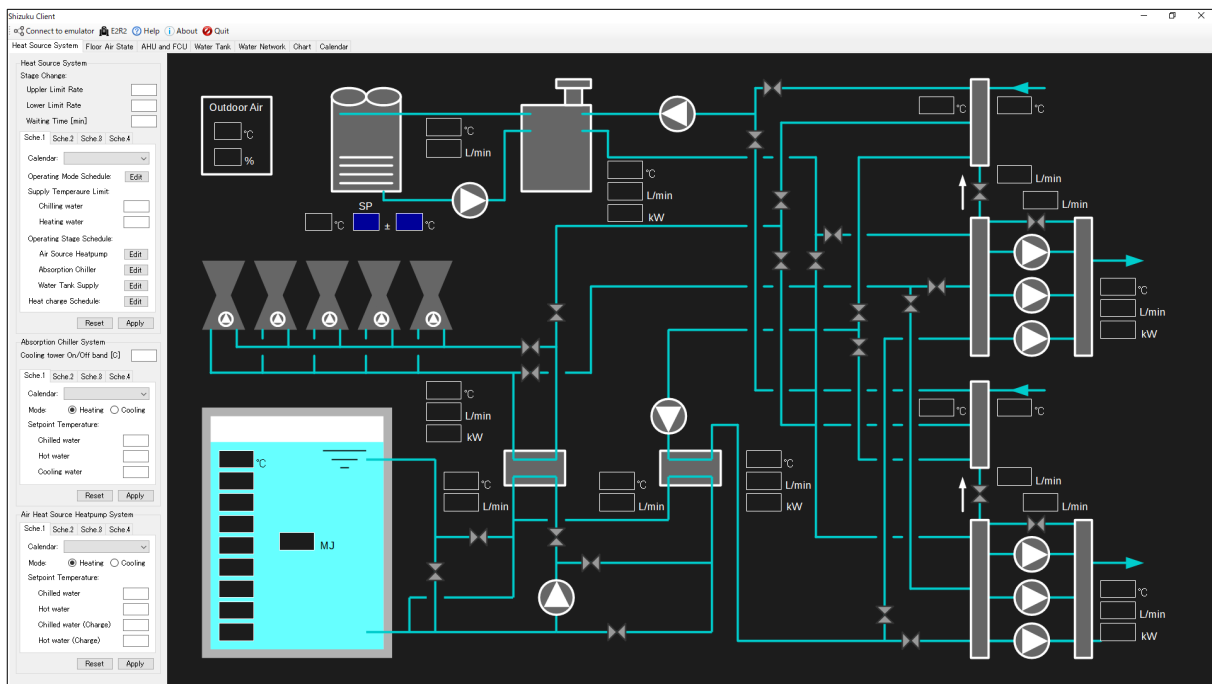


Figure 5.5 Startup screen of Simple BAS

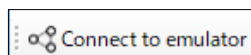


Figure 5.6 Connection button

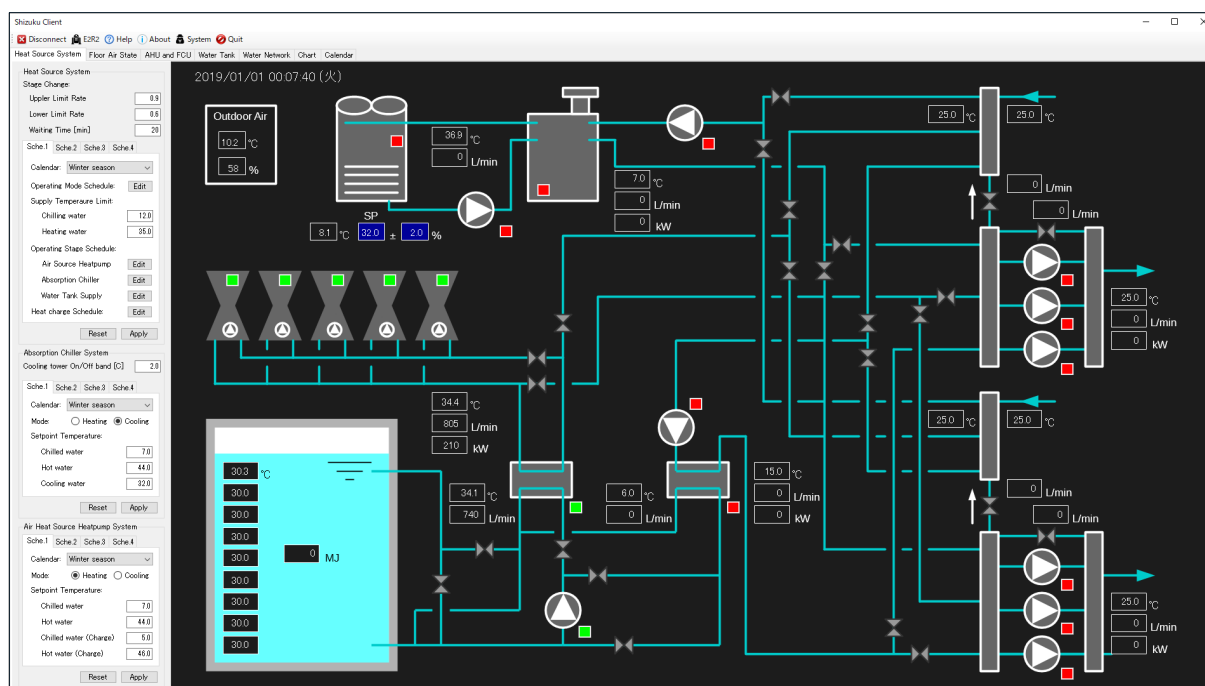


Figure 5.7 Screens after connecting to the emulator

Various information on the emulator are displayed on the simple BAS. Details of each control are explained in Chapter 6; thus, in this chapter some representative information will be given and some controls will be tried to change. After starting the simple BAS, the heat source system diagram is displayed as shown in Figure 5.7. The current date and time in the emulator are displayed on the upper left corner of the screen, and you can view the time progression (Figure 5.8). In the standard setting, the emulator starts from 0:00 on January 1, 2019, and the calculation speed is 60 times the real time. Therefore, if time has not passed since the start of the emulator, the conditions during New Year's morning should be displayed on the screen.

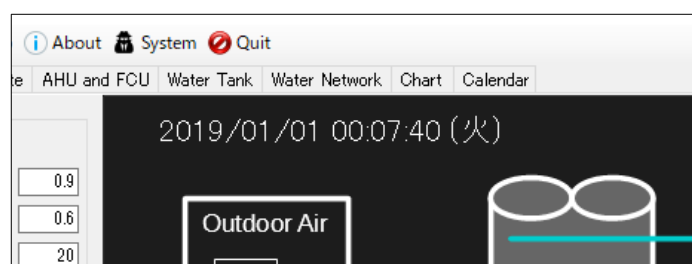


Figure 5.8 Current date and time in the emulator

The equipment in operation is colored green on the screen. As it is late-night in winter, you can see that the air heat source heat pump (AHP) is operating due to heat storage in the hot water storage tank (Fig. 5.9). In the tank, 9 thermometers are installed vertically, and hot water seeps from the top. The water temperature is 30 °C initially. In the example shown in Figure 5.9, the hot water in the tank exchanges heat with hot water of 34.4 °C,

supplied from the AHP and reaches 34.1 °C and returns to the water tank.

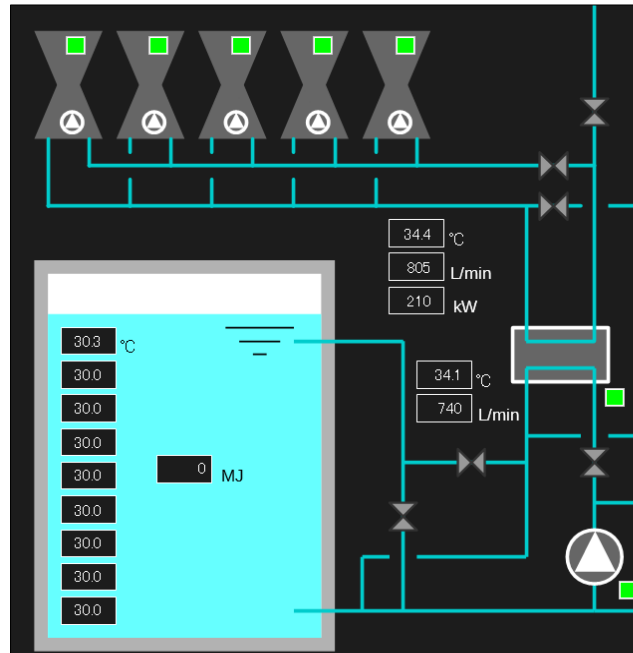


Figure 5.9 Operating state of equipment around the water tank

In the standard schedule, the heat source and air conditioner will begin the preheating operation at 8 o'clock in the morning. Let us advance time to the morning to confirm that the air conditioner starts up. You may wait, but you can also accelerate the speed of time in the emulator. Click "System" from the control button on the upper left, and the window shown in Figure 5.10 appears. This is a control to change the acceleration of the emulator, and now you can see that the acceleration rate is 60 times. When you change the track bar and click the "Apply" button, the acceleration of the emulator changes. If you check the time in the emulator shown in Figure 5.8, you can see that the progress of time has been advanced.

As time advances to 10 o'clock, the heat source system will be in the state as shown in Figure 5.11. Heat storage operation was performed, but because the temperature of water is still low, heat release from the water tank is still not performed. Instead, the AHP system is in operation. In the interior zone, there is demand for cooling throughout the year, so you can see that the absorption chiller system is performing the cooling operation.

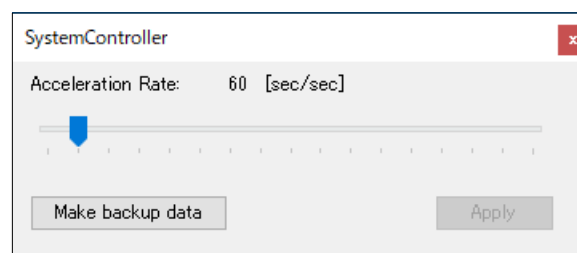


Figure 5.10 Controlling the acceleration of the emulator

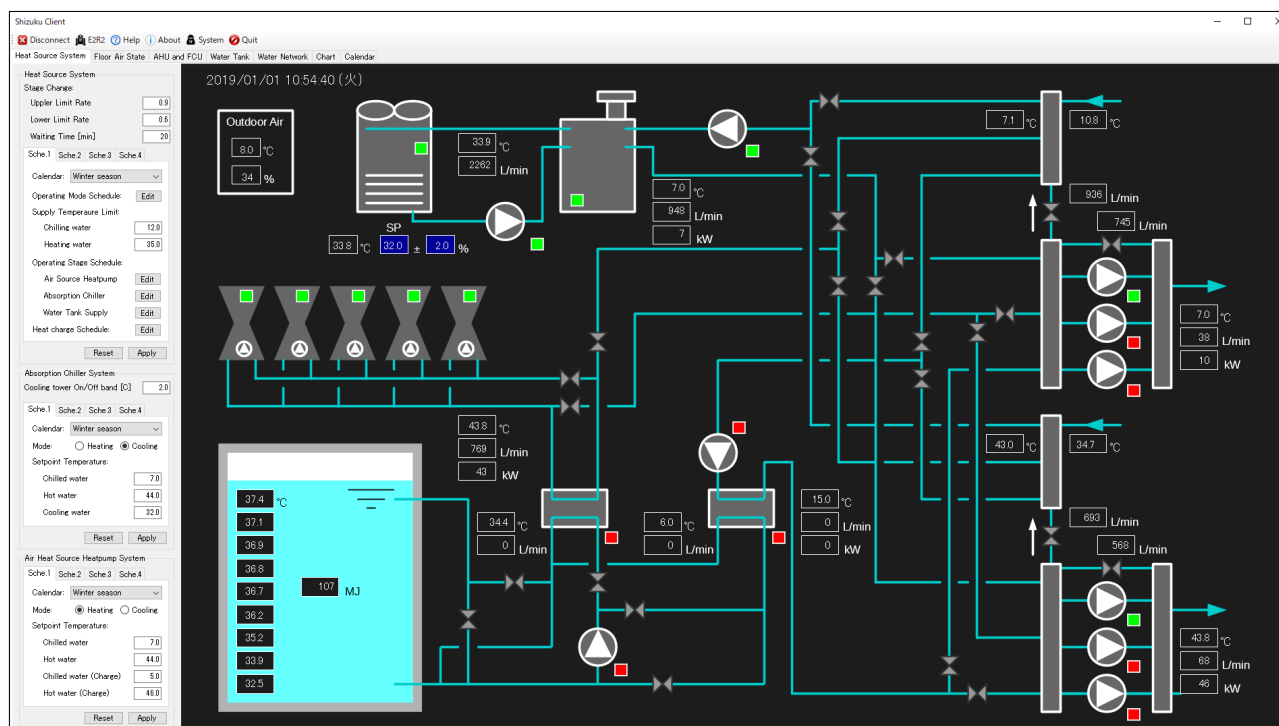


Figure 5.11 State of the heat source system during the day

The image shown in Figure 5.12 is displayed by clicking the "E2R2" button on the upper left control bar. ERR at the bottom left of the window is the energy reduction rate, DRR at the bottom right is the dissatisfied reduction rate, and the number displayed in large letters is E2R2 (see Chapter 4 for definitions). The purpose of this championship is to increase this value, but as we have not changed any control yet, "0" is displayed. In other words, the current evaluation is 0 points. In the following sections, some operational changes will be attempted to improve E2R2. Because an analysis result is present in Appendix 6, the operation will be tried to improve with reference to this.



Figure 5.12 Displaying E2R2

### 5.3.2 Optimizing outside air intake (winter)

From Figure 16 in Appendix 6, it is seen that the density of indoor CO<sub>2</sub> concentration fluctuates due to the difference in staff density based on the presence of tenants. Especially, the tenants on north and south



directions of the 7th floor are centered on the distribution values, at a considerably lower than the standard value of 1,000 ppm of the law. Even if we reduce the outside air intake a little, the reference value seems to be satisfied. As the amount of outside air intake affects air conditioner load and heat source load, energy reduction can be expected. Thus, let us try to optimize the outside air intake by adjusting the opening rate of the OA damper.

Figure 5.13 shows how to change the OA damper opening of AHU7-1. First, select the "AHU and FCU" tab to display the panel that controls air conditioners on each floor. Select the 7th floor from the Floor combo box and select AHU-7-1 from the air conditioner number combo box, and the current information of AHU-7-1 will be displayed. In "OA damper lift," the current OA damper opening is displayed, which shows that it is 1.00 (fully open). If you change this value to 0.7 and click "Apply" button, the damper opening change command is sent to the emulator.

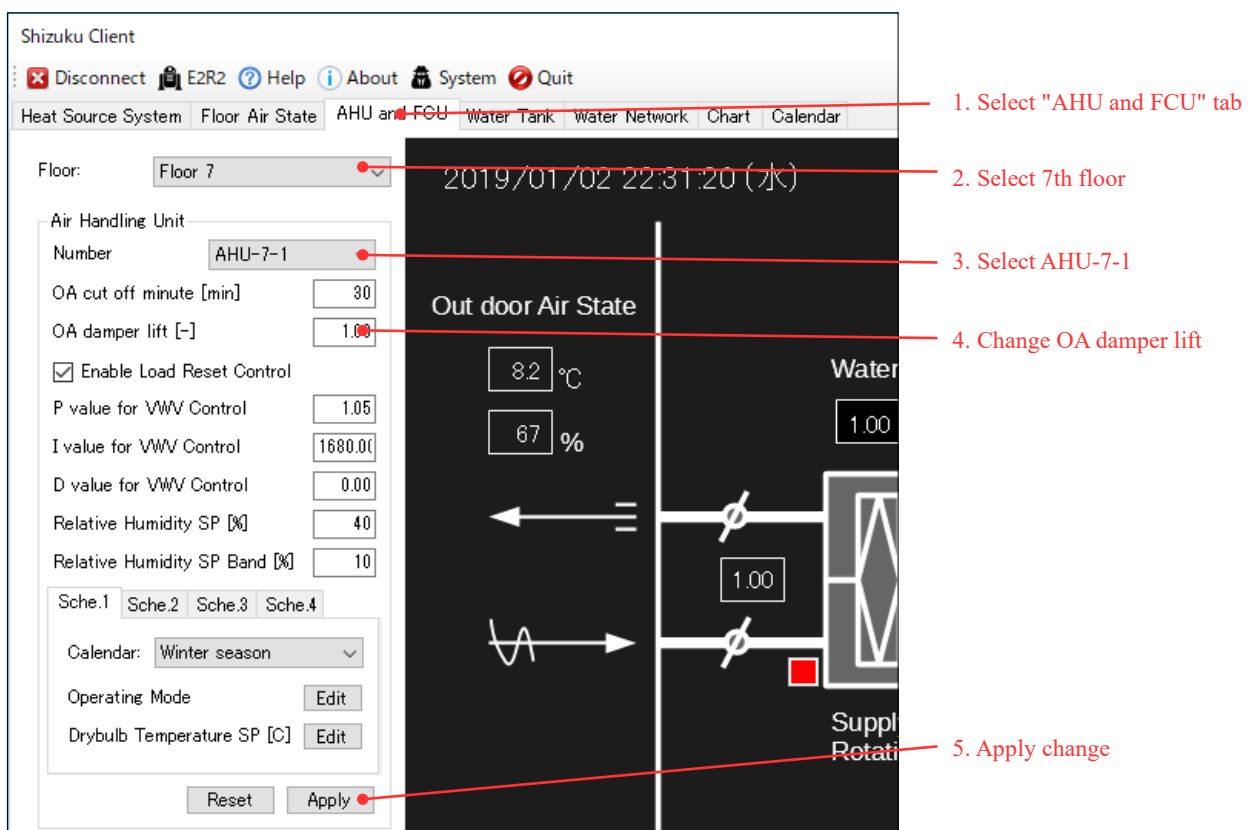


Figure 5.13 Adjusting OA damper lift

Before making similar changes for other air conditioners (AHU-7-2~4), some points need to be considered. They are, the interior zone air conditioner performs cooling operation around the year. For air conditioners that perform heating in winter, reducing the amount of outside air is effective in reducing the heat load, but for air conditioners in cooling mode, the heat load increases. This is because, the cold outside air cannot be used. For air conditioners in these cooling modes, it is preferable to take outside air sufficiently and cool with

outside air. Therefore, it is not a good idea to uniformly close the OA dampers of all air conditioners. If you close the damper of the air conditioner in the perimeter zone preferentially, heating load is reduced which is effective for energy reduction. Reading the equipment list in Appendix 2, you can see that the air conditioners for the perimeter zone are AHU-7-1 and AHU-7-3. Therefore, we will not change the opening rate of the outside air damper of the air conditioners for the interior -zone (AHU-7-2 and AHU-7-4), and lower only the opening rate of the air conditioners for the perimeter zone (AHU-7-1 and AHU-7-3) to 0.7.

Let us confirm the effect of optimizing the outside air intake in the E2R2 window (Figure 5.14). In the Figure 5.14, the ERR is 0.00124, which shows that the energy reduction rate is improved by about 0.1%. On the other hand, the DRR is rather reduced (red letter indicates a negative effect), as a result of reduction of outside air, and the number of occupants who feel dissatisfied increases slightly. As explained in Chapter 4, this championship does not take the position that it is only necessary to realize either "reduction of energy consumption" or "improvement of thermal comfort". We define "optimization" to realize both, simultaneously. Therefore, E2R2 will not be evaluated positively with this. It is also necessary to think about ways to improve the thermal environment and lower the rate of dissatisfaction.



Figure 5.14 The effect of optimizing the outside air intake

### 5.3.3 Changing the room zone temperature (winter)

Viewing the results of the questionnaire (Figure 22 of Appendix 6), it is seen that there are many people who feel hot in the afternoon during winter. The current room temperature setting is 25 °C, but there are many people who feel comfortable with a slightly lower temperature. Thus, let us change the temperature setting value of each zone to improve thermal comfort.

Figure 5.15 shows how to change the temperature setting value of the zone. First, select the "Floor Air State" tab and select 7F from the combo box of the floor selection to display the temperature and humidity status of each zone of 7th floor. The blue text box of each zone is the temperature setting value, and all zones are now uniform at 25 °C. On clicking the SP button, a sub window for changing the temperature setting of each season is displayed as shown in Figure 5.15. There are four text boxes; thus, the temperature setting of the zone can be changed for the four seasons. By default, on top is the setting for winter (the season changing method is explained in Chapter 6, section 6.8). Change this value from 25 to 24, and click Set to set it to the emulator.

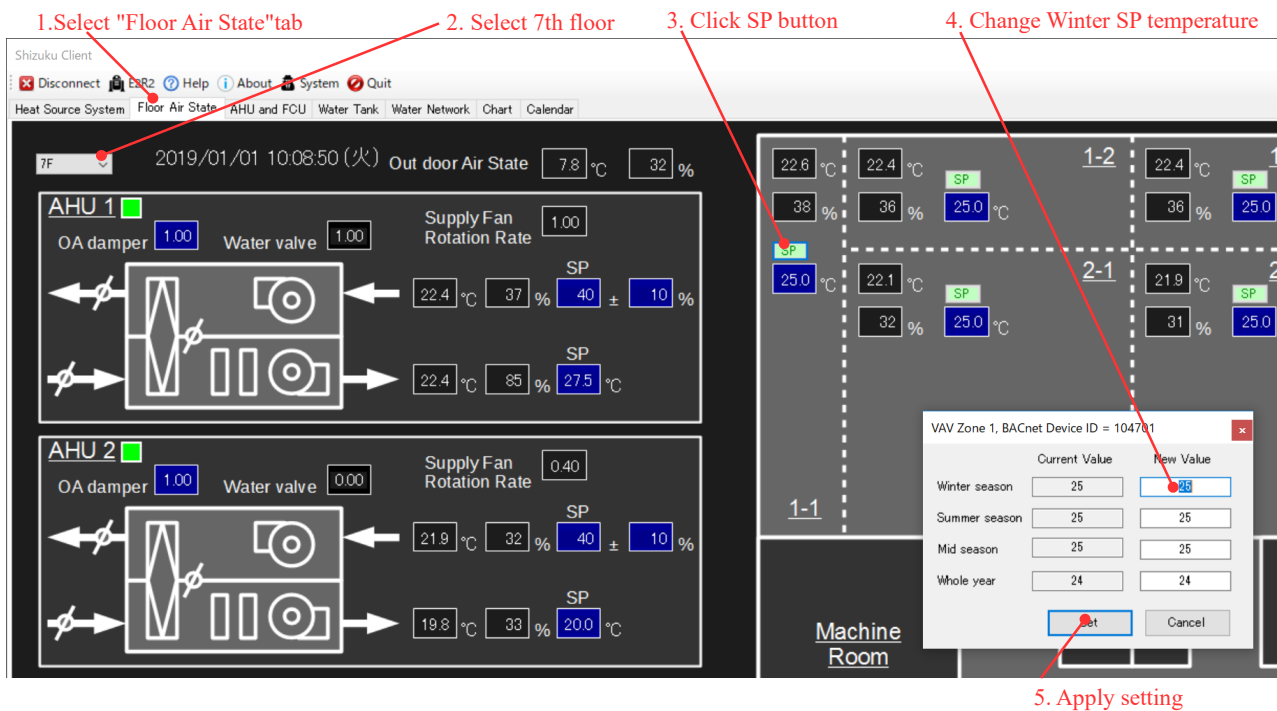


Figure 5.15 Changing the room zone temperature

Consideration is needed as to whether all zone temperatures should be changed to 24 °C. As explained already, in winter, the interior zone of the air conditioner is in the cooling mode and the perimeter zone is in the heating mode. In such operation, air conditioning of the interior and heating of the perimeter cancel each other, which tends to waste energy, called mixing loss. To avoid mixing loss, temperature setting of the cooling zone can be set to be higher than that of the heating zone. For example, if the cooling zone temperature is set at 25 °C and that of the heating zone is set at 24 °C, the air conditioner does not move while the room temperature varies between 24 to 25 °C; thus, the possibility of mixing loss is small. Therefore, the setting value of the air conditioner in the heating mode is changed to 24 °C, but that of the cooling mode is left at 25 °C.

Verify the effect of changing the temperature setting on the E2R2 window (Fig. 5.16). You can see that the rate of dissatisfaction is reduced and the value of DRR becomes positive. Furthermore, by avoiding mixing losses, energy consumption was also reduced and the ERR was further increased. Because both ERR and DRR are positive values, E2R2 also has a positive value. Participants who can maximize this E2R2 value will be champions.



Figure 5.16 The effect of changing the temperature setting

### 5.3.4 Optimization of heat source start-up time

As explained already, in the standard operation schedule of this facility, the heat source starts operating at 8 am and the air conditioner at 8:30 am. The difference of 30 min in startup time can be attributed to cold water and hot water requiring more time to reach the set temperature, depending on the heat capacity of the heat source machine and water in the piping. However, referring to Fig. 12 in Appendix 6, the supply temperature of the heat source machine reaches the set point value in about 10 min even on Mondays which have large thermal heat load. It seems that setting the current startup time is a bit too early. Therefore, by changing the startup time of the heat source from 8:00 to 8:20, the operation time is shortened, thereby reducing energy consumption. However, the detailed schedule setting in this section is quite complicated and difficult. For easy schedule setting at 1-h interval, we recommend using Excel sheet described in section 5.4.

Figure 5.17 shows the procedure for changing the startup time of the heat source. Open the "Heat Source System" tab for setting the operation of the heat source system and open the "Sche.1" tab for changing the winter schedule. The schedule setting window opens on clicking the Edit button, and the operation mode by time of each day is displayed. You can see that it is set to stop (No. 0) at 0:00, operate (No. 3) at 8:00, and stop (No. 0) at 19:00 on a Monday to Friday schedule by time. The correspondence between numbers and operation modes is explained in Table 6.1 in section 6.2. By changing 8:00 to 8:20 and clicking the "Update" button, the change in startup time will be reflected in the emulator. With this, energy can be reduced by around 1% between 8:00 and 8:20 as unnecessary operation is avoided.

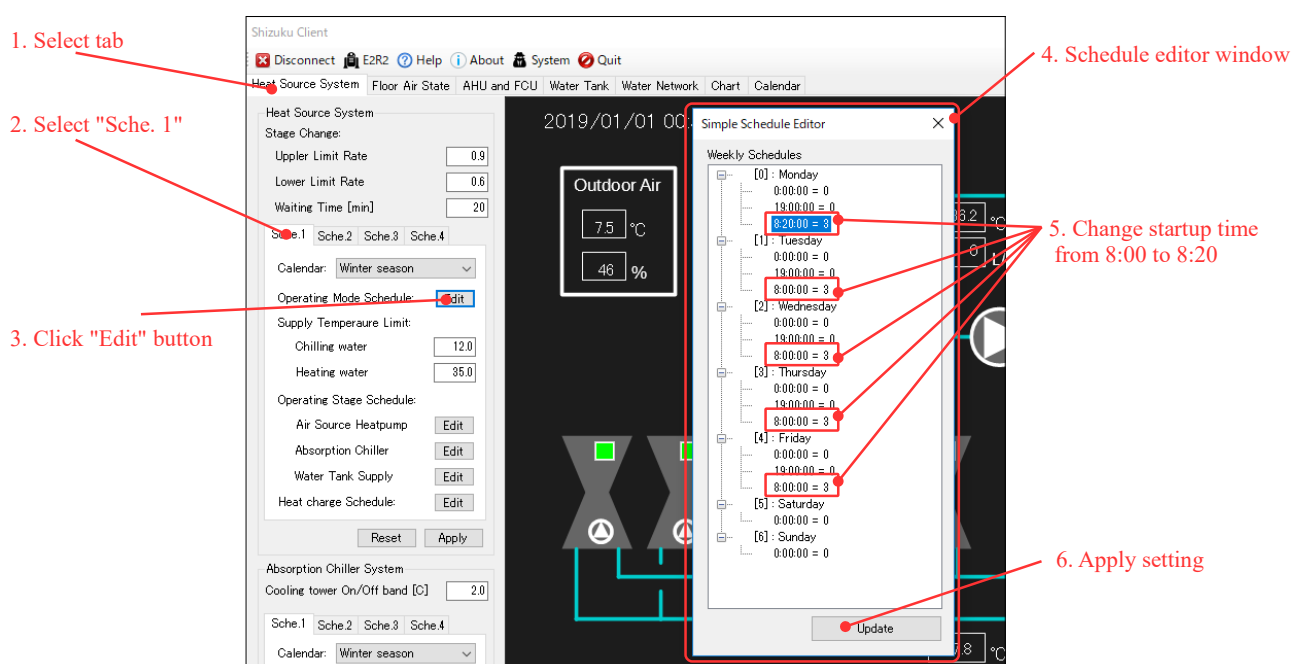


Figure 5.17 The procedure for changing the startup time of the heat source

### 5.3.5 Optimization of the temperature setpoint of absorption chiller

This facility supplies cold water with absorption chiller system to cool the interior zone during winter. In the default setting, the set temperature of cold water and cooling water are constant throughout the year, at 7 °C and 32 °C. However, as the outside air temperature in winter is low and there is no great demand for cold water, energy consumption can possibly be reduced by changing these temperature settings.

By checking the average outside air condition for each month in Figure 13 of Appendix 6, it is seen that the wet-bulb temperature in winter (December - March) is lower than 6 °CWB (Wetbulb temperature). In addition, viewing the equipment characteristics of the cooling tower in Appendix 2, it is seen that if the wet-bulb temperature is 8 °CWB, cooling tower fan power hardly increases even if cooling water set point temperature is changed to 20 °C. From the equipment characteristics of absorption chiller, it is clear if the cooling water temperature is lowered from 32 °C to 20°C, the primary COP of the refrigerator can be improved by about 0.3. In addition, by comparing the equipment characteristics by cold water supply temperature, it is seen that the primary Coefficient of Performance (COP) further increases by increasing the cold water temperature. An increase in the default cold water set point temperature from 7°C to 10°C, the primary COP is improved by 0.1. No dehumidification is necessary in winter; thus, cold water at 7 °C is not required. Thus, let us try to reduce energy consumption by changing these temperature settings.

Figure 5.18 shows the procedure to change the water set point temperature. Open the tab for setting the operation of the heat source system and open the schedule tab for winter. Change chilled water setting temperature from 7 °C to 10 °C and change cooling water setting temperature from 32 °C to 20 °C. Click Apply to update the setting value in the emulator. The energy consumption decreased by approximately by 5%.

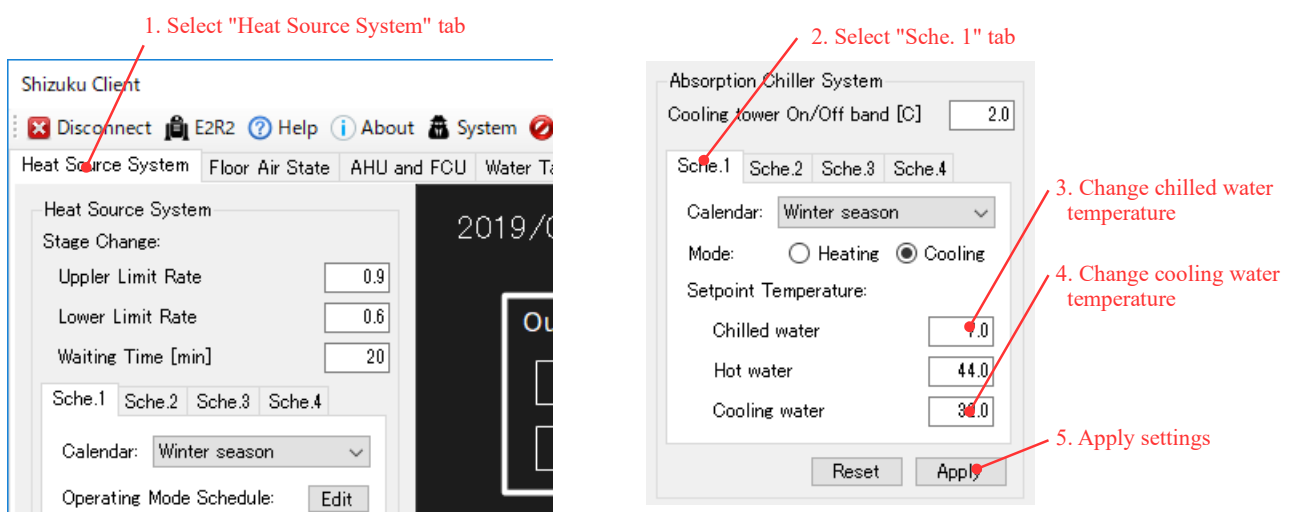


Figure 5.18 Procedure to change water set point temperature

### 5.3.6 Optimization of operation of air conditioner in summer

The example mentioned in the previous section addressed operation improvement in winter. In this section, examples for summer are shown. By default, the emulator starts calculation from January 1, 2019; thus, it is necessary to forward the time to summer. Let's change the simulation start date of the emulator, as an appropriate calculation time is required even at the maximum speed to perform half a year's simulation. Shutdown the emulator (Shizuku.exe) and simple BAS (ShizukuClient.exe), and edit the "setting.ini" file in the "initFiles" directory as shown in Figure 5.19. "Setting.ini" file is explained in Chapter 7. Calculation will begin from 0 o'clock on August 5, 2019, if you restart the emulator.

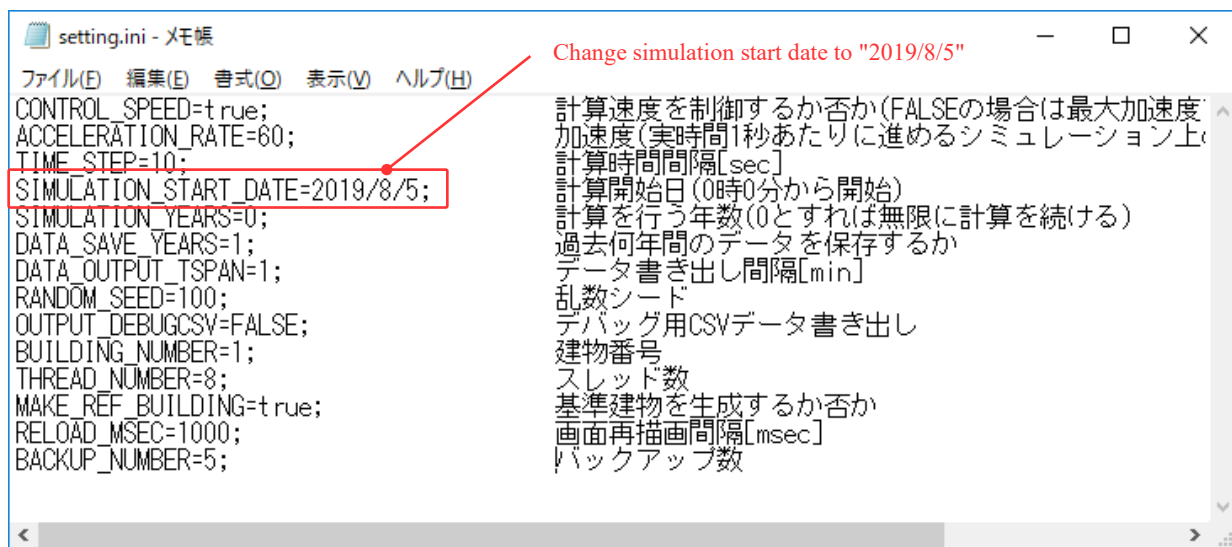


Figure 5.19 Changing emulator calculation start date (initFiles/setting.ini)

As seen from Figure 21 of Appendix 6, many occupants feel that both the interior and the perimeter zone are hot both in the morning and afternoon during summer, which necessitates lowering the room set point temperature. Thus, change the set point temperature from 25 °C to 24 °C by the method shown in section 5.3.3. Please note that the value of the second text box (Summer season) should be changed. All floor settings should be changed, but the result of changing only the 7th floor setting is evaluated in this section.

As time progresses to noon, the DRR will increase because the rate of dissatisfaction decreases as the room becomes cool. However, due to the increased cold water demand, energy increases and ERR declines (Figure 5.20). Therefore, we need to consider new ways to reduce the surge in energy consumption.



Figure 5.20 E2R2 window

First, change the opening rate of the OA damper by the method in section 5.3.2, and reduce the amount of outside air intake. This can reduce the OA heat load. According to Appendix 6, Figure 17, the tenant on the 7th floor is indoors at 18:00, and at 20:00 fresh CO<sub>2</sub> concentration is witnessed. By default, it is scheduled to stop cooling at 20:00 and stop the ventilation at 22:00, but it seems that the operating time is too long from the actual status of the office worker remaining in the room. Thus, change the schedule to stop air cooling at 19:00 stop ventilation at 20:00. Figure 5.21 shows the procedure to change the schedule. This change in operation will slightly reduce energy consumption after 19:00, but ERR is still negative, and further improvement is required.

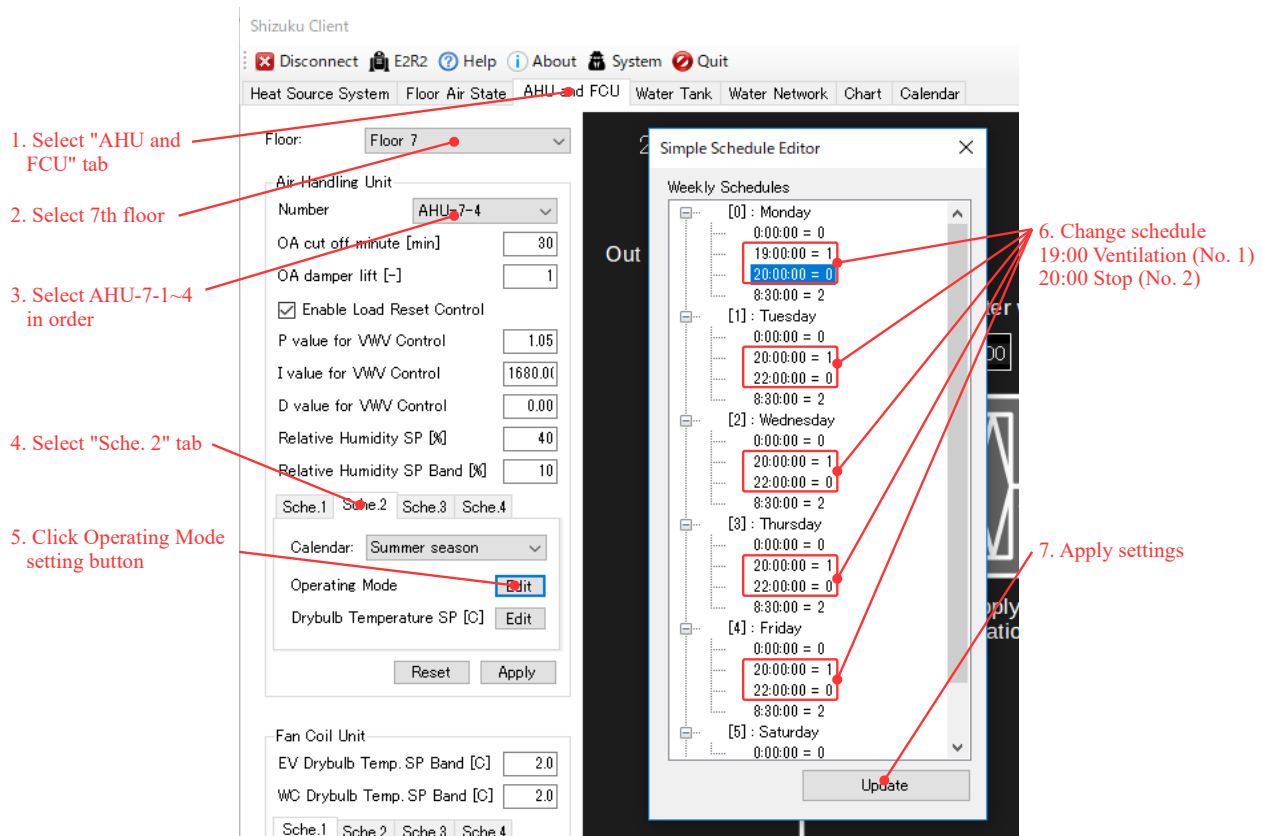


Figure 5.21 Changing the AHU Schedule

### 5.3.7 Changing heat source operation order

By default, the heat source operation order is "No. 1: Heat release from water tank, No. 2: Absorption chiller, No. 3: Air heat source heat pump". However, looking at the equipment list in Appendix 2, you can see that in the primary energy COP, the air heat source heat pump is in higher order than the absorption chiller. Thus, change the order of operation. Figure 5.22 shows the method of changing the order of operation. Because the schedule of operation order is updated every day at 0:00, the effect reflects the next day after the change in schedule.

By preferentially starting air heat source heat pump with high primary energy efficiency, the ERR will also be positive in summer and E2R2 will start to be evaluated positively.

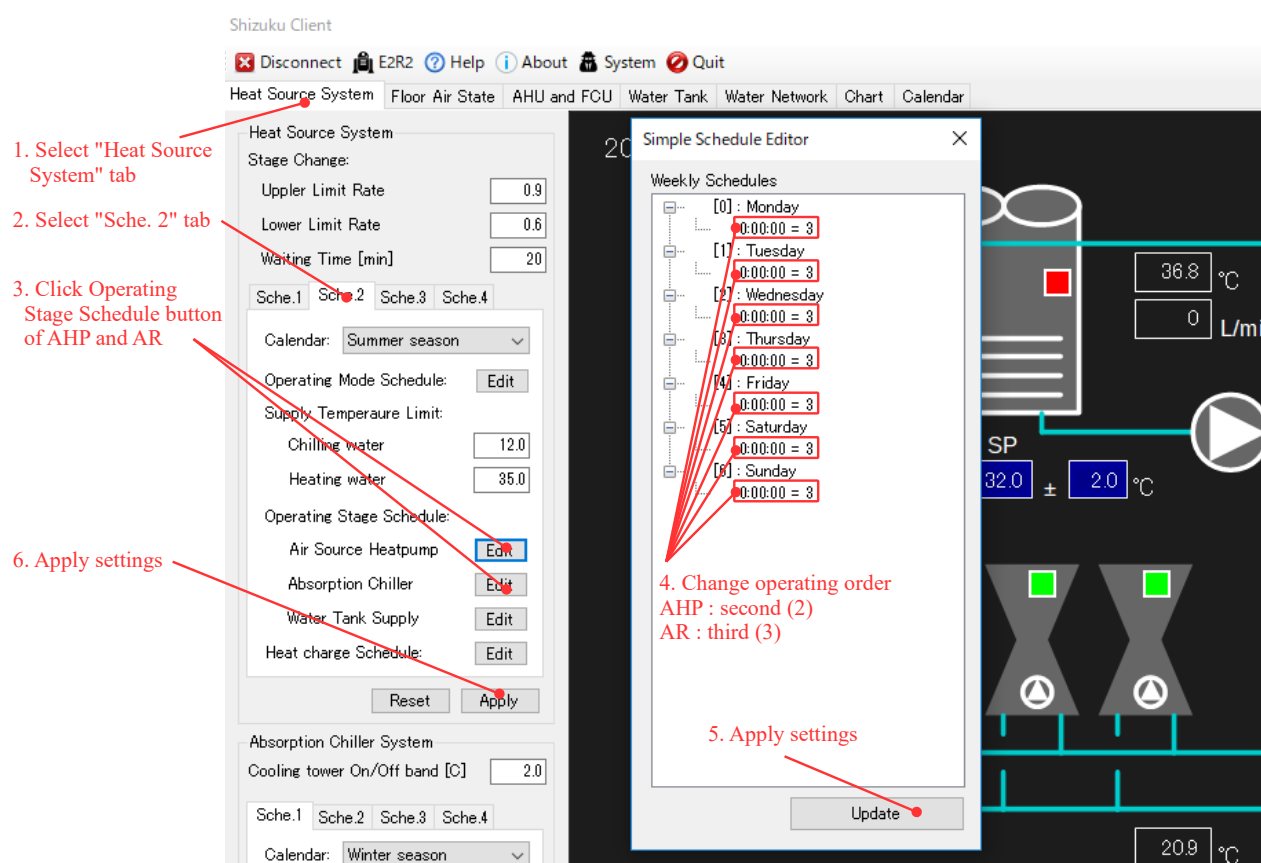


Figure 5.22 Changing heat source operation order

### 5.3.8 Result of optimization

Figure 5.23 shows the trend of primary energy consumption, dissatisfaction rate, ERR, DRR, and E2R2, with all the operational improvements described above. Because both primary energy and dissatisfaction rate decreased over the year, E2R2 has a positive value.



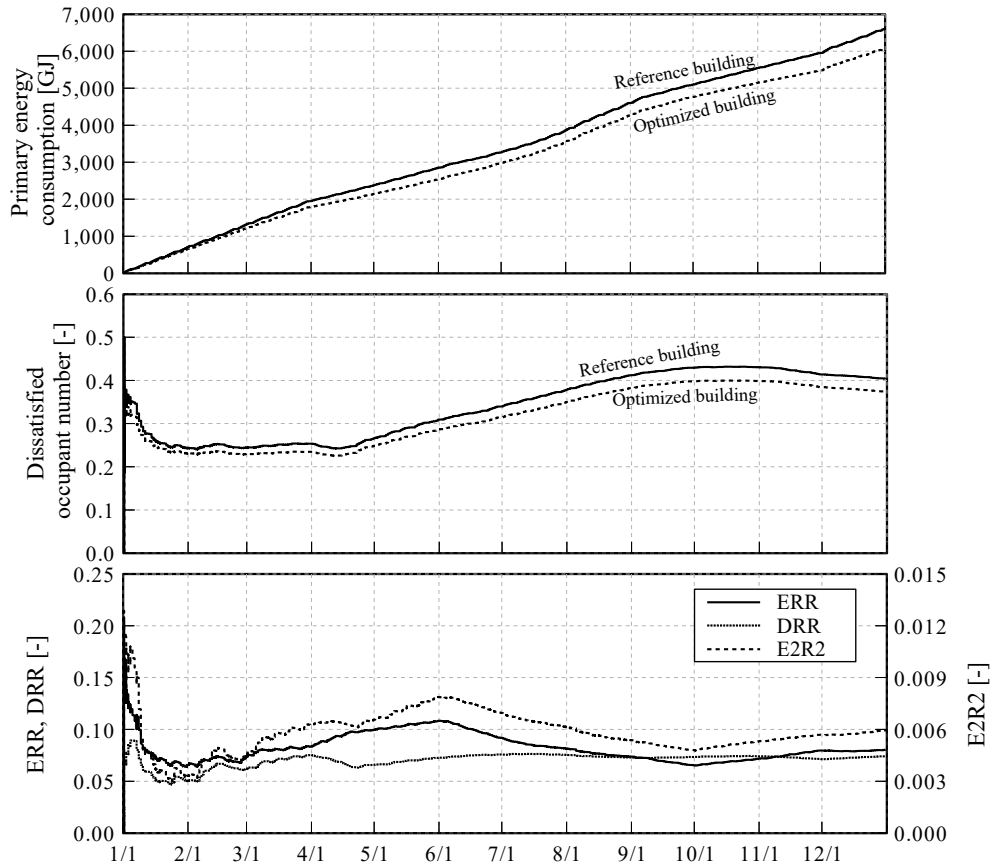


Figure 5.23 The trend of primary energy consumption, dissatisfaction rate, ERR, DRR, E2R2

### 5.3.9 Export and upload of "controller file"

Because some operational change plans have been arrived at, based on the evaluations till previous section, let us now calculate the grade by uploading this control strategy to the server. To do this, the current control strategy needs to be exported to a file. Click "System" in the upper left corner of control bar to display the window for saving (Figure 5.24), and click "Make backup data". A message of save processing is displayed on the console screen of the emulator (Figure 5.25), and a file named "controller.bin" is generated in the "Shizuku / Backup" directory. The control file (controller.bin) is automatically saved at 0:00 every day without performing the above processing, and the data of the past 5 days is also saved.

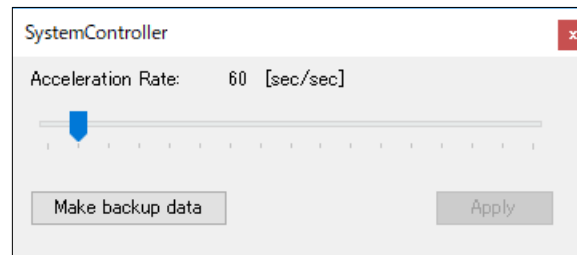


Figure 5.24 System controller window

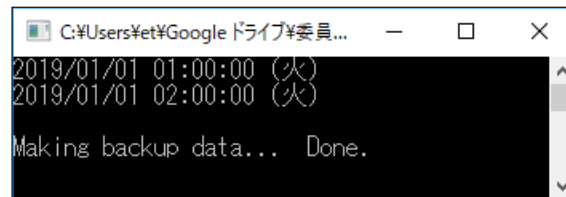


Figure 5.25 Saving process in console window

Upload the control data (controller.bin) to the server. In this championship, a server is assigned for each participant, and you can easily access your server from a web browser (Figure 5.26). The address of the server is "http://xxx.xxx.xxx.xxx/~shizuku". "xxx.xxx.xxx.xxx" is the IP address assigned to each participant which will be notified at the start of the championship.

First process is uploading of control data. When uploading "controller.bin" which was exported above, calculation starts on the server side. A password is required for uploading, and this password will be distributed at the beginning of the championship. The calculation on the server is completed in about one day in real time. Because the current date and time of the emulator is displayed, you can check the progress of calculation. Additionally, even if you are in the middle of simulation, if you upload a new control file (controller.bin), calculation will be interrupted and a new calculation will be started. In this case, the calculation results that were obtained halfway will be discarded.

The second process is the generation of a graph for checking the calculation result. Select the desired date to check the calculation result from the calendar and select the desired operation data to display, and the trend of the 24-h value will be graphed.

The third area is a list of results of calculation in the past. The date and time of calculation, ERR, DRR, and E2R2 are displayed and you can download the control file (controller.bin). The best results on this list will be posted in the score rankings. The score-based ranking is displayed on the top page of the WCCBO web site (<http://www.wccbo.org>), and you can always check your current ranking.

The fourth process is downloading the file necessary for remote control for real time tuning, whose

details are explained in Chapter 8 (Remote control sample using BACnet).

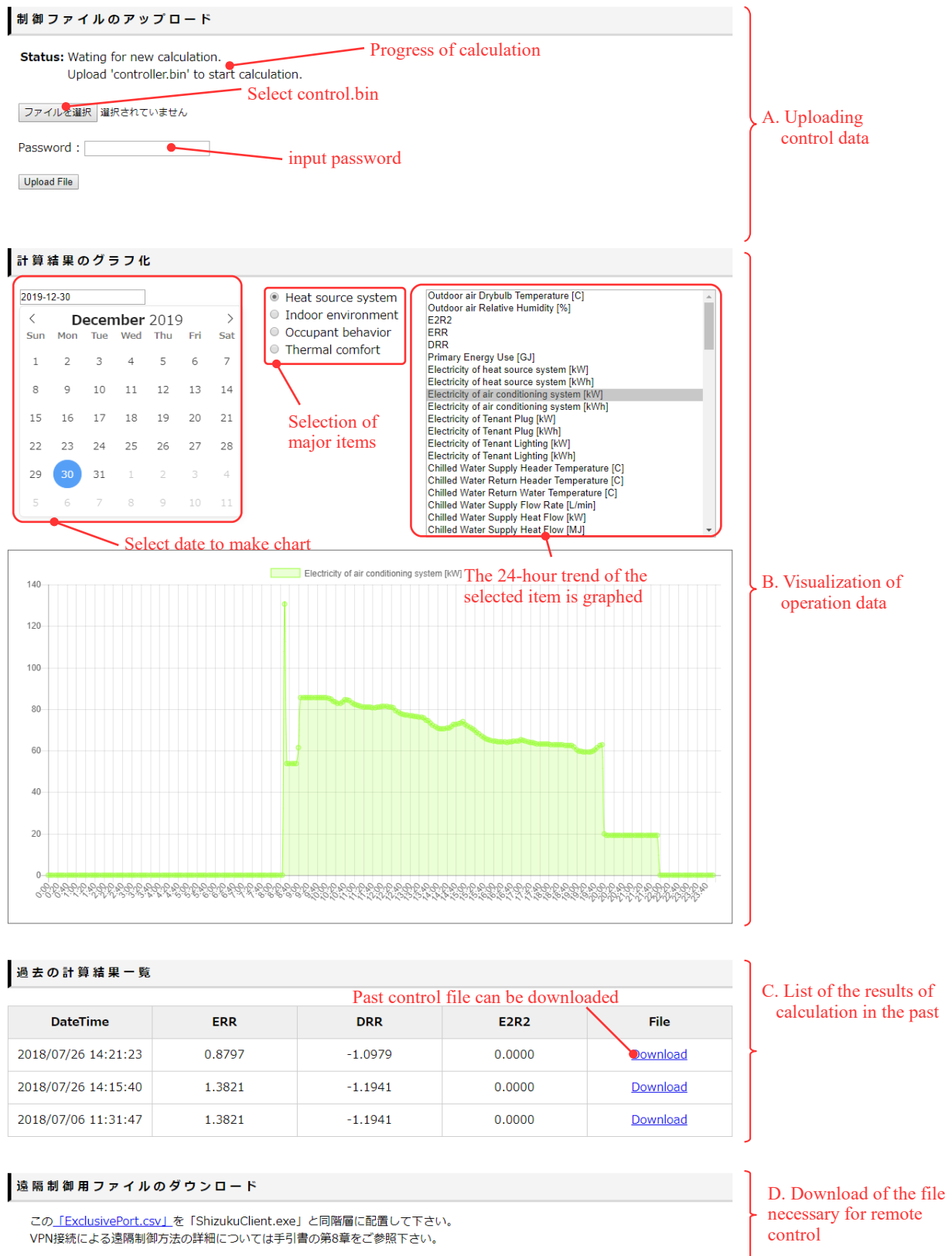


Figure 5.26 Managing emulator server with browser

## 5.4 Controlling the emulator from Excel sheet

Because the simple BAS described in Section 5.3 has a graphical interface, it is easy to understand, however, requiring time and effort to learn changing many control parameters. For example, in order to change the temperature setting of all zones of a building, the work in section 5.3 has to be repeated for more than 100 zones. The easiest way to simplify such task is to create your own BACnet communication program and make parameter changes automatically, as described in Chapter 8. However, it is difficult for many who are not familiar with program development. Therefore, an Excel file has been prepared, that allows you to change parameters and schedule all at once.

### 1) Batch change of parameters

Open "ExcelInterface.xlsm" in the same directory as the emulator and display the sheet "PresentValueWriter" (Figure 5.27). The emulator supports BACnet communication. In general, BACnet uses two values "Device ID" and "Instance Number" to manage information, whose values are represented in columns A and B. For example, Device ID "104701" represents the controller of AHU-7-1. Instance Number "20" represents the set point temperature of Zone 1 (Season 1). Thus, the second line of the sheet shown in Figure 5.27 shows the set point temperature of zone 1 of AHU-7-1 during winter. The number and type of information managed by the emulator is described in the BACnet Device List in Appendix 5. There is also a list on the "DeviceList" sheet of the Excel file shown in Figure 5.27).

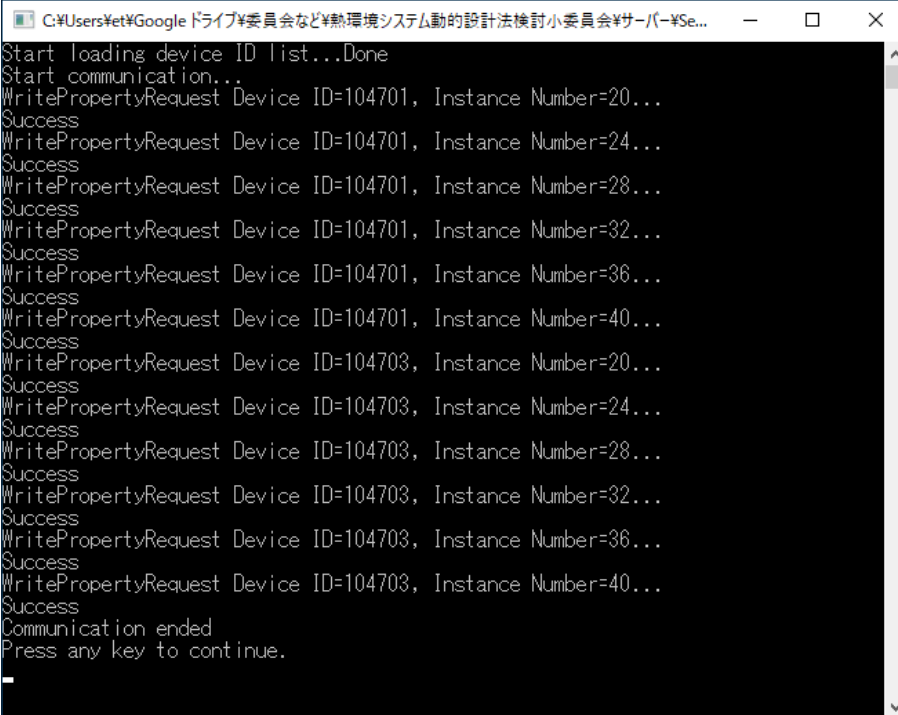
	A	B	C	D
	Device ID	Instance Number	Data Type	Present Value
2	104701	20	OBJECT_ANALOG_OUTPUT	24
3	104701	24	OBJECT_ANALOG_OUTPUT	24
4	104701	28	OBJECT_ANALOG_OUTPUT	24
5	104701	32	OBJECT_ANALOG_OUTPUT	24
6	104701	36	OBJECT_ANALOG_OUTPUT	24
7	104701	40	OBJECT_ANALOG_OUTPUT	24
8	104703	20	OBJECT_ANALOG_OUTPUT	24
9	104703	24	OBJECT_ANALOG_OUTPUT	24
10	104703	28	OBJECT_ANALOG_OUTPUT	24
11	104703	32	OBJECT_ANALOG_OUTPUT	24
12	104703	36	OBJECT_ANALOG_OUTPUT	24
13	104703	40	OBJECT_ANALOG_OUTPUT	24
14				
15				

Figure 5.27 "PresentValueWriter" sheet in "ExcelInterface.xlsm" file

The information managed by the emulator has various formats such as analog numbers, binary, date,

schedule, and character strings. "Data Type" in column C in Figure 5.27 shows such information. In this Excel sheet, you can control either "OBJECT\_ANALOG\_OUTPUT" representing integer or real number, or "OBJECT\_BINARY\_OUTPUT" representing binary value of True / False.

Figure 5.27 shows an example of changing the set point temperature of the 7th floor perimeter zone during winter. This example changes the set point temperature of all zones to 24 °C. Finally, clicking "Send Write Property Request" will communicate with the emulator using the external program (Figure 5.28). As shown in Figure 5.28, data is sent to the emulator based on the information written in each line of the Excel file. Please do not forget to enable Excel macros.



```

C:\Users\et\Google ドライブ\委員会など\熱環境システム動的設計法検討小委員会\サ-バ-¥Se...
Start loading device ID list...Done
Start communication...
WritePropertyRequest Device ID=104701, Instance Number=20...
Success
WritePropertyRequest Device ID=104701, Instance Number=24...
Success
WritePropertyRequest Device ID=104701, Instance Number=28...
Success
WritePropertyRequest Device ID=104701, Instance Number=32...
Success
WritePropertyRequest Device ID=104701, Instance Number=36...
Success
WritePropertyRequest Device ID=104701, Instance Number=40...
Success
WritePropertyRequest Device ID=104703, Instance Number=20...
Success
WritePropertyRequest Device ID=104703, Instance Number=24...
Success
WritePropertyRequest Device ID=104703, Instance Number=28...
Success
WritePropertyRequest Device ID=104703, Instance Number=32...
Success
WritePropertyRequest Device ID=104703, Instance Number=36...
Success
WritePropertyRequest Device ID=104703, Instance Number=40...
Success
Communication ended
Press any key to continue.

```

Figure 5.28 External program for BACnet communication

The BACnet device must have a unique ID in the range of 0 to 419403. In this emulator, the ID is given by the rule shown in Figure 5.29. The upper two digits (A, B) are the building number. In this championship, only 1 building is subject to calculation and a fixed value of "01" is used. The third and fourth digits (C, D) are allocated according to the type of controller as given below.

00: Special instrument (outside temperature, humidity, solar radiation)

01: Heat source controller (start / stop of heat source, schedule management)

02: Water tank controller (heat storage and release schedule, temperature control)

03: Pump controller (rotation speed control, operation stage)

04: AHU controller (cold and hot water valve control, fan rotation speed control, VAV control)

05: FCU controller (ON / OFF control set point temperature, operation mode)

06: Blind controller (pulled down or not, slat angle)

07: Office worker (clo value, thermal sensation, presence / absence)

99: Other general purpose devices (simulation speed, saving data)

The lower 3 digits (E, F, G) are allocated according to the number of controllers. In this emulator, the third digit is the floor number, and the first and second digits are the equipment number. For example, for fourth controller on the second floor, is the equipment number is 204. Thus, the device ID for controller of AHU-2-4 becomes "104204".

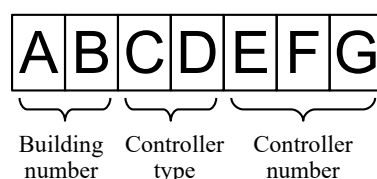


Figure 5.29 Rules of setting BACnet device ID

## 2) Setting schedule

While the schedule setting method described in Section 5.3.4 allows detailed settings per minute, the task is very complicated. If you set schedule by hours, the task is much easier if you use the Excel sheet shown this section. By opening "Calendar" sheet and clicking "Load Calendar Names" button, the list of calendar names will be loaded from the emulator you are running.

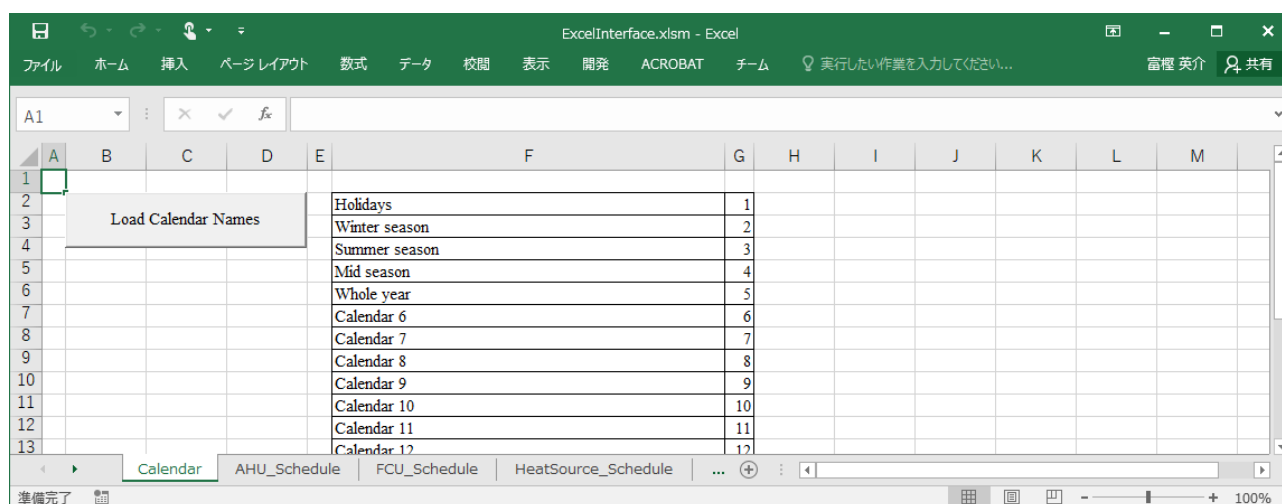


Figure 5.30 Loading calendar names

An example of AHU schedule setting will be explained later. Figure 5.31 shows the "AHU\_Schedule" sheet. As shown in figure, editable cells are colored in this Excel sheet. In the "Apply" column, decide the AHU for setting the schedule based on True or False. In this example, the schedule of AHU-2-3 and AHU-2-4 are

discussed.

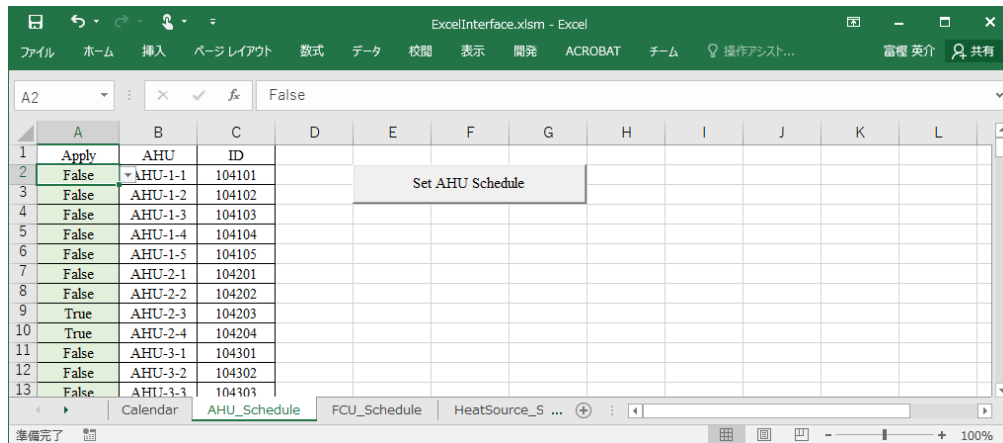


Figure 5.31 Deciding the AHU for setting the schedule

Figure 5.32 is below the seat. The information set as the AHU schedule are, operation modes (Heating, Cooling, Ventilation, Shutoff) and setpoint temperature at each time for each season. A total of four schedules can be setup. In the example in Figure 5.32, we set the calendar "Winter season" to be the first schedule. The operation mode is, heating operation from 08:00 - 20:00 on weekdays, ventilation from 20:00 - 22:00, and the other is shutoff. The supply air setpoint temperature is constant at 28.5 °C.

		Operating mode							Setpoint Temperature						
		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
0:00	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
1:00	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
2:00	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
3:00	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
4:00	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
5:00	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
6:00	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
7:00	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
8:00	Shutoff	Heating	Heating	Heating	Heating	Heating	Heating	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
9:00	Shutoff	Heating	Heating	Heating	Heating	Heating	Heating	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
10:00	Shutoff	Heating	Heating	Heating	Heating	Heating	Heating	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
11:00	Shutoff	Heating	Heating	Heating	Heating	Heating	Heating	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
12:00	Shutoff	Heating	Heating	Heating	Heating	Heating	Heating	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
13:00	Shutoff	Heating	Heating	Heating	Heating	Heating	Heating	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
14:00	Shutoff	Heating	Heating	Heating	Heating	Heating	Heating	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
15:00	Shutoff	Heating	Heating	Heating	Heating	Heating	Heating	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
16:00	Shutoff	Heating	Heating	Heating	Heating	Heating	Heating	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
17:00	Shutoff	Heating	Heating	Heating	Heating	Heating	Heating	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
18:00	Shutoff	Heating	Heating	Heating	Heating	Heating	Heating	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
19:00	Shutoff	Heating	Heating	Heating	Heating	Heating	Heating	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
20:00	Shutoff	Ventilation	Ventilation	Ventilation	Ventilation	Ventilation	Ventilation	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
21:00	Shutoff	Ventilation	Ventilation	Ventilation	Ventilation	Ventilation	Ventilation	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
22:00	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5
23:00	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	Shutoff	28.5	28.5	28.5	28.5	28.5	28.5	28.5

Figure 5.32 Setting hourly AHU schedule

You can edit the cells of the colored part, and easily organize your schedule. After editing the schedule, click "Set AHU Schedule" button in Figure 5.31, and an external program will start and perform communication with the emulator. As shown in Figure 5.33, when the communication is successful, the word "Success" is displayed. In this Excel sheet, in addition to AHU, it is possible to set the schedule of FCU (operation mode), heat source system (operation mode, operating order, heat storage time), and secondary pump system (start / stop).

```
C:\Users\Yetoga\Desktop\ServerAndClient\ExcelCommunic...
Setting AHU-2-3... Success
Setting AHU-2-4... Success

Set Calendar Number of Schedule 3
Setting AHU-2-3... Success
Setting AHU-2-4... Success

Setting Operating Mode Schedule 3
Setting AHU-2-3... Success
Setting AHU-2-4... Success

Setting Setpoint Temperature Schedule 3
Setting AHU-2-3... Success
Setting AHU-2-4... Success

Set Calendar Number of Schedule 4
Setting AHU-2-3... Success
Setting AHU-2-4... Success

Setting Operating Mode Schedule 4
Setting AHU-2-3... Success
Setting AHU-2-4... Success

Setting Setpoint Temperature Schedule 4
Setting AHU-2-3... Success
Setting AHU-2-4... Success

Communication end
Press any key to continue.
```

Figure 5.33 Console output of batch schedule setting



## 6. Simple BAS operation manual

### 6.1 Structure of software

Simple BAS starts by double clicking "ShizukuClient.exe". The startup screen is shown in Figure 6.1. Monitor resolution requires  $1920 \times 1080$  or higher. Before connecting to the emulator, default information is displayed as shown in figure 6.1.

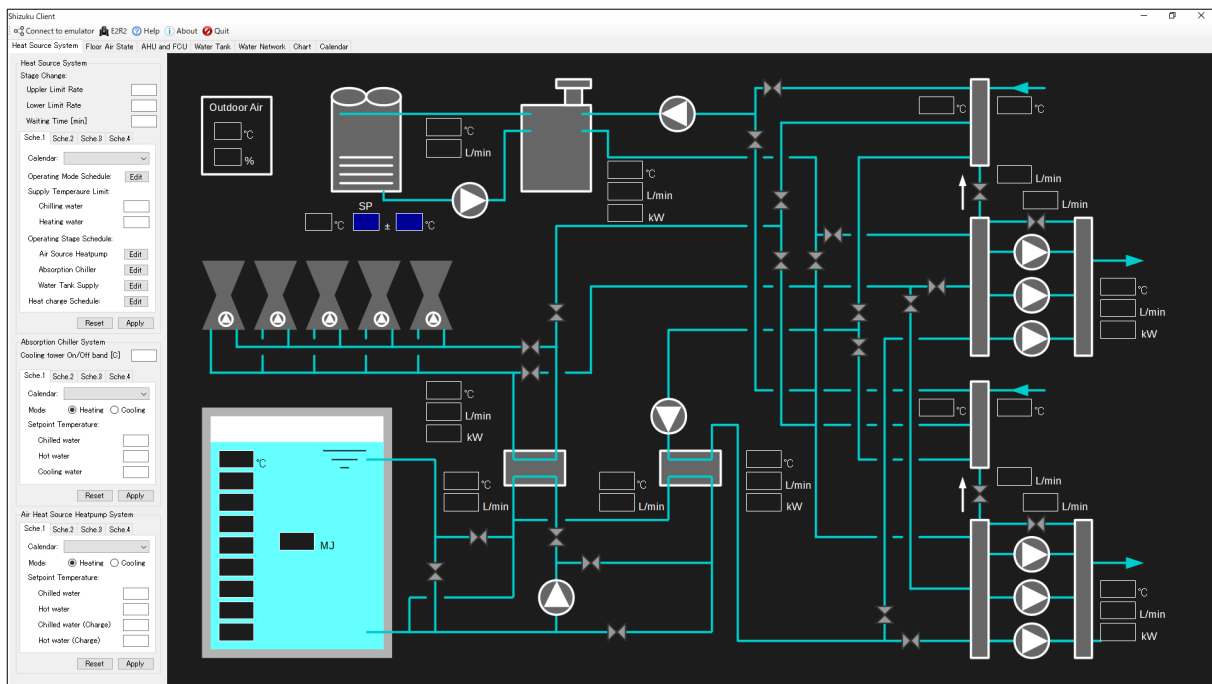


Figure 6.1 Startup screen

There are control buttons on the upper left corner of the window, and the operation related to the whole system can be performed with these buttons. A tab is displayed just below it, which is switches according to the system to be operated. By default, "Heat Source System" tab is selected.

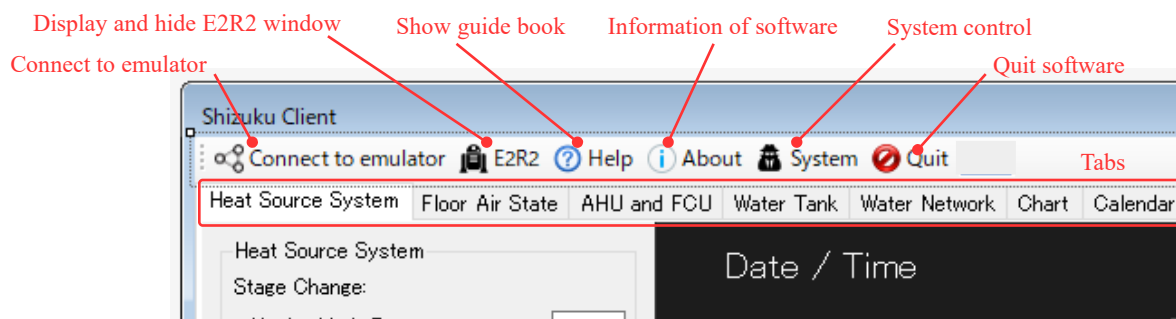


Figure 6.2 Control buttons and tabs

The function of the control buttons are as follows.

1) "Connect to emulator" button

This is a button for connecting to the emulator. In order to connect, it is necessary for the emulator to be running on the local PC or server, and if the emulator cannot be found, an error window will be displayed as shown in Figure 6.3. If the connection is successful, Simple BAS will automatically receive data from the emulator and start redrawing the screen. The data reception interval is 1 s in real time (it can be changed with the initial setting file).

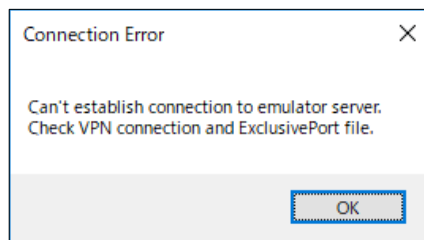


Figure 6.3 Error message when simple BAS can't find emulator system

2) "E2R2" button

A floating window showing the emulator's current E2R2 (Effective Energy Reduction Rate) value is displayed. This window is displayed in the foreground, and it switches between display and non-display each time the button is clicked.

The ERR (Energy Reduction Rate) is shown on the lower left corner, the DRR (Dissatisfied Occupant Reduction Rate) is shown on the bottom right corner, and E2R2 which is the product of both is shown at the top. In this championship, maximizing E2R2 is defined as "optimization" (explained in Chapter 4). The unit of E2R2 is the basis point, which is a value with 0.0001 as 1.



Figure 6.4 Floating window showing E2R2

3) "Help" button

PDF data of this guide book is displayed.

4) "About" button

A description of the simplified BAS software is displayed.

5) "System" button

Clicking this will display the window shown in Figure 6.5 and you can change the simulation speed of the emulator. In this example the acceleration rate is 60 and the emulator works at the rate of 60 s per real second. However, this acceleration depends on the performance of the PC running the emulator. For computers with Intel core i7 6500 U (2.5 GHz, 2 cores, 4 threads) an acceleration of 1,000 times the real time was possible. In actual championship, we will operate at 12 times the real time and slowly calculate the data for one year, over a month.

#### 6) “Quit” button

Quit simple BAS software



Figure 6.5 System Controller window

Simple BAS has seven tabs as shown below. Each will be explained in the following sections.

#### 1) “Heat Source System” tab

Displays the state of the primary heat source system and changes the control.

#### 2) “Floor Air State” tab

Displays the thermal environment on the specific floor.

#### 3) “AHU and FCU” tab

Displays the state of each air conditioner and fan coil unit and changes the control.

#### 4) “Water Tank” tab

Displays the state of the water tank and changes the control.

#### 5) “Water Network” tab

Displays the state of cold and hot water flow network.

#### 6) “Chart” tab

Creates a trend chart of operation data.

#### 7) “Calendar” tab

Defines the "calendar" used for schedule settings.

## 6.2 Controlling heat source system (Heat Source System tab)

The "Heat Source System" tab is shown in Figure 6.6. The function of this tab is largely divided into the current operation status display section on the right side and the control change section on the left side.

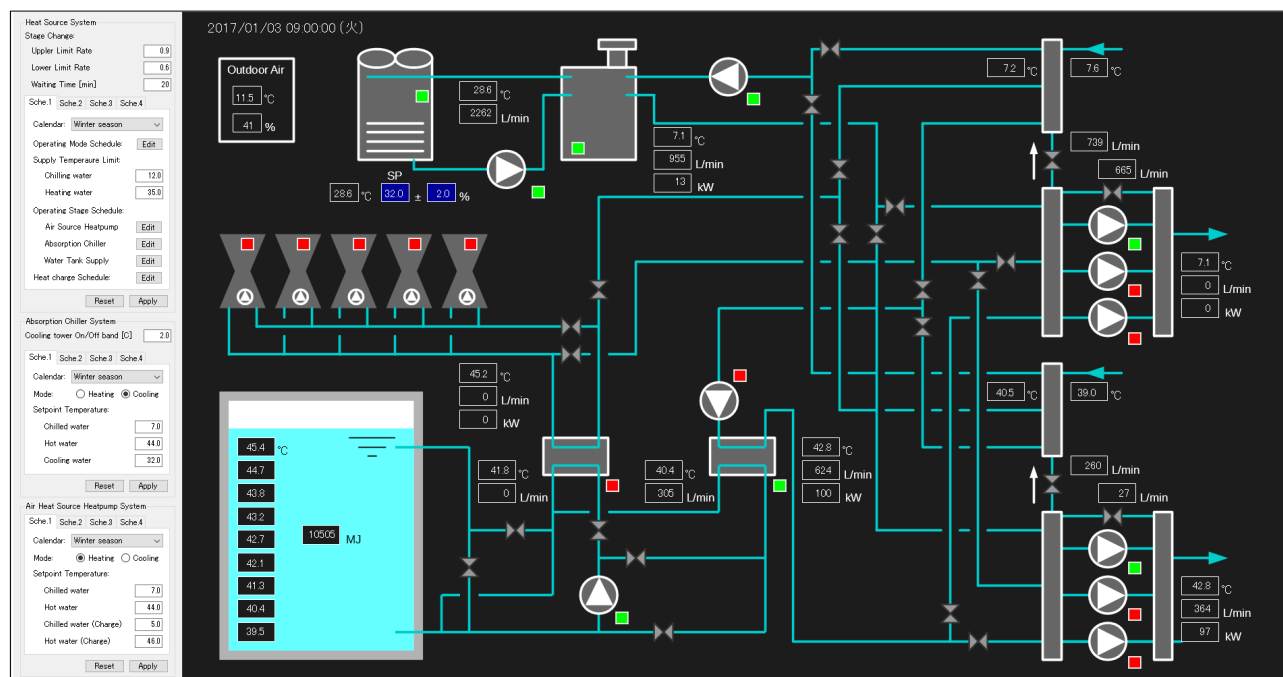


Figure 6.6 Heat Source System tab

In the operation status display section on the right side, the current state (water temperature, water flow rate, On / Off state) of the heat source of primary side system is displayed.

The control change section on the left side is divided into control related to the entire heat source system, control related to the air heat source heat pump, and control related to the absorption chiller.

Figure 6.7 shows the control related to the entire heat source system. The above three text boxes are the thresholds for changing the number of heat sources to be operated. For example, when upper limit rate is 0.9, start the next heat source when the partial load rate of the heat source exceeds 90%. Likewise, for example, if the lower limit rate is 0.6, stop one heat source when the partial load rate falls below 60%. Furthermore, to prevent frequent changes in the number of operating units, you can set the waiting time.

Four schedules can be set to operate individually for each season. The four tabs at the bottom of the controls show schedules. As explained in section 6.8, you can define 20 types of calendars for scheduled operation. You can select the calendar to be used by selecting the combo box. For example, if you want to set a summer schedule, define the calendar as "6/1 - 9/30" and select this calendar from the combo box.

In addition to designating the seasonal operation, you need to set the time during which you will be

operating in the day. By clicking button No. 4, the schedule editor shown in figure 6.8 appears, and you can set an hourly schedule.

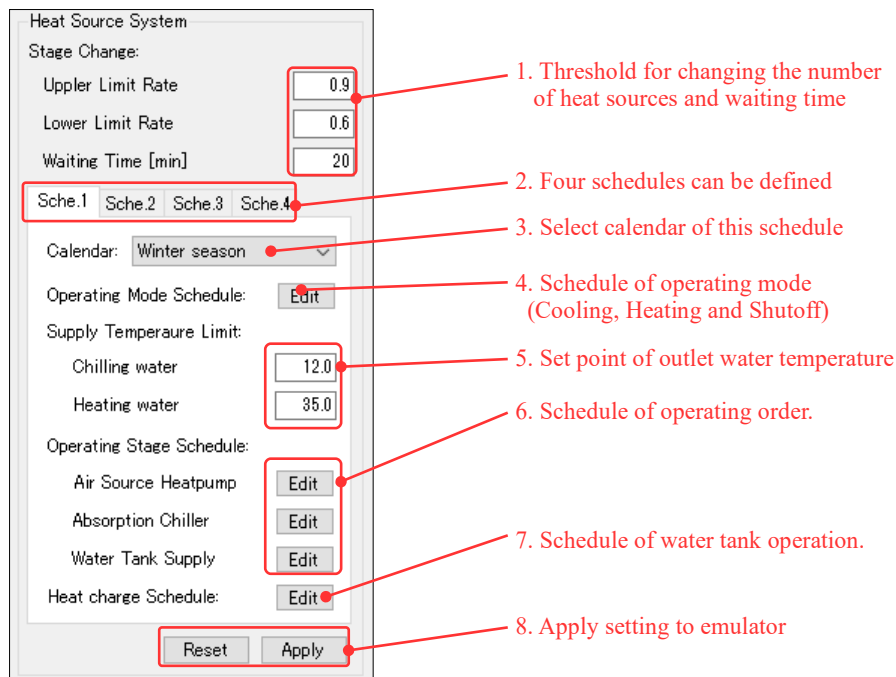


Figure 6.7 The control related to the entire heat source system

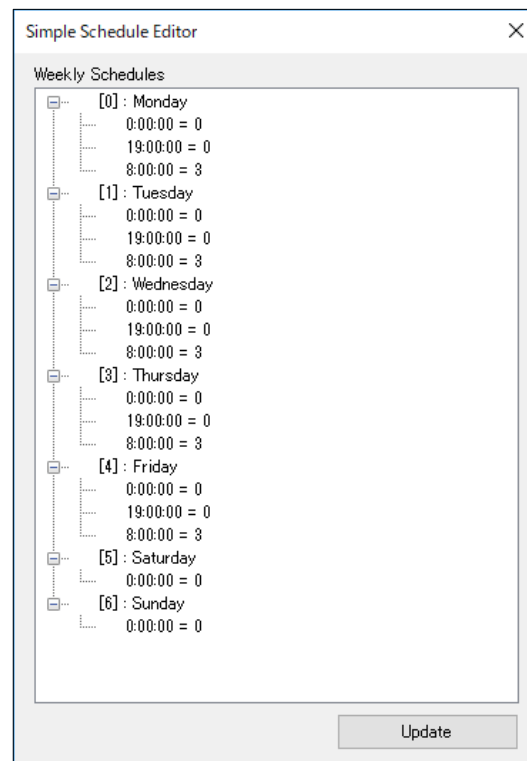


Figure 6.8 Schedule editor window

It is possible to set the operation mode for each time by days of the week. Integer corresponds to each

operation mode: 0 is shutoff, 1 is cooling mode, 2 is heating mode, and 3 is cooling and heating mode, respectively. In the example in Figure 6.8, system will be in heating mode at 8:00 am on Monday to Friday and will shut off at 19:00 in the evening. The system will be shut off all day on Saturdays and Sundays. Table 6.1 shows the correspondence between integer and operation mode used in schedule setting. Details of each schedule will be described later.

Table 6.1 List of operation mode

Schedule	Operation mode
Heat source	0: Shutoff, 1: Cooling, 2: Heating, 3: Both Cooling and Heating
Heat source operating order	0: Always shutoff, 1: First, 2: Second, 3: Third
Heat charge	false: Stop, true: Charge
AHU	0: Shutoff, 1: Ventilation, 2: Cooling, 3: Heating
Secondary pump	false: Shutoff, true: Operate
FCU	0: Shutoff, 1: Fan circulation, 2: Cooling, 3: Heating

The sSetpoint temperature of chilled cold water and heating hot water is done using the text box (No. 5). This is the setpoint temperature of the whole heat source system, and when the heat demand rises and this temperature cannot be maintained, system increases the number of operating heat source. The setpoint temperature for individual heat sources can be set to a be a different value each.

You can also set the schedule by time for the operating order of the heat source. For example, you can schedule to release heat from the water heat storage tank preferentially during daytime hours with at high electricity usage rates. This schedule can be set with middle the three buttons in the middle (No. 6). From the top, it represents the schedule of an air heat source heat pump, absorption chiller, heat release from water heat storage tank. The numeric values that can be set are 0, 1, 2, 3. 0 means shutoff, 1 means operates first, 2 means operates second, 3 means operates third. and 1,2,3 indicate the order of operation, respectively.

The bButton of No. 7 is a the schedule setting of water heat storage tank operation. A number of 0 indicates turn off heat charging , and 1 indicates heat charging. In order to charge heat for the next day's air conditioning, by default, heat charge is valid from Sunday to Thursday from 23:00 until 7:00 morning.

No. 8 is the reflection ofis setting and initialization. After updating the setting, on clicking Apply, the setting is transferedtransferred to the emulator. If you click Reset, all settings will be restored to the value of the current control value of the emulator.

The controls for a single heat source machine are shown in Figure 6.9. An air heat source heat pump and an absorbing chiller are present, and the control method is almost the same. The cooling tower of the absorption

chiller controls the temperature of cold water by turning on / off the fan. This temperature band is set using the No. 1 text box. For example, if the cooling water temperature setting is 32 °C and the temperature band is 1 °C, the fan stops at 31 °C or lower, and the fan starts at 33 °C or higher.

Four schedules can be set for the heat source, and it is selected with the No. 2 tab. Select the calendar corresponding to each schedule using No. 3 combo box. No. 4 is to select the operation mode as either cooling or heating. The text box of No. 5 is the setpoint temperature of cold water, hot water, cooling water. In the case of the air heat source heat pump, the setpoint temperature can be changed between thermal storage operation and normal operation. When the water heat storage tank is used, heat exchange is needed to charge and release; thus, it is necessary to lower the temperature compared with normal operation. Because the design temperature difference of the heat exchanger is 1 °C by default, the cold / hot water temperature during normal operation is 7 °C and 44 °C, the temperature during heat storage operation is 5 °C and 46 °C.

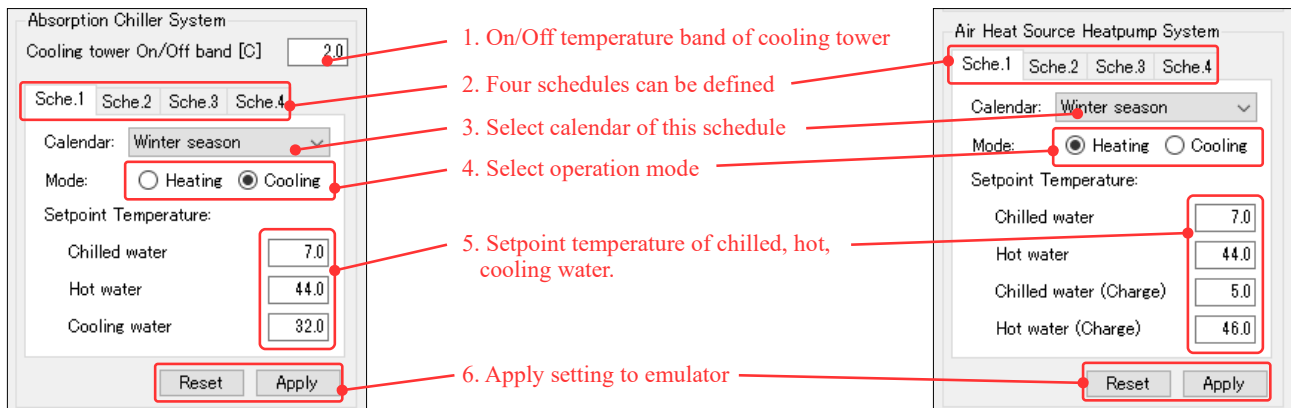


Figure 6.9 The controls for a single heat source machine  
(Left: Absorption chiller, Right: Air heat source heat pump)

6.3 Thermal environment on the specific floor (“Floor Air State” tab)

The “Floor Air State” tab is shown in figure 6.10. The statuses displayed are supply and return air temperature and humidity, cold and hot water valve opening rate of the four air conditioners, status of the two fan coil units, temperature and humidity of each zone, and the CO2 level. Switch the floor to be displayed with the combo box in the upper left corner. As shown in Figure 6.11, clicking the temperature setting button of each zone opens a window for setting the temperature for each season.

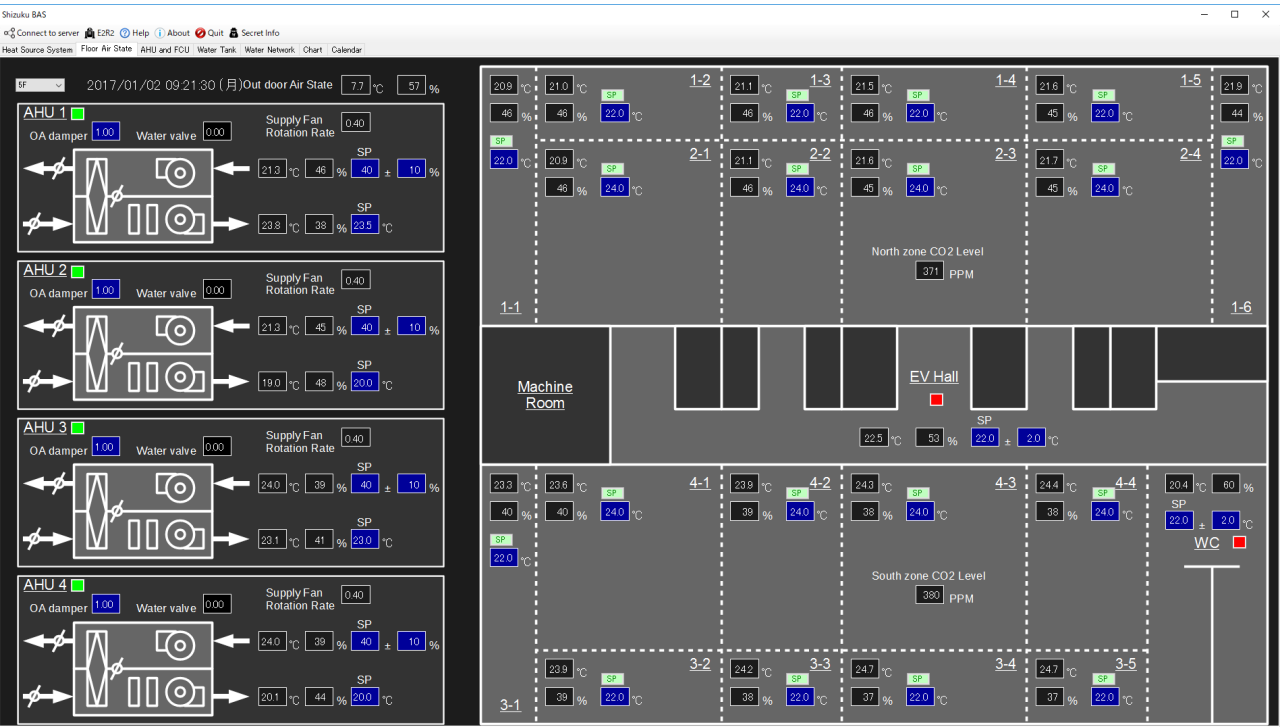


Figure 6.10 “Floor Air State” tab

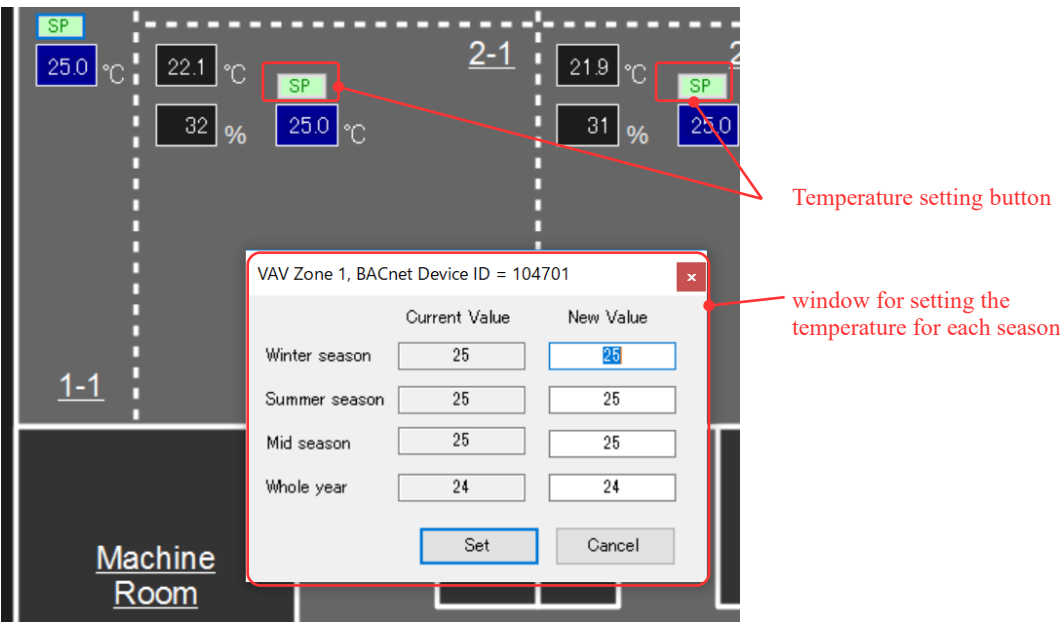


Figure 6.11 Changing setpoint temperature of zone



## 6.4 Controlling AHU and FCU (“AHU and FCU” tab)

Figure 6.12 shows the AHU and FCU tab. With this control, you can display the status and change operation of a single air conditioner and fan coil unit. On the left side is the control setting part and the right side is the status display part. Figure 6.13 shows the control setting part on the left.

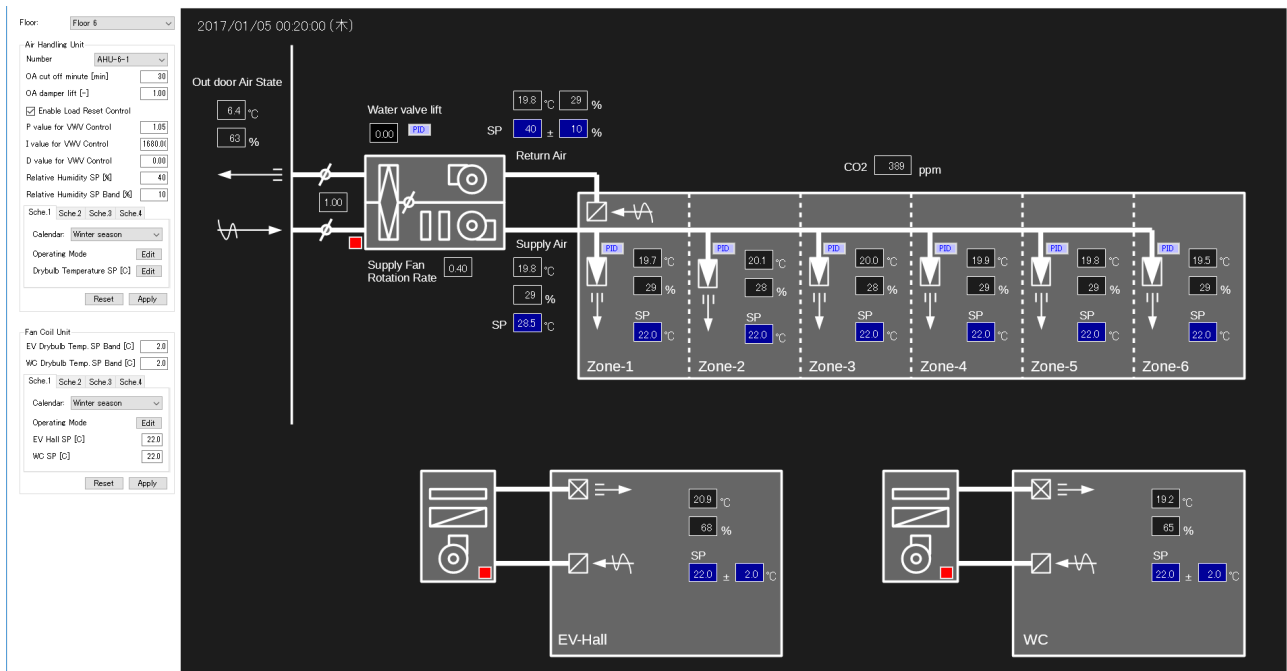


Figure 6.12 “AHU and FCU” tab

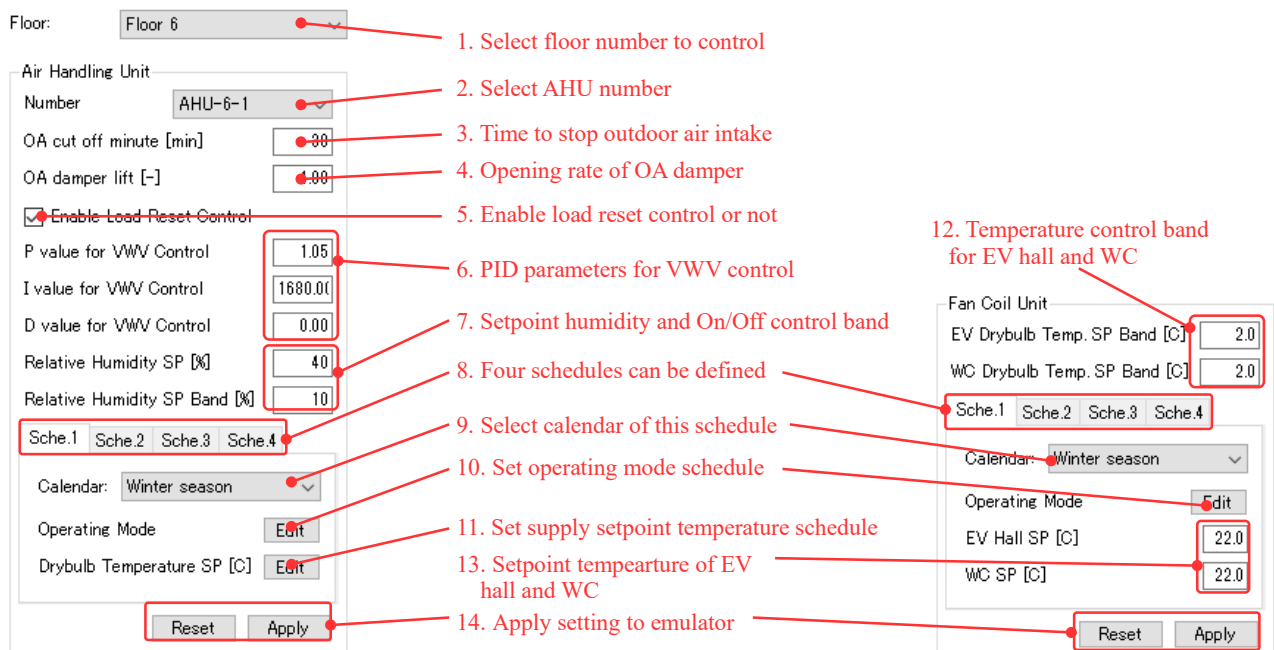


Figure 6.13 The controls of air conditioner and fan coil unit

First, by selecting the combo boxes No.1 and No.2, identify the air conditioner to set and change the control.

To reduce the outdoor air heat load during preheating operation, outside air intake can be set to 0 for a certain period of time after startup. This time is set in the text box of No. 3. No. 4 is the opening rate of the OA damper. For houses with low number of occupants and CO<sub>2</sub> concentration, reduced outside air volume is sufficient for operation. No. 5 is to switch between load reset controls. Basically, the supply air temperature of the air conditioner is controlled according to the supply air temperature setting schedule set in No. 11. However, when load reset control is enabled, temperature setting automatically changes based on the air volume. The cold and hot water valve of the air conditioner changes based on the opening rate, so the supply air temperature becomes the setpoint value. The PID parameter for controlling the opening rate of this valve can be changed using text box of No. 6.

The supply air relative humidity of the air conditioner is controlled with ON / OFF. The setpoint humidity and ON / OFF control band can be set using text box no. 7. For example, when the setpoint humidity is 40% and the control band is 10%, humidification starts at 30% and stops at 50%. Both air conditioner and the fan coil unit can be used to set the four schedules and change the operation. Switching this schedule is done in the tab No. 8. Select the calendar to be used with the combo box No. 9. No.10 is the operation schedule by time. The operation mode of the air conditioner is 0: Shutoff, 1: Ventilation, 2: Cooling, 3: Heating. The operation mode of the fan coil unit is 0: Shutoff, 1: Fan circulation, 2: Cooling, 3: Heating. No.11 is the schedule setting of setpoint temperature by time. The temperature of elevator hall and the restroom are controlled by ON / OFF by the fan coil unit. Set this temperature band with the text box No.12. The setpoint temperature can be set with No. 13 for each season. When all settings are completed, click the Apply button No. 14 to apply the setting to the emulator.

In each air conditioning zone there is a PID parameter setting button for adjusting the opening rate of the VAV damper as shown in the left side of Figure 6.14. When this button is clicked, the PID parameter can be set using the window on the right of Figure 6.14.

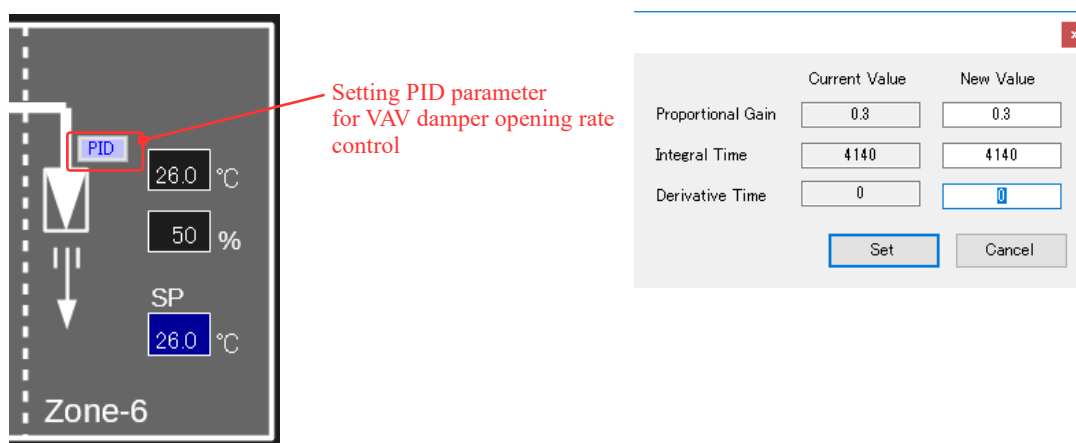


Figure 6.14 PID parameter setting window for VAV damper opening rate control

## 6.5 Control water storage tank ("Water tank" tab)

Figure 6.15 shows the Water tank tab. The chart on the right shows the temperature change of each layer in the water tank. The temperature change over the past two days is displayed. On the left side is the control of the water storage tank whose details are shown in figure 6.16.

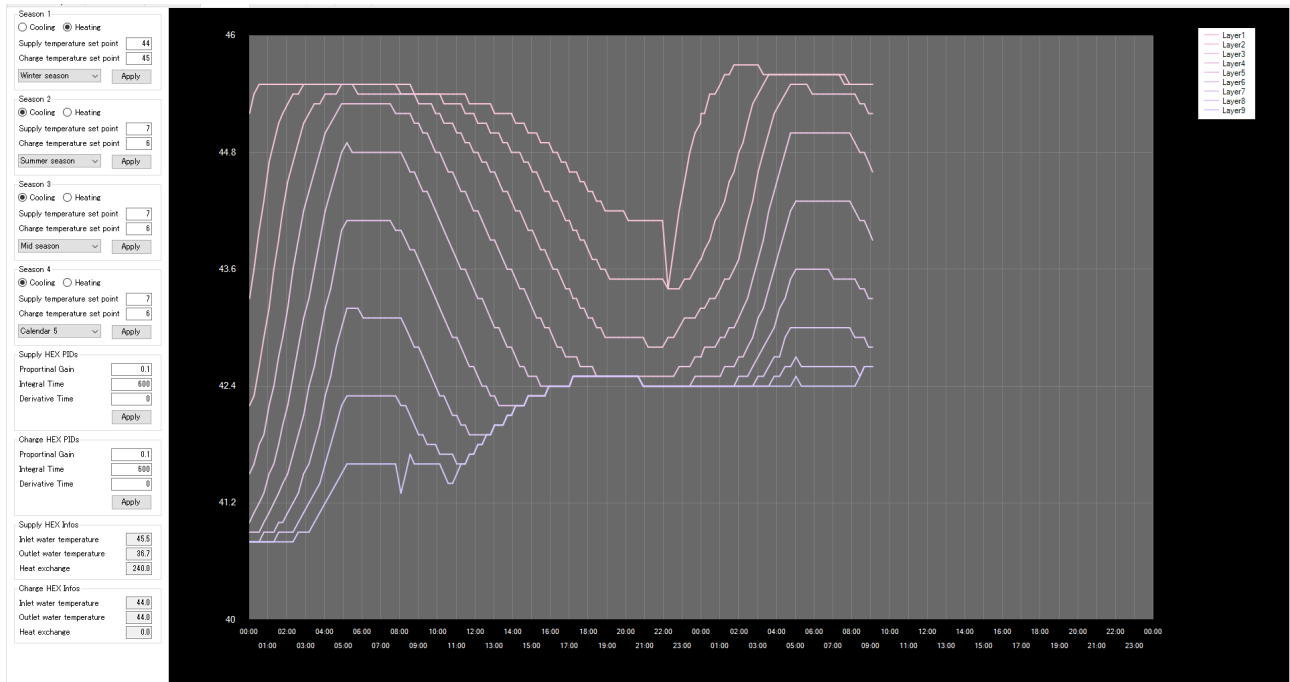


Figure 6.15 "Water tank" tab

Season 1

☐ Cooling ☒ Heating

Supply temperature set point

Charge temperature set point

Winter season

Season 2

☒ Cooling ☐ Heating

Supply temperature set point

Charge temperature set point

Summer season

Season 3

☒ Cooling ☐ Heating

Supply temperature set point

Charge temperature set point

Mid season

Season 4

☒ Cooling ☐ Heating

Supply temperature set point

Charge temperature set point

Calendar 5

Supply HEX PIDs

Proportional Gain

Integral Time

Derivative Time

Charge HEX PIDs

Proportional Gain

Integral Time

Derivative Time

Supply HEX Infos

Inlet water temperature

Outlet water temperature

Heat exchange

Charge HEX Infos

Inlet water temperature

Outlet water temperature

Heat exchange

1. Storage chilled water or hot water

2. Supply and charge temperature

3. Select calendar of this schedule

4. Apply settings

5. PID parameters for HEX

Heat release HEX

Heat charge HEX

Figure 6.16 Controls for water tank

The radio button of No.1 is to switch between operation as a cold water or a hot water tank. Heat storage and release temperature can be set by text box No.2. In this example, the heat exchanger is controlled to charge hot water at 45 °C and release hot water at 44 °C.

The temperature is controlled by the opening rate of the two-way valve of the heat exchanger. The PID parameter for this control is set in the text box of No.5. The water tank can set four control schedules. Select the calendar that each schedule uses using combo box No.3.

## 6.6 Control chilled and hot water flow network ("Water Network" tab)

Figure 6.17 shows the Water Network tab. This control displays the amount of water flowing through each pipe and the opening rate of the valves. You can switch between cold water circuit and hot water circuit in the radio box at the upper left corner of the control. The differential pressure of the secondary pump can be set using the primary equation of water flow. By default, the differential pressure is 150 kPa regardless of the water flow rate. Four schedules can be defined based on the time of water supply.

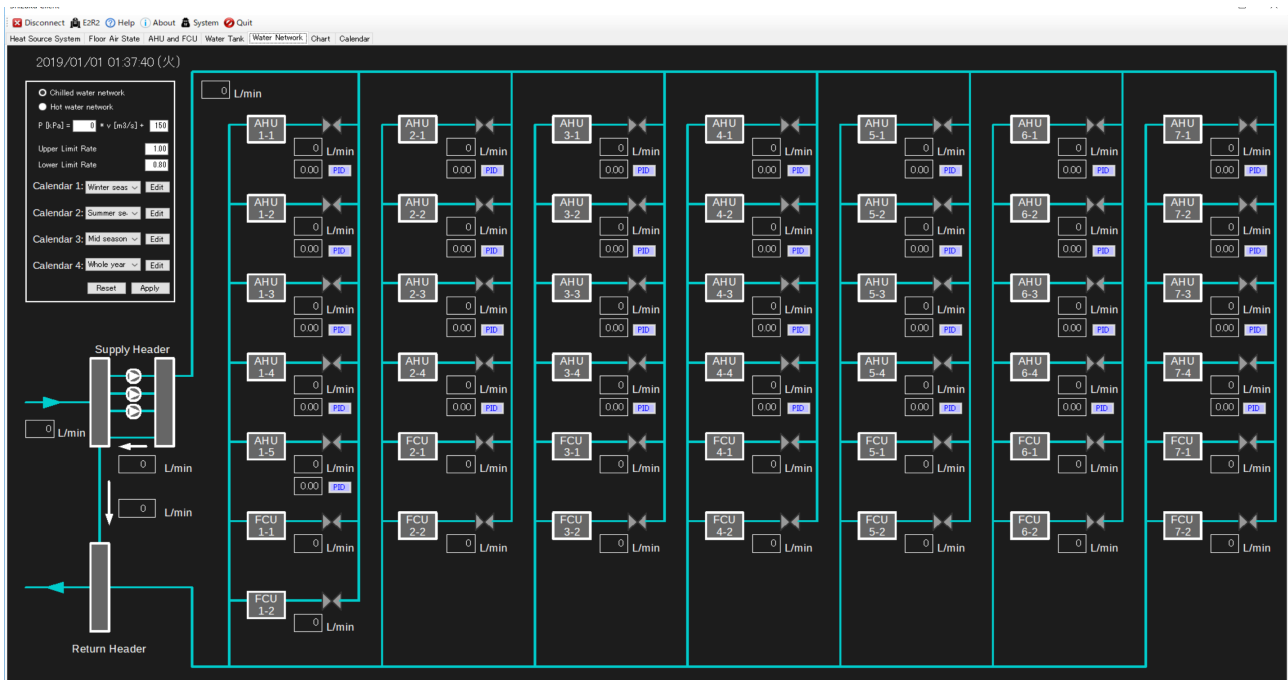


Figure 6.17 "Water Network" tab

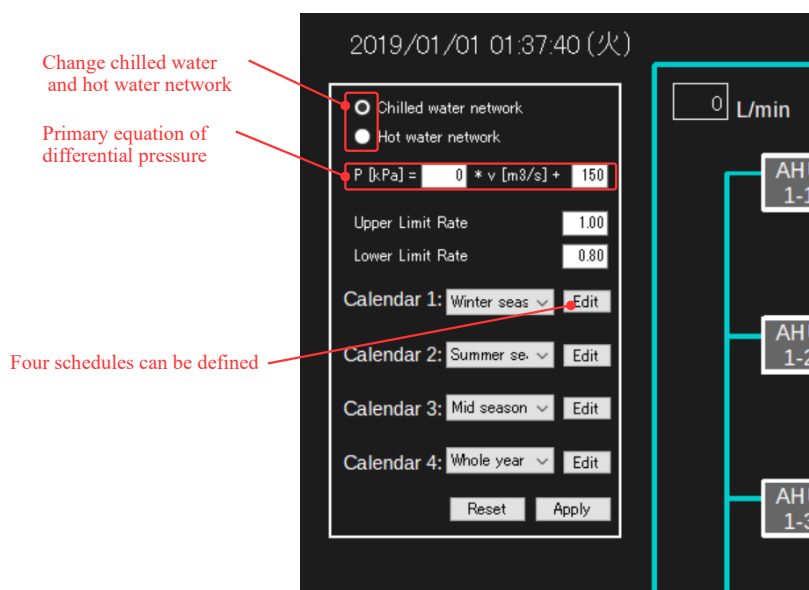


Figure 6.18 Controls for water network

## 6.7 Making trend chart ("Chart" tab)

Figure 6.19 shows the Chart tab. This is a control for displaying the trend of specific operation data, and it is possible to display three data at the same time. If you select BACnet device in the combo box No.1 at the top, the instance list included in the device is set in the combo box No.2. Next, if you select an instance number from the combo box in No.2, the current value of that instance will be plotted on the chart.

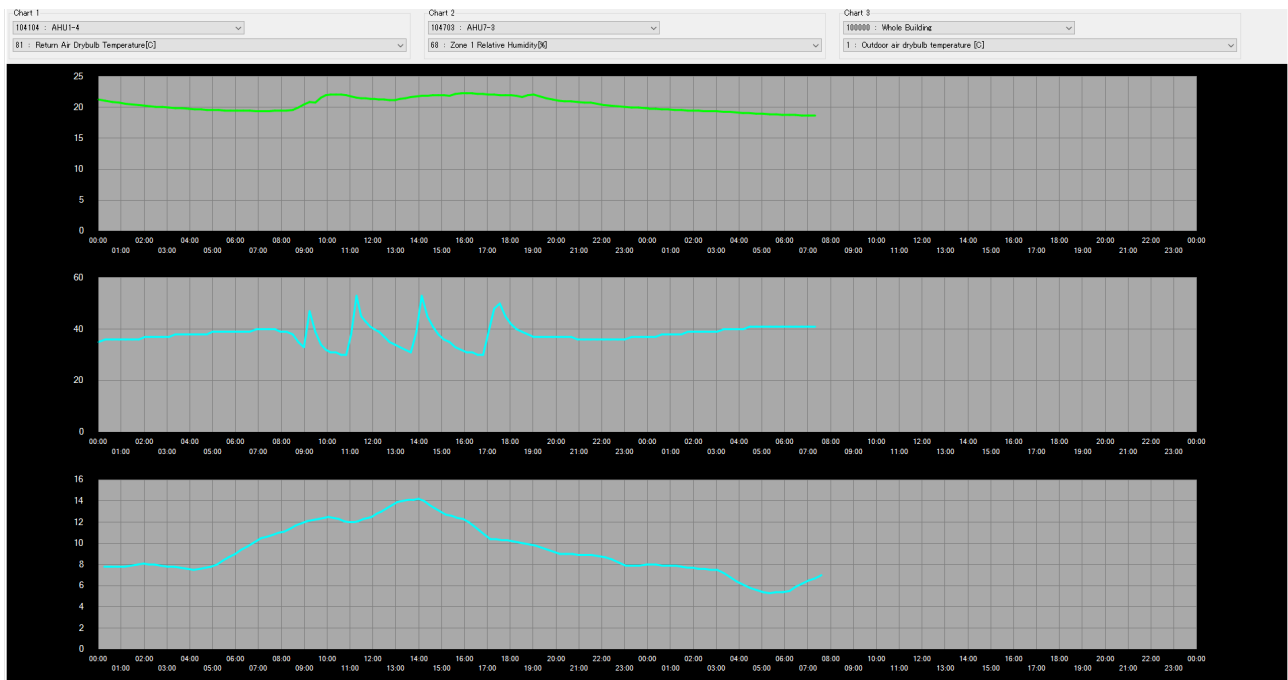


Figure 6.19 "Chart" tab

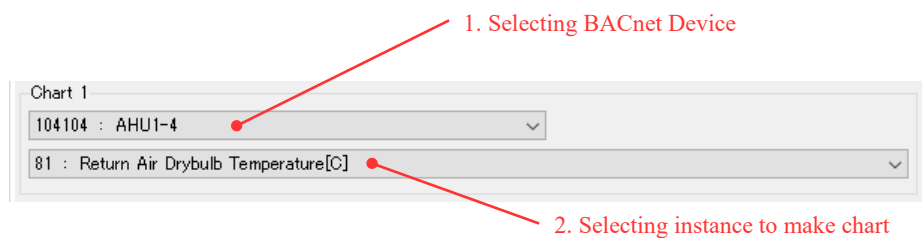


Figure 6.20 Selecting data to draw chart

## 6.8 Making calendar ("Calendar" tab)

Figure 6.21 shows the Calendar tab. With this control, you can define a calendar to use for schedule setting.

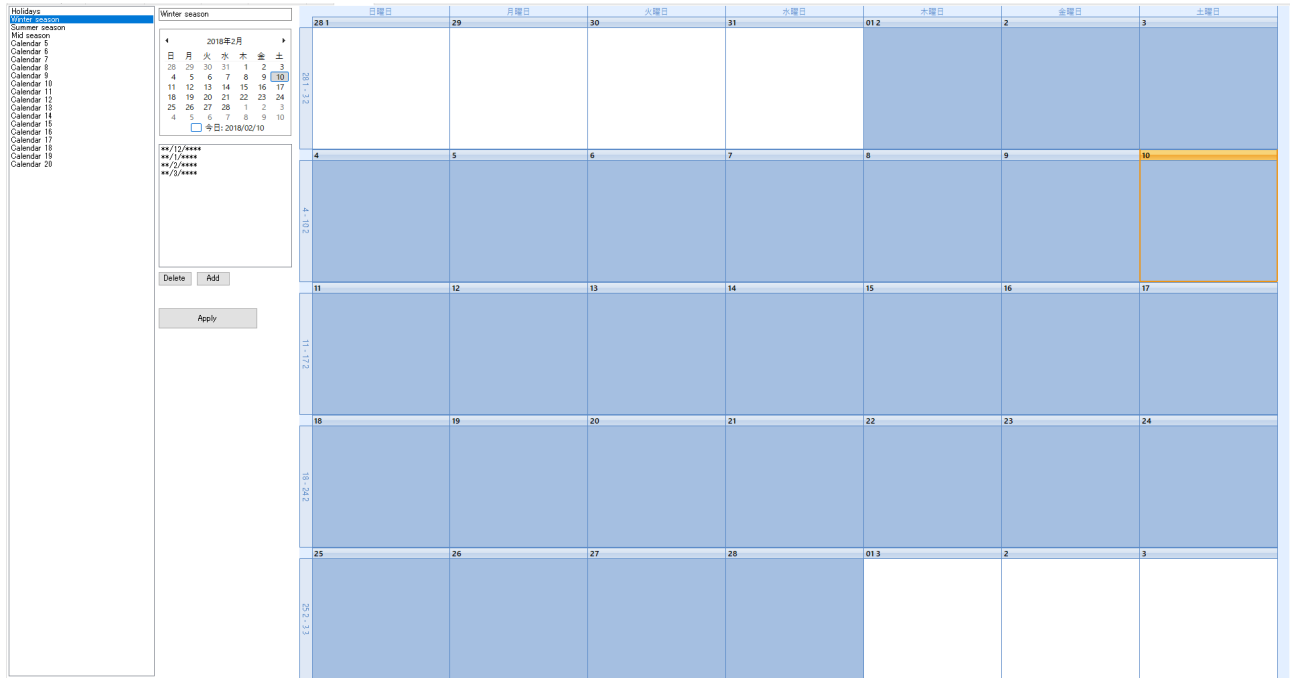
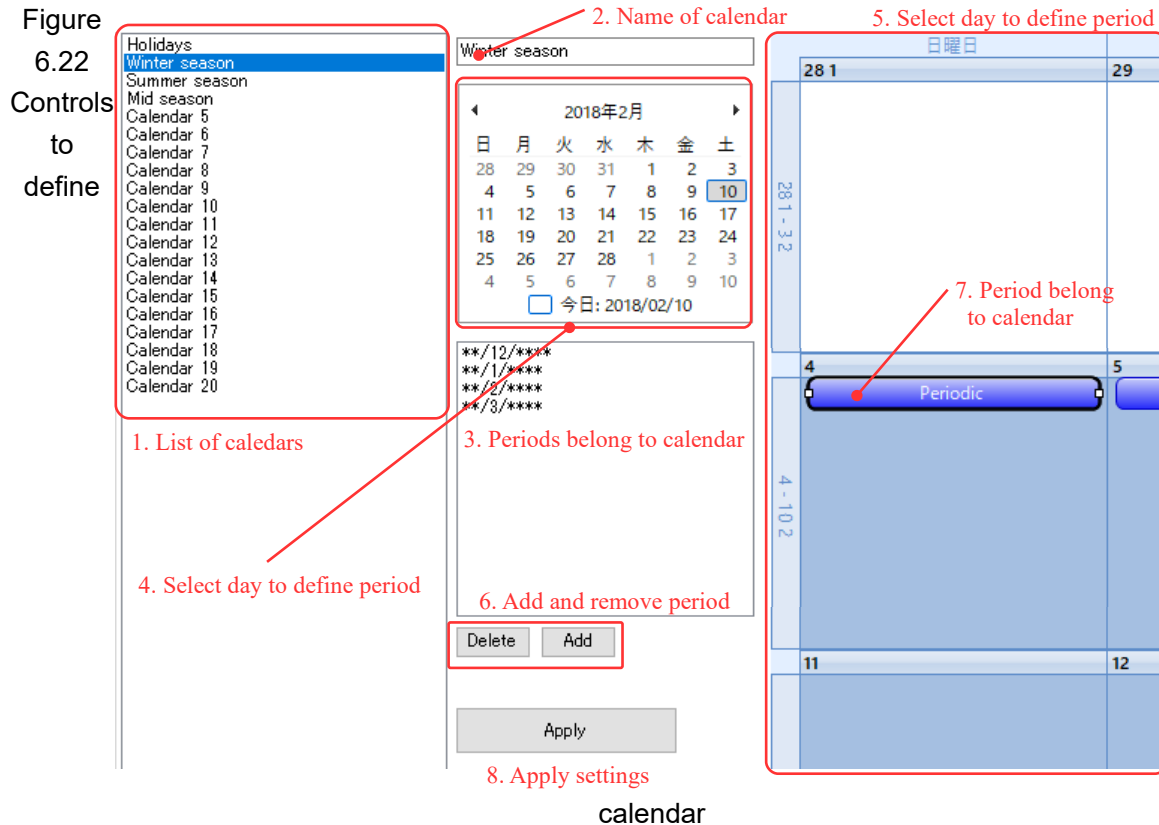


Figure 6.21 "Calendar" tab

Use the control on the upper left corner (figure 6.22) to define the calendar. The list in No.1 is a defined calendar and you can create a maximum of 20. By default, four calendars are defined: "holidays", "winter season (Dec., Jan., Feb., and Mar.)", "summer season (Jun., Jul., Aug., and Sep.)" and "mid-season (Apr., May, Oct., and Nov.)".

When you select a calendar from the list, the corresponding information (Name and time period) is displayed in textbox (No. 2) and list box (No.3). List box No.3 is a list of periods included in the calendar. In this example, a calendar "winter season" is defined, and the period included in this calendar is four months of December, January, February, and March.



To add a new period to the calendar, first select the date that includes the period you need to add from the calendar control (No.4). When selected, the month is displayed in detail in the No.5 control. Select a date and press the add button (No.6) to add a new period. The new period is displayed in the No.3 list box, and it is displayed as No. 7 in the No. 5 control.

If you wish to modify the added period, double click on the period you want to modify in the No.3 list box. The window shown in Figure 6.23 is displayed. You can set the day of the week, day, month, year as shown on the left of Figure 6.23. Select the day of week, date, and month from the drop box as shown in the right of Figure 6.23. "\*" is a wild card. For example, if the year is set to "\*\*\*\*", it means every year.

To delete the period, select the displayed period as shown in No.7 and press Delete. After setting the period, press Apply (No.8) to set the calendar to the emulator.



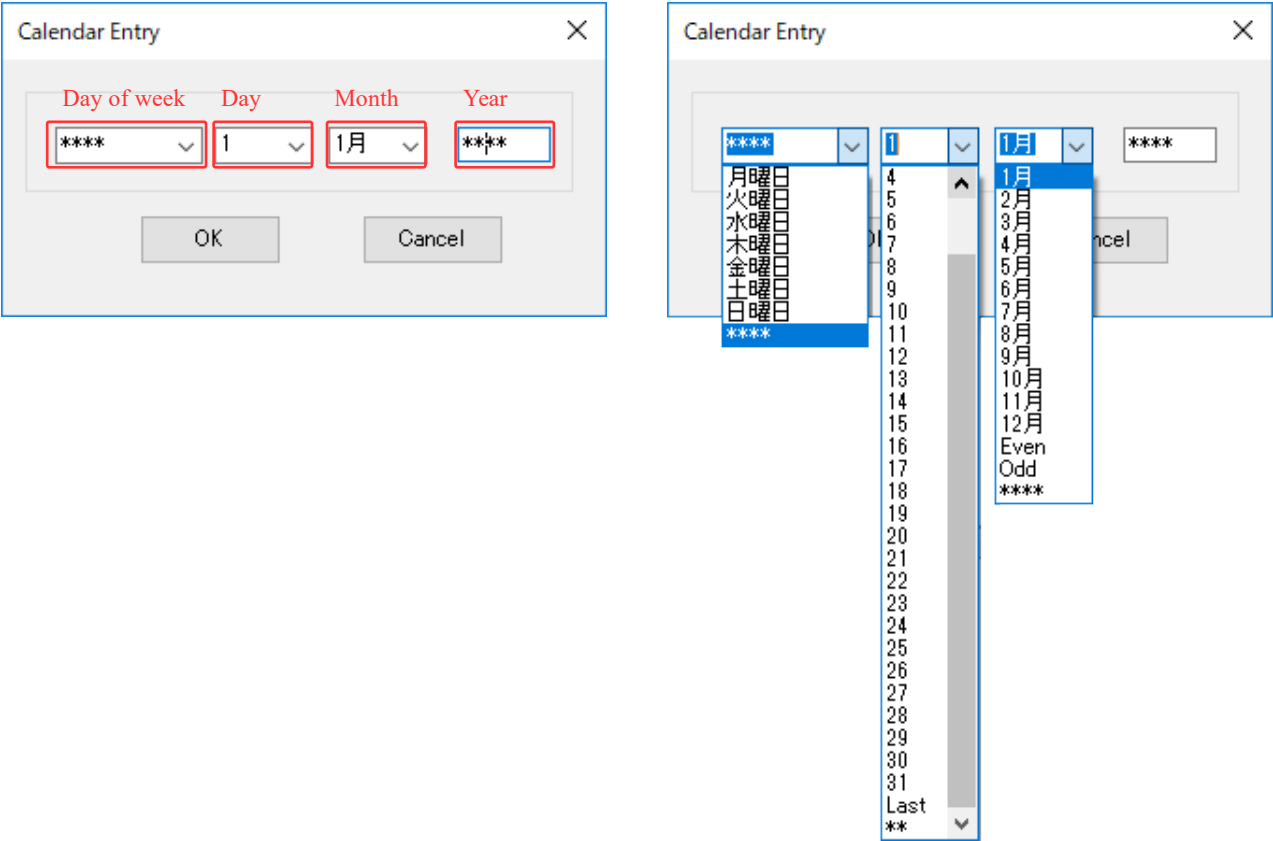


Figure 6.23 Editing period

## 7. Initial setting of emulator and simple BAS

You can change the operation of the emulator and simple BAS by editing the initialization file (setting.ini) in the initFiles directory. The contents of the initialization file are shown in Figure 7.1. It has the format of "setting item = setting value;", and you can change the behavior of the software by editing the "setting value".

```
CONTROL_SPEED=true;
ACCELERATION_RATE=60;
SIMULATION_START_DATE=2019/1/1;
SIMULATION_YEARS=1;
TIME_STEP=10;
THREAD_NUMBER=4;
MAKE_REF_BUILDING=true;
DATA_OUTPUT_TSPAN=1;
DATA_SAVE_YEARS=1;
OUTPUT_REF_BUILDING=false;
RANDOM_SEED=100;
BUILDING_NUMBER=1;
RELOAD_MSEC=1000;
BACKUP_NUMBER=5;
```

Figure 7.1 Contents of "setting.ini" file

### 1) Settings related to calculation speed

"CONTROL\_SPEED" is to decide whether to control the execution speed of the emulator or not. If false, the calculation speed is not controlled, and calculation is performed at the maximum speed according to the maximum capability of the computer. If true, it controls the time progress of the emulator with acceleration with respect to real time. In this case, set the value to "ACCELERATION\_RATE". In the example shown in Figure 7.1, the emulator speed is set to be 60 times the real time. Therefore, it will be calculated for one year in about 60 real days.

### 2) Settings related to the calculation progress method

"SIMULATION\_START\_DATE" is the date at the start of calculation. The emulator will start from 0:00:00 on the date set here. "SIMULATION\_YEARS" is a setting to decide the number of years to simulate. Set 0 to continue simulation infinitely. "TIME\_STEP" is the calculation time interval. In ordinary building energy simulation tools, it is often set to 1 h (= 3600 s), but as the emulator calculates various control equipment, it is preferable to set it to 10 s.

This emulator can perform high-speed calculation by multiple threads. This number can be set with "THREAD\_NUMBER". Because the office building to be simulated is divided for each floor and parallel calculation is carried out, up to 8 threads can be expected to increase the speed.

As explained in Chapter 4 of Definition of "Optimization", in order to evaluate operational skills, in the

emulator, the reference building that operated with standard control and the building whose operation was changed, are calculated. Therefore, if evaluation of operational skills is unnecessary, stopping the calculation of reference building doubles the simulation speed. The reference building generation can be set by "MAKE\_REF\_BUILDING".

### 3) Settings related to data exportation

The emulator writes its internal state to a file at specific time intervals. "DATA\_OUTPUT\_TSPAN" is the time interval [min] for writing data. If you export data at 1-min intervals, the amount of data per year will be less than 10 GB. If the hard disk runs short of memory, the emulator automatically deletes the old data. "DATA\_SAVE\_YEARS" is a setting to decide the number years to save. In the example in Figure 7.1, the data of past one year is saved. If "OUTPUT\_REF\_BUILDING" is set to True, not only the building that changed the operation, but also the operation data of the reference building will be outputted.

### 4) Settings related to starting the emulator

The emulator uses random numbers to generate weather state and behavior of occupants. The seed for this random number generation is set with "RANDOM\_SEED".

"BUILDING\_NUMBER" is a building identification number. The BACnet device ID in the emulator is allocated based on this number. Therefore, by changing the building identification number, it is possible to maintain the BACnet device ID unique. This is useful when you want to place multiple emulators on the same network, for example, district heating / cooling.

### 5) Settings related to simplified BAS interface

"RELOAD\_MSEC" is the time interval for redrawing the state with the simple BAS. In the example in Figure 7.1, it is 1 s (= 1,000 m sec). Redrawing rarely increases the load on the data communication of the emulator, so it should be a good value for this level.

## 8. Remote control sample using BACnet

BACnet (A Data Communication Protocol for Building Automation and Control Network) is an open communication protocol for integrally managing building facilities (air conditioning, electricity, sanitary, crime prevention, fire prevention, etc.). After being standardized by the ASHRAE in the United States in 1995, it became the ISO standard in 2003, and today adopted as a communication system of many building facility systems.



An important feature of the emulator developed for this championship is that it is possible to change the operation using this BACnet communication. Most of the existing building energy simulation software have changed the operation using a specific format file for each software or directly writing it to the source code. Therefore, in order to introduce an optimization method researched using these simulation software into the real building system, it was necessary to prepare a program linking the virtual and the real world.

The emulator used in this championship depicts clearly the uncertain and nonstationary nature of the real world by a probabilistic and dynamic model. If optimization is done for such highly realistic building model and control can be done by BACnet communication, the optimization method has very high practicality for real buildings as well. Thus, BACnet communication has been integrated with this emulator.

In this chapter, remote operational procedure of the emulator of the server is explained by BACnet communication. It also shows how to develop a simple optimization program that communicates with the emulator via BACnet.

### 8.1 Remote operation of the emulator

Currently, a central monitoring room has been planned for large-scale construction. A janitor residing in this room monitors the day-to-day operating state using a local computer in the monitoring room. However, as already started in some package systems and advanced cases, there is a high possibility that the collection of operating information and optimization will be performed remotely using internet lines in the future. There are several ways to communicate with the network of remote buildings using BACnet. In this section, a method using Virtual Private Network (VPN) is shown, which has many cases in particular.

In this championship, we set up an emulator on a Virtual Private Server (VPS) and run the emulator on this server. Because BACnet supports IP communication, it can communicate with other BACnet devices using IP address and port number. However, normally, a firewall is provided between subnetworks, and ports used for

BACnet communication (generally 47808) are blocked, so it is impossible to communicate directly with the remote BACnet Device across the local network. Therefore, connect the server and local PC on which simple BAS are running, with VPN. Specifically, run the VPN server on the server and connect using the VPN client on the local PC. This enables the local PC to run on the server's local network. Figure 8.1 shows the concept of VPN remote emulator operation.

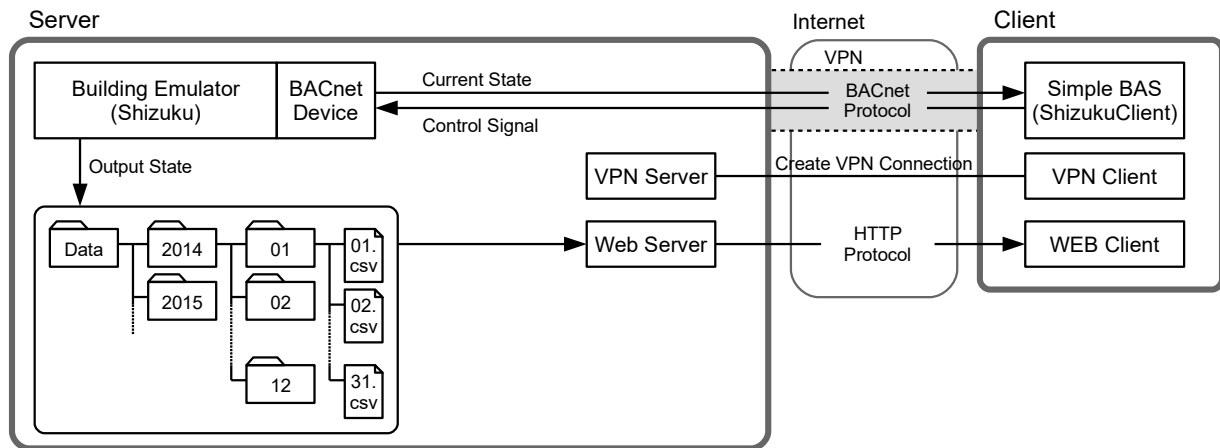


Figure 8.1 The concept of VPN remote emulator operation

The detailed procedure is discussed below. A VPN client is installed by default in Windows 10, and by using it, a VPN connection can be established without installing new software. First, select "VPN" from "Network and Internet settings" (Figure 8.2). By clicking the "Set up a new connection or network" button in the center, the setting window shown in Figure 8.3 appears. "Connection name" is a name for managing this VPN connection setting. Set the IP address of the server provided for each championship participant to "Server name or address". For "VPN type", select "L2TP / IPsec with pre-shared key". Select "User name and password" for "Type of sign-in info". When you set the information as shown in Figure 8.3 and click Save button, a new VPN connection is registered as shown in Figure 8.4. By clicking the "Connect" button you will be prompted for a user name and password as shown in Figure 8.5. Enter "emulator\_user" as the user name and "emulator\_pass" as the password and press OK, and the VPN connection will be established.

If you enter "ipconfig" in the command prompt, the IP address of the local PC is displayed and you can confirm that it is treated as one of the local networks on the VPN server side.

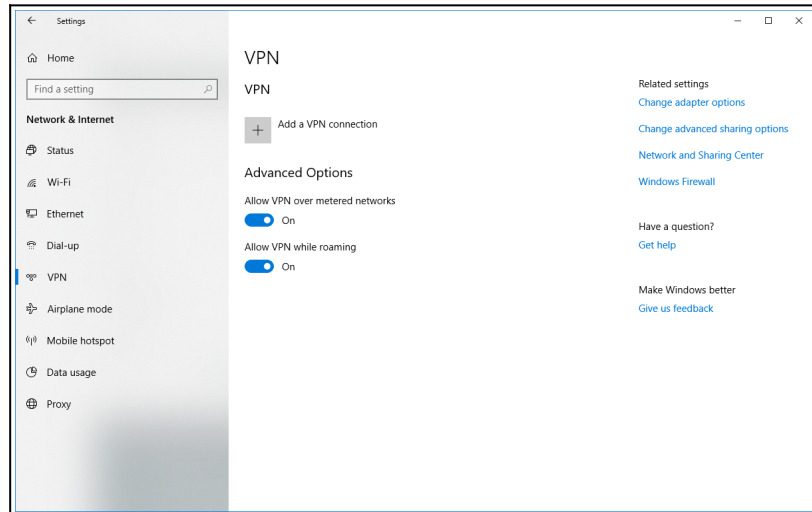


Figure 8.2 Network setting (VPN)

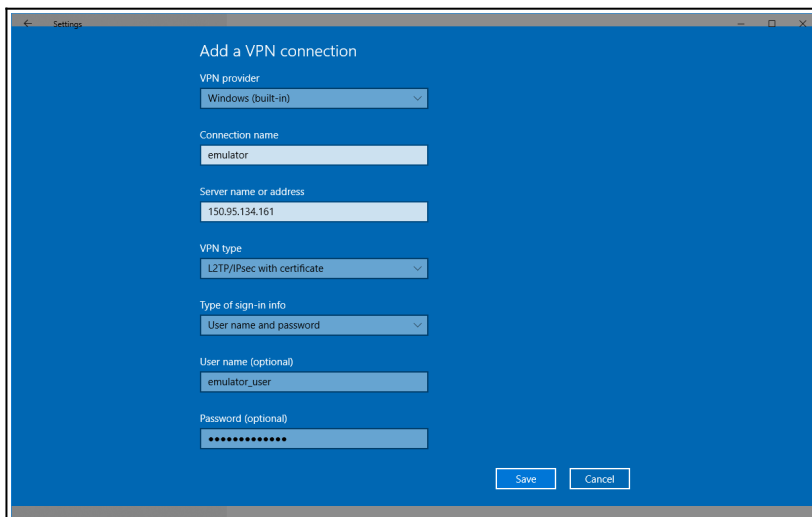


Figure 8.3 Settings for VPN connection

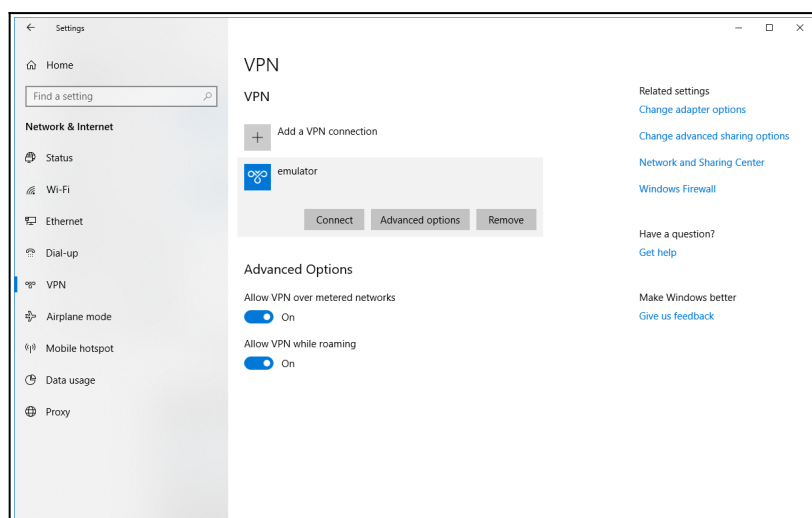


Figure 8.4 Adding VPN connection

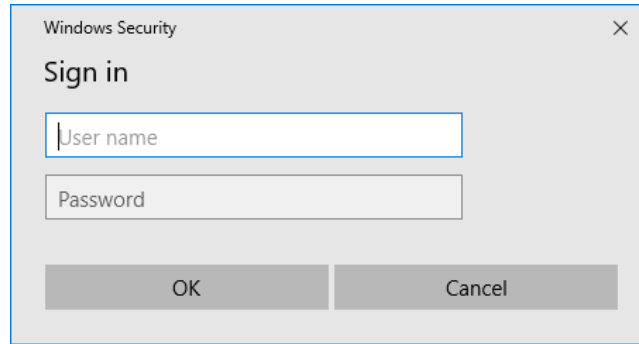


Figure 8.5 User name and password

When communicating with the BACnet device, it is necessary to identify the BACnet device. If each BACnet device has a different IP address, it can be specified based on the difference in IP address, but you require multiple BACnet devices coexisting on the same IP address. A typical example of this system is to run multiple BACnet devices on a single emulator. In such a case, you can identify the device by allocating a different port number for each BACnet Device. Therefore, to communicate with the BACnet device in the emulator, it is necessary to know which port number the emulator allocated to each BACnet device. When the emulator is executed, it writes the correspondence table between BACnet device and port number in "ExclusivePort.csv". When both emulator and the simple BAS are run on the local PC, the simple BAS automatically reads this file and there is no problem. However, in order to operate the emulator on the server side, "ExclusivePort.csv" must be downloaded from the server. Enter "[http:// \(server's IP address\) /~shizuku/ExclusivePort.csv](http://(server's IP address)/~shizuku/ExclusivePort.csv)" in the URL bar of the browser and download the CSV file to the same directory as the simple BAS of the local PC.

After the above said tasks are accomplished, start simple BAS (ShizukuClient.exe). The subsequent operations are the same as the methods described in Chapter 5 and Chapter 6. The only difference is the emulator operating either locally or on the server side, and Simple BAS does not recognize the difference.

A dummy server will be established for testing remote emulator connection. The setting is as follows.

IP Address : 150.95.134.161  
 User name : shizuku\_user  
 Password : shizuku\_pass

## 8.2 Development of original control program

The value that can be controlled from the simple BAS is only a part of all the functions of the emulator. If you directly communicate with BACnet and rewrite the value of BACnet device, you can expect further improvement of operation. Because BACnet is an open protocol, libraries are developed in various programming

languages (Java, Node.js, C #, C ++, etc.). This section shows an example of developing a program for BACnet communication and control using YABE (<https://sourceforge.net/projects/yetanotherbacnetexplorer>) which is a library by C #. This example is stored in the "SampleCommunicators" project in "Shizuku solution" of distribution data.

Figure 8.6 shows the function of the sample program to be developed. This is a sample that performs PMV constant control. First, the sample program uses BACnet's ReadPropertyMultiple service to request information from the emulator. In response, the emulator sends the relative humidity and mean radiation temperature data of each air conditioning zone. Based on this data, the sample program estimates the dry-bulb temperature so that the PMV of the zone becomes zero. Next, using the WriteProperty service of BACnet, this dry bulb temperature is sent to the emulator as the set point of dry bulb temperature of the zone.

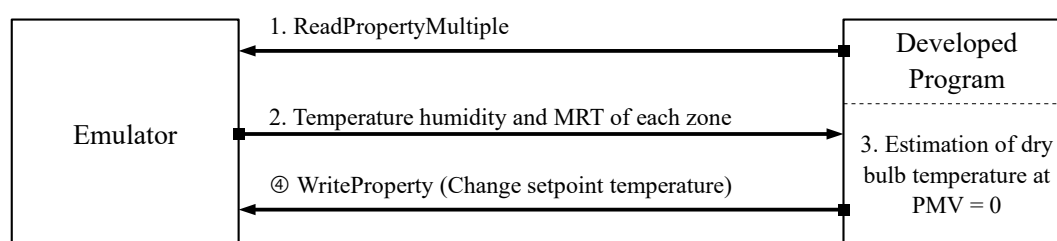


Figure 8.6 Function of the sample program

The emulator can load the original control function as a plug-in. If you create a control device class derived from a specific abstract class, compile it as a DLL and save it in a specific directory, and the control device class is dynamically loaded to emulator and reflected in the calculation.

Samples of control device class is shown in Table 8.1.

The third line refers to the namespace in which the abstract class of the control device is defined. In abstract classes, several methods for BACnet communication are also defined. The fourth line is a namespace in which functions for estimating dry bulb temperature are defined from PMV. Popolo ([www.hvacsimulator.net](http://www.hvacsimulator.net)) which is an open source building thermal environment calculation library is used.

Lines 8 to 116 are the control class to be developed, and the class name is "ConstantPMVControl". In line 9, it is declared that it derives from the abstract class "AbstractShizukuBACnetCommunicator", and it becomes the control class which can be loaded by the emulator.

As the control class is called at short time intervals, updating the BACnet communication and the control value every time causes an enormous computational load. Therefore, if the time in the emulator is not advanced by much, it is desirable not to update the control value and skip the communication. Thus, the communication time interval setting is 16 lines. In this case, when 300 s have elapsed in the emulator, the control



value is updated and communication is made. The previous communication date and time is held in the DateTime type variable of line 19.

Lines 21 to 26 are constructors. No special initialization process is performed on this sample.

Lines 28 to 84 indicate main processing. The argument is the current date and time inside the emulator.

Because it is a PMV constant control, the control is enabled only between 08:00 - 23:00 when the office staff stay in the building (line 36). In line 38, the current date and time are compared with the previous communication date and time, and only when 300 s have elapsed, the control is updated.

There are four air conditioners in each floor, totaling 28 units. The calculation loop for this is given in lines 41 and 43. In line 46, the BACnet device ID of the air conditioner controller is specified based on the floor number and air conditioner number. BACnet Device ID is summarized in "List of BACnet Devices" in Appendix 5.

There are various functions of BACnet communication, and the most basic processing functions are "ReadPropertyRequest" for reading the value of a single BACnet Device, "ReadPropertyMultiple Request" for reading the value of multiple BACnet Devices, and "WritePropertyRequest" for writing the value of single BACnet Device. In this sample, we first use "ReadPropertyMultipleRequest" to read a list of relative humidity and mean radiant temperature of multiple zones held by each air conditioner controller.

Lines 45 to 66 are important. BACnet device holds one or more objects. For example, in the case of an air conditioner controller, it may be an object that holds information on the dry bulb temperature of zone 1 or an object that holds information on the mean radiant temperature of zone 2. The term for identifying the object is "instance number". In addition, there are several types of objects, such as "Type" that manages real values like temperature and humidity (Analog input), and "Type" that manages Boolean values like air conditioning start / stop (Binary input). The Type and instance number of the objects registered in each BACnet device in the emulator are summarized in "List of BACnet Devices" in Appendix 5. Therefore, when specifying the data you need to obtain by communication, you need to specify three items: BACnet device ID, object type, and instance number.

Create a list of object information you want to communicate using lines 50 ~ 62. For example, in line 51, an object of the Analog Input Type with instance number 68 is specified. Instance numbers 68 to 73 are objects holding information about relative humidity, numbers 95 to 100 are objects holding information on mean radiant temperature. In line 66, BACnet communication is performed by passing the BACnet device ID and object information list by ReadPropertyMultipleRequest method. When the communication is successful, the result is assigned to the third argument.

Lines 68 to 80 are calculation when ReadPropertyMultipleRequest succeeds. The setpoint temperature of each zone is rewritten using WritePropertyRequest. Relative humidity and mean radiant temperature are read on lines 71 and 72, and the setpoint dry-bulb temperature at which PMV becomes 0.0 is estimated based on these values on lines 74 to 76. Popolo is used for estimation. Please refer to Ref. 12 for details on this method. Lines 77 and 78 are the specifications of objects. An object of the Analog Output Type with instance numbers 74 to 79 is specified. Analog Output is a writable object, and Analog Input is a read only object. Instance numbers 74 to 79 are setpoint dry bulb temperature and denote writable objects. In line 79, BACnet communication is performed using the ReadPropertyRequest method.

The WritePriority of the third argument of the ReadPropertyRequest method is important. In BACnet, control priorities can be set in 16 levels. The lower the number, the higher the priority. For example, Priority 1 or 2 is used for fire restoration command, fire interlock control and so on. Changing the control value by the scheduler in the emulator or changing the control value using simple BAS is performed in Priority 8. Therefore, when developing the original control class, if you update the value with Priority 8 or higher, the value is overwritten by the scheduler in the emulator. Thus, in line 79, setting it to Priority 7 prevents the scheduler from overwriting the value. On the other hand, when stopping the original controller, it is necessary to allow overwriting by the standard scheduler again. In this case, override the value with null with high priority.

Lines 106 to 115 are samples of ReadPropertyRequest. This is just a sample and is not used for this control.

Table 8.1 Samples of control device class

```

1 using System;
2
3 using Shizuku;
4 using Popolo.HumanBody;
5
6 namespace SampleCommunicators
7 {
8     /// <summary>Sample of constant PMV controller</summary>
9     public class ConstantPMVControl : AbstractShizukuBACnetCommunicator
10    {
11
12        /// <summary>Enable this controller or not</summary>
13        private const bool ENABLE_COMMUNICATOR = true;
14
15        /// <summary>communication interval to emulator[sec]</summary>
16        private const int COMMUNICATION_INTERVAL = 300;
17
18        /// <summary>last communicate date and time</summary>
19        private DateTime lastCommunicateDTime = new DateTime(1000, 1, 1, 0, 0, 0);
20
21        /// <summary>Initialize controller</summary>
22        public ConstantPMVControl() : base()
23        {
24            //If not enabled, just return
25            if (!ENABLE_COMMUNICATOR) return;
26        }

```

```

27
28 /// <summary>Communicate with BACnet device in Shizuku</summary>
29 /// <param name="dtNow">Current date and time in emulator</param>
30 public override void Communicate(DateTime dtNow)
31 {
32     //If not enabled, just return
33     if (!ENABLE_COMMUNICATOR) return;
34
35     //Make communication at only 8:00-23:00
36     if (dtNow.Hour < 8 || 23 < dtNow.Hour) return;
37     //Communication at specific intervals: heavy when communicating every time!
38     if ((dtNow - lastCommunicatedDTime).TotalSeconds < COMMUNICATION_INTERVAL) return;
39     lastCommunicatedDTime = dtNow;
40
41     for (int flNum = 1; flNum <= 7; flNum++) //1-7F each floor
42     {
43         for (int znNum = 1; znNum <= 4; znNum++) //1-4 each AHU
44         {
45             //BACnet Device ID of each air conditioner controller
46             uint dvID = (uint)(104000 + flNum * 100 + znNum);
47
48             //Create an object ID list to read
49             bacnetObjectID[] objIDs = new bacnetObjectID[]
50             {
51                 new bacnetObjectID(bacnetObjectType.analogInput, 68),
52                 new bacnetObjectID(bacnetObjectType.analogInput, 69),
53                 new bacnetObjectID(bacnetObjectType.analogInput, 70),
54                 new bacnetObjectID(bacnetObjectType.analogInput, 71),
55                 new bacnetObjectID(bacnetObjectType.analogInput, 72),
56                 new bacnetObjectID(bacnetObjectType.analogInput, 73),
57                 new bacnetObjectID(bacnetObjectType.analogInput, 95),
58                 new bacnetObjectID(bacnetObjectType.analogInput, 96),
107                new bacnetObjectID(bacnetObjectType.analogInput, 97),
108                new bacnetObjectID(bacnetObjectType.analogInput, 98),
109                new bacnetObjectID(bacnetObjectType.analogInput, 99),
110                new bacnetObjectID(bacnetObjectType.analogInput, 100),
111            };
112
113            object[] rsIts;
114            if (readPropertyMultipleRequest(dvID, objIDs, out rsIts))
115            {
116                //Update set point dry bulb temperature of each zone
117                for (int znN = 0; znN < 6; znN++)
118                {
119                    double relHumid = (double)rsIts[znN];
120                    double radTemp = (double)rsIts[6 + znN];
121                    //Estimate dry bulb temperature at which PMV = 0.0
122                    double setPoint =
123                        ThermalComfort.GetDrybulbTemperature(0, radTemp, relHumid, 0.1, 0.9, 1.2, 0);
124                    setPoint = Math.Max(16, Math.Min(30, setPoint));
125                    bacnetObjectID bID =
126                        new bacnetObjectID(bacnetObjectType.analogOutput, (uint)(znN + 74));
127                    writePropertyRequest(dvID, bID, setPoint, 7);
128                }
129            }
130        }
131    }
132
133    /// <summary>End communication</summary>
134    /// <param name="dtNow">Current date and time in emulator</param>
135    public override void EndCommunication(DateTime dtNow)
136    {
137        for (int flNum = 1; flNum <= 7; flNum++) //1-7F each floor
138        {
139            for (int znNum = 1; znNum <= 4; znNum++) //1-4 each AHU
140            {
141                //BACnet Device ID of each air conditioner controller
142                uint dvID = (uint)(104000 + flNum * 100 + znNum);
143                for (int znN = 0; znN < 6; znN++)
144                {

```

```

87     bacnetObjectID bID = new bacnetObjectID(bacnetObjectType.analogOutput, (uint)(znN + 74));
88     writePropertyRequest(dvID, bID, null, 7);
89 }
90 }
91 }
92 }
93
94 /// <summary>Sample of readPropertyRequest</summary>
95 private void readPropertySample()
96 {
97     //Read the set point temperature of zone 1 of AHU-1 of 7F and write it to the console
98     bacnetObjectID bID = new bacnetObjectID(bacnetObjectType.analogOutput, 74);
99     object tmp;
100     if (readPropertyRequest(104701, bID, out tmp))
101         Console.WriteLine(((double)tmp).ToString());
102     else Console.WriteLine("ReadPropertyRequest error.");
103 }
104 }
105 }
106 }

```

If you compile the program above and place the created DLL in "Communicators" directory, the DLL will be loaded at emulator startup. As the dry bulb temperature is controlled finely according to mean radiant temperature and relative humidity, comfort improves and DRR increases greatly. Figure 8.7 shows the annual trend of ERR, DRR, E2R2. The annual DRR is about 30%, which means the percentage of unsatisfied people has been reduced by 30%. However, as a result of the large increase in air conditioning mainly in summer, ERR became a negative value. Therefore, E2R2 is 0. It is necessary to simultaneously introduce control aiming at energy reduction.

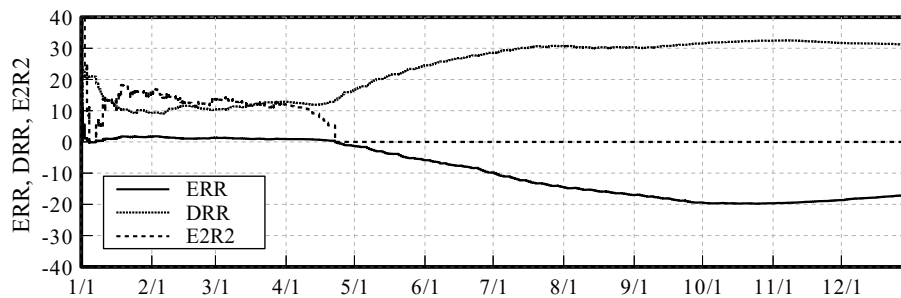


Figure 8.7 The annual trend of ERR, DRR, E2R2 with constant PMV control

Shown above is an example of calculation on the local PC. Even when remotely controlling the emulator on the server side, you can use the same program. First, establish a VPN connection with the server as described in section 8.1 and start "RemoteCommunicator.exe" in the local PC emulator directory. The DLL in the Communicators directory is loaded, communication with the emulator on the server side is performed at 1 s intervals of real time, and control by the developed control class is performed.

During the real-time tuning challenge period of this championship, competition is for such remote control improvement. When calculating with the local PC, the progress of the calculation on the building model stops until the calculation of the control equipment is completed, but in real time tuning, it is necessary make sure the calculation on the server side proceeds. In the case of real buildings, the flow of time on the building side of the server will not wait for the progress of control equipment calculations. On the server, as time progresses by 12 times the real time, you need to ensure the control program has similar speed.

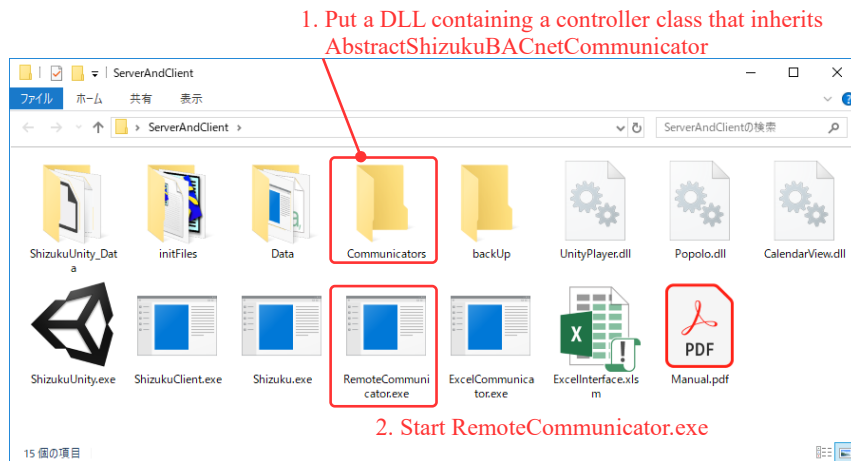


Figure 8.8 Method of remote control by original control equipment

The “AbstractShizukuBACnetCommunicator” class used in the program in Table 8.1 is intended to make it easy to create control device classes; thus, only a part of BACnet communication functions is taken out. If you use the library directly and use all the functions of BACnet communication, finer control is also possible. "http://bacnet.sourceforge.net" introduces libraries for BACnet communication developed in various programming languages.

### 8.3 Other examples of BACnet communication

BACnet communication expands the possibilities of developing various user interfaces. Figures 8.9 and 8.10 show an example in which the office on the 4th floor on the south was made 3 dimensional using the game engine Unity. Nine VAV blowing status (Supply air volume and temperature) and thermal environment information of each zone are visualized.



Figure 8.9 Visualization of VAV blowing information by Unity



Figure 8.10 Visualization of occupants' thermal sensation by Unity

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## Appendix 1 Architectural design drawing



「平成25年省エネルギー基準に準拠した算定・判断の方法及び解説」からの変更点

- ・柱を追加
- ・柱追加に合わせて事務室1の裏手廊下の位置を調整
- ・蓄熱槽を追加
- ・電気室と熱源機械室位置を調整



記事

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作成

DATE

名称: H25年省エネルギー基準に準拠した算定・判断の方法及び解説  
モデル建物

図面番号

E.Togashi

縮尺

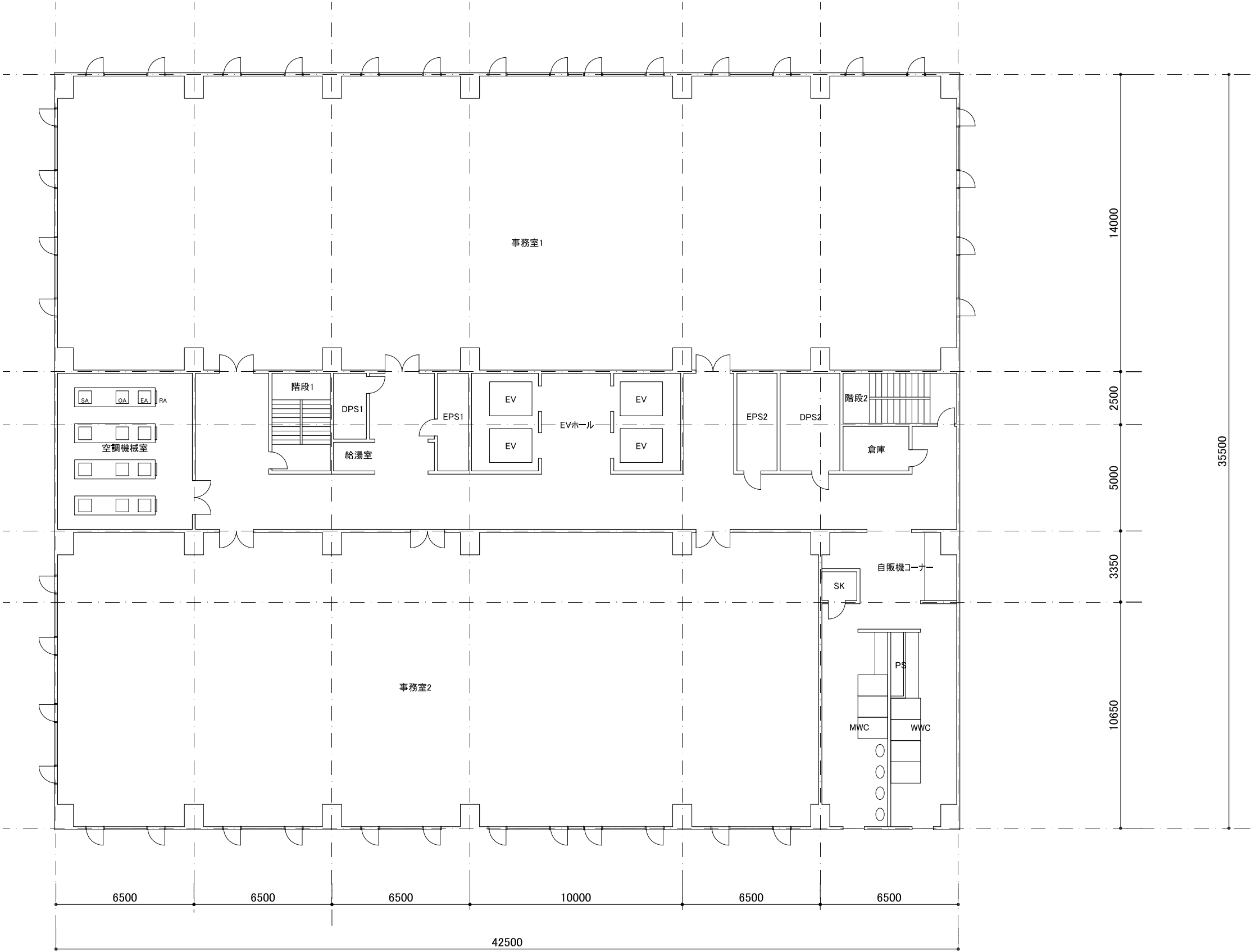
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図面名: 1階 平面図



「平成25年省エネルギー基準に準拠した算定・判断の方法及び解説」からの変更点

- ・柱を追加
- ・柱追加に合わせて扉位置を調整
- ・共用部からメンテ可能にEPS1の扉位置を変更



記事

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作成

DATE

名称: H25年省エネルギー基準に準拠した算定・判断の方法及び解説  
モデル建物

図面番号

E.Togashi

縮尺

Scale= 1:200 (A3)

図面名: 2～7階 平面図



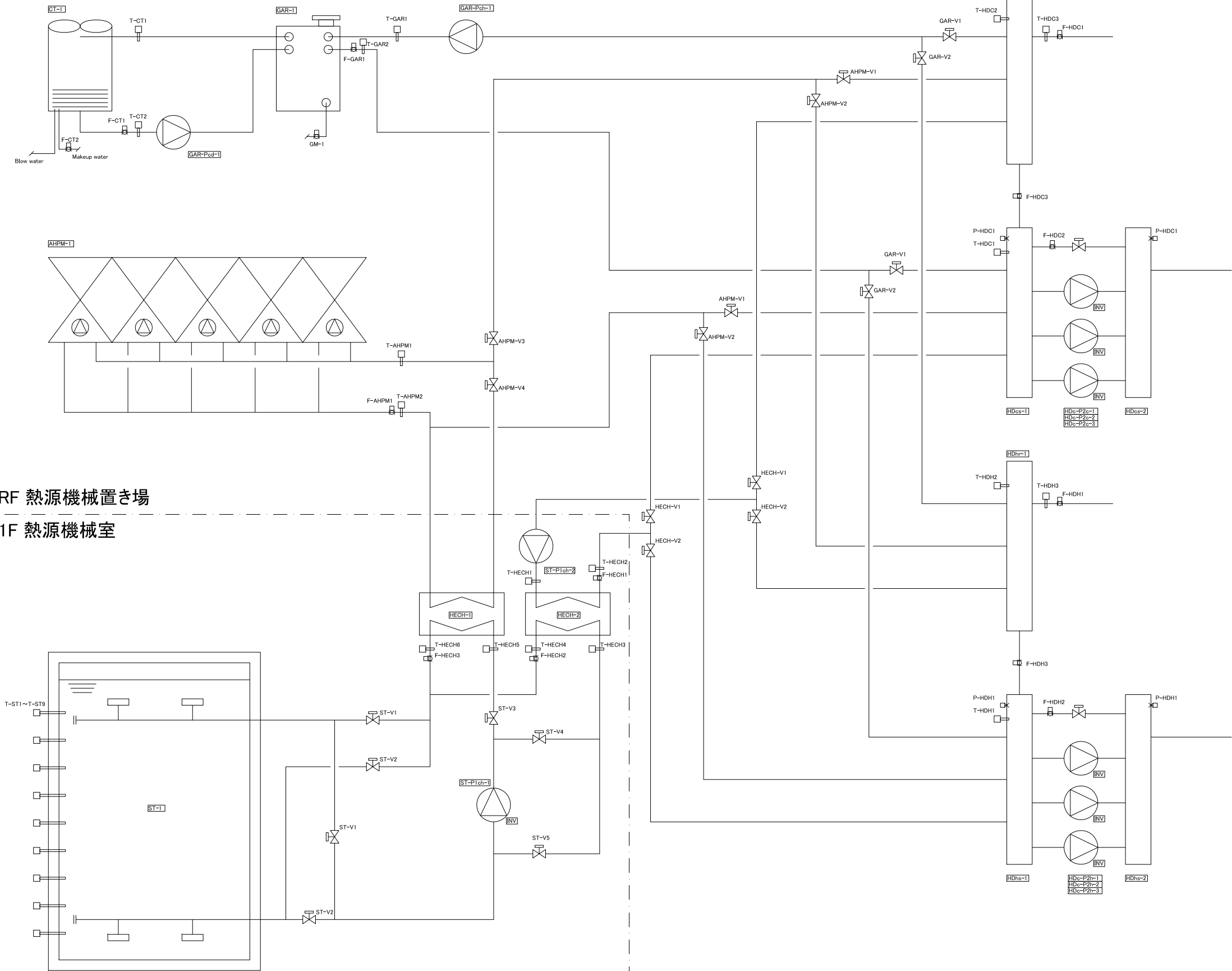
Appendix 2   HVAC design drawing





機器番号	機器名称	機 器 仕 様						付属電動機			台数	据付位置	備 考			
								電 源	容量kW	起動方式						
GAR-1 Gas Absorption Refrigerator	直だし吸収冷水機	型式	ガスだし、ヘビーロード対応（年間8,000h）						3φ-200V	25.6kVA	L-S	1	RF階	参考外形寸法・重量 2,300mmH×3,900mmL×2,400mmH 機器重量：7,500kg 運転重量：8,000kg		
		冷却能力	528 kW	(150USRT)	冷房COP	1.36 以上（高位発熱基準）										
		冷水	15.0 ℃	→	7.0 ℃	流量	946 L/min	圧力損失	90.1 kPa以下							
		冷却水	38.0 ℃	→	32.0 ℃	流量	2,096 L/min	圧力損失	51.9 kPa以下							
		燃料消費量	388 kW	(31.1 Nm3/h)												
		加熱能力	348 kW	(1.253MJ/h)	暖房COP	0.90 以上（高位発熱基準）										
		温水	36.0 ℃	→	44.0 ℃	流量	624 L/min	圧力損失	39.2 kPa以下							
		燃料消費量	387 kW	(30.9 Nm3/h)												
		燃料	都市ガス13A													
		容量制御範囲	20 %	～	100 %											
		付属機器	溶液ポンプ1					1.1kW								
		溶液ポンプ2					0.3kW									
冷媒ポンプ					0.3kW											
バスターブロー					0.75kW											
付属品	制御盤（遠方発停、遠方出口温度設定、運転故障表示端子付） 防振装置（防振スプリング）、機器カバー 感温器付ガス遮断弁、煙突（30m、煙道ダンパ付）、ほか標準付属品一式															
仕様	屋外型（外装：ガルバリウム鋼板製）、耐震構造、冷水・冷却水変流量制御、低Noiseバーナー															
AHPM-1 Air Heat Source Heat Pump	空冷ヒートポンプ モジュールチラー （5ユニット連結）	型式	インバータ型・ボンプ内蔵型						3φ-200V	圧縮機	INV	1	RF階	参考外形寸法・重量 3,000mmH×5,200mmL×2,300mmH 機器重量：5,200kg 運転重量：5,300kg		
		冷却運転運転時：														
		冷却能力	425 kW	(121USRT)	外気温度	35.0 ℃			7.5 kW							
		冷水出入口温度	15.0 ℃	→	7.0 ℃				3台							
		COP	3.55 以上		入力	119.7 kW以下			×							
		冷水流量	761 L/min		機内揚程	70 kPa		機外揚程	115 kPa		5ユニット					
		冷却蓄熱運転時：														
		冷却能力	404 kW	(115USRT)	外気温度	35.0 ℃			ファン							
		冷水出入口温度	13.0 ℃	→	5.0 ℃				1.0 kW							
		COP	3.45 以上		入力	117.1 kW以下			×							
		冷水流量	724 L/min						3台							
									×							
									5ユニット							
		加熱運転運転時														
		加熱能力	382 kW	(1,373MJ/h)	外気温度	0.0 ℃			ポンプ							
		温水出入口温度	36.0 ℃	→	44.0 ℃				0.75 kW							
		COP	3.36 以上		入力	113.5 kW以下			×							
		温水流量	684 L/min		機内揚程	56 kPa		機外揚程	130 kPa		5ユニット					
		加熱蓄熱運転時														
		加熱能力	379 kW	(1,364MJ/h)	外気温度	0.0 ℃										
		温水出入口温度	38.0 ℃	→	46.0 ℃											
		COP	3.20 以上		入力	118.5 kW以下										
		温水流量	679 L/min													
		耐圧	冷水 1.0 MPa		温水 1.0 MPa											
容量制御範囲	10 %	～	100 %													
	冷水変流量仕様	60	～	100 %												
	冷水変流量仕様	60	～	100 %												
付属品	インバータ型、防振スプリングその他標準付属品一式															
仕様	耐震構造、減振器圧力・温度、高静圧圧力・温度、油圧、電流値、LTD、圧縮機電流値を中央に表示する 冷水・冷却水変流量制御、水熱源、熱源水はブライン															
CT-1 Cooling Tower	冷却塔 （直だし吸収冷水機系統）	型式	開放式冷却塔（白煙防止型、超低騒音型、内部配管、耐震構造仕様、高層階仕様）						3φ-200V	5.5	INV	1	RF階	参考外形寸法・重量 2,300mmH×3,700mmL×3,400mmH 機器重量：1,200kg 運転重量：3,000kg		
		冷却能力	877 kW	(115USRT)												
		冷却水	38.0 ℃	→	32.0 ℃	流量	2,096 L/min	冷却塔揚程	50.0 kPa以下							
		外気条件	28.0 ℃DB													
		耐震	2.0 G													
		付属品	階段、上部放水槽蓋、上部手摺、ファン内部歩廊 連通管接続口（250A）、飛散水防止型 吸込側消音器（-20dB）、風向固定ルーバー（羽根確度固定90度、方向45度固定） 吐出側消音器（-26dB） 材質：ガルバリウム鋼板（1.2t） 吸音材：ポリエステル不織布充填 防振装置 高性能スプリング防振架台（3Hz）													
		HEQH-1	熱交換器（蓄熱）	型式	プレート式（SU316）、ガスケット：EPDM						-	-	-	1	1階 熱源機械室	参考外形寸法・重量 500mmH×2,000mmL×2,000mmH 機器重量：1,100kg
		冷却能力	404 kW	(115USRT)												
		冷水（蓄熱側側）	14.0 ℃	→	6.0 ℃	流量	724 L/min	圧力損失	60.0 kPa以下							
		冷水（AHP側側）	5.0 ℃	→	13.0 ℃	流量	724 L/min	圧力損失	60.0 kPa以下							
		加熱能力	379 kW	(1,364MJ/h)												
		温水（蓄熱側側）	37.0 ℃	→	45.0 ℃	流量	679 L/min	圧力損失	60.0 kPa以下							
温水（AHP側側）	46.0 ℃	→	38.0 ℃	流量	679 L/min	圧力損失	60.0 kPa以下									
必要伝熱面積	100 m <sup>2</sup> 以上															
HEQH-2	熱交換器（放熱）	型式	プレート式（SU316）、ガスケット：EPDM						-	-	-	1	1階 熱源機械室	参考外形寸法・重量 500mmH×2,000mmL×2,000mmH 機器重量：1,100kg		
冷却能力	340 kW	(97USRT)														
冷水（蓄熱側側）	6.0 ℃	→	14.0 ℃	流量	609 L/min	圧力損失	60.0 kPa以下									
冷水（二次側）	15.0 ℃	→	7.0 ℃	流量	609 L/min	圧力損失	60.0 kPa以下									
加熱能力	340 kW	(1,224MJ/h)														
温水（蓄熱側側）	45.0 ℃	→	37.0 ℃	流量	609 L/min	圧力損失	60.0 kPa以下									
温水（二次側）	36.0 ℃	→	44.0 ℃	流量	609 L/min	圧力損失	60.0 kPa以下									
必要伝熱面積	90 m <sup>2</sup> 以上															
Ttex-1 Expansion Tank	膨張タンク （冷水系統）	型式	開放式						-	-	-	1	RF階			
		有効容量	500 L													
		外形寸法	1,000 φ×1,000 mmH													
		耐震	2.0 G													
		付属品	架台（1000mmH、SUS製）、圧力計、安全弁、その他標準付属品													
Ttex-2 Expansion Tank	膨張タンク （温水系統）	型式	開放式						-	-	-	1	RF階			
		有効容量	500 L													
		外形寸法	1,000 φ×1,000 mmH													
		耐震	2.0 G													
		付属品	架台（1000mmH、SUS製）、圧力計、安全弁、その他標準付属品													
ST-1	冷水水蓄熱槽	型式	温度成層型 蓄熱槽効率90%以上						-	-	-	1	-	断熱断熱防水：建築工事		
		温度条件	冷水：8℃/14℃		温水：45℃/37℃											
		有効容量	460 m <sup>3</sup>													
		水深	7 m													
			断熱防水、タラップ（背かご付）、水面床腐材													
		分配器	円盤スロット開閉式 PVC製		寸法	1,800 φ	×	300mmH								
			上下	各2個	流速	0.050 m/s		吸込、吹出共								
CF-1	冷却水薬注装置	型式	タンク一体型ユニット、屋外型						1φ-100V	0.2	L-S	1	RF階	参考外形寸法・重量 900×800×1,000mmH 運転重量：330kg		
		タンク容量	200L													
		制御方式	給水流量の比例注入方式（流量計付属）													
		構造仕様	防スケーリング、防錆、殺菌、耐レジオネラ菌													
		材質	PVC製													
吐出量	0.5～4.5L/h						500 kPa（ポンプ2台、自動交互運転）									
付属品	レベルスイッチ、一括警報信号、ステンレスパン（水抜き付）、他標準付属品一式															
AV-1	蓄熱槽脱気装置	型式	タンク一体型ユニット						3φ-200V	0.9	L-S	1	1階 熱源機械室	参考外形寸法・重量 2,100×1,900×3,800mmH 運転重量：3,400kg 参考外形寸法（窒素発生装置） 1,000×1,000×1,800mmH		
		処理水量	3m3/h													
		処理水質	溶存酸素量 10.0mg/L → 0.5mg/L													
		窒素ガス流量	0.45Nm3/h（純度99.9%）													
		窒素発生装置														
		付属品	制御盤、平架台、その他一式（遠方操作及び一括警報端子付）						2.0							

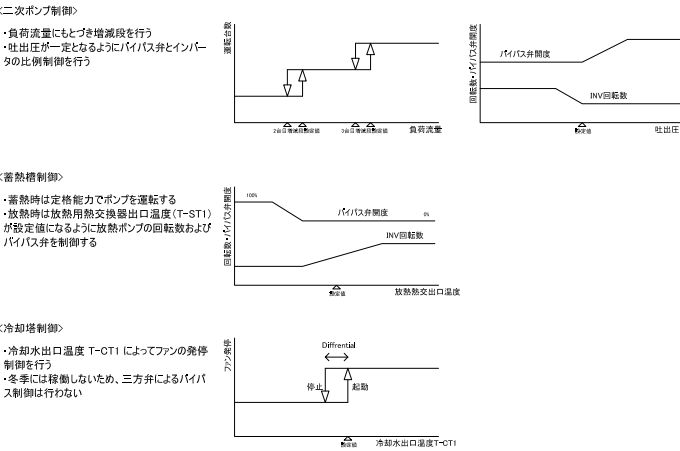




空気熱源ヒートポンプ 運転モード						
	AHPM-V1	AHPM-V2	AHPM-V3	AHPM-V4	AHPM-Pch-1	AHPM-Pch-2
加熱蓄熱	Close	Open	Close	Open	Off	On
加熱追掛	Close	Open	Open	Close	On	Off
冷却蓄熱	Open	Close	Close	Open	Off	On
冷却追掛	Open	Close	Open	Close	On	Off

直燃吸収冷凍水機 運転モード		
	GAR-V1	GAR-V2
加熱	Open	Close
冷却	Close	Open

蓄熱槽 運転モード						
	ST-V1	ST-V2	ST-V3	ST-V4	ST-V5	ST-P1ch-2
加熱蓄熱	Open	Close	Open	Close	Close	Off
加熱追掛	Close	Open	Close	Open	Control	On
冷却蓄熱	Close	Open	Open	Close	Close	Off
冷却追掛	Open	Close	Close	Open	Control	On



RF 熱源機械置き場

1F 熱源機械室

記事	

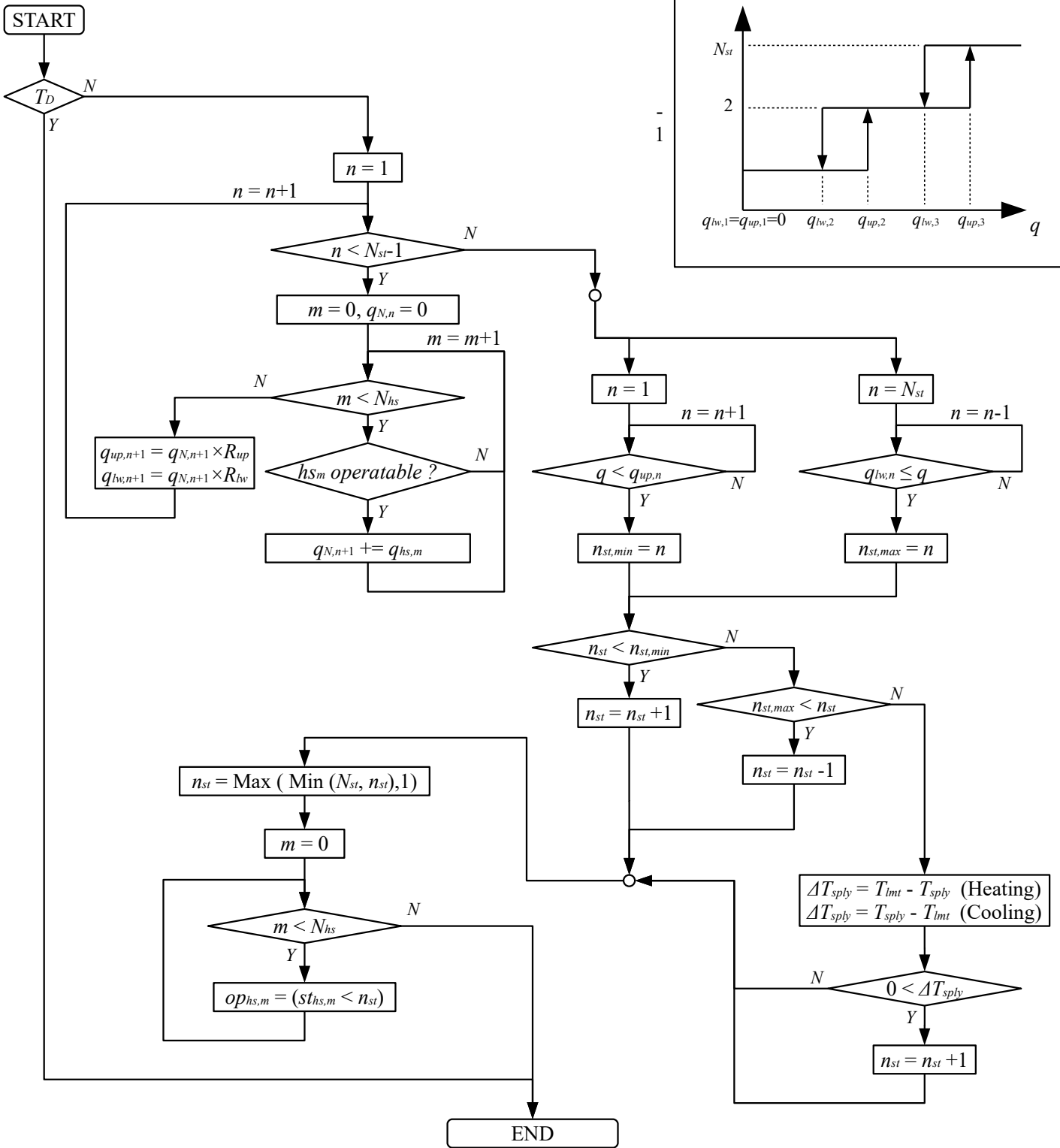
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作成	DATE	名 称 :H25年省エネルギー基準に準拠した算定・判断の方法及び解説 モデル建物	図面番号
	縮 尺 N. S		

図面名: 熱源システム系統図



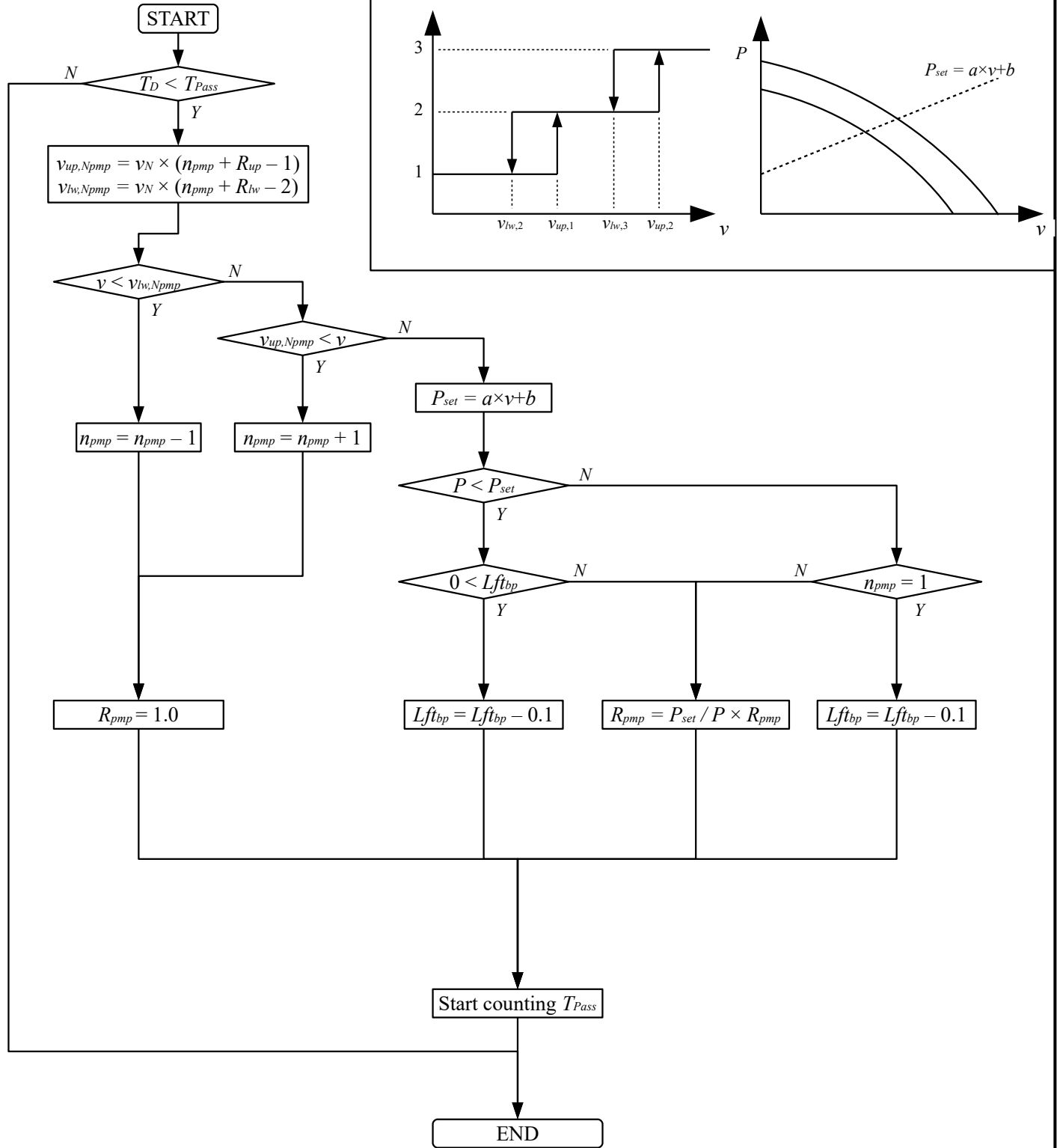
# 1 Heat source operating stage control



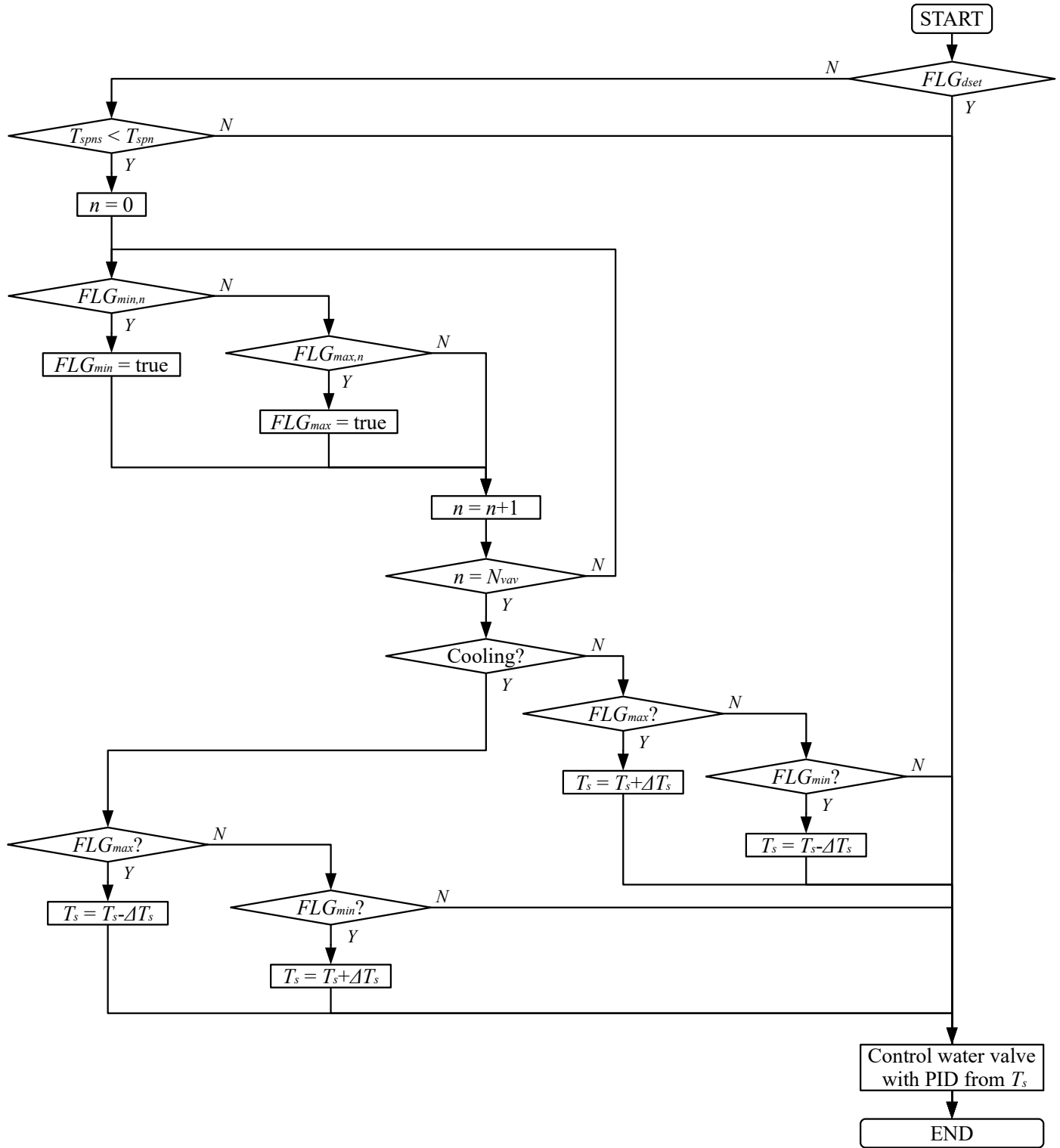
$q$  : Heat load  
 $q_{up,n}$  : Upper limit of  $n^{th}$  stage heat load.  
 $q_{lw,n}$  : Lower limit of  $n^{th}$  stage heat load.  
 $q_{hs,m}$  : Heat capacity of  $m^{th}$  heat source.  
 $N_{op}$  : Number of operable heat source.  
 $N_{st}$  : Number of stage.  
 $n_{st}$  : Current stage.  
 $T_D$  : Time to delay changing operating stage.  
 $op_{hs,m}$  : Is  $m^{th}$  heat source operating.  
 $st_{hs,m}$  : Stage to operate  $m^{th}$  heat source.  
 $R_{up}$  : Limit to increase operating stage. (1.0)  
 $R_{lw}$  : Limit to decrease operating stage. (0.8)  
 $T_{lim}$  : Temperature limit to increase stage.

$T_{sply}$  : Supply header water temperature.

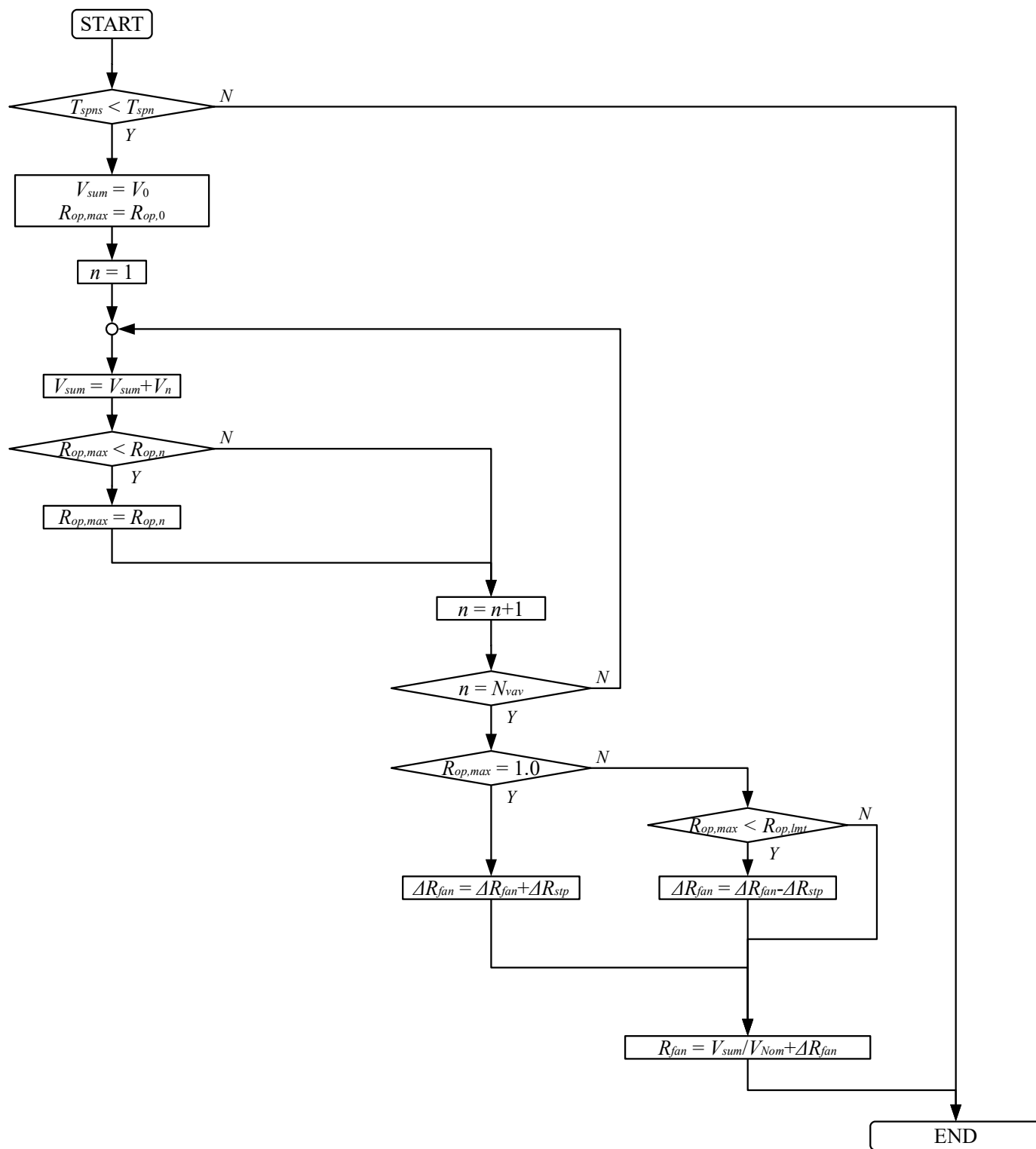
## 2 Secondary pump system rotation rate and operating number control



$T_D$	: Time to delay changing number of operating units.	:
$n_{pmp}$	: Number of operating pumps.	:
$R_{pmp}$	: Rotation ratio of pump. (0.5~1.0)	:
$P$	: Pressure	:
$P_{set}$	: Set point of pressure.	:
$a$	: Coefficient for constant terminal pressure control.	:
$b$	: Coefficient for constant terminal pressure control.	:
$v$	: Volumetric flow rate.	:
$T_{Pass}$	: Time passage from last control.	:
$Lft_{bp}$	: Lift of bypass valve (0.0~1.0)	:
:	:	:
:	:	:
:	:	:



$T_{spns}$	: Temperature control interval. (5min)
$T_{spn}$	: Time passage from last temperature control.
$FLG_{min}$	: Air flow reaches to minimum.
$FLG_{max}$	: Air flow reaches to maximum.
$N_{vav}$	: Number of VAV units.
$T_s$	: Supply air set point temperature.
$\Delta T_s$	: Set point temperature variation range. (0.5 °C)
$FLG_{dset}$	: Set point temperature is provided directly.



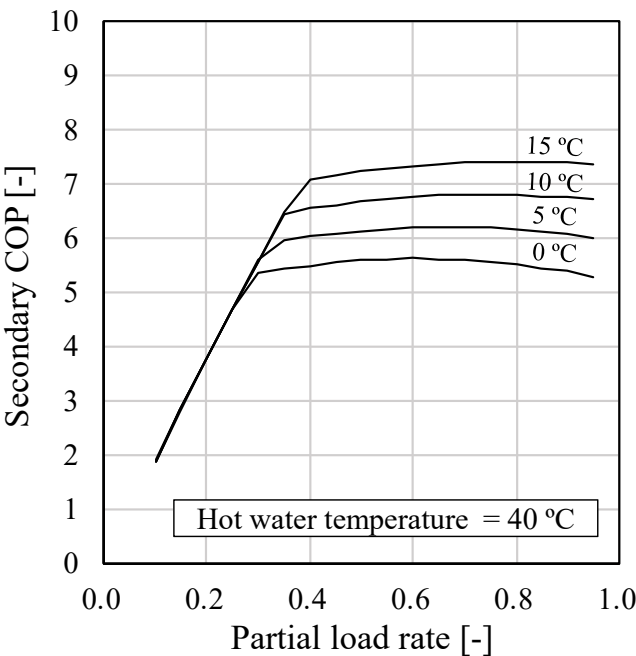
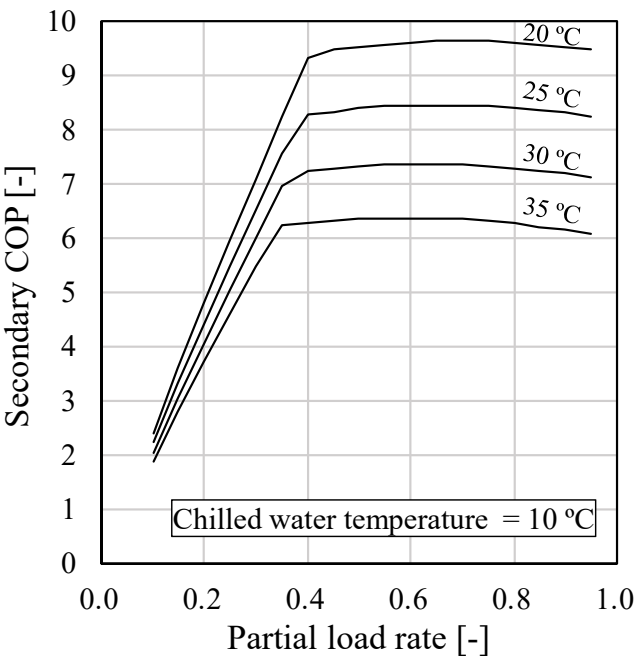
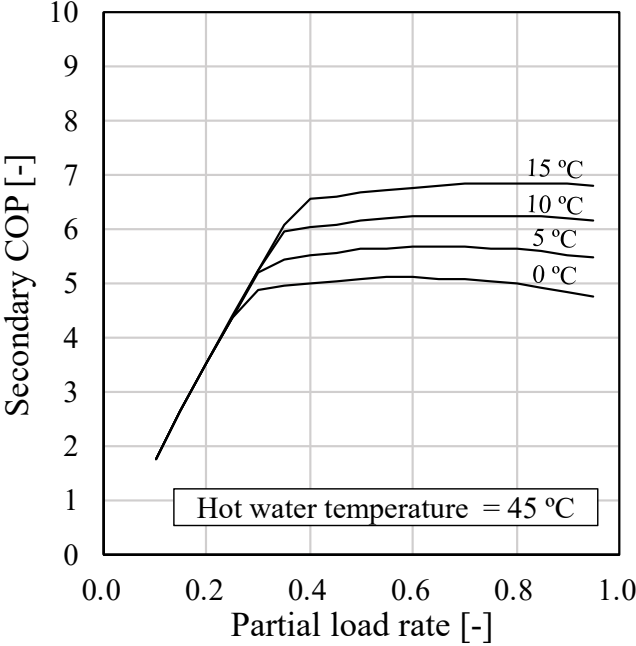
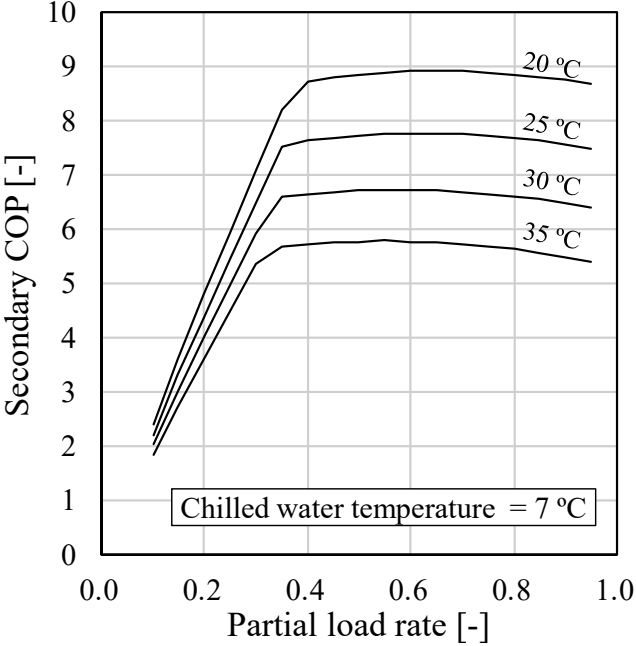
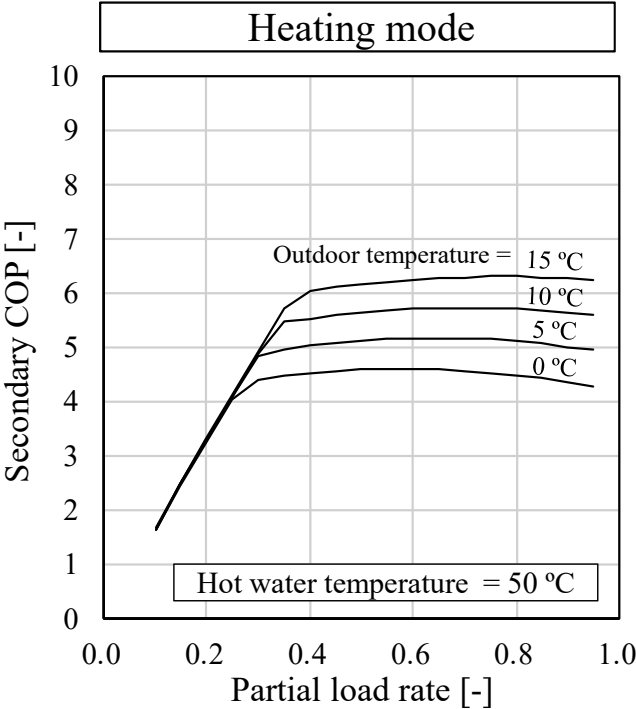
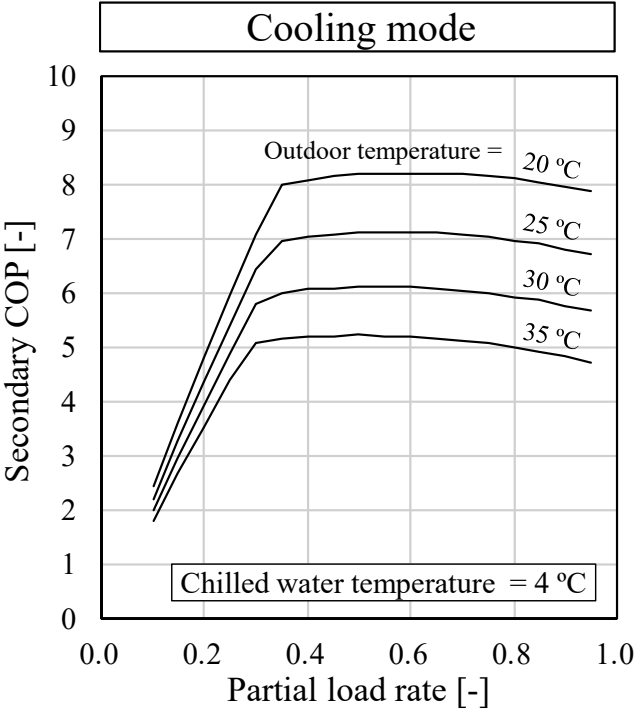
$T_{spns}$  : Air flow control interval. (1 min)  
 $T_{spn}$  : Time passage from last air flow control.  
 $V_{sum}$  : Total air flow set point.  
 $V_n$  : Air flow set point of  $n^{\text{th}}$  VAV unit.  
 $N_{vav}$  : Number of VAV units.  
 $R_{op,n}$  : Opening rate of  $n^{\text{th}}$  VAV unit.  
 $\underline{R_{op,limt}}$  : Opening rate limit of VAV units. (0.9)  
 $\overline{R_{op,max}}$  : Maximum opening rate of VAV units.  
 $\Delta R_{fan}$  : Shift of fan rotation ratio.  
 $\underline{\Delta R_{stp}}$  : Fan rotation ratio variation range. (0.01)  
 $R_{fan}$  : Fan rotation ratio.  
 $V_{Nom}$  : Nominal air flow rate of fan.  
 :

[illegible]



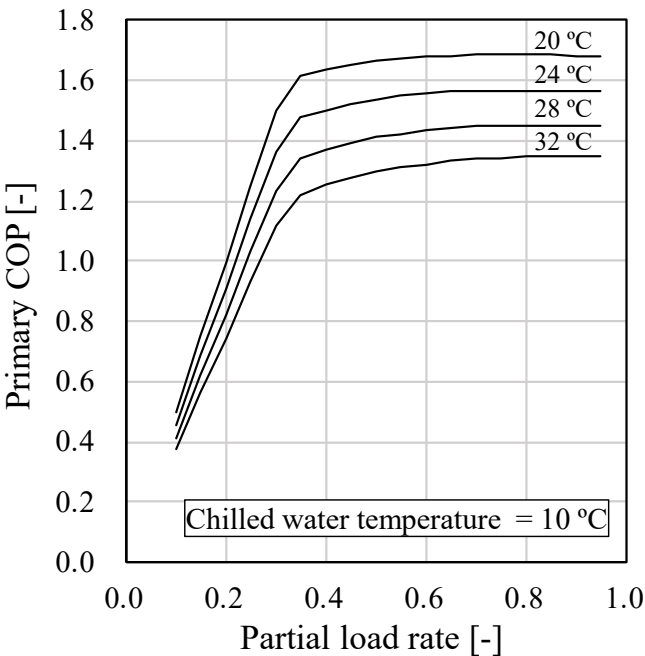
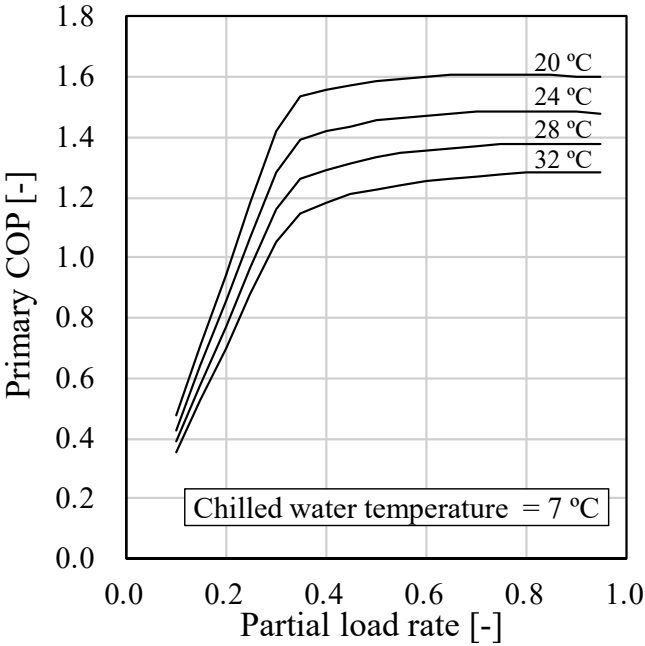
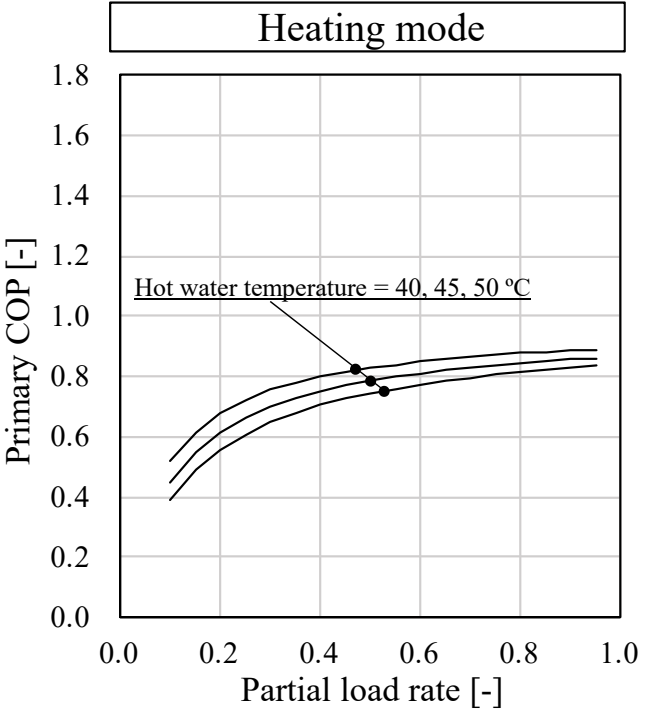
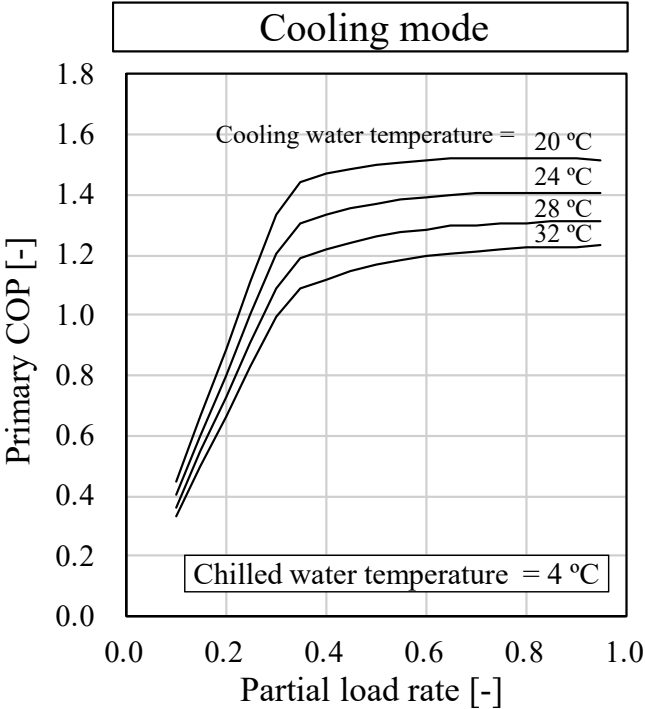
# Characteristics of module heat pump chiller

Water flow rate = Nominal flow rate  
Temperature difference = 5°C × partial load rate

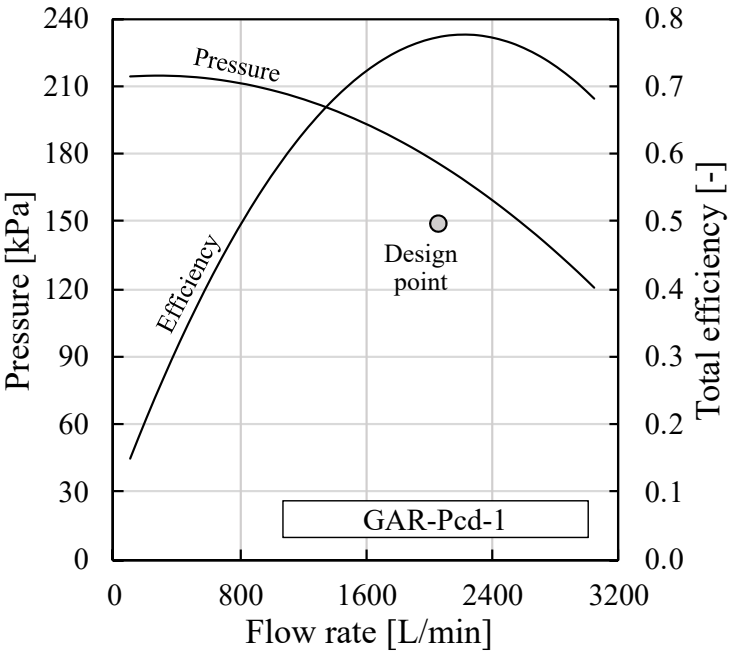
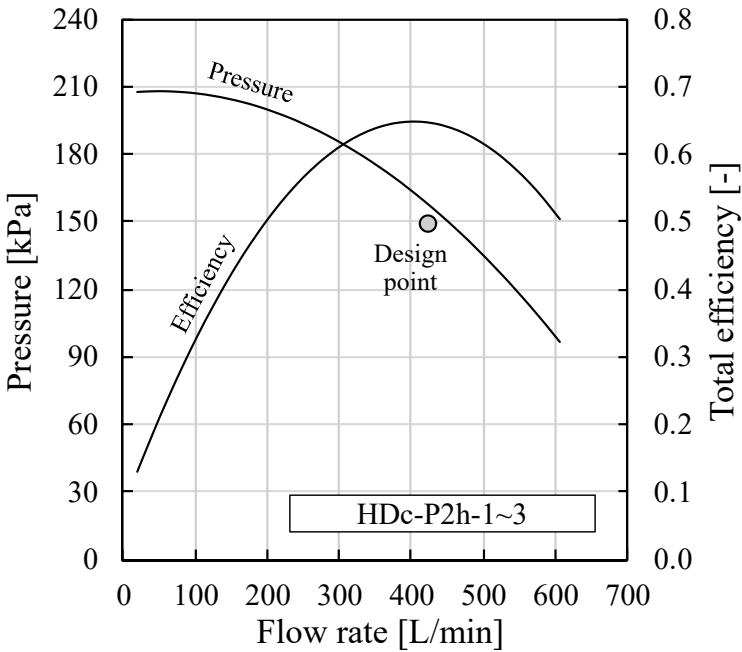
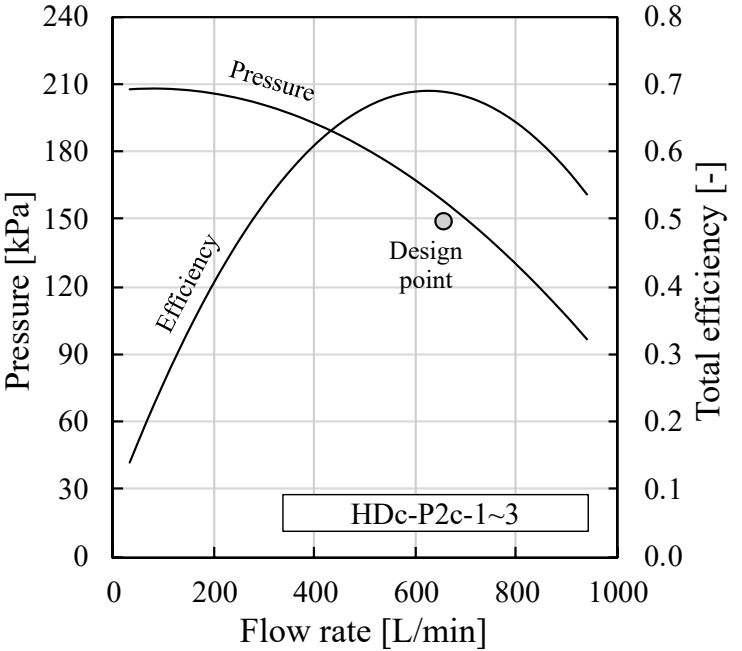
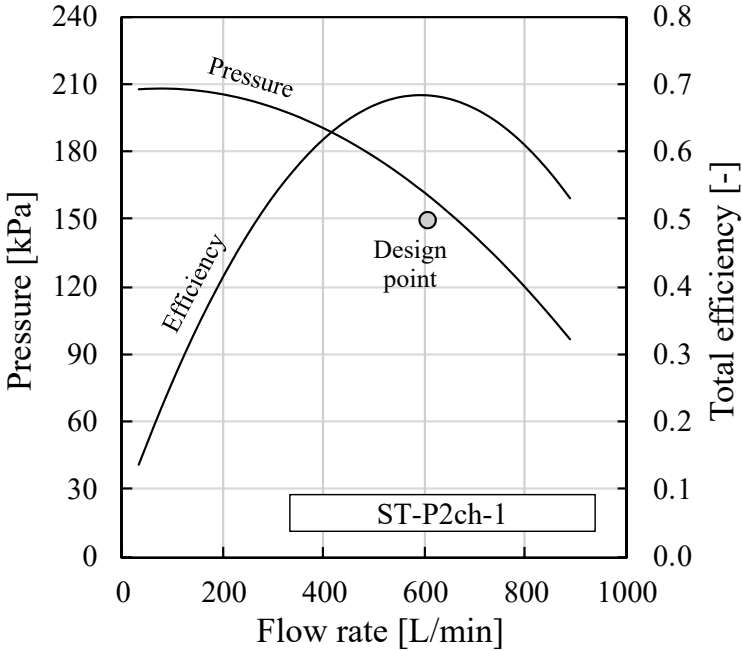
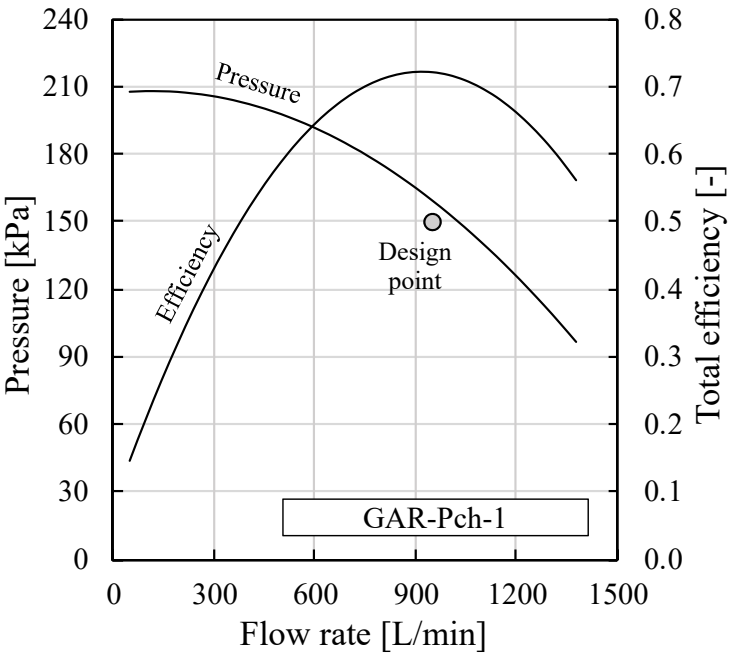
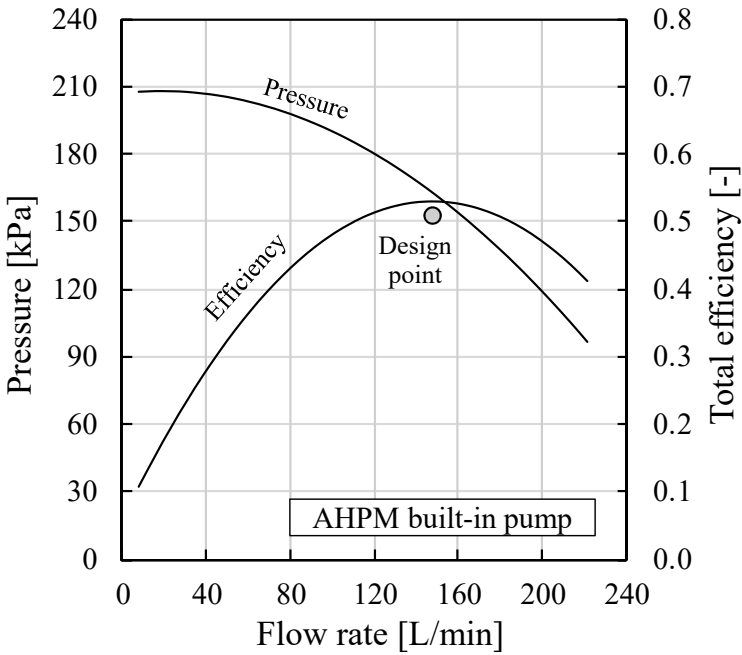


# Characteristics of direct fired absorption chiller

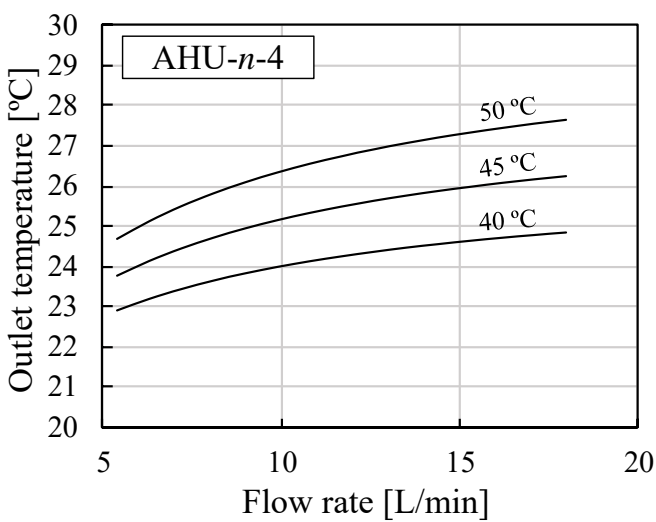
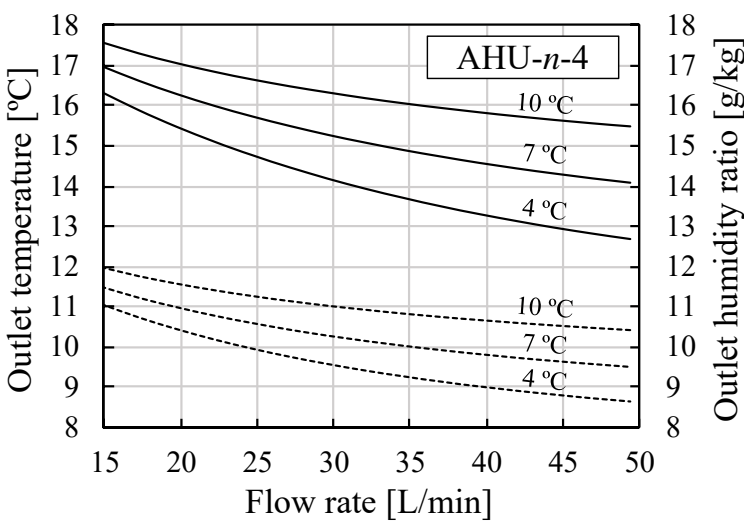
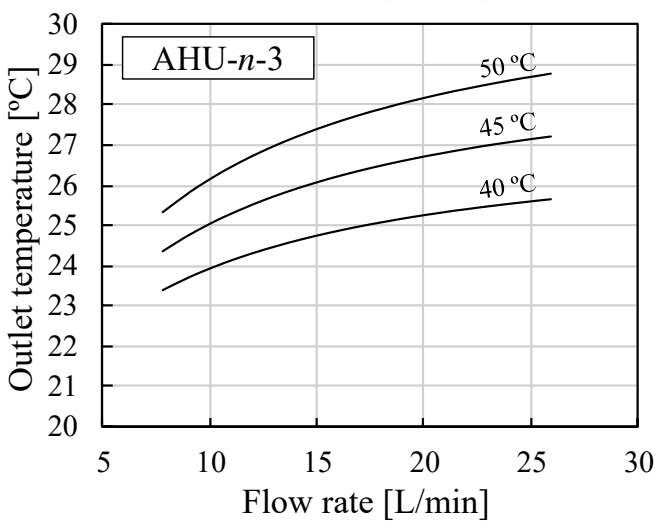
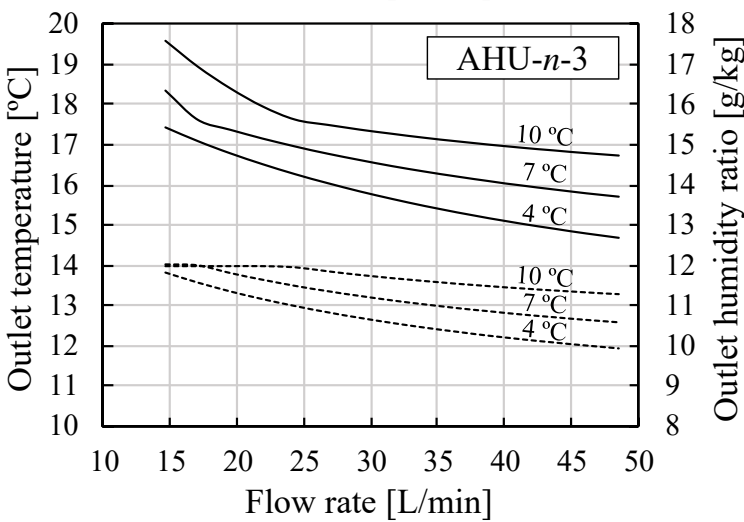
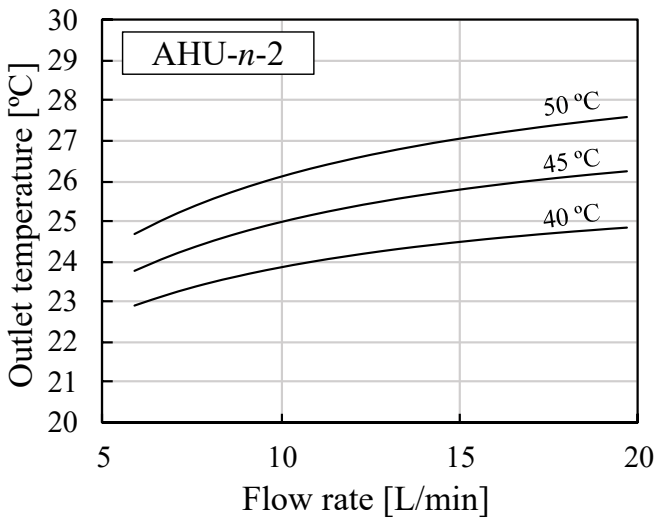
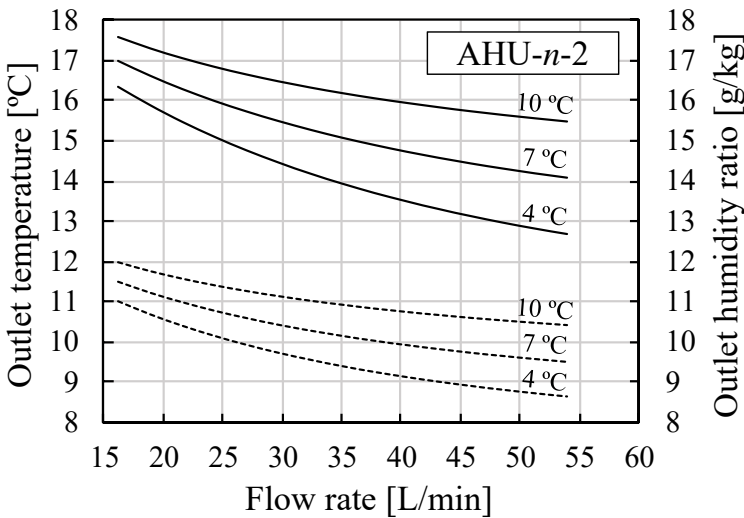
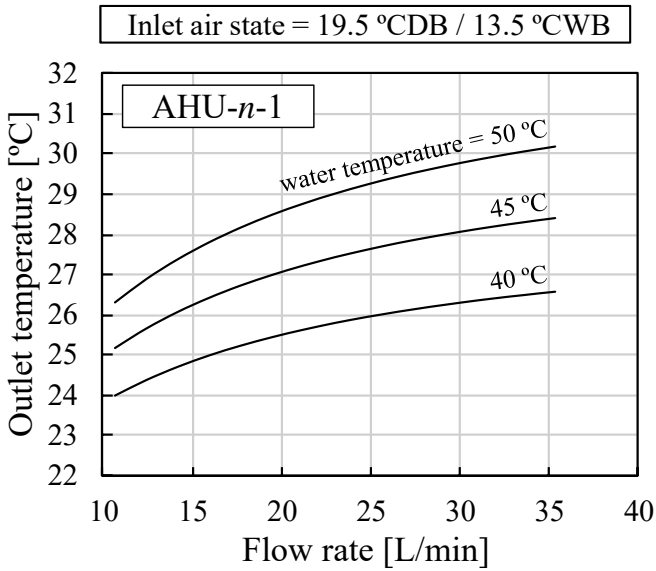
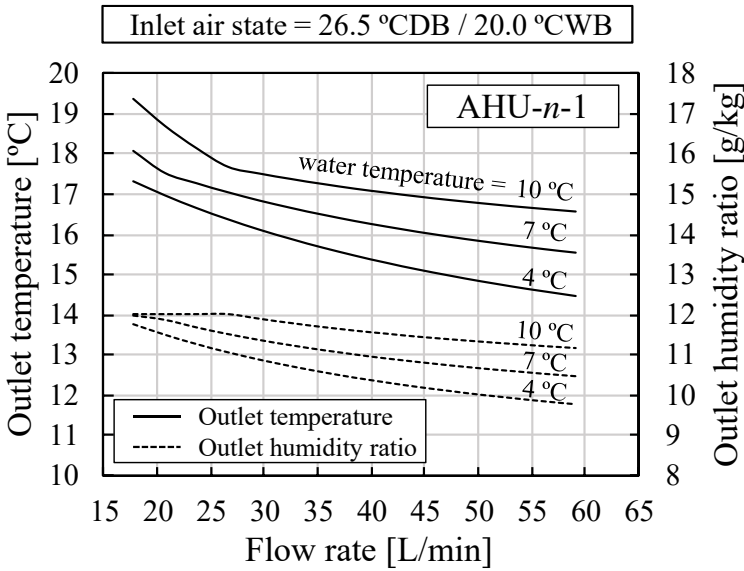
Chilled or hot water flow rate = Nominal flow rate, Cooling water flow rate = Nominal flow rate  
Temperature difference = 5°C × partial load rate



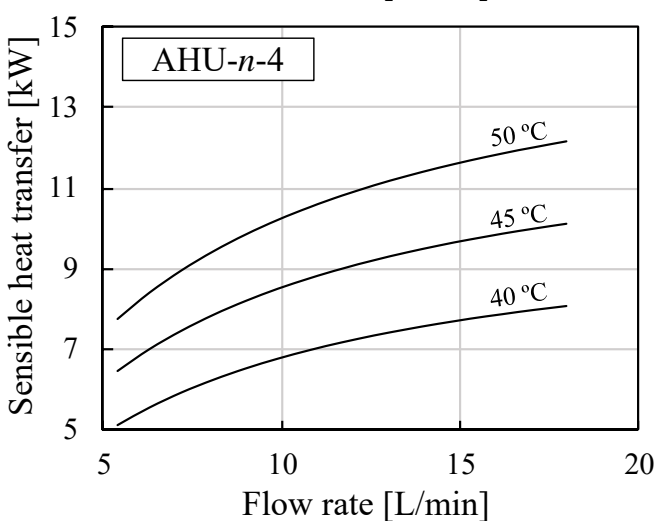
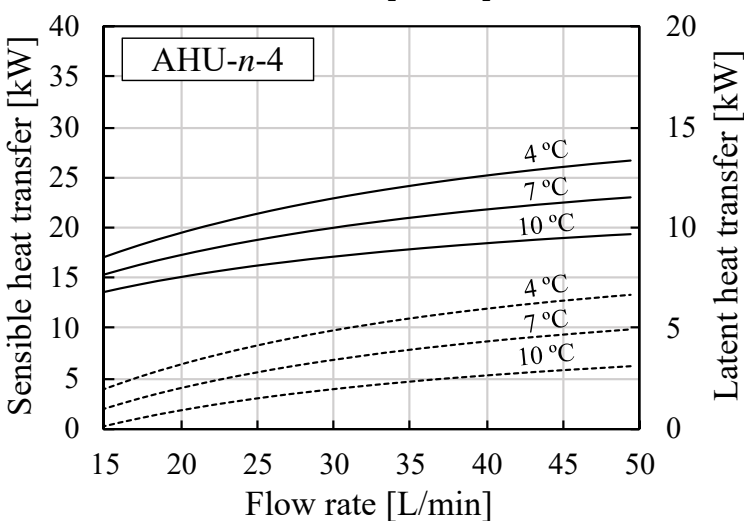
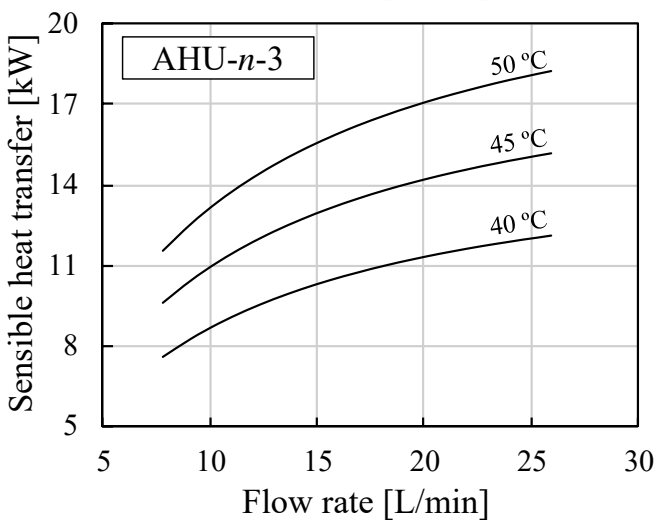
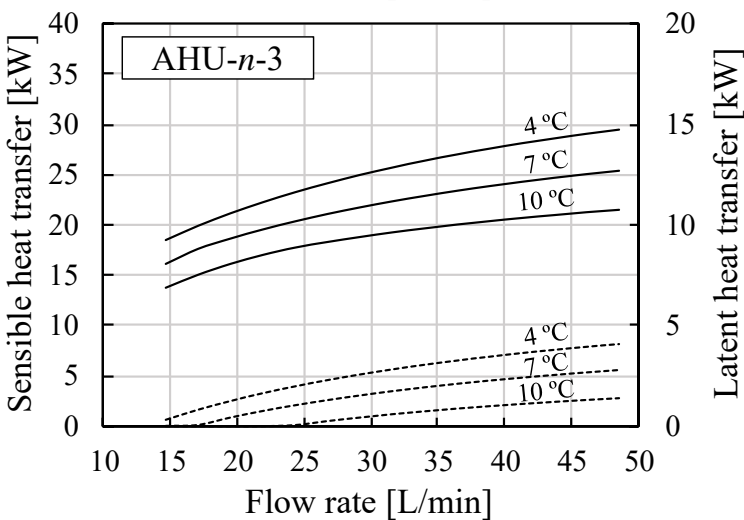
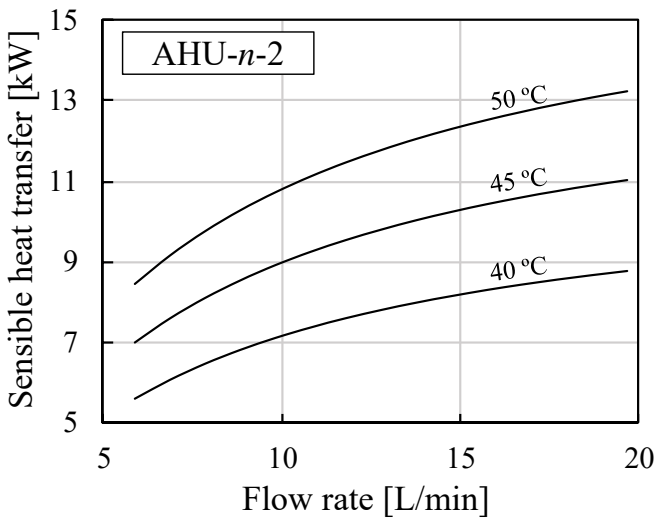
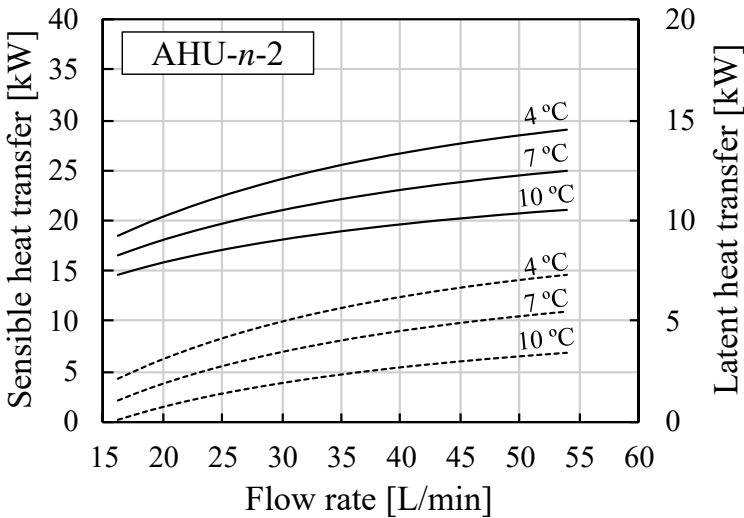
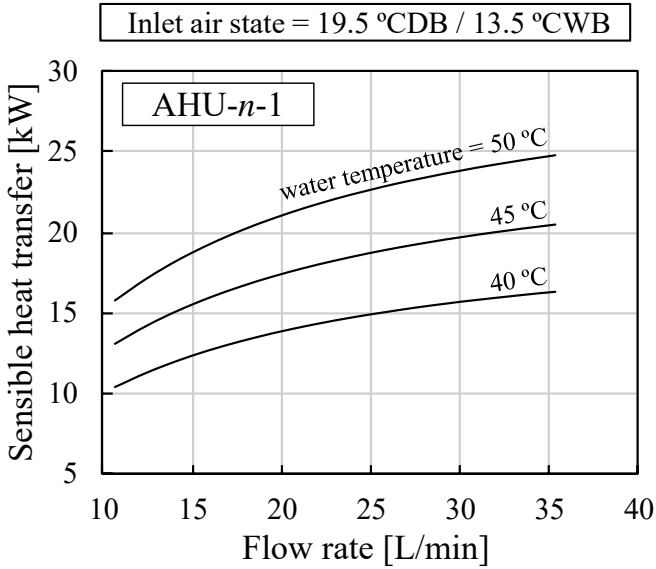
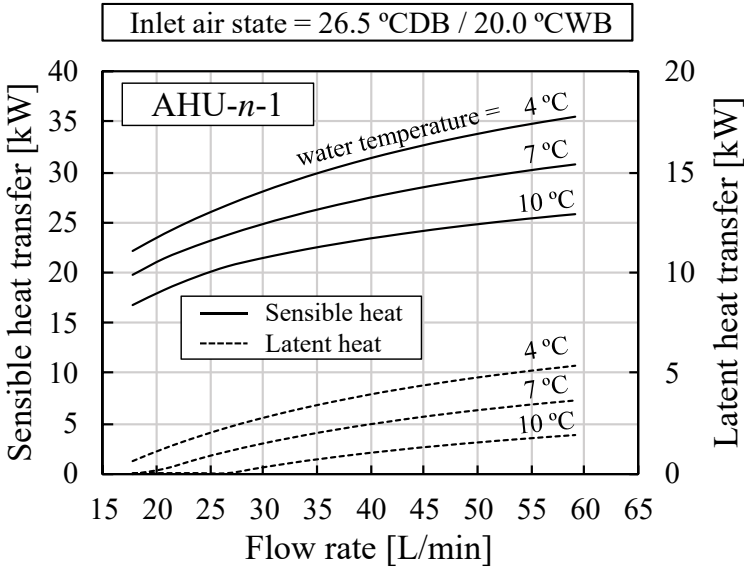
# Characteristics of pumps



# Characteristics of cooling and heating coils

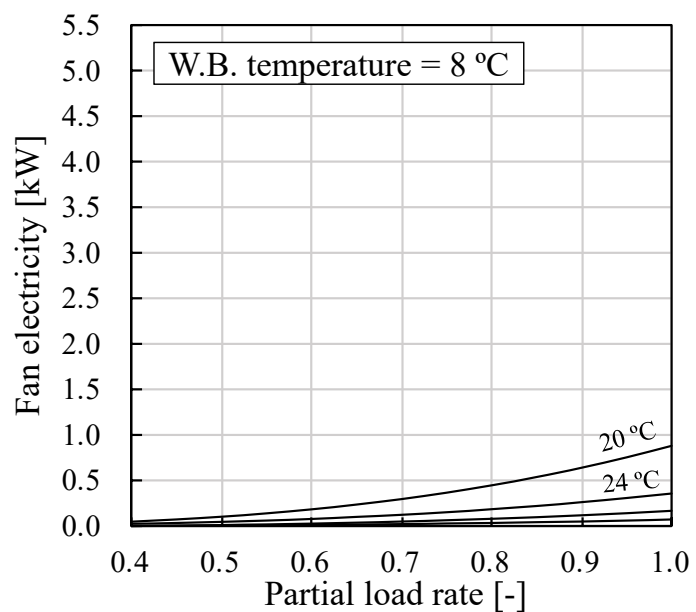
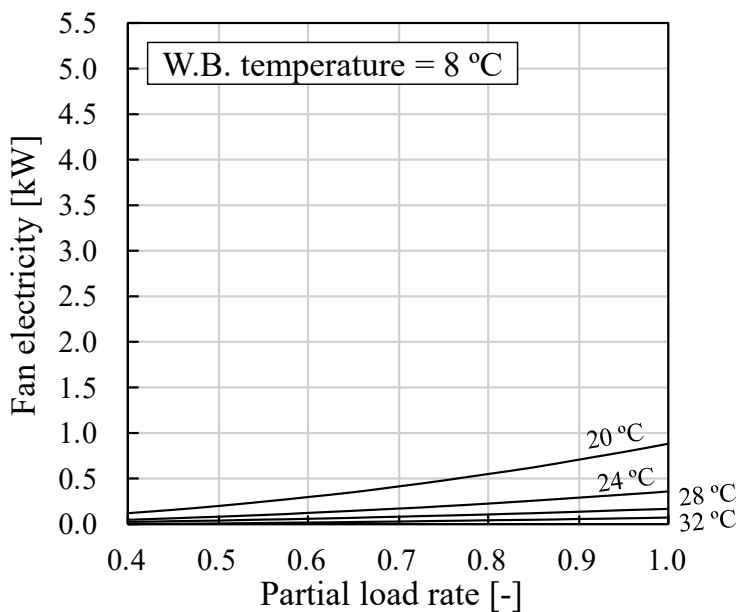
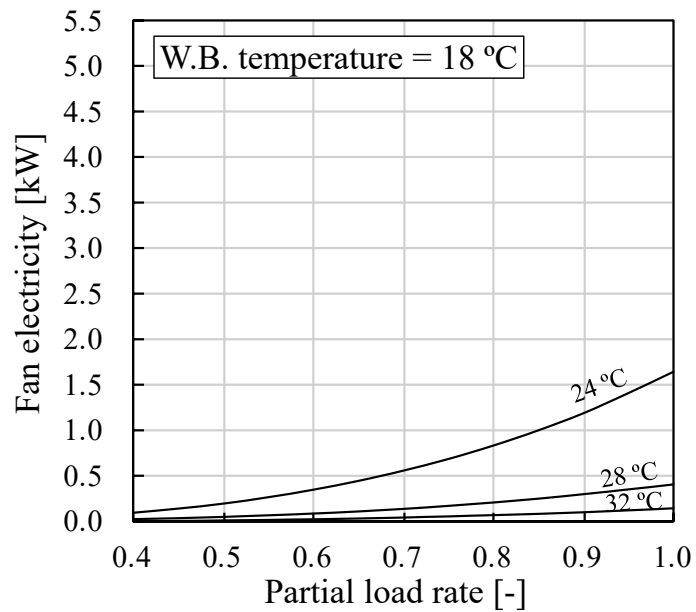
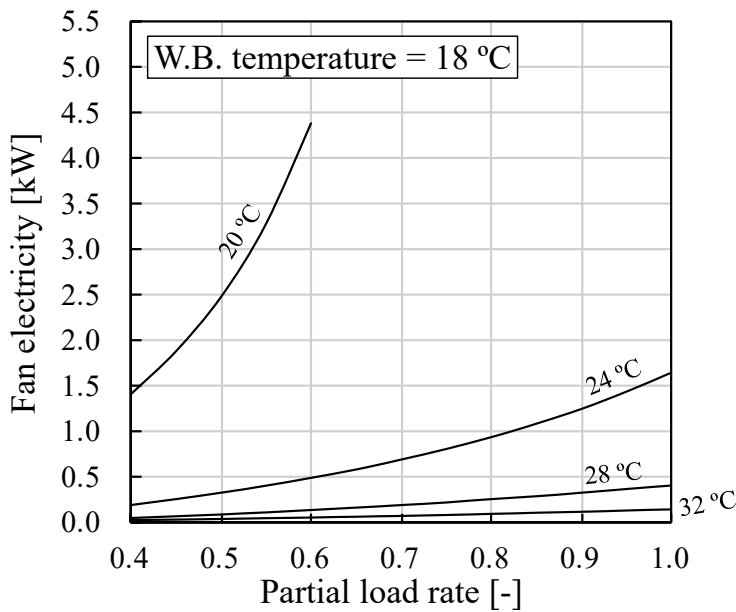
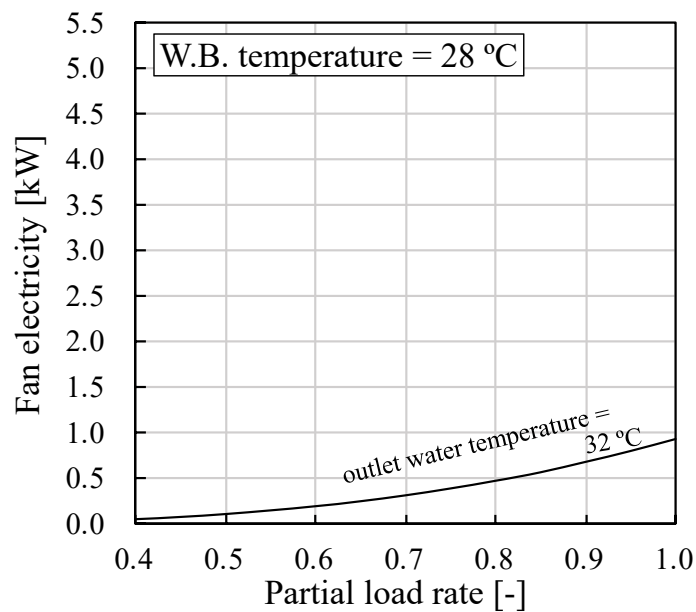
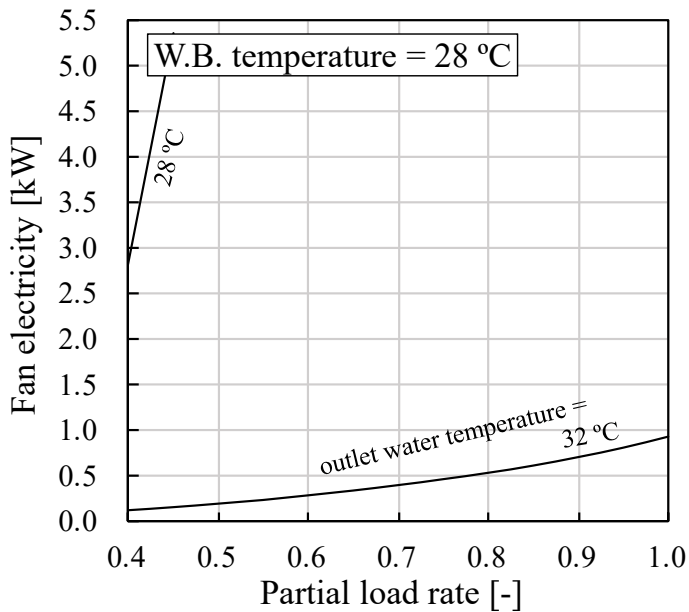


# Characteristics of cooling and heating coils



# Characteristics of cooling tower

Cooling water flow rate = const.  
Cooling water temperature difference =  $5^{\circ}\text{C} \times \text{partial load rate}$

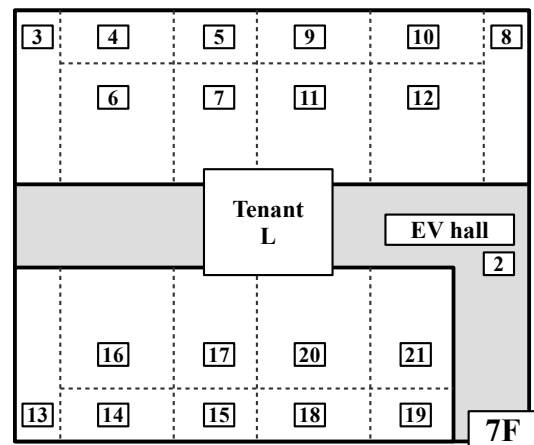
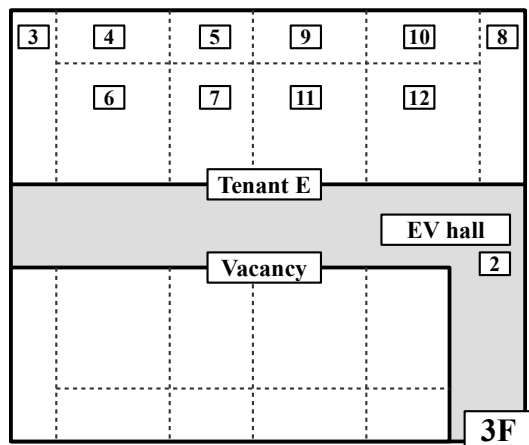
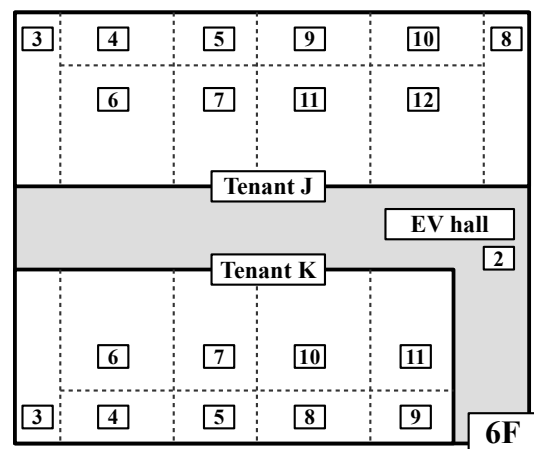
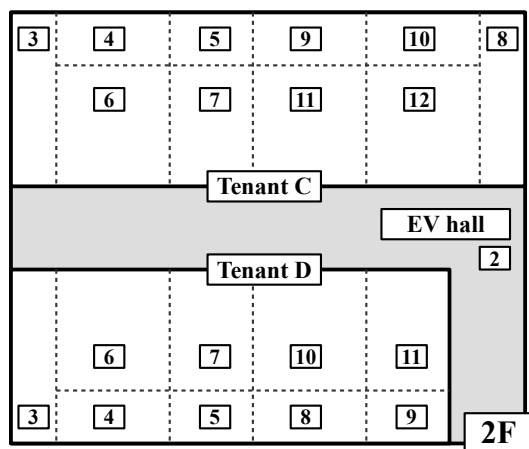
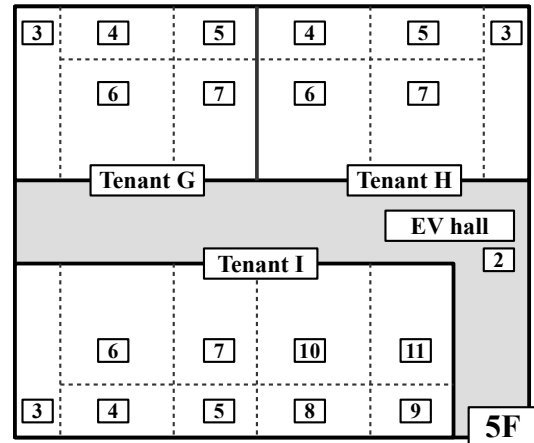
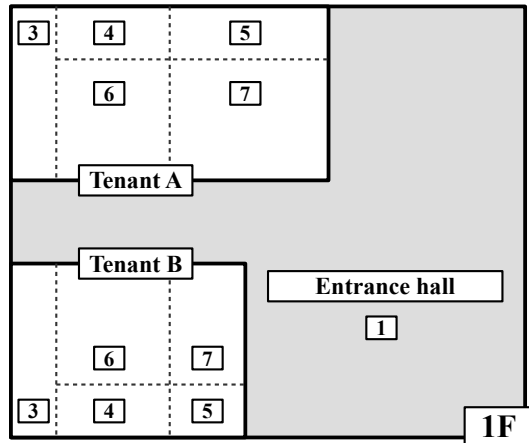


Appendix 3    Tenants and workers





## Tenant name and zone number

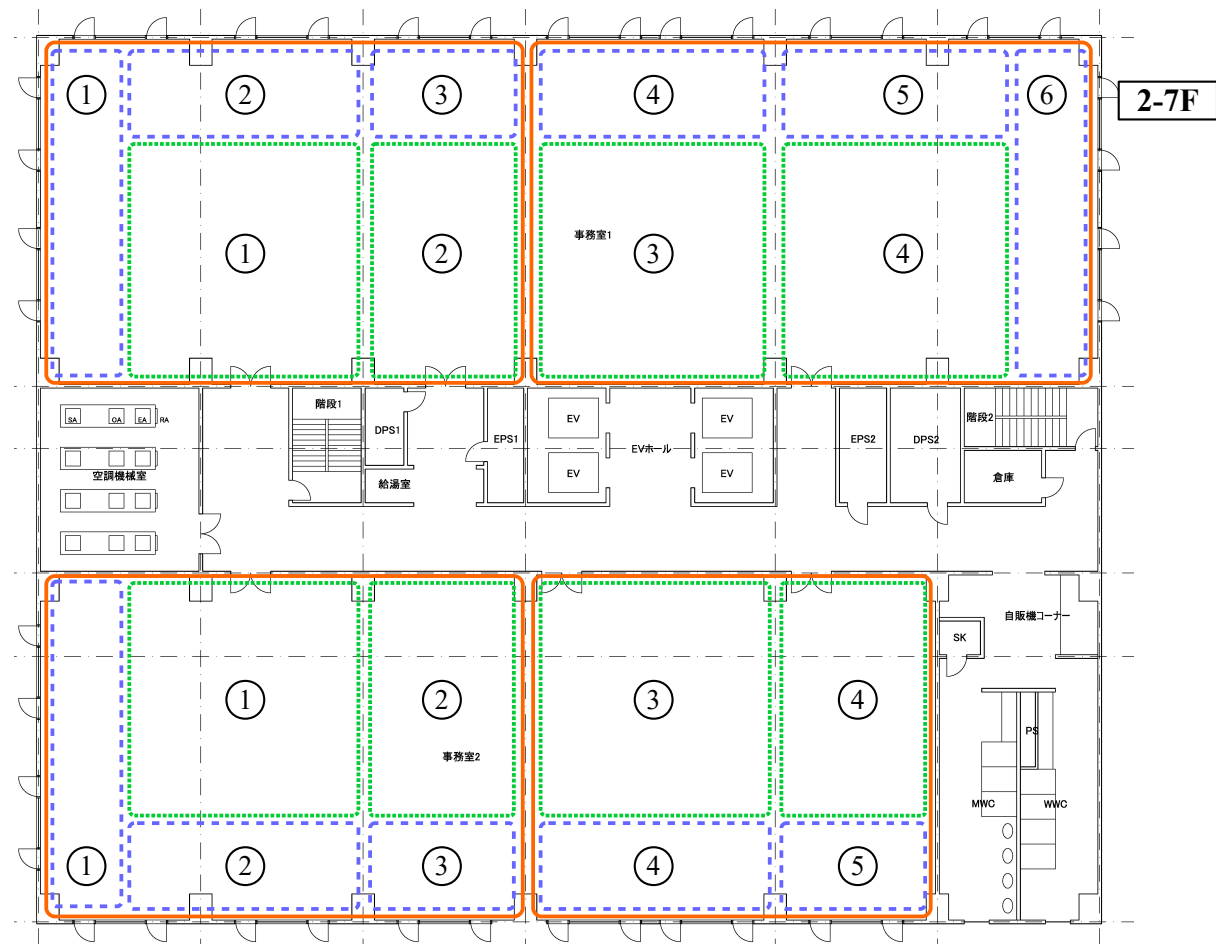


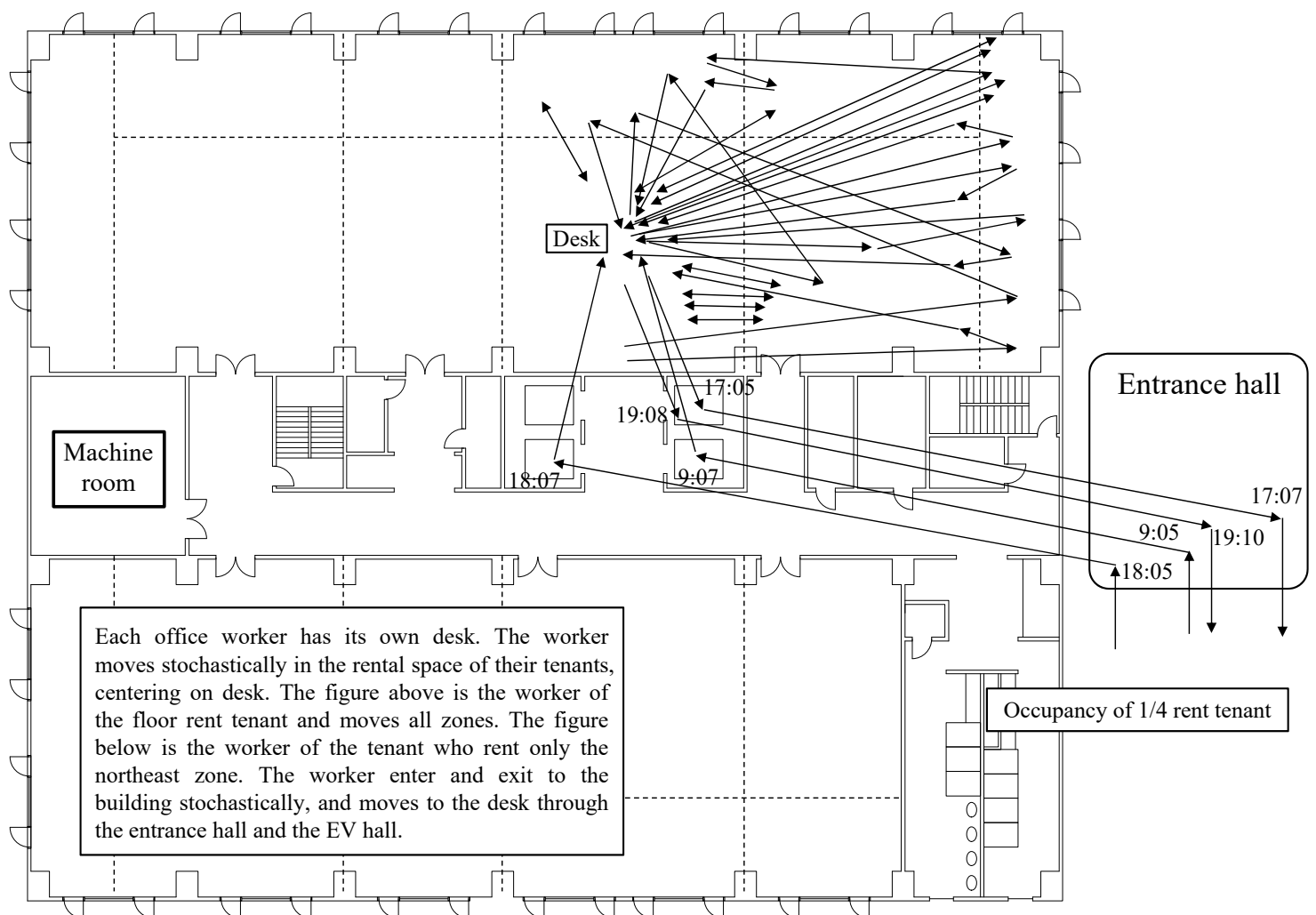
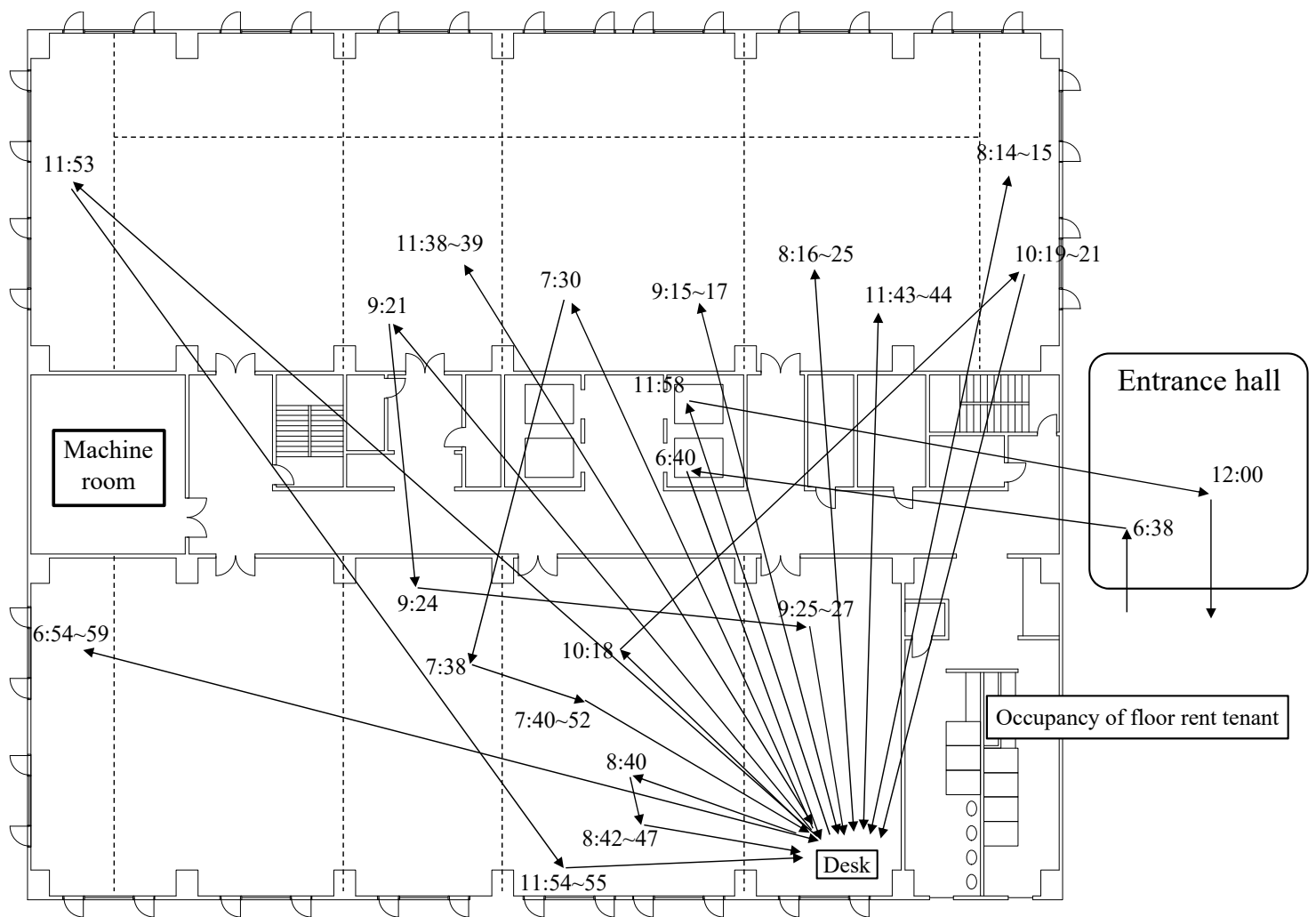
1 ~ 21 : zone Index

## Tenant List

ID	Industry category	Male	Female	Start	End	Floor
A	Real Estate	36	14	9:00	18:00	364.0
B	Finance or Insurance	22	4	9:00	18:00	273.0
C	Manufacturing	42	4	9:10	18:10	595.0
D	Information and Communications	26	7	9:00	18:00	504.0
E	Wholesale or Retailing	65	7	8:30	17:30	595.0
F	Construction	92	14	8:30	17:30	1099.0
G	Wholesale or Retailing	30	4	9:10	18:10	273.0
H	Finance or Insurance	36	8	10:00	19:00	322.0
ID	Real Estate	49	8	9:00	18:00	504.0
J	Manufacturing	50	8	9:00	18:00	595.0
K	Traffic or Postal Service	43	5	9:00	18:00	504.0
L	Information and Communications	91	12	8:30	17:30	1099.0

## Tenant and VAV zone index







No.	Device ID	Instance No.	Name	Tenant	Zone	Sex	Age	Hight	Weight
1	10710x	1	Konno Kamio	A:RealEstate	1-NWP	Female	37	161.5	52.9
2	10710x	2	Itou Kashimoto	A:RealEstate	1-NWP	Female	61	153.6	49.9
3	10710x	3	Horiguchi Toshitaka	A:RealEstate	1-NWP	Female	27	154.0	42.5
4	10710x	4	Itagaki Tsuruoka	A:RealEstate	1-NWP	Male	49	175.1	71.5
5	10710x	5	Kurita Seiwa	A:RealEstate	1-NWP	Male	65	170.3	60.8
6	10710x	6	Maruyama Asada	A:RealEstate	1-NWP	Male	28	173.9	66.3
7	10710x	7	Yamaguchi Yohei	A:RealEstate	1-NWP	Male	54	172.3	54.2
8	10710x	8	Takahira Haraguchi	A:RealEstate	1-NWP	Male	45	182.7	68.5
9	10710x	9	Kajita Saga	A:RealEstate	1-NWP	Male	27	164.3	56.3
10	10710x	10	Kimura Keihiko	A:RealEstate	1-NWP	Male	45	163.4	70.7
11	10710x	11	Yoshikawa Teramoto	A:RealEstate	1-NP-1	Male	21	163.4	63.9
12	10710x	12	Hayama Oota	A:RealEstate	1-NP-1	Female	63	153.3	54.1
13	10710x	13	Takahashi Kimiro	A:RealEstate	1-NP-1	Male	65	172.9	77.3
14	10710x	14	Nakagawa Igarashi	A:RealEstate	1-NP-1	Male	36	174.3	73.2
15	10710x	15	Sekiya Ooe	A:RealEstate	1-NP-1	Female	49	156.1	56.1
16	10710x	16	Kosaka Kangdaige	A:RealEstate	1-NP-2	Male	25	177.1	80.6
17	10710x	17	Kaneko Kanesen	A:RealEstate	1-NP-2	Male	67	172.5	62.5
18	10710x	18	Oohara Hamada	A:RealEstate	1-NP-2	Female	43	162.8	51.8
19	10710x	19	Seizan Takimoto	A:RealEstate	1-NP-2	Female	27	160.6	50.9
20	10710x	20	Aoki Terasaka	A:RealEstate	1-NP-2	Female	66	152.0	63.0
21	10710x	21	Watanabe Kinoshita	A:RealEstate	1-NP-2	Female	45	161.0	67.2
22	10710x	22	Suzuki Ishige	A:RealEstate	1-NP-2	Female	54	154.7	41.1
23	10710x	23	Yamamoto Kensetsugu	A:RealEstate	1-NP-2	Female	38	160.5	57.1
24	10710x	24	Nanba Ike	A:RealEstate	1-NP-2	Female	41	166.8	54.3
25	10710x	25	Koyanagi Scripture	A:RealEstate	1-NP-2	Male	55	168.5	65.9
26	10710x	26	Suzuki Kazuo	A:RealEstate	1-NP-2	Male	25	174.4	60.4
27	10710x	27	Takagi Tomonori	A:RealEstate	1-NI-1	Female	49	160.2	55.0
28	10710x	28	Nishitani Kaoru	A:RealEstate	1-NI-1	Female	45	158.9	47.5
29	10710x	29	Tamura Alltogether	A:RealEstate	1-NI-1	Female	23	164.4	53.7
30	10710x	30	Fujimoto Shintoshrine	A:RealEstate	1-NI-1	Male	63	170.7	56.5
31	10710x	31	Rin Tomohiko	A:RealEstate	1-NI-1	Female	25	162.6	59.6
32	10710x	32	Matsunaga Shigemura	A:RealEstate	1-NI-1	Female	35	151.4	49.9
33	10710x	33	Hashimoto Matsukawa	A:RealEstate	1-NI-1	Male	27	168.7	75.0
34	10710x	34	Isaka Oosaki	A:RealEstate	1-NI-1	Female	45	152.5	56.2
35	10710x	35	Itou Keizo	A:RealEstate	1-NI-2	Female	51	162.6	53.4
36	10710x	36	Fujii Mitsuki	A:RealEstate	1-NI-2	Male	29	172.5	64.7
37	10710x	37	Ogawa Chihiro	A:RealEstate	1-NI-2	Male	25	166.5	63.4
38	10710x	38	Satou Shingo	A:RealEstate	1-NI-2	Female	38	159.2	44.4
39	10710x	39	Kinoshita Shinwa	A:RealEstate	1-NI-2	Female	35	165.8	43.4
40	10710x	40	Itou Feng	A:RealEstate	1-NI-2	Male	62	168.7	65.1
41	10710x	41	Kitaura Shigeyuki	A:RealEstate	1-NI-2	Male	62	162.2	71.5
42	10710x	42	Watanabe Kaname	A:RealEstate	1-NI-2	Male	61	164.0	63.2
43	10710x	43	Iwashita Takaaki	A:RealEstate	1-NI-2	Male	62	172.7	78.5
44	10710x	44	Takeuchi Beimura	A:RealEstate	1-NI-2	Female	55	154.4	58.9
45	10710x	45	Ogura Kaihyo	A:RealEstate	1-NI-2	Female	45	159.9	52.5
46	10710x	46	Saito Shouzou	A:RealEstate	1-NI-2	Male	55	162.6	67.8
47	10710x	47	Kan Teraguchi	B: FinanceOrInsurance	1-SWP	Female	48	157.5	56.4
48	10710x	48	Itou Kawai	B: FinanceOrInsurance	1-SWP	Female	25	161.7	56.1
49	10710x	49	Kuroda Ban	B: FinanceOrInsurance	1-SWP	Female	43	162.4	53.4
50	10710x	50	Itou Hatano	B: FinanceOrInsurance	1-SWP	Male	55	175.9	73.2

No.	Device ID	Instance No.	Name	Tenant	Zone	Sex	Age	Hight	Weight
51	10710x	51	Sakurai Tao	B: FinanceOrInsurance	1-SWP	Female	39	166.4	45.4
52	10710x	52	Watanabe Kuniaki	B: FinanceOrInsurance	1-SWP	Male	58	155.6	76.8
53	10710x	53	Takakura Asai	B: FinanceOrInsurance	1-SWP	Male	28	180.1	76.6
54	10710x	54	Nagao Kantaro	B: FinanceOrInsurance	1-SP-1	Male	25	183.4	61.5
55	10710x	55	Kaneko Itano	B: FinanceOrInsurance	1-SP-1	Male	34	167.1	71.5
56	10710x	56	Matsumoto Mawatari	B: FinanceOrInsurance	1-SP-1	Female	23	151.1	43.5
57	10710x	57	Kawarazaki Tadahito	B: FinanceOrInsurance	1-SP-1	Female	31	157.4	56.6
58	10710x	58	Shibata Keuma	B: FinanceOrInsurance	1-SP-1	Female	42	157.8	54.6
59	10710x	59	Maruta Inohara	B: FinanceOrInsurance	1-SP-1	Male	31	172.0	65.3
60	10710x	60	Ide Oku	B: FinanceOrInsurance	1-SP-1	Male	52	170.0	58.6
61	10710x	61	Takahashi Ichigo	B: FinanceOrInsurance	1-SP-1	Female	52	156.7	47.0
62	10710x	62	Sumiyoshi Daisuke	B: FinanceOrInsurance	1-SP-2	Male	48	179.4	65.3
63	10710x	63	Kameyama Kaki	B: FinanceOrInsurance	1-SP-2	Female	55	162.7	58.7
64	10710x	64	Koike Iwamura	B: FinanceOrInsurance	1-SP-2	Female	45	165.4	52.6
65	10710x	65	Miura Un-ichi	B: FinanceOrInsurance	1-SI-1	Male	42	168.8	66.1
66	10710x	66	Yamazaki Shogun	B: FinanceOrInsurance	1-SI-1	Female	49	150.9	42.2
67	10710x	67	Matsuda Kusaba	B: FinanceOrInsurance	1-SI-1	Male	33	166.5	77.6
68	10710x	68	Fuke Ooiwa	B: FinanceOrInsurance	1-SI-1	Female	21	152.3	53.8
69	10710x	69	Imamura Sadao	B: FinanceOrInsurance	1-SI-1	Male	25	170.4	65.3
70	10710x	70	Ueno Kazama	B: FinanceOrInsurance	1-SI-1	Male	23	165.9	62.5
71	10710x	71	Kusuda Tamami	B: FinanceOrInsurance	1-SI-1	Male	57	175.6	76.8
72	10710x	72	Nakata Kenya	B: FinanceOrInsurance	1-SI-1	Male	45	170.0	58.5
73	10710x	73	Satou Chikara	B: FinanceOrInsurance	1-SI-1	Female	66	158.7	46.9
74	10710x	74	Hitomi Tadane	B: FinanceOrInsurance	1-SI-1	Female	53	149.6	56.7
75	10710x	75	Kasahara Mukawa	B: FinanceOrInsurance	1-SI-2	Female	43	165.5	48.8
76	10710x	76	Adachi Nishizaki	B: FinanceOrInsurance	1-SI-2	Male	61	160.4	63.2
77	10710x	77	Hachimaki Shinji	B: FinanceOrInsurance	1-SI-2	Male	59	170.4	71.9
78	10710x	78	Ikeda Naruse	B: FinanceOrInsurance	1-SI-2	Male	56	172.1	61.0
79	10710x	79	Toyama Takashi	B: FinanceOrInsurance	1-SI-2	Male	31	177.6	56.9
80	10710x	80	Fukuda Takataka	B: FinanceOrInsurance	1-SI-2	Male	26	179.6	68.3
81	10710x	81	Hirokawa Isozaki	B: FinanceOrInsurance	1-SI-2	Female	57	162.8	63.4
82	10710x	82	Yamamura Kitsune	B: FinanceOrInsurance	1-SI-2	Male	21	175.0	64.5
83	10710x	83	Inoue Mase	B: FinanceOrInsurance	1-SI-2	Male	27	179.5	54.2
84	10710x	84	Tashiro Tatuichiro	B: FinanceOrInsurance	1-SI-2	Male	35	178.6	64.8
85	10710x	85	Wada Ninichi	B: FinanceOrInsurance	1-SI-2	Male	58	173.5	64.1
86	10710x	86	Wakabayashi Nakazawa	B: FinanceOrInsurance	1-SI-2	Female	22	158.4	57.2
87	10710x	87	Ishii Takeo	B: FinanceOrInsurance	1-SI-2	Male	49	175.3	74.2
88	10710x	88	Iguchi Ide	B: FinanceOrInsurance	1-SI-2	Male	24	168.2	64.5
89	10720x	1	Satou Fujino	C: Manufacturing	2-NWP	Male	34	171.5	65.1
90	10720x	2	Yamamoto Kunikari	C: Manufacturing	2-NWP	Female	51	158.8	42.3
91	10720x	3	Sugimoto Seisei	C: Manufacturing	2-NWP	Male	24	175.9	72.6
92	10720x	4	Fujii Nasu	C: Manufacturing	2-NWP	Male	53	163.3	81.2
93	10720x	5	Shimizu Okutani	C: Manufacturing	2-NWP	Male	25	165.7	51.0
94	10720x	6	Uchida Sayama	C: Manufacturing	2-NWP	Male	64	169.3	71.9
95	10720x	7	Yamamoto Yoshihide	C: Manufacturing	2-NWP	Male	35	168.7	80.4
96	10720x	8	Kimura Kouichiro	C: Manufacturing	2-NWP	Male	63	163.7	70.2
97	10720x	9	Inoue Takeuchi	C: Manufacturing	2-NP-1	Male	52	173.5	66.4
98	10720x	10	Kurihara Hakuhiko	C: Manufacturing	2-NP-1	Male	42	169.1	88.5
99	10720x	11	Morinaga Norikuni	C: Manufacturing	2-NP-1	Female	48	160.6	54.1
100	10720x	12	Tanaka Akira	C: Manufacturing	2-NP-1	Female	51	155.3	59.9

No.	Device ID	Instance No.	Name	Tenant	Zone	Sex	Age	Hight	Weight
101	10720x	13	Uno Kawazoe	C: Manufacturing	2-NP-1	Male	45	167.5	52.5
102	10720x	14	Yamanaka Yokouchi	C: Manufacturing	2-NP-1	Male	56	171.0	54.8
103	10720x	15	Kikuchi Tinto	C: Manufacturing	2-NP-2	Female	52	157.6	59.7
104	10720x	16	Tsuruta Wakabayashi	C: Manufacturing	2-NP-2	Male	31	182.2	76.3
105	10720x	17	Yamazaki Tomura-Kun	C: Manufacturing	2-NP-2	Female	43	162.5	47.4
106	10720x	18	Yoshida Tejima	C: Manufacturing	2-NP-3	Male	24	178.8	62.2
107	10720x	19	Fujimoto Ushioda	C: Manufacturing	2-NP-3	Male	44	170.2	82.6
108	10720x	20	Atsuta Omonehitome	C: Manufacturing	2-NP-3	Male	47	175.0	66.5
109	10720x	21	Terasaki Kazunori	C: Manufacturing	2-NP-3	Male	56	167.2	71.5
110	10720x	22	Tachibana Taniguchi	C: Manufacturing	2-NP-3	Male	25	171.0	78.7
111	10720x	23	Ooyama Shinta	C: Manufacturing	2-NP-3	Male	38	178.1	70.9
112	10720x	24	Suzuki Kouduki	C: Manufacturing	2-NP-3	Male	68	168.0	70.2
113	10720x	25	Sugiura Hamano	C: Manufacturing	2-NP-3	Female	33	162.0	52.1
114	10720x	26	Kondou Yoda	C: Manufacturing	2-NP-3	Male	55	177.1	78.4
115	10720x	27	Suzuki Norihiro	C: Manufacturing	2-NP-4	Male	26	167.3	67.5
116	10720x	28	Iida Koji	C: Manufacturing	2-NP-4	Male	27	171.3	58.1
117	10720x	29	Narikawa Tetsuyoshi	C: Manufacturing	2-NP-4	Male	46	164.8	69.7
118	10720x	30	Asada Tricolor	C: Manufacturing	2-NP-4	Male	39	176.0	72.3
119	10720x	31	Uno Tenzuro	C: Manufacturing	2-NP-4	Male	24	164.5	65.8
120	10720x	32	Doi Kannosuke	C: Manufacturing	2-NP-4	Female	53	158.2	45.2
121	10720x	33	Miyaji Kyou	C: Manufacturing	2-NEP	Female	44	161.6	43.1
122	10720x	34	Shigematsu Maejima	C: Manufacturing	2-NEP	Male	58	177.8	60.6
123	10720x	35	Kawakami Onigashira	C: Manufacturing	2-NEP	Female	66	164.2	57.2
124	10720x	36	Tsurumi Sugisaki	C: Manufacturing	2-NEP	Female	52	158.5	58.9
125	10720x	37	Fukazawa Kozo	C: Manufacturing	2-NEP	Male	32	160.2	67.0
126	10720x	38	Oooka Juzo	C: Manufacturing	2-NEP	Female	45	159.4	49.2
127	10720x	39	Ishii Yuya	C: Manufacturing	2-NEP	Male	32	183.3	46.3
128	10720x	40	Tanaka Satoru	C: Manufacturing	2-NEP	Male	29	181.9	68.1
129	10720x	41	Ooshita Kawashima	C: Manufacturing	2-NEP	Female	49	162.9	52.7
130	10720x	42	Matsumoto Shingira	C: Manufacturing	2-NI-1	Male	37	172.8	64.8
131	10720x	43	Nakamura Muramatsu	C: Manufacturing	2-NI-1	Male	44	174.3	74.8
132	10720x	44	Kosugi Tomoyasu	C: Manufacturing	2-NI-1	Male	21	176.2	53.3
133	10720x	45	Ogura Usui	C: Manufacturing	2-NI-1	Male	41	183.4	75.6
134	10720x	46	Seizan Hayasaka	C: Manufacturing	2-NI-1	Male	62	170.9	62.1
135	10720x	47	Suzuki Watanabe	C: Manufacturing	2-NI-1	Male	63	162.2	60.0
136	10720x	48	Ootake Satya	C: Manufacturing	2-NI-1	Male	58	168.2	77.9
137	10720x	49	Uemura Iwano	C: Manufacturing	2-NI-1	Male	58	165.5	70.7
138	10720x	50	Tamura Tomoyasu	C: Manufacturing	2-NI-1	Female	32	152.6	46.4
139	10720x	51	Shimizu Sezaki	C: Manufacturing	2-NI-1	Male	57	174.8	58.0
140	10720x	52	Kobayashi Yotaro	C: Manufacturing	2-NI-1	Male	25	177.3	62.2
141	10720x	53	Andou Sasanuma	C: Manufacturing	2-NI-1	Male	48	177.3	77.5
142	10720x	54	Itou Yuen	C: Manufacturing	2-NI-1	Male	35	174.0	71.1
143	10720x	55	Takada Toshimi	C: Manufacturing	2-NI-2	Male	25	176.3	51.6
144	10720x	56	Shimada Kuroyanagi	C: Manufacturing	2-NI-2	Female	45	162.1	55.7
145	10720x	57	Sakamoto Tomoaki	C: Manufacturing	2-NI-2	Male	55	166.0	75.9
146	10720x	58	Hoshino Mrs.Oshu	C: Manufacturing	2-NI-2	Male	42	172.9	59.1
147	10720x	59	Hishida Tetuya	C: Manufacturing	2-NI-3	Male	25	163.7	70.3
148	10720x	60	Shimada Satya	C: Manufacturing	2-NI-3	Female	45	151.7	45.4
149	10720x	61	Nakajima Fujishima	C: Manufacturing	2-NI-3	Male	55	169.4	73.6
150	10720x	62	Maeda Kawamoto	C: Manufacturing	2-NI-3	Male	39	164.3	81.1

No.	Device ID	Instance No.	Name	Tenant	Zone	Sex	Age	Hight	Weight
151	10720x	63	Katsuragawa Yaguchi	C: Manufacturing	2-NI-3	Male	41	171.8	85.7
152	10720x	64	Satou Sengoku	C: Manufacturing	2-NI-3	Male	49	169.7	83.1
153	10720x	65	Takahashi Akihiro	C: Manufacturing	2-NI-3	Male	57	167.3	57.6
154	10720x	66	Takashima Shinta	C: Manufacturing	2-NI-3	Male	66	165.1	59.5
155	10720x	67	Watanabe Zhouzhou	C: Manufacturing	2-NI-3	Male	26	173.1	76.4
156	10720x	68	Sakai Akimoto	C: Manufacturing	2-NI-3	Female	54	155.2	54.5
157	10720x	69	Nijijima Emori	C: Manufacturing	2-NI-3	Female	27	151.5	59.0
158	10720x	70	Shinjou Ekishi	C: Manufacturing	2-NI-3	Male	38	171.6	57.7
159	10720x	71	Maruyama Harigaya	C: Manufacturing	2-NI-3	Female	45	158.2	51.4
160	10720x	72	Kawamura Kuze	C: Manufacturing	2-NI-3	Male	69	168.7	68.6
161	10720x	73	Shimono Tosaka	C: Manufacturing	2-NI-3	Female	25	155.0	47.7
162	10720x	74	Takatsu Ichiki	C: Manufacturing	2-NI-3	Male	26	160.1	61.5
163	10720x	75	Tabuchi Honen	C: Manufacturing	2-NI-3	Male	25	171.3	65.8
164	10720x	76	Shouji Asahi	C: Manufacturing	2-NI-3	Male	44	185.9	68.5
165	10720x	77	Nakagawa Jun	C: Manufacturing	2-NI-4	Male	29	168.4	91.4
166	10720x	78	Yamaguchi Minoritai	C: Manufacturing	2-NI-4	Male	35	182.5	71.0
167	10720x	79	Suganuma Yoshiki	C: Manufacturing	2-NI-4	Female	26	170.7	50.5
168	10720x	80	Sugimoto Kenshin	C: Manufacturing	2-NI-4	Male	56	168.0	67.2
169	10720x	81	Kanazawa Shirasaka	C: Manufacturing	2-NI-4	Male	27	183.8	60.4
170	10720x	82	Tachikawa Shintaku	C: Manufacturing	2-NI-4	Female	25	156.3	53.5
171	10720x	83	Fukuhara Aoki	C: Manufacturing	2-NI-4	Female	47	153.1	46.2
172	10720x	84	Fukumoto Akanuma	C: Manufacturing	2-NI-4	Male	27	172.1	62.1
173	10720x	85	Hirao Shoshi	C: Manufacturing	2-NI-4	Male	68	164.9	61.3
174	10720x	86	Hattori Akatsuka	C: Manufacturing	2-NI-4	Male	32	172.3	51.0
175	10720x	87	Seki Takayoshi	C: Manufacturing	2-NI-4	Male	49	168.2	55.1
176	10720x	88	Takagi Yokoshima	C: Manufacturing	2-NI-4	Male	55	173.2	67.9
177	10720x	89	Yoshioka Takeo	C: Manufacturing	2-NI-4	Female	43	161.0	56.8
178	10720x	90	Katagiri Mao	C: Manufacturing	2-NI-4	Male	28	173.7	66.1
179	10720x	91	Ueno Takemi	C: Manufacturing	2-NI-4	Male	25	168.5	60.8
180	10720x	92	Udagawa Mituhiro	D: InformationAndCommu	2-SWP	Male	63	172.8	72.2
181	10720x	93	Sakurai Shigetaka	D: InformationAndCommu	2-SWP	Male	29	178.1	77.1
182	10720x	94	Koyama Kotaka	D: InformationAndCommu	2-SWP	Male	49	169.3	54.4
183	10720x	95	Hirabayashi Hisashiro	D: InformationAndCommu	2-SWP	Male	21	168.7	58.7
184	10720x	96	Kanzaki Koishi	D: InformationAndCommu	2-SWP	Male	41	177.2	76.5
185	10720x	97	Doi Sakai	D: InformationAndCommu	2-SP-1	Male	59	176.4	67.8
186	10720x	98	Yamaguchi Hiromasa	D: InformationAndCommu	2-SP-1	Male	32	168.9	73.2
187	10720x	99	Kitazawa Chungcheon	D: InformationAndCommu	2-SP-1	Female	42	162.0	52.2
188	10720x	100	Hamada Hayate	D: InformationAndCommu	2-SP-1	Female	32	162.3	56.7
189	10720x	101	Torii Funabashi	D: InformationAndCommu	2-SP-1	Male	42	178.6	64.0
190	10720x	102	Katou Kentaandyou	D: InformationAndCommu	2-SP-1	Male	46	168.7	81.1
191	10720x	103	Kitani Takashima	D: InformationAndCommu	2-SP-1	Male	62	170.5	58.2
192	10720x	104	Inoue Kobayashi	D: InformationAndCommu	2-SP-1	Male	53	168.9	62.2
193	10720x	105	Yano Akiyoshi	D: InformationAndCommu	2-SP-1	Male	45	168.4	68.2
194	10720x	106	Murai Ryuma	D: InformationAndCommu	2-SP-1	Male	23	178.0	68.7
195	10720x	107	Komine Kanazawa	D: InformationAndCommu	2-SP-2	Male	55	180.6	88.1
196	10720x	108	Ishimaru Tada	D: InformationAndCommu	2-SP-2	Male	49	167.7	75.3
197	10720x	109	Yoshimi Ooya	D: InformationAndCommu	2-SP-2	Male	58	168.7	44.9
198	10720x	110	Nishimura Izumi	D: InformationAndCommu	2-SP-3	Male	59	170.8	67.9
199	10720x	111	Mita Shinbun	D: InformationAndCommu	2-SP-3	Male	41	177.1	69.5
200	10720x	112	Matsumoto Shouji	D: InformationAndCommu	2-SP-4	Male	65	169.7	62.9

No.	Device ID	Instance No.	Name	Tenant	Zone	Sex	Age	Hight	Weight
201	10720x	113	Kawashita Nagori	D: InformationAndCommu	2-SP-4	Female	59	158.5	66.8
202	10720x	114	Iino Mitsunaga	D: InformationAndCommu	2-SP-4	Female	46	153.7	60.9
203	10720x	115	Tada Takashi	D: InformationAndCommu	2-SI-1	Male	58	168.6	69.5
204	10720x	116	Takayama Yukio	D: InformationAndCommu	2-SI-1	Male	61	167.7	66.0
205	10720x	117	Sasaki Tsuruki	D: InformationAndCommu	2-SI-1	Female	24	164.5	44.8
206	10720x	118	Matsuda Kunikari	D: InformationAndCommu	2-SI-1	Male	36	177.4	65.9
207	10720x	119	Enomoto Masayuki	D: InformationAndCommu	2-SI-1	Male	35	172.9	68.6
208	10720x	120	Araki Yamane	D: InformationAndCommu	2-SI-1	Female	27	150.8	61.4
209	10720x	121	Ookawa Otsujin	D: InformationAndCommu	2-SI-1	Male	52	160.3	93.0
210	10720x	122	Uno Sukue	D: InformationAndCommu	2-SI-1	Female	49	156.4	59.7
211	10720x	123	Lee Myonhyang	D: InformationAndCommu	2-SI-1	Female	26	153.1	43.1
212	10720x	124	Suzuki Akiyuki	D: InformationAndCommu	2-SI-1	Female	56	167.9	57.8
213	10720x	125	Tsunekawa Hisatomi	D: InformationAndCommu	2-SI-1	Male	41	174.5	73.9
214	10720x	126	Sato Akira	D: InformationAndCommu	2-SI-1	Male	28	165.6	58.8
215	10720x	127	Ono Kimiyoshi	D: InformationAndCommu	2-SI-1	Male	24	168.2	60.7
216	10720x	128	Chiba Satou	D: InformationAndCommu	2-SI-1	Female	28	163.6	49.8
217	10720x	129	Shibuya Sakaguchi	D: InformationAndCommu	2-SI-1	Male	45	168.9	52.5
218	10720x	130	Nakamura Shinnosuke	D: InformationAndCommu	2-SI-2	Female	31	160.2	51.2
219	10720x	131	Matsunaga Tsunema	D: InformationAndCommu	2-SI-2	Male	38	171.0	67.9
220	10720x	132	Ido Yagisawa	D: InformationAndCommu	2-SI-2	Female	35	156.5	49.0
221	10720x	133	Ishikawa Kawadu	D: InformationAndCommu	2-SI-2	Male	29	180.2	73.9
222	10720x	134	Shimizu Satake	D: InformationAndCommu	2-SI-2	Male	35	165.9	55.3
223	10720x	135	Kudou Miyoshi	D: InformationAndCommu	2-SI-2	Male	35	169.2	62.5
224	10720x	136	Mori Hachimaki	D: InformationAndCommu	2-SI-2	Female	44	158.4	55.6
225	10720x	137	Takahashi Takamori	D: InformationAndCommu	2-SI-2	Male	49	161.0	73.8
226	10720x	138	Matsumura Tomoaki	D: InformationAndCommu	2-SI-2	Male	23	164.1	75.5
227	10720x	139	Mizuguchi Ideta	D: InformationAndCommu	2-SI-2	Female	55	145.9	49.5
228	10720x	140	Moriyama Takebe	D: InformationAndCommu	2-SI-2	Male	41	168.5	49.2
229	10720x	141	Tanaka Kotobuki	D: InformationAndCommu	2-SI-2	Male	52	163.6	68.1
230	10720x	142	Itou Ike	D: InformationAndCommu	2-SI-2	Female	32	162.8	67.6
231	10720x	143	Toyokawa Longxu	D: InformationAndCommu	2-SI-3	Female	45	159.8	46.2
232	10720x	144	Suzuki Akitoshiakira	D: InformationAndCommu	2-SI-3	Male	37	175.0	89.9
233	10720x	145	Wakui Shiina	D: InformationAndCommu	2-SI-3	Male	26	164.1	56.6
234	10720x	146	Kuribayashi Kentaro	D: InformationAndCommu	2-SI-3	Male	33	156.5	85.6
235	10720x	147	Kobayashi Yasutaro	D: InformationAndCommu	2-SI-3	Female	34	151.9	47.4
236	10720x	148	Higashigawa Shouji	D: InformationAndCommu	2-SI-3	Male	29	170.6	54.3
237	10720x	149	Nagatsuka Sugawara	D: InformationAndCommu	2-SI-3	Male	63	170.5	48.1
238	10720x	150	Araki Watanabe	D: InformationAndCommu	2-SI-3	Male	51	172.2	72.5
239	10720x	151	Ukai Masanari	D: InformationAndCommu	2-SI-3	Male	45	173.6	66.9
240	10720x	152	Okumura Kimjongil	D: InformationAndCommu	2-SI-3	Female	32	163.3	48.7
241	10720x	153	Namiki Hachiman	D: InformationAndCommu	2-SI-3	Male	68	171.6	67.5
242	10720x	154	Arima Narikawa	D: InformationAndCommu	2-SI-3	Female	32	159.6	54.2
243	10720x	155	Akita Keiichiro	D: InformationAndCommu	2-SI-3	Female	53	155.5	49.9
244	10720x	156	Kiuchi Kenichi	D: InformationAndCommu	2-SI-3	Female	29	155.3	44.6
245	10720x	157	Harada Moritou	D: InformationAndCommu	2-SI-3	Male	48	171.6	82.7
246	10720x	158	Shimura Koichi	D: InformationAndCommu	2-SI-3	Female	43	169.7	56.9
247	10720x	159	Suzuki Yanase	D: InformationAndCommu	2-SI-4	Male	43	162.8	73.9
248	10720x	160	Oonuki Susumuman	D: InformationAndCommu	2-SI-4	Male	55	168.9	84.9
249	10720x	161	Oohara Koji	D: InformationAndCommu	2-SI-4	Male	35	156.3	66.2
250	10720x	162	Onose Arita	D: InformationAndCommu	2-SI-4	Male	52	172.5	83.4

No.	Device ID	Instance No.	Name	Tenant	Zone	Sex	Age	Hight	Weight
251	10720x	163	Kondou Horino	D: InformationAndCommu	2-SI-4	Female	22	154.4	47.8
252	10720x	164	Ookura Tsukioka	D: InformationAndCommu	2-SI-4	Male	31	169.1	70.4
253	10720x	165	Yamamoto Ueyama	D: InformationAndCommu	2-SI-4	Male	38	171.1	71.2
254	10720x	166	Odajima Kosaka	D: InformationAndCommu	2-SI-4	Male	31	176.5	73.0
255	10720x	167	Yamada Kuramoto	D: InformationAndCommu	2-SI-4	Male	52	166.9	60.1
256	10720x	168	Kouda Watanabe	D: InformationAndCommu	2-SI-4	Male	32	176.6	71.9
257	10720x	169	Iwasaki Shirono	D: InformationAndCommu	2-SI-4	Male	35	169.8	79.6
258	10720x	170	Kanda Kimiji	D: InformationAndCommu	2-SI-4	Male	44	171.8	64.1
259	10720x	171	Suzuki Umcio	D: InformationAndCommu	2-SI-4	Male	66	174.4	74.3
260	10720x	172	Amano Takashima	D: InformationAndCommu	2-SI-4	Male	31	175.9	70.6
261	10730x	1	Saito Heizo	E: WholesaleOrRetailing	3-NWP	Male	55	177.3	57.9
262	10730x	2	Sakakibara Keizo	E: WholesaleOrRetailing	3-NWP	Male	37	183.2	77.2
263	10730x	3	Sakata Tokitazu	E: WholesaleOrRetailing	3-NWP	Male	43	168.5	64.0
264	10730x	4	Watanabe Satoshi	E: WholesaleOrRetailing	3-NWP	Female	65	149.6	61.5
265	10730x	5	Masuda Ikuma	E: WholesaleOrRetailing	3-NWP	Male	47	176.5	60.2
266	10730x	6	Aoki Yogi	E: WholesaleOrRetailing	3-NWP	Male	47	171.1	78.3
267	10730x	7	Yoshinari Kenji	E: WholesaleOrRetailing	3-NWP	Female	25	166.0	50.8
268	10730x	8	Kobayashi Takihon	E: WholesaleOrRetailing	3-NWP	Male	65	167.1	73.7
269	10730x	9	Tonegawa Ueda	E: WholesaleOrRetailing	3-NWP	Male	45	168.9	68.9
270	10730x	10	Itou Anexpert	E: WholesaleOrRetailing	3-NP-1	Male	45	170.0	73.9
271	10730x	11	Tsutsui Takane	E: WholesaleOrRetailing	3-NP-1	Male	56	179.7	76.6
272	10730x	12	Miyake Ooshiro	E: WholesaleOrRetailing	3-NP-1	Female	49	152.3	41.9
273	10730x	13	Aoki Sasanuma	E: WholesaleOrRetailing	3-NP-1	Male	41	162.9	55.8
274	10730x	14	Hirota Nakakoshi	E: WholesaleOrRetailing	3-NP-1	Male	39	170.8	53.3
275	10730x	15	Takahashi Konaka	E: WholesaleOrRetailing	3-NP-2	Female	31	155.0	48.4
276	10730x	16	Mouri Shintaro	E: WholesaleOrRetailing	3-NP-2	Female	56	150.6	51.8
277	10730x	17	Haga Fukadu	E: WholesaleOrRetailing	3-NP-3	Female	23	158.3	57.6
278	10730x	18	Kobayashi Yamaura	E: WholesaleOrRetailing	3-NP-3	Male	49	176.1	58.0
279	10730x	19	Seki Rantaro	E: WholesaleOrRetailing	3-NP-3	Male	52	164.0	83.3
280	10730x	20	Yasuda Hatayama	E: WholesaleOrRetailing	3-NP-3	Female	52	157.0	57.4
281	10730x	21	Honda Yourwholelif	E: WholesaleOrRetailing	3-NP-3	Male	39	178.1	73.0
282	10730x	22	Sasaki Takami	E: WholesaleOrRetailing	3-NP-3	Male	51	172.1	74.4
283	10730x	23	Utsumi Oshikawa	E: WholesaleOrRetailing	3-NP-3	Female	43	149.9	44.7
284	10730x	24	Ogiso Sadaaki	E: WholesaleOrRetailing	3-NP-4	Male	35	185.3	66.0
285	10730x	25	Hirano Toshio	E: WholesaleOrRetailing	3-NP-4	Male	44	180.5	67.6
286	10730x	26	Nagamine Kakazu	E: WholesaleOrRetailing	3-NEP	Female	35	163.8	57.2
287	10730x	27	Sanya Ogawa	E: WholesaleOrRetailing	3-NEP	Male	31	168.8	73.3
288	10730x	28	Masuda Susumu	E: WholesaleOrRetailing	3-NEP	Male	47	174.2	63.5
289	10730x	29	Suzuki Sawai	E: WholesaleOrRetailing	3-NEP	Male	69	168.0	68.0
290	10730x	30	Tajima Hakuishi	E: WholesaleOrRetailing	3-NEP	Female	62	160.1	52.6
291	10730x	31	Funaki Toujou	E: WholesaleOrRetailing	3-NI-1	Male	69	163.7	61.1
292	10730x	32	Kawasaki Ken	E: WholesaleOrRetailing	3-NI-1	Male	35	173.2	52.7
293	10730x	33	Toda Shouzou	E: WholesaleOrRetailing	3-NI-1	Male	54	169.4	55.3
294	10730x	34	Sasaki Ookura	E: WholesaleOrRetailing	3-NI-1	Male	66	168.2	64.4
295	10730x	35	Imai Katsuragi	E: WholesaleOrRetailing	3-NI-1	Female	35	160.7	46.5
296	10730x	36	Oono Ishimoto	E: WholesaleOrRetailing	3-NI-1	Female	64	154.3	44.3
297	10730x	37	Fukuda Moshio	E: WholesaleOrRetailing	3-NI-1	Male	25	175.8	75.1
298	10730x	38	Kume Jobushi	E: WholesaleOrRetailing	3-NI-1	Male	42	176.1	71.0
299	10730x	39	Kuwabara Masumii	E: WholesaleOrRetailing	3-NI-1	Male	25	168.4	52.8
300	10730x	40	Kamata Bane	E: WholesaleOrRetailing	3-NI-1	Female	31	152.8	53.2

No.	Device ID	Instance No.	Name	Tenant	Zone	Sex	Age	Hight	Weight
301	10730x	41	Arisawa Sata	E: WholesaleOrRetailing	3-NI-1	Female	48	154.0	54.3
302	10730x	42	Kanzaki Shiratori	E: WholesaleOrRetailing	3-NI-1	Female	58	159.5	52.2
303	10730x	43	Maruyama Tashiro	E: WholesaleOrRetailing	3-NI-2	Male	47	172.2	71.6
304	10730x	44	Sakata Yasukawa	E: WholesaleOrRetailing	3-NI-2	Male	28	173.0	59.6
305	10730x	45	Kadoi Satoshiro	E: WholesaleOrRetailing	3-NI-2	Female	48	159.3	55.2
306	10730x	46	Watanabe Tuyoshi	E: WholesaleOrRetailing	3-NI-2	Male	48	159.3	57.2
307	10730x	47	Horie Gorou	E: WholesaleOrRetailing	3-NI-2	Male	25	162.0	62.6
308	10730x	48	Aiga Hiroshi	E: WholesaleOrRetailing	3-NI-2	Male	49	171.0	86.6
309	10730x	49	Shinozaki Takahira	E: WholesaleOrRetailing	3-NI-2	Male	51	169.5	73.7
310	10730x	50	Hosokawa Takaki	E: WholesaleOrRetailing	3-NI-2	Female	35	164.2	43.8
311	10730x	51	Tokuta Kawase	E: WholesaleOrRetailing	3-NI-2	Male	23	179.0	59.1
312	10730x	52	Koide Hosaka	E: WholesaleOrRetailing	3-NI-2	Male	38	168.0	53.7
313	10730x	53	Yokoyama Sou	E: WholesaleOrRetailing	3-NI-2	Female	49	154.6	49.3
314	10730x	54	Ishii Shinta	E: WholesaleOrRetailing	3-NI-2	Female	25	163.6	46.9
315	10730x	55	Oomiya Yonezawa	E: WholesaleOrRetailing	3-NI-2	Female	43	171.0	50.9
316	10730x	56	Uemura Riko	E: WholesaleOrRetailing	3-NI-3	Female	34	160.8	44.2
317	10730x	57	Sakamoto Kotaro	E: WholesaleOrRetailing	3-NI-3	Male	26	170.0	57.5
318	10730x	58	Sakagami Kazuhiro	E: WholesaleOrRetailing	3-NI-3	Female	21	160.2	55.4
319	10730x	59	Hara Taketaka	E: WholesaleOrRetailing	3-NI-3	Female	55	162.0	64.1
320	10730x	60	Kobayashi Kangry?gi	E: WholesaleOrRetailing	3-NI-3	Female	63	152.2	49.3
321	10730x	61	Toda Naiya	E: WholesaleOrRetailing	3-NI-3	Female	56	158.6	38.1
322	10730x	62	Kawasaki Koshino	E: WholesaleOrRetailing	3-NI-3	Female	54	157.3	61.7
323	10730x	63	Kobayashi Kimiro	E: WholesaleOrRetailing	3-NI-3	Female	45	160.7	53.9
324	10730x	64	Nakamura Hiroshi	E: WholesaleOrRetailing	3-NI-3	Female	57	161.3	43.4
325	10730x	65	Nimiya Hideo	E: WholesaleOrRetailing	3-NI-3	Male	24	164.1	61.8
326	10730x	66	Miyagawa Yokoe	E: WholesaleOrRetailing	3-NI-3	Male	23	171.9	66.6
327	10730x	67	Fujita Mizunuma	E: WholesaleOrRetailing	3-NI-3	Female	42	162.8	60.4
328	10730x	68	Sutou Narimatsu	E: WholesaleOrRetailing	3-NI-4	Male	57	177.4	50.5
329	10730x	69	Nakao Senkai	E: WholesaleOrRetailing	3-NI-4	Male	46	181.9	78.9
330	10730x	70	Torii Takamichi	E: WholesaleOrRetailing	3-NI-4	Male	27	172.0	65.3
331	10730x	71	Uchida Nurie	E: WholesaleOrRetailing	3-NI-4	Male	32	167.9	71.9
332	10730x	72	Ishikawa Kimi	E: WholesaleOrRetailing	3-NI-4	Male	44	171.3	64.7
333	10730x	73	Yamashita Ochiai	E: WholesaleOrRetailing	3-NI-4	Female	27	157.0	50.4
334	10730x	74	Seki Hatayama	E: WholesaleOrRetailing	3-NI-4	Male	47	164.6	69.2
335	10730x	75	Ochi Takase	E: WholesaleOrRetailing	3-NI-4	Female	41	154.4	53.7
336	10730x	76	Mita Imagawa	E: WholesaleOrRetailing	3-NI-4	Female	55	164.2	49.8
337	10730x	77	Fujii Kazuhirokin	E: WholesaleOrRetailing	3-NI-4	Male	67	168.0	50.5
338	10730x	78	Nakasato Chikara	E: WholesaleOrRetailing	3-NI-4	Male	62	170.9	75.9
339	10730x	79	Kosuga Kaga	E: WholesaleOrRetailing	3-NI-4	Male	35	175.6	77.6
340	10730x	80	Nakano Arai	E: WholesaleOrRetailing	3-NI-4	Male	68	166.4	70.9
341	10740x	1	Kamei Notsu	F: Construction	4-NWP	Male	36	180.1	63.1
342	10740x	2	Okamoto Imaizumi	F: Construction	4-NWP	Male	39	167.9	80.6
343	10740x	3	Matsuyama Submarine	F: Construction	4-NWP	Male	48	175.8	66.0
344	10740x	4	Ootsu Saruta	F: Construction	4-NWP	Female	66	153.5	59.2
345	10740x	5	Tsukakoshi Shinnosuke	F: Construction	4-NWP	Female	45	160.9	45.0
346	10740x	6	Tsutsui Nakahara	F: Construction	4-NWP	Female	33	163.1	53.7
347	10740x	7	Nakasato Araida	F: Construction	4-NWP	Male	55	166.8	75.1
348	10740x	8	Sasaki Takanashi	F: Construction	4-NWP	Male	34	162.1	79.4
349	10740x	9	Yamamoto Kensui	F: Construction	4-NP-1	Female	44	166.1	43.4
350	10740x	10	Shigeta Tae-Ui	F: Construction	4-NP-1	Female	58	154.8	47.5

No.	Device ID	Instance No.	Name	Tenant	Zone	Sex	Age	Hight	Weight
351	10740x	11	Shibuya Kon	F: Construction	4-NP-1	Male	56	172.6	72.7
352	10740x	12	Araki Kiyoshinii	F: Construction	4-NP-1	Female	57	164.3	50.8
353	10740x	13	Maeda Sakiyama	F: Construction	4-NP-2	Female	35	168.2	52.4
354	10740x	14	Rin Tatsuro	F: Construction	4-NP-2	Male	42	164.5	90.6
355	10740x	15	Ochiai Kun	F: Construction	4-NP-2	Male	57	170.5	55.0
356	10740x	16	Shirai Kurose	F: Construction	4-NP-2	Female	26	156.1	51.2
357	10740x	17	Takase Riyori	F: Construction	4-NP-3	Male	28	176.5	75.3
358	10740x	18	Yamamoto Hirokawa	F: Construction	4-NP-3	Female	59	143.3	48.6
359	10740x	19	Tanaka Shimoda	F: Construction	4-NP-3	Male	26	170.2	69.3
360	10740x	20	Katou Hamachi	F: Construction	4-NP-3	Male	46	164.0	82.3
361	10740x	21	Wakatsuki Masaaki	F: Construction	4-NP-4	Male	44	171.8	54.3
362	10740x	22	Iwanaga Manaka	F: Construction	4-NP-4	Female	37	163.5	49.6
363	10740x	23	Tanaka Oomae	F: Construction	4-NP-4	Male	22	169.6	73.0
364	10740x	24	Sugaya Tetsushi	F: Construction	4-NP-4	Male	63	164.1	75.0
365	10740x	25	Nakahara Yabe	F: Construction	4-NP-4	Male	68	164.0	70.6
366	10740x	26	Takei Satake	F: Construction	4-NEP	Female	25	157.5	55.2
367	10740x	27	Masuda Eishi	F: Construction	4-NEP	Female	55	159.9	52.0
368	10740x	28	Sasaki Kazuya	F: Construction	4-NEP	Male	49	175.1	67.5
369	10740x	29	Sasaki Ibuki	F: Construction	4-NEP	Female	67	151.1	43.4
370	10740x	30	Kobayashi Mizunuma	F: Construction	4-NEP	Female	51	164.5	55.8
371	10740x	31	Kobayashi Ryosei	F: Construction	4-NEP	Female	46	151.3	43.9
372	10740x	32	Takahashi Etsushi	F: Construction	4-NEP	Male	26	179.9	62.4
373	10740x	33	Nakao Hiroji	F: Construction	4-NI-1	Female	57	167.0	40.0
374	10740x	34	Fujii Yangjiang	F: Construction	4-NI-1	Male	35	166.1	51.9
375	10740x	35	Yamashita Atsutaka	F: Construction	4-NI-1	Female	55	157.2	64.1
376	10740x	36	Aoki Takenaka	F: Construction	4-NI-1	Male	51	170.1	82.8
377	10740x	37	Yanagisawa Morninggi	F: Construction	4-NI-1	Female	68	153.9	43.8
378	10740x	38	Kusakabe Ashiko	F: Construction	4-NI-1	Male	43	173.4	74.8
379	10740x	39	Takahashi Seikei	F: Construction	4-NI-1	Male	68	155.0	68.3
380	10740x	40	Shighihara Takatoshi	F: Construction	4-NI-1	Male	31	165.9	49.1
381	10740x	41	Miyamoto Muratou	F: Construction	4-NI-1	Female	57	159.5	43.7
382	10740x	42	Kawazoe Takeya	F: Construction	4-NI-2	Male	35	166.4	69.2
383	10740x	43	Shimanuki Uchihito	F: Construction	4-NI-2	Female	52	156.5	52.9
384	10740x	44	Akita Shoichiro	F: Construction	4-NI-2	Male	52	167.0	82.0
385	10740x	45	Kimura Nakazawa	F: Construction	4-NI-2	Female	51	152.8	64.7
386	10740x	46	Aoki Kitaoka	F: Construction	4-NI-2	Male	55	162.1	74.0
387	10740x	47	Chiba Fukutome	F: Construction	4-NI-3	Male	33	161.2	64.7
388	10740x	48	Morita Kitajima	F: Construction	4-NI-3	Female	52	154.9	50.3
389	10740x	49	Tanaka Yoshidome	F: Construction	4-NI-3	Male	56	167.4	66.6
390	10740x	50	Yamagata Isobe	F: Construction	4-NI-3	Female	42	162.3	59.7
391	10740x	51	Ogino Morozumi	F: Construction	4-NI-3	Male	32	152.9	37.3
392	10740x	52	Andou Teraoka	F: Construction	4-NI-3	Male	28	169.7	63.9
393	10740x	53	Sasaki Shimamoto	F: Construction	4-NI-3	Female	57	148.0	67.4
394	10740x	54	Horiuchi Sho	F: Construction	4-NI-3	Female	55	160.0	53.0
395	10740x	55	Uemura Takaya	F: Construction	4-NI-3	Male	25	172.0	70.7
396	10740x	56	Hisayasu Kyou	F: Construction	4-NI-3	Male	36	174.5	66.3
397	10740x	57	Akaba Kubo	F: Construction	4-NI-3	Male	55	157.1	74.1
398	10740x	58	Suzuki Gouda	F: Construction	4-NI-3	Male	34	168.8	71.0
399	10740x	59	Hatakeyama Tomohiro	F: Construction	4-NI-3	Female	69	150.2	41.3
400	10740x	60	Asai Kitaura	F: Construction	4-NI-3	Female	45	162.1	58.2



No.	Device ID	Instance No.	Name	Tenant	Zone	Sex	Age	Hight	Weight
401	10740x	61	Shimomura Itoga	F: Construction	4-NI-4	Male	39	167.1	72.8
402	10740x	62	Yamashita Ai	F: Construction	4-NI-4	Male	46	163.8	58.6
403	10740x	63	Mori Senda	F: Construction	4-NI-4	Male	59	170.5	67.6
404	10740x	64	Iida Withdrawal	F: Construction	4-NI-4	Female	45	154.7	45.1
405	10740x	65	Yamamoto Iwase	F: Construction	4-NI-4	Female	45	151.7	52.0
406	10740x	66	Mori Kenrow	F: Construction	4-NI-4	Female	64	155.4	45.9
407	10740x	67	Yamada Katsunori	F: Construction	4-NI-4	Male	21	170.8	64.5
408	10740x	68	Shimizu Onigashira	F: Construction	4-NI-4	Male	41	169.9	75.1
409	10740x	69	Tominaga Shimoda	F: Construction	4-NI-4	Male	57	166.3	74.6
410	10740x	70	Kojima Kinichi	F: Construction	4-NI-4	Male	48	172.2	81.4
411	10740x	71	Nakata Iwabuchi	F: Construction	4-NI-4	Male	63	169.2	64.5
412	10740x	72	Yamashita Kyoukiga	F: Construction	4-NI-4	Female	41	156.5	52.9
413	10740x	73	Tsuruta Kunikari	F: Construction	4-NI-4	Female	68	155.1	46.9
414	10740x	74	Yahagi Katsuya	F: Construction	4-NI-4	Female	66	141.4	42.0
415	10740x	75	Tsuchita Takanori	F: Construction	4-NI-4	Male	65	165.5	51.8
416	10740x	76	Watanabe Koji	F: Construction	4-NI-4	Male	45	170.1	61.9
417	10740x	77	Watanabe Shitara	F: Construction	4-NI-4	Male	42	170.9	73.1
418	10740x	78	Hosokawa Kazumasa	F: Construction	4-NI-4	Female	54	153.5	52.4
419	10740x	79	Ochi Ishikawa	F: Construction	4-NI-4	Male	49	163.9	64.0
420	10740x	80	Iguchi Satoru	F: Construction	4-NI-4	Male	48	170.5	61.3
421	10740x	81	Miyazato Hajime	F: Construction	4-NI-4	Female	29	167.0	45.2
422	10740x	82	Tanaka Kwanghyeon	F: Construction	4-SWP	Female	61	157.8	53.1
423	10740x	83	Tamura Takashi	F: Construction	4-SWP	Male	27	180.0	64.7
424	10740x	84	Shibuya Kunio	F: Construction	4-SWP	Male	37	177.0	67.7
425	10740x	85	Nomura Akira	F: Construction	4-SWP	Female	67	159.6	52.5
426	10740x	86	Komori Imura	F: Construction	4-SWP	Female	66	156.6	45.1
427	10740x	87	Okada Junkim	F: Construction	4-SWP	Male	23	173.6	64.1
428	10740x	88	Tsuchiya Minetwopeop	F: Construction	4-SP-1	Male	69	165.8	73.4
429	10740x	89	Fujiwara Kazushige	F: Construction	4-SP-1	Male	51	169.1	61.2
430	10740x	90	Itou Akihiro	F: Construction	4-SP-1	Male	45	170.1	67.8
431	10740x	91	Nakamoto Minamide	F: Construction	4-SP-1	Female	57	157.8	56.4
432	10740x	92	Ooishi Chiya	F: Construction	4-SP-1	Male	58	171.8	67.1
433	10740x	93	Haga Maruyama	F: Construction	4-SP-1	Male	66	160.3	69.8
434	10740x	94	Takamatsu Norio	F: Construction	4-SP-2	Male	55	167.5	66.5
435	10740x	95	Naoi Tateishi	F: Construction	4-SP-2	Male	56	175.0	72.8
436	10740x	96	Nagano Geno	F: Construction	4-SP-2	Male	22	179.1	63.0
437	10740x	97	Niisato Sera	F: Construction	4-SP-2	Male	43	177.7	74.6
438	10740x	98	Ise Tooyama	F: Construction	4-SP-2	Male	29	175.8	57.6
439	10740x	99	Hiratsuka Shouno	F: Construction	4-SP-2	Male	48	179.0	51.7
440	10740x	100	Fujiwara Tatsunobu	F: Construction	4-SP-3	Female	61	154.6	53.1
441	10740x	101	Oogami Kenichi	F: Construction	4-SP-3	Male	33	174.2	51.3
442	10740x	102	Ozawa Miyamori	F: Construction	4-SP-3	Male	32	172.3	61.6
443	10740x	103	Matsuoka Megumitaka	F: Construction	4-SP-3	Male	39	178.7	71.6
444	10740x	104	Ikeda Kenshun	F: Construction	4-SP-3	Female	45	162.1	50.1
445	10740x	105	Tomita Miki	F: Construction	4-SP-3	Female	48	165.8	48.9
446	10740x	106	Oikawa Kyoya	F: Construction	4-SP-4	Male	59	169.3	55.4
447	10740x	107	Kimura Tomono	F: Construction	4-SP-4	Male	59	164.7	72.8
448	10740x	108	Sugawa Machida	F: Construction	4-SP-4	Male	35	183.1	72.3
449	10740x	109	Arakawa Nakauchi	F: Construction	4-SI-1	Male	68	173.7	62.3
450	10740x	110	Muraki Nagano	F: Construction	4-SI-1	Male	63	173.6	57.3

No.	Device ID	Instance No.	Name	Tenant	Zone	Sex	Age	Hight	Weight
451	10740x	111	Utsumi Beimura	F: Construction	4-SI-1	Male	45	171.6	53.5
452	10740x	112	Juudani Ishimoto	F: Construction	4-SI-1	Female	53	159.7	55.7
453	10740x	113	Satou Atsuto	F: Construction	4-SI-1	Male	47	172.9	77.6
454	10740x	114	Ishibashi Shimabukuro	F: Construction	4-SI-1	Male	66	161.6	54.2
455	10740x	115	Misawa Intelligence	F: Construction	4-SI-1	Male	56	168.7	51.5
456	10740x	116	Sakurai Kinnosuke	F: Construction	4-SI-1	Male	25	175.2	85.6
457	10740x	117	Hasegawa Koichiro	F: Construction	4-SI-1	Male	66	169.5	61.1
458	10740x	118	Hamada Hirose	F: Construction	4-SI-1	Male	69	170.2	45.1
459	10740x	119	Akiyoshi Taima	F: Construction	4-SI-1	Male	58	170.7	63.7
460	10740x	120	Aoki Akira	F: Construction	4-SI-1	Male	58	168.1	58.3
461	10740x	121	Ikehata Masashige	F: Construction	4-SI-1	Female	66	152.5	47.5
462	10740x	122	Yamaguchi Kyonosuke	F: Construction	4-SI-1	Female	43	158.4	62.8
463	10740x	123	Yanagi Kusano	F: Construction	4-SI-1	Female	59	152.0	51.1
464	10740x	124	Noguchi Takamaru	F: Construction	4-SI-1	Male	35	168.7	78.8
465	10740x	125	Arai Houjou	F: Construction	4-SI-2	Female	57	150.0	57.2
466	10740x	126	Saitou Meguro	F: Construction	4-SI-2	Male	69	159.7	66.3
467	10740x	127	Matsuo Mukumoto	F: Construction	4-SI-2	Female	41	167.4	53.4
468	10740x	128	Nagayama Aonuma	F: Construction	4-SI-2	Male	31	170.9	64.3
469	10740x	129	Nagatsuka Mamoru	F: Construction	4-SI-2	Male	44	176.9	91.5
470	10740x	130	Okuno Komatsu	F: Construction	4-SI-2	Male	45	179.3	74.1
471	10740x	131	Abe Koichi	F: Construction	4-SI-2	Female	41	155.1	51.2
472	10740x	132	Ooyama Muramoto	F: Construction	4-SI-2	Female	39	162.3	44.8
473	10740x	133	Kawahara Nurie	F: Construction	4-SI-3	Male	52	163.5	68.2
474	10740x	134	Yamamoto Fukutani	F: Construction	4-SI-3	Female	34	160.1	48.9
475	10740x	135	Oota Inaoka	F: Construction	4-SI-3	Male	54	168.3	66.6
476	10740x	136	Iwaki Ikari	F: Construction	4-SI-3	Female	64	158.4	47.4
477	10740x	137	Matsuo Mukumoto	F: Construction	4-SI-3	Male	65	168.3	77.3
478	10740x	138	Nakao Onodera	F: Construction	4-SI-3	Male	44	178.8	65.5
479	10740x	139	Miyakoshi Hatori	F: Construction	4-SI-3	Male	63	170.9	64.0
480	10740x	140	Fukumori Hirohiro	F: Construction	4-SI-3	Male	22	182.8	76.1
481	10740x	141	Kuno Nishihata	F: Construction	4-SI-3	Female	44	161.3	62.4
482	10740x	142	Kojima Ueshima	F: Construction	4-SI-3	Female	42	154.3	49.3
483	10740x	143	Okabe Ikky?	F: Construction	4-SI-3	Male	67	174.7	78.3
484	10740x	144	Tsuruta Kokomitsu	F: Construction	4-SI-3	Female	62	155.9	62.7
485	10740x	145	Nakatsuka Kunii	F: Construction	4-SI-3	Female	23	151.0	55.0
486	10740x	146	Furukawa Satoshiro	F: Construction	4-SI-3	Female	44	151.4	46.3
487	10740x	147	Gotou Sawada	F: Construction	4-SI-3	Female	34	156.7	43.4
488	10740x	148	Kouno Hisayuki	F: Construction	4-SI-3	Male	51	171.4	64.7
489	10740x	149	Inaoka Emory	F: Construction	4-SI-4	Male	36	179.2	61.3
490	10740x	150	Kuroda Toshiyuki	F: Construction	4-SI-4	Female	32	159.6	38.2
491	10740x	151	Kuwabara Miwa	F: Construction	4-SI-4	Female	62	158.4	51.0
492	10740x	152	Kishima Kawanabe	F: Construction	4-SI-4	Male	66	166.1	59.8
493	10740x	153	Ninomiya Inomata	F: Construction	4-SI-4	Male	45	167.3	49.6
494	10740x	154	Yamada Hamada	F: Construction	4-SI-4	Male	27	176.9	82.5
495	10740x	155	Inagaki Ootaki	F: Construction	4-SI-4	Female	65	157.2	57.0
496	10740x	156	Tamura Oomori	F: Construction	4-SI-4	Male	62	161.6	64.7
497	10740x	157	Murase Nishio	F: Construction	4-SI-4	Female	41	165.0	37.3
498	10740x	158	Udagawa Tomihiro	F: Construction	4-SI-4	Male	36	175.9	72.8
499	10750x	1	Seo Akita	G: WholesaleOrRetailing	5-NWP	Female	46	159.3	51.8
500	10750x	2	Satou Kikukawa	G: WholesaleOrRetailing	5-NWP	Female	63	149.4	40.4

No.	Device ID	Instance No.	Name	Tenant	Zone	Sex	Age	Hight	Weight
501	10750x	3	Sasaki Yoshi-Kun	G: WholesaleOrRetailing	5-NWP	Male	53	169.9	83.9
502	10750x	4	Nakanishi Kawajiri	G: WholesaleOrRetailing	5-NWP	Male	51	174.6	63.8
503	10750x	5	Fujikawa Erikyo	G: WholesaleOrRetailing	5-NWP	Female	32	158.4	44
504	10750x	6	Satou Onelake	G: WholesaleOrRetailing	5-NWP	Male	68	166	63.7
505	10750x	7	Miyazaki Uemura	G: WholesaleOrRetailing	5-NWP	Female	51	151.3	60.5
506	10750x	8	Maeda Toshio	G: WholesaleOrRetailing	5-NWP	Male	32	166	80.3
507	10750x	9	Imada Ship	G: WholesaleOrRetailing	5-NWP	Female	58	151.3	50.4
508	10750x	10	Ishihara Miyao	G: WholesaleOrRetailing	5-NWP	Male	32	169.6	72.7
509	10750x	11	Uchida Hideo	G: WholesaleOrRetailing	5-NWP	Male	28	174.3	70.7
510	10750x	12	Morimoto Seiwa	G: WholesaleOrRetailing	5-NP-1	Female	35	166.5	54.1
511	10750x	13	Kimura Kouichiro	G: WholesaleOrRetailing	5-NP-1	Male	25	170.5	61.6
512	10750x	14	Nagao Takayanagi	G: WholesaleOrRetailing	5-NP-1	Male	35	183.7	67.9
513	10750x	15	Ehata Kenji	G: WholesaleOrRetailing	5-NP-1	Male	66	172.3	67.9
514	10750x	16	Yoshioka Hirohiro	G: WholesaleOrRetailing	5-NP-1	Male	39	175.3	53.8
515	10750x	17	Satou Tomii	G: WholesaleOrRetailing	5-NP-1	Male	38	181.1	63.2
516	10750x	18	Takaoka Minghiro	G: WholesaleOrRetailing	5-NP-1	Female	65	158.1	47.3
517	10750x	19	Ishiwata Miyoshi	G: WholesaleOrRetailing	5-NP-2	Male	67	165.8	59.1
518	10750x	20	Ina Oota	G: WholesaleOrRetailing	5-NP-2	Female	59	158.7	49.9
519	10750x	21	Yamada Kenko	G: WholesaleOrRetailing	5-NP-2	Male	49	161.8	48.7
520	10750x	22	Nosaki Ueda	G: WholesaleOrRetailing	5-NP-2	Male	23	174.2	59.2
521	10750x	23	Takeda Aratata	G: WholesaleOrRetailing	5-NI-1	Female	21	168.5	61.7
522	10750x	24	Tanahashi Toko	G: WholesaleOrRetailing	5-NI-1	Female	45	163.8	49.7
523	10750x	25	Shimazaki Nishiumi	G: WholesaleOrRetailing	5-NI-1	Female	25	154.4	41
524	10750x	26	Kinoshita Takeshi	G: WholesaleOrRetailing	5-NI-1	Male	65	162.1	65.1
525	10750x	27	Tanaka Agatsuma	G: WholesaleOrRetailing	5-NI-1	Female	41	160.2	57
526	10750x	28	Motomura Iwamatsu	G: WholesaleOrRetailing	5-NI-1	Female	37	154	54.1
527	10750x	29	Yamashita Serizawa	G: WholesaleOrRetailing	5-NI-1	Male	25	166.3	65.8
528	10750x	30	Yanagida Shin	G: WholesaleOrRetailing	5-NI-1	Female	47	163	65.3
529	10750x	31	Satou Praise	G: WholesaleOrRetailing	5-NI-1	Female	22	153.3	49.4
530	10750x	32	Nakamura Shintaku	G: WholesaleOrRetailing	5-NI-1	Male	31	167	68.5
531	10750x	33	Suzuki Kumano	G: WholesaleOrRetailing	5-NI-1	Female	57	140	58.3
532	10750x	34	Miyata Masato	G: WholesaleOrRetailing	5-NI-1	Male	29	178.7	65.8
533	10750x	35	Togashi Elsuke	G: WholesaleOrRetailing	5-NI-2	Male	24	172.9	60.6
534	10750x	36	Katuta Kouji	G: WholesaleOrRetailing	5-NI-2	Male	45	169.8	64.7
535	10750x	37	Izumi Satoru	G: WholesaleOrRetailing	5-NI-2	Male	55	160.4	68.5
536	10750x	38	Sakuraba Okata	G: WholesaleOrRetailing	5-NI-2	Male	23	171.1	60.9
537	10750x	39	Sakurai Shougo	G: WholesaleOrRetailing	5-NI-2	Male	64	166.6	68.8
538	10750x	40	Tajiri Takahiro	G: WholesaleOrRetailing	5-NI-2	Female	54	157.5	48.7
539	10750x	41	Mihara Tadayori	H: FinanceOrInsurance	5-NP-3	Female	63	158.6	41.9
540	10750x	42	Ootsuka Oomae	H: FinanceOrInsurance	5-NP-3	Female	53	156.7	58.2
541	10750x	43	Hosoya Dejun	H: FinanceOrInsurance	5-NP-3	Female	33	170.2	46.4
542	10750x	44	Oogami Asanuma	H: FinanceOrInsurance	5-NP-3	Male	52	167.6	62.8
543	10750x	45	Ishikawa Masaharu	H: FinanceOrInsurance	5-NP-3	Male	52	171.9	61.5
544	10750x	46	Katayama Taishaku	H: FinanceOrInsurance	5-NP-4	Female	58	150.8	54.8
545	10750x	47	Ishihara Ootsubo	H: FinanceOrInsurance	5-NP-4	Male	56	176	82.4
546	10750x	48	Carrier Willis	H: FinanceOrInsurance	5-NP-4	Male	55	177.3	56.4
547	10750x	49	Fujii Kouji	H: FinanceOrInsurance	5-NP-4	Male	26	173.3	63.2
548	10750x	50	Ozaki Sakakibara	H: FinanceOrInsurance	5-NP-4	Male	41	174.1	67.1
549	10750x	51	Morisaki Katsuragi	H: FinanceOrInsurance	5-NP-4	Male	63	158.6	56.3
550	10750x	52	Arita Hosono	H: FinanceOrInsurance	5-NEP	Male	34	174.5	80.1

No.	Device ID	Instance No.	Name	Tenant	Zone	Sex	Age	Hight	Weight
551	10750x	53	Inoue Kiyotake	H: FinanceOrInsurance	5-NEP	Male	44	180.2	71.5
552	10750x	54	Suzuki Furuta	H: FinanceOrInsurance	5-NEP	Male	42	170.8	54.6
553	10750x	55	Mutou Nukui	H: FinanceOrInsurance	5-NEP	Female	48	159.6	56.4
554	10750x	56	Matuo You	H: FinanceOrInsurance	5-NEP	Male	56	168.9	58.1
555	10750x	57	Yamazaki Meng	H: FinanceOrInsurance	5-NI-3	Female	46	149	44
556	10750x	58	Minami Tomonori	H: FinanceOrInsurance	5-NI-3	Female	46	158	51.9
557	10750x	59	Ogawa Araki	H: FinanceOrInsurance	5-NI-3	Male	53	166.2	76.7
558	10750x	60	Hamada Kinji	H: FinanceOrInsurance	5-NI-3	Female	32	157.1	44.3
559	10750x	61	Miyamoto Kin	H: FinanceOrInsurance	5-NI-3	Male	66	162.9	68.9
560	10750x	62	Yamada Nogami	H: FinanceOrInsurance	5-NI-3	Female	47	159.6	50.1
561	10750x	63	Wakui Katsura	H: FinanceOrInsurance	5-NI-3	Male	22	171.6	68
562	10750x	64	Minami Onelake	H: FinanceOrInsurance	5-NI-3	Female	32	163.1	50.7
563	10750x	65	Yasuhara Abe	H: FinanceOrInsurance	5-NI-4	Female	31	157.6	56.7
564	10750x	66	Tateiwa Kazuma	H: FinanceOrInsurance	5-NI-4	Male	64	161	61.7
565	10750x	67	Suzuki Kanesen	H: FinanceOrInsurance	5-NI-4	Female	45	161.8	48.3
566	10750x	68	Yasuoka Hoshina	H: FinanceOrInsurance	5-NI-4	Male	48	174.7	55.8
567	10750x	69	Shimizu Shogun	H: FinanceOrInsurance	5-NI-4	Female	41	155.2	37.7
568	10750x	70	Doi Ikkin	H: FinanceOrInsurance	5-NI-4	Female	45	153.8	42.9
569	10750x	71	Kataoka Kenji	H: FinanceOrInsurance	5-NI-4	Male	46	165.8	63.1
570	10750x	72	Okumura Watarai	H: FinanceOrInsurance	5-NI-4	Male	35	170.4	59.6
571	10750x	73	Ishihara Masao	H: FinanceOrInsurance	5-NI-4	Male	69	173.7	74.8
572	10750x	74	Saitou Takashi	H: FinanceOrInsurance	5-NI-4	Male	51	155.8	66.1
573	10750x	75	Mikami Matsuzaki	H: FinanceOrInsurance	5-NI-4	Female	51	154.8	49.4
574	10750x	76	Ogura Honori	H: FinanceOrInsurance	5-NI-4	Female	45	155.1	44.9
575	10750x	77	Kamitaira Hajime	H: FinanceOrInsurance	5-NI-4	Female	24	153.5	51.3
576	10750x	78	Miura Fujioka	H: FinanceOrInsurance	5-NI-4	Female	44	151.9	53.8
577	10750x	79	Nomura Takeyama	H: FinanceOrInsurance	5-NI-4	Female	45	167.2	63.6
578	10750x	80	Sakurai Wasabi	H: FinanceOrInsurance	5-NI-4	Male	69	170.6	59.9
579	10750x	81	Sakai Iita	H: FinanceOrInsurance	5-NI-4	Male	59	167.2	56.6
580	10750x	82	Muramatsu Toshiakitos	I: RealEstate	5-SWP	Male	51	168	71.2
581	10750x	83	Nishihata Kiyoharu	I: RealEstate	5-SWP	Male	34	169.8	68.2
582	10750x	84	Yoshizawa Koshino	I: RealEstate	5-SWP	Male	65	167.9	63.2
583	10750x	85	Matsubara Takeharu	I: RealEstate	5-SWP	Male	38	163.2	70.7
584	10750x	86	Yagi Miyakoshi	I: RealEstate	5-SWP	Female	51	153.7	55
585	10750x	87	Harada Sonoda	I: RealEstate	5-SWP	Male	61	174.3	72.4
586	10750x	88	Mukai Jun-San	I: RealEstate	5-SWP	Female	28	167.4	44
587	10750x	89	Abe Yanai	I: RealEstate	5-SWP	Female	23	159.5	43
588	10750x	90	Funabashi Sakai	I: RealEstate	5-SWP	Female	34	168.8	56.9
589	10750x	91	Sawada Totallight	I: RealEstate	5-SWP	Female	29	165.3	46.8
590	10750x	92	Koyama Aso	I: RealEstate	5-SP-1	Female	65	157.9	55.7
591	10750x	93	Hirai Shimamoto	I: RealEstate	5-SP-1	Female	28	161	52.1
592	10750x	94	Matsumoto Hachioji	I: RealEstate	5-SP-1	Male	21	169.7	72.7
593	10750x	95	Hanashima Oshio	I: RealEstate	5-SP-2	Female	49	152.4	48.8
594	10750x	96	Hamaguchi Todoroki	I: RealEstate	5-SP-2	Female	26	157.9	41.3
595	10750x	97	Kawabata Hiroshima	I: RealEstate	5-SP-2	Female	35	170.7	50.8
596	10750x	98	Tsuji Dakakuchi	I: RealEstate	5-SP-2	Female	64	151.5	43.5
597	10750x	99	Tanifuji Kyoya	I: RealEstate	5-SP-2	Male	36	168.9	79
598	10750x	100	Saitou Miyadaira	I: RealEstate	5-SP-2	Female	28	161.2	46.9
599	10750x	101	Shiozawa Kigochi	I: RealEstate	5-SP-3	Male	69	181.2	67.8
600	10750x	102	Hosoe Cheol	I: RealEstate	5-SP-3	Male	65	164.4	56.8

No.	Device ID	Instance No.	Name	Tenant	Zone	Sex	Age	Hight	Weight
601	10750x	103	Shiraishi Hideyo	I: RealEstate	5-SP-3	Male	27	175	59
602	10750x	104	Sugimura Shinjiro	I: RealEstate	5-SP-3	Male	69	160.4	62.5
603	10750x	105	Matsumoto Nanba	I: RealEstate	5-SP-3	Female	29	158.8	52.7
604	10750x	106	Daikaku Taketomi	I: RealEstate	5-SP-4	Male	36	177.2	66.7
605	10750x	107	Matsui Hirakawa	I: RealEstate	5-SP-4	Male	57	186.1	54.4
606	10750x	108	Kuwabara Fukata	I: RealEstate	5-SP-4	Male	48	174.1	61.5
607	10750x	109	Ikezawa Akanuma	I: RealEstate	5-SP-4	Female	29	149.5	58.1
608	10750x	110	Kobayashi Mingaka	I: RealEstate	5-SI-1	Male	39	173.6	50.6
609	10750x	111	Kishimoto Wada	I: RealEstate	5-SI-1	Male	25	178.8	59.2
610	10750x	112	Yonekura Kawaguchi	I: RealEstate	5-SI-1	Male	66	171.8	66.5
611	10750x	113	Sakagami Oota	I: RealEstate	5-SI-1	Male	61	162.8	59.9
612	10750x	114	Matsushita Eiichiro	I: RealEstate	5-SI-1	Male	36	173.1	60.3
613	10750x	115	Matsumoto Iizumi	I: RealEstate	5-SI-1	Male	41	172.4	72.9
614	10750x	116	Oda Ishimoto	I: RealEstate	5-SI-1	Female	24	156.7	53.4
615	10750x	117	Ogawa Kawasaki	I: RealEstate	5-SI-1	Female	26	157.3	51.6
616	10750x	118	Kimura Miyazawa	I: RealEstate	5-SI-1	Male	41	168.9	80.1
617	10750x	119	Motomura Umekawa	I: RealEstate	5-SI-1	Male	25	161.8	69.5
618	10750x	120	Kishima T.Mitsuru	I: RealEstate	5-SI-1	Female	33	163.9	50.9
619	10750x	121	Tahara Takaya	I: RealEstate	5-SI-1	Female	28	159.7	50.2
620	10750x	122	Nagae Bitou	I: RealEstate	5-SI-1	Male	48	175.2	33.4
621	10750x	123	Ooshima Shussui	I: RealEstate	5-SI-1	Female	45	168.1	47.8
622	10750x	124	Tanabe Sakai	I: RealEstate	5-SI-1	Female	33	163.8	56.1
623	10750x	125	Katagiri Toshi	I: RealEstate	5-SI-1	Female	54	159.3	53.7
624	10750x	126	Kimura Yu	I: RealEstate	5-SI-1	Female	39	156.7	58.7
625	10750x	127	Inoue Uichi	I: RealEstate	5-SI-1	Male	23	172.2	67.4
626	10750x	128	Haruyama Mukawa	I: RealEstate	5-SI-1	Male	64	174.3	67.6
627	10750x	129	Fukuda Miyanishi	I: RealEstate	5-SI-1	Male	41	177.1	71
628	10750x	130	Shindou Kumai	I: RealEstate	5-SI-1	Male	65	167.4	70
629	10750x	131	Tsuda Kenji	I: RealEstate	5-SI-1	Male	46	165.7	69
630	10750x	132	Maeda Toshio	I: RealEstate	5-SI-2	Male	51	174.6	67.7
631	10750x	133	Sugihara Shimoyama	I: RealEstate	5-SI-2	Female	49	159.1	50.9
632	10750x	134	Ono Ise	I: RealEstate	5-SI-2	Male	23	182.2	60.6
633	10750x	135	Hira Nakatake	I: RealEstate	5-SI-2	Male	52	177.4	47.3
634	10750x	136	Handa Shiichiroro	I: RealEstate	5-SI-2	Male	56	181.1	55.2
635	10750x	137	Nagatani Takashima	I: RealEstate	5-SI-2	Male	27	165.3	74.5
636	10750x	138	Honda Takeshi	I: RealEstate	5-SI-2	Male	65	171.6	69.9
637	10750x	139	Tada Bachelor'Sdegree	I: RealEstate	5-SI-2	Female	67	158.8	62.9
638	10750x	140	Itou Afewofyou	I: RealEstate	5-SI-2	Male	69	159.7	40.2
639	10750x	141	Watanabe Umehara	I: RealEstate	5-SI-2	Male	31	161.1	58.7
640	10750x	142	Kanda Usui	I: RealEstate	5-SI-2	Female	47	163.5	49.8
641	10750x	143	Nonoyama Ubukata	I: RealEstate	5-SI-2	Female	62	150.9	53.5
642	10750x	144	Nagai Tatuo	I: RealEstate	5-SI-2	Male	55	169.4	64.5
643	10750x	145	Kishida Goku	I: RealEstate	5-SI-2	Male	55	173.9	77.5
644	10750x	146	Takechi Gentlemen	I: RealEstate	5-SI-3	Male	49	171.1	62.8
645	10750x	147	Tanaka Koshimizu	I: RealEstate	5-SI-3	Female	27	158.2	49.6
646	10750x	148	Tada Sugino	I: RealEstate	5-SI-3	Male	32	160.8	54.5
647	10750x	149	Katou Kunikari	I: RealEstate	5-SI-3	Female	49	158.3	54.5
648	10750x	150	Tsukamoto Yonggi	I: RealEstate	5-SI-3	Female	63	156.6	43.4
649	10750x	151	Inoue Takeshi	I: RealEstate	5-SI-3	Female	55	156.7	66.9
650	10750x	152	Tajima Muneakisoke	I: RealEstate	5-SI-3	Female	55	160.9	53.7

No.	Device ID	Instance No.	Name	Tenant	Zone	Sex	Age	Hight	Weight
651	10750x	153	Fujita Masuda	I: RealEstate	5-SI-3	Female	37	162.7	51.9
652	10750x	154	Nakajima Ike	I: RealEstate	5-SI-3	Male	63	178	67.3
653	10750x	155	Imai Satori	I: RealEstate	5-SI-3	Female	35	155.9	47.1
654	10750x	156	Yoneyama Muneaki	I: RealEstate	5-SI-4	Female	53	153.4	57.6
655	10750x	157	Watanabe Kuroki	I: RealEstate	5-SI-4	Male	58	166.1	61.2
656	10750x	158	Miyamoto Seiji	I: RealEstate	5-SI-4	Female	49	150.9	55.2
657	10750x	159	Kano Tokubei	I: RealEstate	5-SI-4	Female	64	159.2	55.9
658	10750x	160	Ishizaki Erieriya	I: RealEstate	5-SI-4	Male	25	171.4	57.3
659	10760x	1	Tanida Kojou	J: Manufacturing	6-NWP	Male	41	172.6	64.1
660	10760x	2	Kitagawa Hirakawa	J: Manufacturing	6-NWP	Male	44	178.5	63
661	10760x	3	Takashima Yajima	J: Manufacturing	6-NWP	Male	32	171.9	71.3
662	10760x	4	Matsumoto Tokiwa	J: Manufacturing	6-NWP	Male	38	165.6	43.1
663	10760x	5	Harada Gengo	J: Manufacturing	6-NWP	Male	33	166.9	65.5
664	10760x	6	Sekito Kunisuke	J: Manufacturing	6-NWP	Male	45	170.1	80.8
665	10760x	7	Ueki Sakairi	J: Manufacturing	6-NWP	Female	34	160.3	44.3
666	10760x	8	Takahashi Mihiro	J: Manufacturing	6-NP-1	Male	24	160.5	38.5
667	10760x	9	Iwasaki Asanuma	J: Manufacturing	6-NP-1	Female	36	151.4	57.3
668	10760x	10	Ooishi Ezaki	J: Manufacturing	6-NP-1	Male	32	174.7	67.1
669	10760x	11	Nagamine Yoshizaki	J: Manufacturing	6-NP-1	Female	44	158.8	42.6
670	10760x	12	Yanagimachi Masanostu	J: Manufacturing	6-NP-1	Male	55	176	63
671	10760x	13	Kanai Expert	J: Manufacturing	6-NP-1	Male	55	177.8	72.2
672	10760x	14	Sano Kai	J: Manufacturing	6-NP-1	Male	49	166.9	55.5
673	10760x	15	Aida Ezaki	J: Manufacturing	6-NP-1	Male	49	165.9	86.8
674	10760x	16	Kai Kuniya	J: Manufacturing	6-NP-2	Male	25	177.8	60.5
675	10760x	17	Takemura Takashi	J: Manufacturing	6-NP-2	Male	55	167.6	65.4
676	10760x	18	Akimoto Nagaoka	J: Manufacturing	6-NP-2	Male	41	167.6	60.7
677	10760x	19	Yoshida Shogun	J: Manufacturing	6-NP-2	Male	68	166.3	75
678	10760x	20	Ohara Takayoshi	J: Manufacturing	6-NP-3	Male	39	167.8	72.9
679	10760x	21	Satou Nagano	J: Manufacturing	6-NP-3	Female	41	164.5	55.3
680	10760x	22	Takeda Kiichi	J: Manufacturing	6-NP-4	Male	31	169.6	68.3
681	10760x	23	Ooba Yukinori	J: Manufacturing	6-NP-4	Male	59	164	74.1
682	10760x	24	Asada Tonomura	J: Manufacturing	6-NP-4	Female	25	151.4	45.3
683	10760x	25	Isobe Nishioka	J: Manufacturing	6-NP-4	Male	44	165.8	77
684	10760x	26	Sasaki Shigemoto	J: Manufacturing	6-NP-4	Male	67	177.5	62.4
685	10760x	27	Satou Honored	J: Manufacturing	6-NP-4	Male	61	166.3	64.6
686	10760x	28	Yasui Kanno	J: Manufacturing	6-NEP	Male	67	156.3	61.3
687	10760x	29	Hirayama Takashi	J: Manufacturing	6-NEP	Male	45	163.8	78.2
688	10760x	30	Ishizaki Kimito	J: Manufacturing	6-NEP	Male	59	166.9	54.8
689	10760x	31	Itoi Shibusawa	J: Manufacturing	6-NEP	Male	33	173.7	58.6
690	10760x	32	Yamazaki Koumi	J: Manufacturing	6-NEP	Male	48	173.4	74.7
691	10760x	33	Ishibashi Nagatomo	J: Manufacturing	6-NEP	Female	45	151	63.2
692	10760x	34	Suzuki Imura	J: Manufacturing	6-NI-1	Male	42	167.7	72.6
693	10760x	35	Endou Kenjin	J: Manufacturing	6-NI-1	Male	52	175.2	67
694	10760x	36	Suzuki Imanishi	J: Manufacturing	6-NI-1	Male	37	175.1	66.6
695	10760x	37	Sawada Chikada	J: Manufacturing	6-NI-1	Male	48	171.4	76.3
696	10760x	38	Tonegawa Tomoya	J: Manufacturing	6-NI-1	Male	55	163.3	78.4
697	10760x	39	Takanashi Takuato	J: Manufacturing	6-NI-1	Male	65	174.4	62.9
698	10760x	40	Akiyama Satya	J: Manufacturing	6-NI-1	Male	51	167.3	63.9
699	10760x	41	Touson Negishi	J: Manufacturing	6-NI-1	Male	63	162	58.3
700	10760x	42	Hayasaka Naoko	J: Manufacturing	6-NI-1	Female	22	160	47.2

No.	Device ID	Instance No.	Name	Tenant	Zone	Sex	Age	Hight	Weight
701	10760x	43	Nakajima Kensuke	J: Manufacturing	6-NI-1	Male	24	177.9	67.5
702	10760x	44	Miura Hachisuka	J: Manufacturing	6-NI-1	Male	33	173.3	72.3
703	10760x	45	Tanaka Zenji	J: Manufacturing	6-NI-1	Male	24	163.5	70
704	10760x	46	Seki Kohashi	J: Manufacturing	6-NI-1	Male	62	168.3	57.5
705	10760x	47	Watanabe Okiji	J: Manufacturing	6-NI-2	Male	41	172.4	84.1
706	10760x	48	Rin Tanioka	J: Manufacturing	6-NI-2	Male	48	174.5	68.9
707	10760x	49	Iwase Farewell	J: Manufacturing	6-NI-2	Male	45	167.7	62.7
708	10760x	50	Takei Yonetsu	J: Manufacturing	6-NI-2	Male	59	170.1	57.6
709	10760x	51	Shirakawa Ryuichi	J: Manufacturing	6-NI-2	Male	47	167.6	47
710	10760x	52	Kawakami Kasuke	J: Manufacturing	6-NI-2	Male	29	169.4	58
711	10760x	53	Takemoto Funatsu	J: Manufacturing	6-NI-2	Male	49	172.5	75.4
712	10760x	54	Shimada Teruichi	J: Manufacturing	6-NI-2	Male	23	181.1	66.9
713	10760x	55	Akamatsu Komatsuzaki	J: Manufacturing	6-NI-2	Female	48	165.4	58.9
714	10760x	56	Kase Himself	J: Manufacturing	6-NI-2	Male	56	175	71.2
715	10760x	57	Horie Shirato	J: Manufacturing	6-NI-2	Male	34	173.4	62.1
716	10760x	58	Takahashi Unicorn	J: Manufacturing	6-NI-2	Male	68	169	51.2
717	10760x	59	Kurahashi Shinsuke	J: Manufacturing	6-NI-2	Male	62	167.6	75.8
718	10760x	60	Ookubo Tokunaga	J: Manufacturing	6-NI-3	Male	69	165	55.4
719	10760x	61	Kobayashi Toshinobu	J: Manufacturing	6-NI-3	Male	38	167.9	52.7
720	10760x	62	Tajima Takanori	J: Manufacturing	6-NI-3	Female	36	157.8	42.7
721	10760x	63	Hasegawa Takeya	J: Manufacturing	6-NI-3	Male	58	166.9	50.5
722	10760x	64	Kunitake Kozeki	J: Manufacturing	6-NI-3	Male	26	180.5	66.3
723	10760x	65	Watanabe Koshiro	J: Manufacturing	6-NI-3	Female	66	149.7	54.3
724	10760x	66	Yasuda Terayama	J: Manufacturing	6-NI-3	Female	52	153.2	58.5
725	10760x	67	Igarashi Toshio	J: Manufacturing	6-NI-3	Male	46	161.2	55
726	10760x	68	Fukushima Ichijo	J: Manufacturing	6-NI-3	Female	45	159	55
727	10760x	69	Ooya Tou	J: Manufacturing	6-NI-3	Male	41	177.4	62.1
728	10760x	70	Hamaguchi Junya	J: Manufacturing	6-NI-3	Male	48	173	81
729	10760x	71	Hironaka Omonehitomi	J: Manufacturing	6-NI-3	Male	31	170.9	46.9
730	10760x	72	Igarashi Tatsumi	J: Manufacturing	6-NI-3	Male	24	166.7	34.6
731	10760x	73	Matsumoto Ryosei	J: Manufacturing	6-NI-3	Male	61	165.7	68.4
732	10760x	74	Okano Shishi	J: Manufacturing	6-NI-3	Male	61	168.3	72.3
733	10760x	75	Kudou Yonekura	J: Manufacturing	6-NI-3	Male	25	161.2	69.2
734	10760x	76	Kanazawa Nozue	J: Manufacturing	6-NI-3	Male	25	178.1	74.6
735	10760x	77	Ishikawa Shinzo	J: Manufacturing	6-NI-3	Male	25	173.4	72.8
736	10760x	78	Nagata Akihiro	J: Manufacturing	6-NI-3	Male	23	162.8	82.6
737	10760x	79	Ueno Haruyama	J: Manufacturing	6-NI-4	Male	28	183.7	69.6
738	10760x	80	Maruyama Onoda	J: Manufacturing	6-NI-4	Female	54	152.5	56.3
739	10760x	81	Taki Sasakura	J: Manufacturing	6-NI-4	Male	68	169.2	71.7
740	10760x	82	Nagura Seibu	J: Manufacturing	6-NI-4	Male	59	168.9	63.5
741	10760x	83	Seisen Toshiakitoshi	J: Manufacturing	6-NI-4	Male	55	168.5	54.3
742	10760x	84	Shimada Tabuchi	J: Manufacturing	6-NI-4	Male	62	171	71.3
743	10760x	85	Meiseki Founder	J: Manufacturing	6-NI-4	Male	36	167.7	80.9
744	10760x	86	Muto Juro	J: Manufacturing	6-NI-4	Male	23	171.6	68.2
745	10760x	87	Watanabe Taishin	J: Manufacturing	6-NI-4	Male	39	172.2	63.1
746	10760x	88	Nakatsuka Koshiro	J: Manufacturing	6-NI-4	Male	24	175.6	75.3
747	10760x	89	Tokashi Kuniya	J: Manufacturing	6-NI-4	Male	39	173.3	68.4
748	10760x	90	Nagai Kenyasuhiro	J: Manufacturing	6-NI-4	Male	59	176.3	72.4
749	10760x	91	Sano Nobuyuki	J: Manufacturing	6-NI-4	Male	55	169	75.8
750	10760x	92	Ootsuka Shigetaka	J: Manufacturing	6-NI-4	Male	57	176.9	72.5

No.	Device ID	Instance No.	Name	Tenant	Zone	Sex	Age	Hight	Weight
751	10760x	93	Okazaki Atsuke	J: Manufacturing	6-NI-4	Male	65	162.9	69
752	10760x	94	Shimizu Keisuke	K: TrafficOrPostalService	6-SWP	Male	59	159.1	75.8
753	10760x	95	Matsuura Britishenglish	K: TrafficOrPostalService	6-SWP	Female	31	161.6	53.4
754	10760x	96	Suzuki Katsuzan	K: TrafficOrPostalService	6-SWP	Male	41	170.4	59.7
755	10760x	97	Urano Akira	K: TrafficOrPostalService	6-SWP	Male	38	169.7	72.4
756	10760x	98	Ikeda Kimiya	K: TrafficOrPostalService	6-SWP	Male	53	162.2	86.3
757	10760x	99	Kosaka Kazunori	K: TrafficOrPostalService	6-SWP	Male	38	173.5	73.5
758	10760x	100	Oosaka Ebina	K: TrafficOrPostalService	6-SWP	Male	32	175.3	72.3
759	10760x	101	Sakamoto Kenshun	K: TrafficOrPostalService	6-SWP	Male	44	167.2	58.7
760	10760x	102	Hirota Yasuichiro	K: TrafficOrPostalService	6-SWP	Male	42	158.8	53.1
761	10760x	103	Tomioka Sugino	K: TrafficOrPostalService	6-SP-1	Male	45	165.8	76.8
762	10760x	104	Shiraishi Kunai	K: TrafficOrPostalService	6-SP-1	Female	25	154.7	61.3
763	10760x	105	Nakano Tomonobu	K: TrafficOrPostalService	6-SP-1	Female	57	154	55.2
764	10760x	106	Satou Sata	K: TrafficOrPostalService	6-SP-2	Female	44	158.2	38.1
765	10760x	107	Yuasa Kayaka	K: TrafficOrPostalService	6-SP-2	Female	43	162.1	43.9
766	10760x	108	Hasegawa Iwashita	K: TrafficOrPostalService	6-SP-2	Female	48	160.1	53.4
767	10760x	109	Gotou Nagaya	K: TrafficOrPostalService	6-SP-2	Male	47	168.4	53.7
768	10760x	110	Nagano Tsuda	K: TrafficOrPostalService	6-SP-3	Male	31	177.5	72.1
769	10760x	111	Tokudome Hibikyouno	K: TrafficOrPostalService	6-SP-3	Male	64	169.1	57.7
770	10760x	112	Kitamura Makita	K: TrafficOrPostalService	6-SP-3	Female	65	160.4	50.7
771	10760x	113	Sakai Amino	K: TrafficOrPostalService	6-SP-3	Male	45	178.8	82.4
772	10760x	114	Kanno Wakakira	K: TrafficOrPostalService	6-SP-3	Female	35	165.8	55.3
773	10760x	115	Gotou Kariya	K: TrafficOrPostalService	6-SP-4	Female	46	165.5	55.2
774	10760x	116	Irie Migita	K: TrafficOrPostalService	6-SP-4	Male	58	170.6	65.3
775	10760x	117	Higuchi Kenshinkim	K: TrafficOrPostalService	6-SP-4	Male	55	171.5	81
776	10760x	118	Matsuda Kyoya	K: TrafficOrPostalService	6-SP-4	Male	56	169.9	66.5
777	10760x	119	Sekiya Naoko	K: TrafficOrPostalService	6-SI-1	Male	62	171.2	57.8
778	10760x	120	Takano Takumori	K: TrafficOrPostalService	6-SI-1	Female	47	160.9	37.6
779	10760x	121	Masuda Takeimasu	K: TrafficOrPostalService	6-SI-1	Female	53	160.5	43.8
780	10760x	122	Shimizu Holes	K: TrafficOrPostalService	6-SI-1	Male	69	168.1	53.8
781	10760x	123	Irie Nagumo	K: TrafficOrPostalService	6-SI-1	Male	31	170.5	72.5
782	10760x	124	Ogura Takaaki	K: TrafficOrPostalService	6-SI-1	Male	35	172	57.8
783	10760x	125	Hata Matsunaga	K: TrafficOrPostalService	6-SI-1	Male	34	177.6	85.3
784	10760x	126	Terada Goshima	K: TrafficOrPostalService	6-SI-2	Male	35	168.7	78.9
785	10760x	127	Kawahara Year-Old	K: TrafficOrPostalService	6-SI-2	Female	29	163.3	54.5
786	10760x	128	Satou Takeuchi	K: TrafficOrPostalService	6-SI-2	Female	42	158.5	50.6
787	10760x	129	Kobayashi Ooki	K: TrafficOrPostalService	6-SI-2	Female	44	150.2	40.2
788	10760x	130	Nishiyama Tatsuro	K: TrafficOrPostalService	6-SI-2	Male	65	169	60.2
789	10760x	131	Tada Rikato	K: TrafficOrPostalService	6-SI-2	Male	54	180.1	65.7
790	10760x	132	Tateishi Toshima	K: TrafficOrPostalService	6-SI-2	Male	65	182.5	66.9
791	10760x	133	Inoue Sugisawa	K: TrafficOrPostalService	6-SI-2	Male	35	171.5	73.9
792	10760x	134	Terao Tsuchiya	K: TrafficOrPostalService	6-SI-2	Female	47	149.5	59.3
793	10760x	135	Tabuchi Inutaro	K: TrafficOrPostalService	6-SI-2	Male	45	177.2	73.2
794	10760x	136	Takahashi Tokuhiro	K: TrafficOrPostalService	6-SI-2	Female	45	149.1	45.5
795	10760x	137	Oonuki Koga	K: TrafficOrPostalService	6-SI-2	Female	57	157.1	53
796	10760x	138	Takagi Takahiro	K: TrafficOrPostalService	6-SI-3	Female	65	160.2	55.4
797	10760x	139	Uemura Emoto	K: TrafficOrPostalService	6-SI-3	Female	51	162	51.5
798	10760x	140	Ochi Akira	K: TrafficOrPostalService	6-SI-3	Male	58	177.3	58.6
799	10760x	141	Saito Kouichiro	K: TrafficOrPostalService	6-SI-3	Male	47	160.4	74.4
800	10760x	142	Sakurai Shiozawa	K: TrafficOrPostalService	6-SI-3	Female	61	154	54.9

No.	Device ID	Instance No.	Name	Tenant	Zone	Sex	Age	Hight	Weight
801	10760x	143	Tsutsumi Matsuzaki	K: TrafficOrPostalService	6-SI-3	Female	37	155	60.6
802	10760x	144	Nakamura Kawashima	K: TrafficOrPostalService	6-SI-3	Female	61	150.6	71.8
803	10760x	145	Yano Keiko	K: TrafficOrPostalService	6-SI-3	Male	38	177.6	72
804	10760x	146	Fujii Dobashi	K: TrafficOrPostalService	6-SI-3	Male	44	164.4	78.9
805	10760x	147	Yamamoto Shintaro	K: TrafficOrPostalService	6-SI-3	Male	45	168.7	77.3
806	10760x	148	Nakano Wakatsuki	K: TrafficOrPostalService	6-SI-3	Male	45	156.6	71.6
807	10760x	149	Motoyama Kuroiwa	K: TrafficOrPostalService	6-SI-3	Female	24	162.5	44.3
808	10760x	150	Miki Toshimitsu	K: TrafficOrPostalService	6-SI-3	Female	59	158.1	51.6
809	10760x	151	Muramatsu Narumi	K: TrafficOrPostalService	6-SI-3	Male	38	173.6	63.2
810	10760x	152	Andou Tatsuro	K: TrafficOrPostalService	6-SI-3	Male	43	172.1	58.6
811	10760x	153	Koyama Yokouchi	K: TrafficOrPostalService	6-SI-3	Female	48	165.3	62.8
812	10760x	154	Suzuki Megumi	K: TrafficOrPostalService	6-SI-3	Male	49	160.5	66.7
813	10760x	155	Saitou Atsutaka	K: TrafficOrPostalService	6-SI-3	Male	44	167.3	67.7
814	10760x	156	Yamauchi Ookane	K: TrafficOrPostalService	6-SI-3	Male	47	170.1	64.9
815	10760x	157	Yoshizawa Tsunashima	K: TrafficOrPostalService	6-SI-3	Male	66	165.1	63.6
816	10760x	158	Yanagisawa Keizo	K: TrafficOrPostalService	6-SI-4	Male	45	168.9	65.2
817	10760x	159	Ogawa Ohyamura	K: TrafficOrPostalService	6-SI-4	Female	37	153.2	51.5
818	10760x	160	Kobayashi Urata	K: TrafficOrPostalService	6-SI-4	Male	45	168.5	73.9
819	10760x	161	Matsui Atsuko	K: TrafficOrPostalService	6-SI-4	Male	63	167.9	80.8
820	10760x	162	Itou Yoshimasa	K: TrafficOrPostalService	6-SI-4	Male	51	179.8	63.7
821	10760x	163	Oono Shimizu	K: TrafficOrPostalService	6-SI-4	Female	25	162.1	47.5
822	10760x	164	Hongou Abe	K: TrafficOrPostalService	6-SI-4	Male	41	174.4	58.6
823	10770x	1	Yoshimura Tanemura	L: InformationAndCommuni	7-NWP	Male	68	171.8	67.6
824	10770x	2	Higuchi Koichi	L: InformationAndCommuni	7-NWP	Male	39	175.7	62.8
825	10770x	3	Uemura Takutoshi	L: InformationAndCommuni	7-NWP	Male	48	174.1	73.7
826	10770x	4	Hori Stringgirl	L: InformationAndCommuni	7-NWP	Male	36	168.8	68.3
827	10770x	5	Hiratsuka Ishioka	L: InformationAndCommuni	7-NWP	Male	33	175.5	71.5
828	10770x	6	Kumasawa Shunsuke	L: InformationAndCommuni	7-NWP	Male	45	170.2	68.9
829	10770x	7	Ooshita Kamoshida	L: InformationAndCommuni	7-NWP	Male	34	179.4	55.1
830	10770x	8	Uchida Ji	L: InformationAndCommuni	7-NWP	Female	48	160.1	53.6
831	10770x	9	Shimizu Nishioka	L: InformationAndCommuni	7-NWP	Male	28	179.3	59.4
832	10770x	10	Doi Inohara	L: InformationAndCommuni	7-NWP	Male	56	169.8	77.1
833	10770x	11	Igarashi Mitsukokuren	L: InformationAndCommuni	7-NWP	Female	45	162.3	45.9
834	10770x	12	Rin Sasamori	L: InformationAndCommuni	7-NP-1	Male	69	168	57.7
835	10770x	13	Miyamura Natori	L: InformationAndCommuni	7-NP-1	Female	49	159.7	56.3
836	10770x	14	Ono Kouduki	L: InformationAndCommuni	7-NP-1	Female	54	154.5	58.9
837	10770x	15	Onishi Ka	L: InformationAndCommuni	7-NP-1	Male	26	167.5	63.9
838	10770x	16	Yoshihara Kusanori	L: InformationAndCommuni	7-NP-1	Male	45	176.2	73
839	10770x	17	Yoshie Araki	L: InformationAndCommuni	7-NP-1	Female	68	149.6	45.1
840	10770x	18	Iwasaki Kurosawa	L: InformationAndCommuni	7-NP-2	Male	24	162.7	74.7
841	10770x	19	Satou Horizon	L: InformationAndCommuni	7-NP-2	Female	24	165	42
842	10770x	20	Hirashima Nakanishi	L: InformationAndCommuni	7-NP-3	Female	38	168	53.3
843	10770x	21	Fukushi Oyama	L: InformationAndCommuni	7-NP-3	Male	21	168.3	67.6
844	10770x	22	Yamagata K-Koto	L: InformationAndCommuni	7-NP-3	Female	36	153.9	50.5
845	10770x	23	Masui Tomoya	L: InformationAndCommuni	7-NP-3	Male	23	174.7	76
846	10770x	24	Shimizu Oonuma	L: InformationAndCommuni	7-NP-3	Male	42	172	57.4
847	10770x	25	Saitou Shibata	L: InformationAndCommuni	7-NP-3	Male	53	165.6	72.4
848	10770x	26	Kawamura Katsuri	L: InformationAndCommuni	7-NP-3	Male	59	171.8	55.9
849	10770x	27	Koya Mannedman	L: InformationAndCommuni	7-NP-3	Female	41	169	59.6
850	10770x	28	Ooya Ka	L: InformationAndCommuni	7-NP-4	Male	38	174.5	72.3

No.	Device ID	Instance No.	Name	Tenant	Zone	Sex	Age	Hight	Weight
851	10770x	29	Kawase Tadayuki	L: InformationAndCommuni	7-NP-4	Male	57	167	56.1
852	10770x	30	Ookura Tsurutani	L: InformationAndCommuni	7-NP-4	Male	36	175.8	77.9
853	10770x	31	Tanaka Kido	L: InformationAndCommuni	7-NP-4	Male	46	170.6	44.5
854	10770x	32	Hasegawa Youngage	L: InformationAndCommuni	7-NP-4	Male	37	165.4	68.9
855	10770x	33	Iida Kamei	L: InformationAndCommuni	7-NEP	Male	32	168	65.8
856	10770x	34	Masaki Horibe	L: InformationAndCommuni	7-NEP	Male	25	173.8	79.6
857	10770x	35	Ootsuka Tonegawa	L: InformationAndCommuni	7-NEP	Male	34	174.9	67.6
858	10770x	36	Miyake Kishigami	L: InformationAndCommuni	7-NEP	Male	48	183.3	72.3
859	10770x	37	Imaizumi Sei-San	L: InformationAndCommuni	7-NI-1	Female	26	156	45.7
860	10770x	38	Takahashi Yoshikiyosh	L: InformationAndCommuni	7-NI-1	Male	56	172.9	65.1
861	10770x	39	Iwasa Masashige	L: InformationAndCommuni	7-NI-1	Female	31	157	53.5
862	10770x	40	Ishibashi Sofue	L: InformationAndCommuni	7-NI-1	Male	49	172.2	65.8
863	10770x	41	Takano Oguchi	L: InformationAndCommuni	7-NI-1	Male	54	179.1	71.2
864	10770x	42	Nakamura Atsuki	L: InformationAndCommuni	7-NI-1	Female	25	159.5	51.3
865	10770x	43	Ueno Matsuhashi	L: InformationAndCommuni	7-NI-1	Male	36	175.4	69.8
866	10770x	44	Yoshida Kurita	L: InformationAndCommuni	7-NI-1	Female	36	156.9	55.2
867	10770x	45	Ueda Koji	L: InformationAndCommuni	7-NI-1	Male	62	169.3	76.2
868	10770x	46	Shimizu Kaji	L: InformationAndCommuni	7-NI-1	Female	47	161.5	52
869	10770x	47	Sugai Kiyoshi	L: InformationAndCommuni	7-NI-1	Male	45	177.3	80.9
870	10770x	48	Nagai Seiki	L: InformationAndCommuni	7-NI-1	Male	47	168.2	73.6
871	10770x	49	Nagaoka Kimo	L: InformationAndCommuni	7-NI-1	Male	59	172.9	64.3
872	10770x	50	Fujiyoshi Kenken	L: InformationAndCommuni	7-NI-1	Female	26	157.9	58.3
873	10770x	51	Nakata Naotojin	L: InformationAndCommuni	7-NI-2	Male	45	166.4	69.7
874	10770x	52	Yamada Rinsen	L: InformationAndCommuni	7-NI-2	Female	21	158.2	48
875	10770x	53	Kinoshita Taito	L: InformationAndCommuni	7-NI-2	Male	23	175	55.3
876	10770x	54	Maekawa Megereon	L: InformationAndCommuni	7-NI-2	Female	41	155.2	56.2
877	10770x	55	Kaneko Seiichi	L: InformationAndCommuni	7-NI-2	Male	46	166.8	76.9
878	10770x	56	Kurosawa Kozo	L: InformationAndCommuni	7-NI-2	Female	23	157.3	53.8
879	10770x	57	Murakami Tetsuhiro	L: InformationAndCommuni	7-NI-2	Male	65	165.3	62.4
880	10770x	58	Takayama Sosh	L: InformationAndCommuni	7-NI-2	Male	29	179.2	71.1
881	10770x	59	Watase Tokuyama	L: InformationAndCommuni	7-NI-2	Female	37	160.8	51.6
882	10770x	60	Fuse Tetsushi	L: InformationAndCommuni	7-NI-2	Male	32	165	57.4
883	10770x	61	Fujimoto Atsushi	L: InformationAndCommuni	7-NI-3	Female	27	157	44.2
884	10770x	62	Nishikawa Adachi	L: InformationAndCommuni	7-NI-3	Female	37	151.4	51.3
885	10770x	63	Matsuno Playingmusic	L: InformationAndCommuni	7-NI-3	Male	21	174	71.3
886	10770x	64	Takayama Minamide	L: InformationAndCommuni	7-NI-3	Male	32	170.6	60.6
887	10770x	65	Sasaki Iijima	L: InformationAndCommuni	7-NI-3	Male	32	168.5	71.8
888	10770x	66	Ishido Tsuyohiro	L: InformationAndCommuni	7-NI-3	Male	34	171.8	67.5
889	10770x	67	Munekata Ichigo	L: InformationAndCommuni	7-NI-4	Male	58	169.6	65.7
890	10770x	68	Katsumi Fightingspirit	L: InformationAndCommuni	7-NI-4	Male	54	173.8	72.1
891	10770x	69	Toyama Takeyuki	L: InformationAndCommuni	7-NI-4	Male	55	171	63.9
892	10770x	70	Nagano Hirokawa	L: InformationAndCommuni	7-NI-4	Male	37	177.3	55.8
893	10770x	71	Ikeda Shosuke	L: InformationAndCommuni	7-NI-4	Male	56	171.6	68.7
894	10770x	72	Katou Ooi	L: InformationAndCommuni	7-NI-4	Female	23	153	54.8
895	10770x	73	Sakamoto Utsume	L: InformationAndCommuni	7-NI-4	Male	46	172	67.4
896	10770x	74	Kumagai Toshiaki	L: InformationAndCommuni	7-NI-4	Male	53	171.4	56.5
897	10770x	75	Tsukamoto Genki	L: InformationAndCommuni	7-NI-4	Male	41	175	55.8
898	10770x	76	Matsui Kadoi	L: InformationAndCommuni	7-NI-4	Female	35	153.6	44.2
899	10770x	77	Hirai Osamu	L: InformationAndCommuni	7-NI-4	Male	31	164	72.6
900	10770x	78	Kitagawa Seijiro	L: InformationAndCommuni	7-NI-4	Female	38	161.6	40.2



Appendix 4    List of measuring points





CSV	No.	Description	Unit
1	1	Time	
1	2	Outdoor air Drybulb Temperature	C
1	3	Outdoor air Relative Humidity	%
1	4	E2R2	
1	5	ERR	
1	6	DRR	
1	7	Primary Energy Use	GJ
1	8	Electricity of heat source system	kW
1	9	Electricity of heat source system	kWh
1	10	Electricity of air conditioning system	kW
1	11	Electricity of air conditioning system	kWh
1	12	Electricity of Tenant Plug	kW
1	13	Electricity of Tenant Plug	kWh
1	14	Electricity of Tenant Lighting	kW
1	15	Electricity of Tenant Lighting	kWh
1	16	Chilled Water Supply Header Temperature	C
1	17	Chilled Water Return Header Temperature	C
1	18	Chilled Water Return Water Temperature	C
1	19	Chilled Water Supply Flow Rate	L/min
1	20	Chilled Water Supply Heat Flow	kW
1	21	Chilled Water Supply Heat Flow	MJ
1	22	Chilled Water Supply-Supply Header Bypass Flow Rate	L/min
1	23	Chilled Water Supply-Return Header Bypass Flow Rate	L/min
1	24	Hot Water Supply Header Temperature	C
1	25	Hot Water Return Header Temperature	C
1	26	Hot Water Return Water Temperature	C
1	27	Hot Water Supply Flow Rate	L/min
1	28	Hot Water Supply Heat Flow	kW
1	29	Hot Water Supply Heat Flow	MJ
1	30	Hot Water Supply-Supply Header Bypass Flow Rate	L/min
1	31	Hot Water Supply-Return Header Bypass Flow Rate	L/min
1	32	Cooling Tower Outlet Temperature	C
1	33	Cooling Tower Fan Electricity	kW
1	34	Cooling Tower Fan Electricity	kWh
1	35	Cooling Tower Water Consumption	L/min
1	36	Cooling Tower Water Consumption	L
1	37	Absorption Chiller and Cooling water pump Electricity	kW
1	38	Absorption Chiller and Cooling water pump Electricity	kWh
1	39	Absorption Chiller Chilled or Hot Water Pump Electricity	kW
1	40	Absorption Chiller Chilled or Hot Water Pump Electricity	kWh
1	41	Absorption Chiller Chilled or Hot Water Outlet Temperature	C
1	42	Absorption Chiller Chilled or Hot Water Flow Rate	L/min
1	43	Absorption Chiller Chilled or Hot Water Heat Flow	kW
1	44	Absorption Chiller Chilled or Hot Water Heat Flow	MJ
1	45	Absorption Chiller Gas Consumption	m3/h
1	46	Absorption Chiller Gas Consumption	m3
1	47	Air Source Heatpump Electricity	kW
1	48	Air Source Heatpump Electricity	kWh

CSV	No.	Description	Unit
1	49	Air Source Heatpump Chilled or Hot Water Pump Electricity	kW
1	50	Air Source Heatpump Chilled or Hot Water Pump Electricity	kWh
1	51	Air Source Heatpump Chilled or Hot Water Inlet Temperature	C
1	52	Air Source Heatpump Chilled or Hot Water Outlet Temperature	C
1	53	Air Source Heatpump Chilled or Hot Water Flow Rate	L/min
1	54	Air Source Heatpump Chilled or Hot Water Heat Flow	kW
1	55	Air Source Heatpump Chilled or Hot Water Heat Flow	MJ
1	56	Water Heat Storage	deltaMJ
1	57	Water Heat Storage Fully Charged	-
1	58	Water Heat Storage Storage Mode	-
1	59	Water Heat Storage Primary Pump Electiricy	kW
1	60	Water Heat Storage Primary Pump Electiricy	kWh
1	61	Water Heat Storage Secondary Pump Electricity	kW
1	62	Water Heat Storage Secondary Pump Electricity	kWh
1	63	Water Heat Storage Charge HEX Inlet Temperature	C
1	64	Water Heat Storage Charge HEX Outlet Temperature	C
1	65	Water Heat Storage Charge HEX Water Flow Rate	L/min
1	66	Water Heat Storage Charge HEX Heat Flow	kW
1	67	Water Heat Storage Charge HEX Heat Flow	MJ
1	68	Water Heat Storage Supply HEX Inlet Temperature	C
1	69	Water Heat Storage Supply HEX Outlet Temperature	C
1	70	Water Heat Storage Supply HEX Water Flow Rate	L/min
1	71	Water Heat Storage Supply HEX Heat Flow	kW
1	72	Water Heat Storage Supply HEX Heat Flow	MJ
1	73	Water Heat Storage Supply Water Temperature	C
1	74	Water Heat Storage Supply Water Flow Rate	L/min
1	75	Water Heat Storage Supply Water Heat Flow	kW
1	76	Water Heat Storage Supply Water Heat Flow	MJ
1	77	Water Heat Storage Tank Water Temperature 1	C
1	78	Water Heat Storage Tank Water Temperature 2	C
1	79	Water Heat Storage Tank Water Temperature 3	C
1	80	Water Heat Storage Tank Water Temperature 4	C
1	81	Water Heat Storage Tank Water Temperature 5	C
1	82	Water Heat Storage Tank Water Temperature 6	C
1	83	Water Heat Storage Tank Water Temperature 7	C
1	84	Water Heat Storage Tank Water Temperature 8	C
1	85	Water Heat Storage Tank Water Temperature 9	C
1	86	Chilled Water Secondary Pump Operating Number	-
1	87	Chilled Water Secondary Pump Electricity	kW
1	88	Chilled Water Secondary Pump Electricity	kWh
1	89	Chilled Water Secondary Pump Rotation Ratio	-
1	90	Chilled Water Secondary Pump Pressure Difference	kPa
1	91	Hot Water Secondary Pump Operating Number	
1	92	Hot Water Secondary Pump Electricity	kW
1	93	Hot Water Secondary Pump Electricity	kWh
1	94	Hot Water Secondary Pump Rotation Ratio	-
1	95	Hot Water Secondary Pump Pressure Difference	kPa
2	1	Time	

CSV	No.	Description	Unit
2	2	Outdoor air Drybulb Temperature	C
2	3	Outdoor air Relative Humidity	%
2	4	ROOM1-1 CO2 Level	ppm
2	5	ROOM1-2 CO2 Level	ppm
2	6	ROOM2-1 CO2 Level	ppm
2	7	ROOM2-2 CO2 Level	ppm
2	8	ROOM3-1 CO2 Level	ppm
2	9	ROOM3-2 CO2 Level	ppm
2	10	ROOM4-1 CO2 Level	ppm
2	11	ROOM4-2 CO2 Level	ppm
2	12	ROOM5-1 CO2 Level	ppm
2	13	ROOM5-2 CO2 Level	ppm
2	14	ROOM6-1 CO2 Level	ppm
2	15	ROOM6-2 CO2 Level	ppm
2	16	ROOM7-1 CO2 Level	ppm
2	17	ROOM7-2 CO2 Level	ppm
2	18	AHU1-1 Zone1 Temperature	C
2	19	AHU1-1 Zone2 Temperature	C
2	20	AHU1-1 Zone3 Temperature	C
2	21	AHU1-2 Zone1 Temperature	C
2	22	AHU1-2 Zone2 Temperature	C
2	23	AHU1-3 Zone1 Temperature	C
2	24	AHU1-3 Zone2 Temperature	C
2	25	AHU1-3 Zone3 Temperature	C
2	26	AHU1-4 Zone1 Temperature	C
2	27	AHU1-4 Zone2 Temperature	C
2	28	AHU1-5 Zone1 Temperature	C
2	29	AHU2-1 Zone1 Temperature	C
2	30	AHU2-1 Zone2 Temperature	C
2	31	AHU2-1 Zone3 Temperature	C
2	32	AHU2-1 Zone4 Temperature	C
2	33	AHU2-1 Zone5 Temperature	C
2	34	AHU2-1 Zone6 Temperature	C
2	35	AHU2-2 Zone1 Temperature	C
2	36	AHU2-2 Zone2 Temperature	C
2	37	AHU2-2 Zone3 Temperature	C
2	38	AHU2-2 Zone4 Temperature	C
2	39	AHU2-3 Zone1 Temperature	C
2	40	AHU2-3 Zone2 Temperature	C
2	41	AHU2-3 Zone3 Temperature	C
2	42	AHU2-3 Zone4 Temperature	C
2	43	AHU2-3 Zone5 Temperature	C
2	44	AHU2-4 Zone1 Temperature	C
2	45	AHU2-4 Zone2 Temperature	C
2	46	AHU2-4 Zone3 Temperature	C
2	47	AHU2-4 Zone4 Temperature	C
2	48	AHU3-1 Zone1 Temperature	C
2	49	AHU3-1 Zone2 Temperature	C

CSV	No.	Description	Unit
2	50	AHU3-1 Zone3 Temperature	C
2	51	AHU3-1 Zone4 Temperature	C
2	52	AHU3-1 Zone5 Temperature	C
2	53	AHU3-1 Zone6 Temperature	C
2	54	AHU3-2 Zone1 Temperature	C
2	55	AHU3-2 Zone2 Temperature	C
2	56	AHU3-2 Zone3 Temperature	C
2	57	AHU3-2 Zone4 Temperature	C
2	58	AHU3-3 Zone1 Temperature	C
2	59	AHU3-3 Zone2 Temperature	C
2	60	AHU3-3 Zone3 Temperature	C
2	61	AHU3-3 Zone4 Temperature	C
2	62	AHU3-3 Zone5 Temperature	C
2	63	AHU3-4 Zone1 Temperature	C
2	64	AHU3-4 Zone2 Temperature	C
2	65	AHU3-4 Zone3 Temperature	C
2	66	AHU3-4 Zone4 Temperature	C
2	67	AHU4-1 Zone1 Temperature	C
2	68	AHU4-1 Zone2 Temperature	C
2	69	AHU4-1 Zone3 Temperature	C
2	70	AHU4-1 Zone4 Temperature	C
2	71	AHU4-1 Zone5 Temperature	C
2	72	AHU4-1 Zone6 Temperature	C
2	73	AHU4-2 Zone1 Temperature	C
2	74	AHU4-2 Zone2 Temperature	C
2	75	AHU4-2 Zone3 Temperature	C
2	76	AHU4-2 Zone4 Temperature	C
2	77	AHU4-3 Zone1 Temperature	C
2	78	AHU4-3 Zone2 Temperature	C
2	79	AHU4-3 Zone3 Temperature	C
2	80	AHU4-3 Zone4 Temperature	C
2	81	AHU4-3 Zone5 Temperature	C
2	82	AHU4-4 Zone1 Temperature	C
2	83	AHU4-4 Zone2 Temperature	C
2	84	AHU4-4 Zone3 Temperature	C
2	85	AHU4-4 Zone4 Temperature	C
2	86	AHU5-1 Zone1 Temperature	C
2	87	AHU5-1 Zone2 Temperature	C
2	88	AHU5-1 Zone3 Temperature	C
2	89	AHU5-1 Zone4 Temperature	C
2	90	AHU5-1 Zone5 Temperature	C
2	91	AHU5-1 Zone6 Temperature	C
2	92	AHU5-2 Zone1 Temperature	C
2	93	AHU5-2 Zone2 Temperature	C
2	94	AHU5-2 Zone3 Temperature	C
2	95	AHU5-2 Zone4 Temperature	C
2	96	AHU5-3 Zone1 Temperature	C
2	97	AHU5-3 Zone2 Temperature	C

CSV	No.	Description	Unit
2	98	AHU5-3 Zone3 Temperature	C
2	99	AHU5-3 Zone4 Temperature	C
2	100	AHU5-3 Zone5 Temperature	C
2	101	AHU5-4 Zone1 Temperature	C
2	102	AHU5-4 Zone2 Temperature	C
2	103	AHU5-4 Zone3 Temperature	C
2	104	AHU5-4 Zone4 Temperature	C
2	105	AHU6-1 Zone1 Temperature	C
2	106	AHU6-1 Zone2 Temperature	C
2	107	AHU6-1 Zone3 Temperature	C
2	108	AHU6-1 Zone4 Temperature	C
2	109	AHU6-1 Zone5 Temperature	C
2	110	AHU6-1 Zone6 Temperature	C
2	111	AHU6-2 Zone1 Temperature	C
2	112	AHU6-2 Zone2 Temperature	C
2	113	AHU6-2 Zone3 Temperature	C
2	114	AHU6-2 Zone4 Temperature	C
2	115	AHU6-3 Zone1 Temperature	C
2	116	AHU6-3 Zone2 Temperature	C
2	117	AHU6-3 Zone3 Temperature	C
2	118	AHU6-3 Zone4 Temperature	C
2	119	AHU6-3 Zone5 Temperature	C
2	120	AHU6-4 Zone1 Temperature	C
2	121	AHU6-4 Zone2 Temperature	C
2	122	AHU6-4 Zone3 Temperature	C
2	123	AHU6-4 Zone4 Temperature	C
2	124	AHU7-1 Zone1 Temperature	C
2	125	AHU7-1 Zone2 Temperature	C
2	126	AHU7-1 Zone3 Temperature	C
2	127	AHU7-1 Zone4 Temperature	C
2	128	AHU7-1 Zone5 Temperature	C
2	129	AHU7-1 Zone6 Temperature	C
2	130	AHU7-2 Zone1 Temperature	C
2	131	AHU7-2 Zone2 Temperature	C
2	132	AHU7-2 Zone3 Temperature	C
2	133	AHU7-2 Zone4 Temperature	C
2	134	AHU7-3 Zone1 Temperature	C
2	135	AHU7-3 Zone2 Temperature	C
2	136	AHU7-3 Zone3 Temperature	C
2	137	AHU7-3 Zone4 Temperature	C
2	138	AHU7-3 Zone5 Temperature	C
2	139	AHU7-4 Zone1 Temperature	C
2	140	AHU7-4 Zone2 Temperature	C
2	141	AHU7-4 Zone3 Temperature	C
2	142	AHU7-4 Zone4 Temperature	C
2	143	AHU1-1 Zone1 Relative Humidity	%
2	144	AHU1-1 Zone2 Relative Humidity	%
2	145	AHU1-1 Zone3 Relative Humidity	%

CSV	No.	Description	Unit
2	146	AHU1-2 Zone1 Relative Humidity	%
2	147	AHU1-2 Zone2 Relative Humidity	%
2	148	AHU1-3 Zone1 Relative Humidity	%
2	149	AHU1-3 Zone2 Relative Humidity	%
2	150	AHU1-3 Zone3 Relative Humidity	%
2	151	AHU1-4 Zone1 Relative Humidity	%
2	152	AHU1-4 Zone2 Relative Humidity	%
2	153	AHU1-5 Zone1 Relative Humidity	%
2	154	AHU2-1 Zone1 Relative Humidity	%
2	155	AHU2-1 Zone2 Relative Humidity	%
2	156	AHU2-1 Zone3 Relative Humidity	%
2	157	AHU2-1 Zone4 Relative Humidity	%
2	158	AHU2-1 Zone5 Relative Humidity	%
2	159	AHU2-1 Zone6 Relative Humidity	%
2	160	AHU2-2 Zone1 Relative Humidity	%
2	161	AHU2-2 Zone2 Relative Humidity	%
2	162	AHU2-2 Zone3 Relative Humidity	%
2	163	AHU2-2 Zone4 Relative Humidity	%
2	164	AHU2-3 Zone1 Relative Humidity	%
2	165	AHU2-3 Zone2 Relative Humidity	%
2	166	AHU2-3 Zone3 Relative Humidity	%
2	167	AHU2-3 Zone4 Relative Humidity	%
2	168	AHU2-3 Zone5 Relative Humidity	%
2	169	AHU2-4 Zone1 Relative Humidity	%
2	170	AHU2-4 Zone2 Relative Humidity	%
2	171	AHU2-4 Zone3 Relative Humidity	%
2	172	AHU2-4 Zone4 Relative Humidity	%
2	173	AHU3-1 Zone1 Relative Humidity	%
2	174	AHU3-1 Zone2 Relative Humidity	%
2	175	AHU3-1 Zone3 Relative Humidity	%
2	176	AHU3-1 Zone4 Relative Humidity	%
2	177	AHU3-1 Zone5 Relative Humidity	%
2	178	AHU3-1 Zone6 Relative Humidity	%
2	179	AHU3-2 Zone1 Relative Humidity	%
2	180	AHU3-2 Zone2 Relative Humidity	%
2	181	AHU3-2 Zone3 Relative Humidity	%
2	182	AHU3-2 Zone4 Relative Humidity	%
2	183	AHU3-3 Zone1 Relative Humidity	%
2	184	AHU3-3 Zone2 Relative Humidity	%
2	185	AHU3-3 Zone3 Relative Humidity	%
2	186	AHU3-3 Zone4 Relative Humidity	%
2	187	AHU3-3 Zone5 Relative Humidity	%
2	188	AHU3-4 Zone1 Relative Humidity	%
2	189	AHU3-4 Zone2 Relative Humidity	%
2	190	AHU3-4 Zone3 Relative Humidity	%
2	191	AHU3-4 Zone4 Relative Humidity	%
2	192	AHU4-1 Zone1 Relative Humidity	%
2	193	AHU4-1 Zone2 Relative Humidity	%

CSV	No.	Description	Unit
2	194	AHU4-1 Zone3 Relative Humidity	%
2	195	AHU4-1 Zone4 Relative Humidity	%
2	196	AHU4-1 Zone5 Relative Humidity	%
2	197	AHU4-1 Zone6 Relative Humidity	%
2	198	AHU4-2 Zone1 Relative Humidity	%
2	199	AHU4-2 Zone2 Relative Humidity	%
2	200	AHU4-2 Zone3 Relative Humidity	%
2	201	AHU4-2 Zone4 Relative Humidity	%
2	202	AHU4-3 Zone1 Relative Humidity	%
2	203	AHU4-3 Zone2 Relative Humidity	%
2	204	AHU4-3 Zone3 Relative Humidity	%
2	205	AHU4-3 Zone4 Relative Humidity	%
2	206	AHU4-3 Zone5 Relative Humidity	%
2	207	AHU4-4 Zone1 Relative Humidity	%
2	208	AHU4-4 Zone2 Relative Humidity	%
2	209	AHU4-4 Zone3 Relative Humidity	%
2	210	AHU4-4 Zone4 Relative Humidity	%
2	211	AHU5-1 Zone1 Relative Humidity	%
2	212	AHU5-1 Zone2 Relative Humidity	%
2	213	AHU5-1 Zone3 Relative Humidity	%
2	214	AHU5-1 Zone4 Relative Humidity	%
2	215	AHU5-1 Zone5 Relative Humidity	%
2	216	AHU5-1 Zone6 Relative Humidity	%
2	217	AHU5-2 Zone1 Relative Humidity	%
2	218	AHU5-2 Zone2 Relative Humidity	%
2	219	AHU5-2 Zone3 Relative Humidity	%
2	220	AHU5-2 Zone4 Relative Humidity	%
2	221	AHU5-3 Zone1 Relative Humidity	%
2	222	AHU5-3 Zone2 Relative Humidity	%
2	223	AHU5-3 Zone3 Relative Humidity	%
2	224	AHU5-3 Zone4 Relative Humidity	%
2	225	AHU5-3 Zone5 Relative Humidity	%
2	226	AHU5-4 Zone1 Relative Humidity	%
2	227	AHU5-4 Zone2 Relative Humidity	%
2	228	AHU5-4 Zone3 Relative Humidity	%
2	229	AHU5-4 Zone4 Relative Humidity	%
2	230	AHU6-1 Zone1 Relative Humidity	%
2	231	AHU6-1 Zone2 Relative Humidity	%
2	232	AHU6-1 Zone3 Relative Humidity	%
2	233	AHU6-1 Zone4 Relative Humidity	%
2	234	AHU6-1 Zone5 Relative Humidity	%
2	235	AHU6-1 Zone6 Relative Humidity	%
2	236	AHU6-2 Zone1 Relative Humidity	%
2	237	AHU6-2 Zone2 Relative Humidity	%
2	238	AHU6-2 Zone3 Relative Humidity	%
2	239	AHU6-2 Zone4 Relative Humidity	%
2	240	AHU6-3 Zone1 Relative Humidity	%
2	241	AHU6-3 Zone2 Relative Humidity	%

CSV	No.	Description	Unit
2	242	AHU6-3 Zone3 Relative Humidity	%
2	243	AHU6-3 Zone4 Relative Humidity	%
2	244	AHU6-3 Zone5 Relative Humidity	%
2	245	AHU6-4 Zone1 Relative Humidity	%
2	246	AHU6-4 Zone2 Relative Humidity	%
2	247	AHU6-4 Zone3 Relative Humidity	%
2	248	AHU6-4 Zone4 Relative Humidity	%
2	249	AHU7-1 Zone1 Relative Humidity	%
2	250	AHU7-1 Zone2 Relative Humidity	%
2	251	AHU7-1 Zone3 Relative Humidity	%
2	252	AHU7-1 Zone4 Relative Humidity	%
2	253	AHU7-1 Zone5 Relative Humidity	%
2	254	AHU7-1 Zone6 Relative Humidity	%
2	255	AHU7-2 Zone1 Relative Humidity	%
2	256	AHU7-2 Zone2 Relative Humidity	%
2	257	AHU7-2 Zone3 Relative Humidity	%
2	258	AHU7-2 Zone4 Relative Humidity	%
2	259	AHU7-3 Zone1 Relative Humidity	%
2	260	AHU7-3 Zone2 Relative Humidity	%
2	261	AHU7-3 Zone3 Relative Humidity	%
2	262	AHU7-3 Zone4 Relative Humidity	%
2	263	AHU7-3 Zone5 Relative Humidity	%
2	264	AHU7-4 Zone1 Relative Humidity	%
2	265	AHU7-4 Zone2 Relative Humidity	%
2	266	AHU7-4 Zone3 Relative Humidity	%
2	267	AHU7-4 Zone4 Relative Humidity	%
2	268	AHU1-1 Zone1 Mean Radiant Temperature	C
2	269	AHU1-1 Zone2 Mean Radiant Temperature	C
2	270	AHU1-1 Zone3 Mean Radiant Temperature	C
2	271	AHU1-2 Zone1 Mean Radiant Temperature	C
2	272	AHU1-2 Zone2 Mean Radiant Temperature	C
2	273	AHU1-3 Zone1 Mean Radiant Temperature	C
2	274	AHU1-3 Zone2 Mean Radiant Temperature	C
2	275	AHU1-3 Zone3 Mean Radiant Temperature	C
2	276	AHU1-4 Zone1 Mean Radiant Temperature	C
2	277	AHU1-4 Zone2 Mean Radiant Temperature	C
2	278	AHU1-5 Zone1 Mean Radiant Temperature	C
2	279	AHU2-1 Zone1 Mean Radiant Temperature	C
2	280	AHU2-1 Zone2 Mean Radiant Temperature	C
2	281	AHU2-1 Zone3 Mean Radiant Temperature	C
2	282	AHU2-1 Zone4 Mean Radiant Temperature	C
2	283	AHU2-1 Zone5 Mean Radiant Temperature	C
2	284	AHU2-1 Zone6 Mean Radiant Temperature	C
2	285	AHU2-2 Zone1 Mean Radiant Temperature	C
2	286	AHU2-2 Zone2 Mean Radiant Temperature	C
2	287	AHU2-2 Zone3 Mean Radiant Temperature	C
2	288	AHU2-2 Zone4 Mean Radiant Temperature	C
2	289	AHU2-3 Zone1 Mean Radiant Temperature	C

CSV	No.	Description	Unit
2	290	AHU2-3 Zone2 Mean Radiant Temperature	C
2	291	AHU2-3 Zone3 Mean Radiant Temperature	C
2	292	AHU2-3 Zone4 Mean Radiant Temperature	C
2	293	AHU2-3 Zone5 Mean Radiant Temperature	C
2	294	AHU2-4 Zone1 Mean Radiant Temperature	C
2	295	AHU2-4 Zone2 Mean Radiant Temperature	C
2	296	AHU2-4 Zone3 Mean Radiant Temperature	C
2	297	AHU2-4 Zone4 Mean Radiant Temperature	C
2	298	AHU3-1 Zone1 Mean Radiant Temperature	C
2	299	AHU3-1 Zone2 Mean Radiant Temperature	C
2	300	AHU3-1 Zone3 Mean Radiant Temperature	C
2	301	AHU3-1 Zone4 Mean Radiant Temperature	C
2	302	AHU3-1 Zone5 Mean Radiant Temperature	C
2	303	AHU3-1 Zone6 Mean Radiant Temperature	C
2	304	AHU3-2 Zone1 Mean Radiant Temperature	C
2	305	AHU3-2 Zone2 Mean Radiant Temperature	C
2	306	AHU3-2 Zone3 Mean Radiant Temperature	C
2	307	AHU3-2 Zone4 Mean Radiant Temperature	C
2	308	AHU3-3 Zone1 Mean Radiant Temperature	C
2	309	AHU3-3 Zone2 Mean Radiant Temperature	C
2	310	AHU3-3 Zone3 Mean Radiant Temperature	C
2	311	AHU3-3 Zone4 Mean Radiant Temperature	C
2	312	AHU3-3 Zone5 Mean Radiant Temperature	C
2	313	AHU3-4 Zone1 Mean Radiant Temperature	C
2	314	AHU3-4 Zone2 Mean Radiant Temperature	C
2	315	AHU3-4 Zone3 Mean Radiant Temperature	C
2	316	AHU3-4 Zone4 Mean Radiant Temperature	C
2	317	AHU4-1 Zone1 Mean Radiant Temperature	C
2	318	AHU4-1 Zone2 Mean Radiant Temperature	C
2	319	AHU4-1 Zone3 Mean Radiant Temperature	C
2	320	AHU4-1 Zone4 Mean Radiant Temperature	C
2	321	AHU4-1 Zone5 Mean Radiant Temperature	C
2	322	AHU4-1 Zone6 Mean Radiant Temperature	C
2	323	AHU4-2 Zone1 Mean Radiant Temperature	C
2	324	AHU4-2 Zone2 Mean Radiant Temperature	C
2	325	AHU4-2 Zone3 Mean Radiant Temperature	C
2	326	AHU4-2 Zone4 Mean Radiant Temperature	C
2	327	AHU4-3 Zone1 Mean Radiant Temperature	C
2	328	AHU4-3 Zone2 Mean Radiant Temperature	C
2	329	AHU4-3 Zone3 Mean Radiant Temperature	C
2	330	AHU4-3 Zone4 Mean Radiant Temperature	C
2	331	AHU4-3 Zone5 Mean Radiant Temperature	C
2	332	AHU4-4 Zone1 Mean Radiant Temperature	C
2	333	AHU4-4 Zone2 Mean Radiant Temperature	C
2	334	AHU4-4 Zone3 Mean Radiant Temperature	C
2	335	AHU4-4 Zone4 Mean Radiant Temperature	C
2	336	AHU5-1 Zone1 Mean Radiant Temperature	C
2	337	AHU5-1 Zone2 Mean Radiant Temperature	C

CSV	No.	Description	Unit
2	338	AHU5-1 Zone3 Mean Radiant Temperature	C
2	339	AHU5-1 Zone4 Mean Radiant Temperature	C
2	340	AHU5-1 Zone5 Mean Radiant Temperature	C
2	341	AHU5-1 Zone6 Mean Radiant Temperature	C
2	342	AHU5-2 Zone1 Mean Radiant Temperature	C
2	343	AHU5-2 Zone2 Mean Radiant Temperature	C
2	344	AHU5-2 Zone3 Mean Radiant Temperature	C
2	345	AHU5-2 Zone4 Mean Radiant Temperature	C
2	346	AHU5-3 Zone1 Mean Radiant Temperature	C
2	347	AHU5-3 Zone2 Mean Radiant Temperature	C
2	348	AHU5-3 Zone3 Mean Radiant Temperature	C
2	349	AHU5-3 Zone4 Mean Radiant Temperature	C
2	350	AHU5-3 Zone5 Mean Radiant Temperature	C
2	351	AHU5-4 Zone1 Mean Radiant Temperature	C
2	352	AHU5-4 Zone2 Mean Radiant Temperature	C
2	353	AHU5-4 Zone3 Mean Radiant Temperature	C
2	354	AHU5-4 Zone4 Mean Radiant Temperature	C
2	355	AHU6-1 Zone1 Mean Radiant Temperature	C
2	356	AHU6-1 Zone2 Mean Radiant Temperature	C
2	357	AHU6-1 Zone3 Mean Radiant Temperature	C
2	358	AHU6-1 Zone4 Mean Radiant Temperature	C
2	359	AHU6-1 Zone5 Mean Radiant Temperature	C
2	360	AHU6-1 Zone6 Mean Radiant Temperature	C
2	361	AHU6-2 Zone1 Mean Radiant Temperature	C
2	362	AHU6-2 Zone2 Mean Radiant Temperature	C
2	363	AHU6-2 Zone3 Mean Radiant Temperature	C
2	364	AHU6-2 Zone4 Mean Radiant Temperature	C
2	365	AHU6-3 Zone1 Mean Radiant Temperature	C
2	366	AHU6-3 Zone2 Mean Radiant Temperature	C
2	367	AHU6-3 Zone3 Mean Radiant Temperature	C
2	368	AHU6-3 Zone4 Mean Radiant Temperature	C
2	369	AHU6-3 Zone5 Mean Radiant Temperature	C
2	370	AHU6-4 Zone1 Mean Radiant Temperature	C
2	371	AHU6-4 Zone2 Mean Radiant Temperature	C
2	372	AHU6-4 Zone3 Mean Radiant Temperature	C
2	373	AHU6-4 Zone4 Mean Radiant Temperature	C
2	374	AHU7-1 Zone1 Mean Radiant Temperature	C
2	375	AHU7-1 Zone2 Mean Radiant Temperature	C
2	376	AHU7-1 Zone3 Mean Radiant Temperature	C
2	377	AHU7-1 Zone4 Mean Radiant Temperature	C
2	378	AHU7-1 Zone5 Mean Radiant Temperature	C
2	379	AHU7-1 Zone6 Mean Radiant Temperature	C
2	380	AHU7-2 Zone1 Mean Radiant Temperature	C
2	381	AHU7-2 Zone2 Mean Radiant Temperature	C
2	382	AHU7-2 Zone3 Mean Radiant Temperature	C
2	383	AHU7-2 Zone4 Mean Radiant Temperature	C
2	384	AHU7-3 Zone1 Mean Radiant Temperature	C
2	385	AHU7-3 Zone2 Mean Radiant Temperature	C

CSV	No.	Description	Unit
2	386	AHU7-3 Zone3 Mean Radiant Temperature	C
2	387	AHU7-3 Zone4 Mean Radiant Temperature	C
2	388	AHU7-3 Zone5 Mean Radiant Temperature	C
2	389	AHU7-4 Zone1 Mean Radiant Temperature	C
2	390	AHU7-4 Zone2 Mean Radiant Temperature	C
2	391	AHU7-4 Zone3 Mean Radiant Temperature	C
2	392	AHU7-4 Zone4 Mean Radiant Temperature	C
2	393	AHU1-1 Supply air drybulb temperature	C
2	394	AHU1-1 Supply air relative humidity	%
2	395	AHU1-1 Return air drybulb temperature	C
2	396	AHU1-1 Return air relative humidity	%
2	397	AHU1-1 Cooling coil load	MJ
2	398	AHU1-1 Heating coil load	MJ
2	399	AHU1-1 Cooling coil load	kW
2	400	AHU1-1 Heating coil load	kW
2	401	AHU1-1 Cooling coil water flow rate	L/min
2	402	AHU1-1 Heating coil water flow rate	L/min
2	403	AHU1-1 Cooling coil valve lift	-
2	404	AHU1-1 Heating coil valve lift	-
2	405	AHU1-1 Supply fan rotation ratio	-
2	406	AHU1-1 Return fan rotation ratio	-
2	407	AHU1-1 Supply air temperature setpoint	C
2	408	AHU1-1 Electricity	kWh
2	409	AHU1-1 Electricity	kW
2	410	AHU1-1 VAV-1 airflow set point	CMH
2	411	AHU1-1 VAV-2 airflow set point	CMH
2	412	AHU1-1 VAV-3 airflow set point	CMH
2	413	AHU1-2 Supply air drybulb temperature	C
2	414	AHU1-2 Supply air relative humidity	%
2	415	AHU1-2 Return air drybulb temperature	C
2	416	AHU1-2 Return air relative humidity	%
2	417	AHU1-2 Cooling coil load	MJ
2	418	AHU1-2 Heating coil load	MJ
2	419	AHU1-2 Cooling coil load	kW
2	420	AHU1-2 Heating coil load	kW
2	421	AHU1-2 Cooling coil water flow rate	L/min
2	422	AHU1-2 Heating coil water flow rate	L/min
2	423	AHU1-2 Cooling coil valve lift	-
2	424	AHU1-2 Heating coil valve lift	-
2	425	AHU1-2 Supply fan rotation ratio	-
2	426	AHU1-2 Return fan rotation ratio	-
2	427	AHU1-2 Supply air temperature setpoint	C
2	428	AHU1-2 Electricity	kWh
2	429	AHU1-2 Electricity	kW
2	430	AHU1-2 VAV-1 airflow set point	CMH
2	431	AHU1-2 VAV-2 airflow set point	CMH
2	432	AHU1-3 Supply air drybulb temperature	C
2	433	AHU1-3 Supply air relative humidity	%

CSV	No.	Description	Unit
2	434	AHU1-3 Return air drybulb temperature	C
2	435	AHU1-3 Return air relative humidity	%
2	436	AHU1-3 Cooling coil load	MJ
2	437	AHU1-3 Heating coil load	MJ
2	438	AHU1-3 Cooling coil load	kW
2	439	AHU1-3 Heating coil load	kW
2	440	AHU1-3 Cooling coil water flow rate	L/min
2	441	AHU1-3 Heating coil water flow rate	L/min
2	442	AHU1-3 Cooling coil valve lift	-
2	443	AHU1-3 Heating coil valve lift	-
2	444	AHU1-3 Supply fan rotation ratio	-
2	445	AHU1-3 Return fan rotation ratio	-
2	446	AHU1-3 Supply air temperature setpoint	C
2	447	AHU1-3 Electricity	kWh
2	448	AHU1-3 Electricity	kW
2	449	AHU1-3 VAV-1 airflow set point	CMH
2	450	AHU1-3 VAV-2 airflow set point	CMH
2	451	AHU1-3 VAV-3 airflow set point	CMH
2	452	AHU1-4 Supply air drybulb temperature	C
2	453	AHU1-4 Supply air relative humidity	%
2	454	AHU1-4 Return air drybulb temperature	C
2	455	AHU1-4 Return air relative humidity	%
2	456	AHU1-4 Cooling coil load	MJ
2	457	AHU1-4 Heating coil load	MJ
2	458	AHU1-4 Cooling coil load	kW
2	459	AHU1-4 Heating coil load	kW
2	460	AHU1-4 Cooling coil water flow rate	L/min
2	461	AHU1-4 Heating coil water flow rate	L/min
2	462	AHU1-4 Cooling coil valve lift	-
2	463	AHU1-4 Heating coil valve lift	-
2	464	AHU1-4 Supply fan rotation ratio	-
2	465	AHU1-4 Return fan rotation ratio	-
2	466	AHU1-4 Supply air temperature setpoint	C
2	467	AHU1-4 Electricity	kWh
2	468	AHU1-4 Electricity	kW
2	469	AHU1-4 VAV-1 airflow set point	CMH
2	470	AHU1-4 VAV-2 airflow set point	CMH
2	471	AHU1-5 Supply air drybulb temperature	C
2	472	AHU1-5 Supply air relative humidity	%
2	473	AHU1-5 Return air drybulb temperature	C
2	474	AHU1-5 Return air relative humidity	%
2	475	AHU1-5 Cooling coil load	MJ
2	476	AHU1-5 Heating coil load	MJ
2	477	AHU1-5 Cooling coil load	kW
2	478	AHU1-5 Heating coil load	kW
2	479	AHU1-5 Cooling coil water flow rate	L/min
2	480	AHU1-5 Heating coil water flow rate	L/min
2	481	AHU1-5 Cooling coil valve lift	-

CSV	No.	Description	Unit
2	482	AHU1-5 Heating coil valve lift	-
2	483	AHU1-5 Supply fan rotation ratio	-
2	484	AHU1-5 Return fan rotation ratio	-
2	485	AHU1-5 Supply air temperature setpoint	C
2	486	AHU1-5 Electricity	kWh
2	487	AHU1-5 Electricity	kW
2	488	AHU1-5 VAV-1 airflow set point	CMH
2	489	AHU2-1 Supply air drybulb temperature	C
2	490	AHU2-1 Supply air relative humidity	%
2	491	AHU2-1 Return air drybulb temperature	C
2	492	AHU2-1 Return air relative humidity	%
2	493	AHU2-1 Cooling coil load	MJ
2	494	AHU2-1 Heating coil load	MJ
2	495	AHU2-1 Cooling coil load	kW
2	496	AHU2-1 Heating coil load	kW
2	497	AHU2-1 Cooling coil water flow rate	L/min
2	498	AHU2-1 Heating coil water flow rate	L/min
2	499	AHU2-1 Cooling coil valve lift	-
2	500	AHU2-1 Heating coil valve lift	-
2	501	AHU2-1 Supply fan rotation ratio	-
2	502	AHU2-1 Return fan rotation ratio	-
2	503	AHU2-1 Supply air temperature setpoint	C
2	504	AHU2-1 Electricity	kWh
2	505	AHU2-1 Electricity	kW
2	506	AHU2-1 VAV-1 airflow set point	CMH
2	507	AHU2-1 VAV-2 airflow set point	CMH
2	508	AHU2-1 VAV-3 airflow set point	CMH
2	509	AHU2-1 VAV-4 airflow set point	CMH
2	510	AHU2-1 VAV-5 airflow set point	CMH
2	511	AHU2-1 VAV-6 airflow set point	CMH
2	512	AHU2-2 Supply air drybulb temperature	C
2	513	AHU2-2 Supply air relative humidity	%
2	514	AHU2-2 Return air drybulb temperature	C
2	515	AHU2-2 Return air relative humidity	%
2	516	AHU2-2 Cooling coil load	MJ
2	517	AHU2-2 Heating coil load	MJ
2	518	AHU2-2 Cooling coil load	kW
2	519	AHU2-2 Heating coil load	kW
2	520	AHU2-2 Cooling coil water flow rate	L/min
2	521	AHU2-2 Heating coil water flow rate	L/min
2	522	AHU2-2 Cooling coil valve lift	-
2	523	AHU2-2 Heating coil valve lift	-
2	524	AHU2-2 Supply fan rotation ratio	-
2	525	AHU2-2 Return fan rotation ratio	-
2	526	AHU2-2 Supply air temperature setpoint	C
2	527	AHU2-2 Electricity	kWh
2	528	AHU2-2 Electricity	kW
2	529	AHU2-2 VAV-1 airflow set point	CMH

CSV	No.	Description	Unit
2	530	AHU2-2 VAV-2 airflow set point	CMH
2	531	AHU2-2 VAV-3 airflow set point	CMH
2	532	AHU2-2 VAV-4 airflow set point	CMH
2	533	AHU2-3 Supply air drybulb temperature	C
2	534	AHU2-3 Supply air relative humidity	%
2	535	AHU2-3 Return air drybulb temperature	C
2	536	AHU2-3 Return air relative humidity	%
2	537	AHU2-3 Cooling coil load	MJ
2	538	AHU2-3 Heating coil load	MJ
2	539	AHU2-3 Cooling coil load	kW
2	540	AHU2-3 Heating coil load	kW
2	541	AHU2-3 Cooling coil water flow rate	L/min
2	542	AHU2-3 Heating coil water flow rate	L/min
2	543	AHU2-3 Cooling coil valve lift	-
2	544	AHU2-3 Heating coil valve lift	-
2	545	AHU2-3 Supply fan rotation ratio	-
2	546	AHU2-3 Return fan rotation ratio	-
2	547	AHU2-3 Supply air temperature setpoint	C
2	548	AHU2-3 Electricity	kWh
2	549	AHU2-3 Electricity	kW
2	550	AHU2-3 VAV-1 airflow set point	CMH
2	551	AHU2-3 VAV-2 airflow set point	CMH
2	552	AHU2-3 VAV-3 airflow set point	CMH
2	553	AHU2-3 VAV-4 airflow set point	CMH
2	554	AHU2-3 VAV-5 airflow set point	CMH
2	555	AHU2-4 Supply air drybulb temperature	C
2	556	AHU2-4 Supply air relative humidity	%
2	557	AHU2-4 Return air drybulb temperature	C
2	558	AHU2-4 Return air relative humidity	%
2	559	AHU2-4 Cooling coil load	MJ
2	560	AHU2-4 Heating coil load	MJ
2	561	AHU2-4 Cooling coil load	kW
2	562	AHU2-4 Heating coil load	kW
2	563	AHU2-4 Cooling coil water flow rate	L/min
2	564	AHU2-4 Heating coil water flow rate	L/min
2	565	AHU2-4 Cooling coil valve lift	-
2	566	AHU2-4 Heating coil valve lift	-
2	567	AHU2-4 Supply fan rotation ratio	-
2	568	AHU2-4 Return fan rotation ratio	-
2	569	AHU2-4 Supply air temperature setpoint	C
2	570	AHU2-4 Electricity	kWh
2	571	AHU2-4 Electricity	kW
2	572	AHU2-4 VAV-1 airflow set point	CMH
2	573	AHU2-4 VAV-2 airflow set point	CMH
2	574	AHU2-4 VAV-3 airflow set point	CMH
2	575	AHU2-4 VAV-4 airflow set point	CMH
2	576	AHU3-1 Supply air drybulb temperature	C
2	577	AHU3-1 Supply air relative humidity	%

CSV	No.	Description	Unit
2	578	AHU3-1 Return air drybulb temperature	C
2	579	AHU3-1 Return air relative humidity	%
2	580	AHU3-1 Cooling coil load	MJ
2	581	AHU3-1 Heating coil load	MJ
2	582	AHU3-1 Cooling coil load	kW
2	583	AHU3-1 Heating coil load	kW
2	584	AHU3-1 Cooling coil water flow rate	L/min
2	585	AHU3-1 Heating coil water flow rate	L/min
2	586	AHU3-1 Cooling coil valve lift	-
2	587	AHU3-1 Heating coil valve lift	-
2	588	AHU3-1 Supply fan rotation ratio	-
2	589	AHU3-1 Return fan rotation ratio	-
2	590	AHU3-1 Supply air temperature setpoint	C
2	591	AHU3-1 Electricity	kWh
2	592	AHU3-1 Electricity	kW
2	593	AHU3-1 VAV-1 airflow set point	CMH
2	594	AHU3-1 VAV-2 airflow set point	CMH
2	595	AHU3-1 VAV-3 airflow set point	CMH
2	596	AHU3-1 VAV-4 airflow set point	CMH
2	597	AHU3-1 VAV-5 airflow set point	CMH
2	598	AHU3-1 VAV-6 airflow set point	CMH
2	599	AHU3-2 Supply air drybulb temperature	C
2	600	AHU3-2 Supply air relative humidity	%
2	601	AHU3-2 Return air drybulb temperature	C
2	602	AHU3-2 Return air relative humidity	%
2	603	AHU3-2 Cooling coil load	MJ
2	604	AHU3-2 Heating coil load	MJ
2	605	AHU3-2 Cooling coil load	kW
2	606	AHU3-2 Heating coil load	kW
2	607	AHU3-2 Cooling coil water flow rate	L/min
2	608	AHU3-2 Heating coil water flow rate	L/min
2	609	AHU3-2 Cooling coil valve lift	-
2	610	AHU3-2 Heating coil valve lift	-
2	611	AHU3-2 Supply fan rotation ratio	-
2	612	AHU3-2 Return fan rotation ratio	-
2	613	AHU3-2 Supply air temperature setpoint	C
2	614	AHU3-2 Electricity	kWh
2	615	AHU3-2 Electricity	kW
2	616	AHU3-2 VAV-1 airflow set point	CMH
2	617	AHU3-2 VAV-2 airflow set point	CMH
2	618	AHU3-2 VAV-3 airflow set point	CMH
2	619	AHU3-2 VAV-4 airflow set point	CMH
2	620	AHU3-3 Supply air drybulb temperature	C
2	621	AHU3-3 Supply air relative humidity	%
2	622	AHU3-3 Return air drybulb temperature	C
2	623	AHU3-3 Return air relative humidity	%
2	624	AHU3-3 Cooling coil load	MJ
2	625	AHU3-3 Heating coil load	MJ

CSV	No.	Description	Unit
2	626	AHU3-3 Cooling coil load	kW
2	627	AHU3-3 Heating coil load	kW
2	628	AHU3-3 Cooling coil water flow rate	L/min
2	629	AHU3-3 Heating coil water flow rate	L/min
2	630	AHU3-3 Cooling coil valve lift	-
2	631	AHU3-3 Heating coil valve lift	-
2	632	AHU3-3 Supply fan rotation ratio	-
2	633	AHU3-3 Return fan rotation ratio	-
2	634	AHU3-3 Supply air temperature setpoint	C
2	635	AHU3-3 Electricity	kWh
2	636	AHU3-3 Electricity	kW
2	637	AHU3-3 VAV-1 airflow set point	CMH
2	638	AHU3-3 VAV-2 airflow set point	CMH
2	639	AHU3-3 VAV-3 airflow set point	CMH
2	640	AHU3-3 VAV-4 airflow set point	CMH
2	641	AHU3-3 VAV-5 airflow set point	CMH
2	642	AHU3-4 Supply air drybulb temperature	C
2	643	AHU3-4 Supply air relative humidity	%
2	644	AHU3-4 Return air drybulb temperature	C
2	645	AHU3-4 Return air relative humidity	%
2	646	AHU3-4 Cooling coil load	MJ
2	647	AHU3-4 Heating coil load	MJ
2	648	AHU3-4 Cooling coil load	kW
2	649	AHU3-4 Heating coil load	kW
2	650	AHU3-4 Cooling coil water flow rate	L/min
2	651	AHU3-4 Heating coil water flow rate	L/min
2	652	AHU3-4 Cooling coil valve lift	-
2	653	AHU3-4 Heating coil valve lift	-
2	654	AHU3-4 Supply fan rotation ratio	-
2	655	AHU3-4 Return fan rotation ratio	-
2	656	AHU3-4 Supply air temperature setpoint	C
2	657	AHU3-4 Electricity	kWh
2	658	AHU3-4 Electricity	kW
2	659	AHU3-4 VAV-1 airflow set point	CMH
2	660	AHU3-4 VAV-2 airflow set point	CMH
2	661	AHU3-4 VAV-3 airflow set point	CMH
2	662	AHU3-4 VAV-4 airflow set point	CMH
2	663	AHU4-1 Supply air drybulb temperature	C
2	664	AHU4-1 Supply air relative humidity	%
2	665	AHU4-1 Return air drybulb temperature	C
2	666	AHU4-1 Return air relative humidity	%
2	667	AHU4-1 Cooling coil load	MJ
2	668	AHU4-1 Heating coil load	MJ
2	669	AHU4-1 Cooling coil load	kW
2	670	AHU4-1 Heating coil load	kW
2	671	AHU4-1 Cooling coil water flow rate	L/min
2	672	AHU4-1 Heating coil water flow rate	L/min
2	673	AHU4-1 Cooling coil valve lift	-



CSV	No.	Description	Unit
2	674	AHU4-1 Heating coil valve lift	-
2	675	AHU4-1 Supply fan rotation ratio	-
2	676	AHU4-1 Return fan rotation ratio	-
2	677	AHU4-1 Supply air temperature setpoint	C
2	678	AHU4-1 Electricity	kWh
2	679	AHU4-1 Electricity	kW
2	680	AHU4-1 VAV-1 airflow set point	CMH
2	681	AHU4-1 VAV-2 airflow set point	CMH
2	682	AHU4-1 VAV-3 airflow set point	CMH
2	683	AHU4-1 VAV-4 airflow set point	CMH
2	684	AHU4-1 VAV-5 airflow set point	CMH
2	685	AHU4-1 VAV-6 airflow set point	CMH
2	686	AHU4-2 Supply air drybulb temperature	C
2	687	AHU4-2 Supply air relative humidity	%
2	688	AHU4-2 Return air drybulb temperature	C
2	689	AHU4-2 Return air relative humidity	%
2	690	AHU4-2 Cooling coil load	MJ
2	691	AHU4-2 Heating coil load	MJ
2	692	AHU4-2 Cooling coil load	kW
2	693	AHU4-2 Heating coil load	kW
2	694	AHU4-2 Cooling coil water flow rate	L/min
2	695	AHU4-2 Heating coil water flow rate	L/min
2	696	AHU4-2 Cooling coil valve lift	-
2	697	AHU4-2 Heating coil valve lift	-
2	698	AHU4-2 Supply fan rotation ratio	-
2	699	AHU4-2 Return fan rotation ratio	-
2	700	AHU4-2 Supply air temperature setpoint	C
2	701	AHU4-2 Electricity	kWh
2	702	AHU4-2 Electricity	kW
2	703	AHU4-2 VAV-1 airflow set point	CMH
2	704	AHU4-2 VAV-2 airflow set point	CMH
2	705	AHU4-2 VAV-3 airflow set point	CMH
2	706	AHU4-2 VAV-4 airflow set point	CMH
2	707	AHU4-3 Supply air drybulb temperature	C
2	708	AHU4-3 Supply air relative humidity	%
2	709	AHU4-3 Return air drybulb temperature	C
2	710	AHU4-3 Return air relative humidity	%
2	711	AHU4-3 Cooling coil load	MJ
2	712	AHU4-3 Heating coil load	MJ
2	713	AHU4-3 Cooling coil load	kW
2	714	AHU4-3 Heating coil load	kW
2	715	AHU4-3 Cooling coil water flow rate	L/min
2	716	AHU4-3 Heating coil water flow rate	L/min
2	717	AHU4-3 Cooling coil valve lift	-
2	718	AHU4-3 Heating coil valve lift	-
2	719	AHU4-3 Supply fan rotation ratio	-
2	720	AHU4-3 Return fan rotation ratio	-
2	721	AHU4-3 Supply air temperature setpoint	C

CSV	No.	Description	Unit
2	722	AHU4-3 Electricity	kWh
2	723	AHU4-3 Electricity	kW
2	724	AHU4-3 VAV-1 airflow set point	CMH
2	725	AHU4-3 VAV-2 airflow set point	CMH
2	726	AHU4-3 VAV-3 airflow set point	CMH
2	727	AHU4-3 VAV-4 airflow set point	CMH
2	728	AHU4-3 VAV-5 airflow set point	CMH
2	729	AHU4-4 Supply air drybulb temperature	C
2	730	AHU4-4 Supply air relative humidity	%
2	731	AHU4-4 Return air drybulb temperature	C
2	732	AHU4-4 Return air relative humidity	%
2	733	AHU4-4 Cooling coil load	MJ
2	734	AHU4-4 Heating coil load	MJ
2	735	AHU4-4 Cooling coil load	kW
2	736	AHU4-4 Heating coil load	kW
2	737	AHU4-4 Cooling coil water flow rate	L/min
2	738	AHU4-4 Heating coil water flow rate	L/min
2	739	AHU4-4 Cooling coil valve lift	-
2	740	AHU4-4 Heating coil valve lift	-
2	741	AHU4-4 Supply fan rotation ratio	-
2	742	AHU4-4 Return fan rotation ratio	-
2	743	AHU4-4 Supply air temperature setpoint	C
2	744	AHU4-4 Electricity	kWh
2	745	AHU4-4 Electricity	kW
2	746	AHU4-4 VAV-1 airflow set point	CMH
2	747	AHU4-4 VAV-2 airflow set point	CMH
2	748	AHU4-4 VAV-3 airflow set point	CMH
2	749	AHU4-4 VAV-4 airflow set point	CMH
2	750	AHU5-1 Supply air drybulb temperature	C
2	751	AHU5-1 Supply air relative humidity	%
2	752	AHU5-1 Return air drybulb temperature	C
2	753	AHU5-1 Return air relative humidity	%
2	754	AHU5-1 Cooling coil load	MJ
2	755	AHU5-1 Heating coil load	MJ
2	756	AHU5-1 Cooling coil load	kW
2	757	AHU5-1 Heating coil load	kW
2	758	AHU5-1 Cooling coil water flow rate	L/min
2	759	AHU5-1 Heating coil water flow rate	L/min
2	760	AHU5-1 Cooling coil valve lift	-
2	761	AHU5-1 Heating coil valve lift	-
2	762	AHU5-1 Supply fan rotation ratio	-
2	763	AHU5-1 Return fan rotation ratio	-
2	764	AHU5-1 Supply air temperature setpoint	C
2	765	AHU5-1 Electricity	kWh
2	766	AHU5-1 Electricity	kW
2	767	AHU5-1 VAV-1 airflow set point	CMH
2	768	AHU5-1 VAV-2 airflow set point	CMH
2	769	AHU5-1 VAV-3 airflow set point	CMH

CSV	No.	Description	Unit
2	770	AHU5-1 VAV-4 airflow set point	CMH
2	771	AHU5-1 VAV-5 airflow set point	CMH
2	772	AHU5-1 VAV-6 airflow set point	CMH
2	773	AHU5-2 Supply air drybulb temperature	C
2	774	AHU5-2 Supply air relative humidity	%
2	775	AHU5-2 Return air drybulb temperature	C
2	776	AHU5-2 Return air relative humidity	%
2	777	AHU5-2 Cooling coil load	MJ
2	778	AHU5-2 Heating coil load	MJ
2	779	AHU5-2 Cooling coil load	kW
2	780	AHU5-2 Heating coil load	kW
2	781	AHU5-2 Cooling coil water flow rate	L/min
2	782	AHU5-2 Heating coil water flow rate	L/min
2	783	AHU5-2 Cooling coil valve lift	-
2	784	AHU5-2 Heating coil valve lift	-
2	785	AHU5-2 Supply fan rotation ratio	-
2	786	AHU5-2 Return fan rotation ratio	-
2	787	AHU5-2 Supply air temperature setpoint	C
2	788	AHU5-2 Electricity	kWh
2	789	AHU5-2 Electricity	kW
2	790	AHU5-2 VAV-1 airflow set point	CMH
2	791	AHU5-2 VAV-2 airflow set point	CMH
2	792	AHU5-2 VAV-3 airflow set point	CMH
2	793	AHU5-2 VAV-4 airflow set point	CMH
2	794	AHU5-3 Supply air drybulb temperature	C
2	795	AHU5-3 Supply air relative humidity	%
2	796	AHU5-3 Return air drybulb temperature	C
2	797	AHU5-3 Return air relative humidity	%
2	798	AHU5-3 Cooling coil load	MJ
2	799	AHU5-3 Heating coil load	MJ
2	800	AHU5-3 Cooling coil load	kW
2	801	AHU5-3 Heating coil load	kW
2	802	AHU5-3 Cooling coil water flow rate	L/min
2	803	AHU5-3 Heating coil water flow rate	L/min
2	804	AHU5-3 Cooling coil valve lift	-
2	805	AHU5-3 Heating coil valve lift	-
2	806	AHU5-3 Supply fan rotation ratio	-
2	807	AHU5-3 Return fan rotation ratio	-
2	808	AHU5-3 Supply air temperature setpoint	C
2	809	AHU5-3 Electricity	kWh
2	810	AHU5-3 Electricity	kW
2	811	AHU5-3 VAV-1 airflow set point	CMH
2	812	AHU5-3 VAV-2 airflow set point	CMH
2	813	AHU5-3 VAV-3 airflow set point	CMH
2	814	AHU5-3 VAV-4 airflow set point	CMH
2	815	AHU5-3 VAV-5 airflow set point	CMH
2	816	AHU5-4 Supply air drybulb temperature	C
2	817	AHU5-4 Supply air relative humidity	%

CSV	No.	Description	Unit
2	818	AHU5-4 Return air drybulb temperature	C
2	819	AHU5-4 Return air relative humidity	%
2	820	AHU5-4 Cooling coil load	MJ
2	821	AHU5-4 Heating coil load	MJ
2	822	AHU5-4 Cooling coil load	kW
2	823	AHU5-4 Heating coil load	kW
2	824	AHU5-4 Cooling coil water flow rate	L/min
2	825	AHU5-4 Heating coil water flow rate	L/min
2	826	AHU5-4 Cooling coil valve lift	-
2	827	AHU5-4 Heating coil valve lift	-
2	828	AHU5-4 Supply fan rotation ratio	-
2	829	AHU5-4 Return fan rotation ratio	-
2	830	AHU5-4 Supply air temperature setpoint	C
2	831	AHU5-4 Electricity	kWh
2	832	AHU5-4 Electricity	kW
2	833	AHU5-4 VAV-1 airflow set point	CMH
2	834	AHU5-4 VAV-2 airflow set point	CMH
2	835	AHU5-4 VAV-3 airflow set point	CMH
2	836	AHU5-4 VAV-4 airflow set point	CMH
2	837	AHU6-1 Supply air drybulb temperature	C
2	838	AHU6-1 Supply air relative humidity	%
2	839	AHU6-1 Return air drybulb temperature	C
2	840	AHU6-1 Return air relative humidity	%
2	841	AHU6-1 Cooling coil load	MJ
2	842	AHU6-1 Heating coil load	MJ
2	843	AHU6-1 Cooling coil load	kW
2	844	AHU6-1 Heating coil load	kW
2	845	AHU6-1 Cooling coil water flow rate	L/min
2	846	AHU6-1 Heating coil water flow rate	L/min
2	847	AHU6-1 Cooling coil valve lift	-
2	848	AHU6-1 Heating coil valve lift	-
2	849	AHU6-1 Supply fan rotation ratio	-
2	850	AHU6-1 Return fan rotation ratio	-
2	851	AHU6-1 Supply air temperature setpoint	C
2	852	AHU6-1 Electricity	kWh
2	853	AHU6-1 Electricity	kW
2	854	AHU6-1 VAV-1 airflow set point	CMH
2	855	AHU6-1 VAV-2 airflow set point	CMH
2	856	AHU6-1 VAV-3 airflow set point	CMH
2	857	AHU6-1 VAV-4 airflow set point	CMH
2	858	AHU6-1 VAV-5 airflow set point	CMH
2	859	AHU6-1 VAV-6 airflow set point	CMH
2	860	AHU6-2 Supply air drybulb temperature	C
2	861	AHU6-2 Supply air relative humidity	%
2	862	AHU6-2 Return air drybulb temperature	C
2	863	AHU6-2 Return air relative humidity	%
2	864	AHU6-2 Cooling coil load	MJ
2	865	AHU6-2 Heating coil load	MJ

CSV	No.	Description	Unit
2	866	AHU6-2 Cooling coil load	kW
2	867	AHU6-2 Heating coil load	kW
2	868	AHU6-2 Cooling coil water flow rate	L/min
2	869	AHU6-2 Heating coil water flow rate	L/min
2	870	AHU6-2 Cooling coil valve lift	-
2	871	AHU6-2 Heating coil valve lift	-
2	872	AHU6-2 Supply fan rotation ratio	-
2	873	AHU6-2 Return fan rotation ratio	-
2	874	AHU6-2 Supply air temperature setpoint	C
2	875	AHU6-2 Electricity	kWh
2	876	AHU6-2 Electricity	kW
2	877	AHU6-2 VAV-1 airflow set point	CMH
2	878	AHU6-2 VAV-2 airflow set point	CMH
2	879	AHU6-2 VAV-3 airflow set point	CMH
2	880	AHU6-2 VAV-4 airflow set point	CMH
2	881	AHU6-3 Supply air drybulb temperature	C
2	882	AHU6-3 Supply air relative humidity	%
2	883	AHU6-3 Return air drybulb temperature	C
2	884	AHU6-3 Return air relative humidity	%
2	885	AHU6-3 Cooling coil load	MJ
2	886	AHU6-3 Heating coil load	MJ
2	887	AHU6-3 Cooling coil load	kW
2	888	AHU6-3 Heating coil load	kW
2	889	AHU6-3 Cooling coil water flow rate	L/min
2	890	AHU6-3 Heating coil water flow rate	L/min
2	891	AHU6-3 Cooling coil valve lift	-
2	892	AHU6-3 Heating coil valve lift	-
2	893	AHU6-3 Supply fan rotation ratio	-
2	894	AHU6-3 Return fan rotation ratio	-
2	895	AHU6-3 Supply air temperature setpoint	C
2	896	AHU6-3 Electricity	kWh
2	897	AHU6-3 Electricity	kW
2	898	AHU6-3 VAV-1 airflow set point	CMH
2	899	AHU6-3 VAV-2 airflow set point	CMH
2	900	AHU6-3 VAV-3 airflow set point	CMH
2	901	AHU6-3 VAV-4 airflow set point	CMH
2	902	AHU6-3 VAV-5 airflow set point	CMH
2	903	AHU6-4 Supply air drybulb temperature	C
2	904	AHU6-4 Supply air relative humidity	%
2	905	AHU6-4 Return air drybulb temperature	C
2	906	AHU6-4 Return air relative humidity	%
2	907	AHU6-4 Cooling coil load	MJ
2	908	AHU6-4 Heating coil load	MJ
2	909	AHU6-4 Cooling coil load	kW
2	910	AHU6-4 Heating coil load	kW
2	911	AHU6-4 Cooling coil water flow rate	L/min
2	912	AHU6-4 Heating coil water flow rate	L/min
2	913	AHU6-4 Cooling coil valve lift	-

CSV	No.	Description	Unit
2	914	AHU6-4 Heating coil valve lift	-
2	915	AHU6-4 Supply fan rotation ratio	-
2	916	AHU6-4 Return fan rotation ratio	-
2	917	AHU6-4 Supply air temperature setpoint	C
2	918	AHU6-4 Electricity	kWh
2	919	AHU6-4 Electricity	kW
2	920	AHU6-4 VAV-1 airflow set point	CMH
2	921	AHU6-4 VAV-2 airflow set point	CMH
2	922	AHU6-4 VAV-3 airflow set point	CMH
2	923	AHU6-4 VAV-4 airflow set point	CMH
2	924	AHU7-1 Supply air drybulb temperature	C
2	925	AHU7-1 Supply air relative humidity	%
2	926	AHU7-1 Return air drybulb temperature	C
2	927	AHU7-1 Return air relative humidity	%
2	928	AHU7-1 Cooling coil load	MJ
2	929	AHU7-1 Heating coil load	MJ
2	930	AHU7-1 Cooling coil load	kW
2	931	AHU7-1 Heating coil load	kW
2	932	AHU7-1 Cooling coil water flow rate	L/min
2	933	AHU7-1 Heating coil water flow rate	L/min
2	934	AHU7-1 Cooling coil valve lift	-
2	935	AHU7-1 Heating coil valve lift	-
2	936	AHU7-1 Supply fan rotation ratio	-
2	937	AHU7-1 Return fan rotation ratio	-
2	938	AHU7-1 Supply air temperature setpoint	C
2	939	AHU7-1 Electricity	kWh
2	940	AHU7-1 Electricity	kW
2	941	AHU7-1 VAV-1 airflow set point	CMH
2	942	AHU7-1 VAV-2 airflow set point	CMH
2	943	AHU7-1 VAV-3 airflow set point	CMH
2	944	AHU7-1 VAV-4 airflow set point	CMH
2	945	AHU7-1 VAV-5 airflow set point	CMH
2	946	AHU7-1 VAV-6 airflow set point	CMH
2	947	AHU7-2 Supply air drybulb temperature	C
2	948	AHU7-2 Supply air relative humidity	%
2	949	AHU7-2 Return air drybulb temperature	C
2	950	AHU7-2 Return air relative humidity	%
2	951	AHU7-2 Cooling coil load	MJ
2	952	AHU7-2 Heating coil load	MJ
2	953	AHU7-2 Cooling coil load	kW
2	954	AHU7-2 Heating coil load	kW
2	955	AHU7-2 Cooling coil water flow rate	L/min
2	956	AHU7-2 Heating coil water flow rate	L/min
2	957	AHU7-2 Cooling coil valve lift	-
2	958	AHU7-2 Heating coil valve lift	-
2	959	AHU7-2 Supply fan rotation ratio	-
2	960	AHU7-2 Return fan rotation ratio	-
2	961	AHU7-2 Supply air temperature setpoint	C



Appendix 5    List of BACnet Devices



Device ID List

Device ID	Description
100000	Whole Building Controller
101000	Heat Source System Controller
101100	Modular Chiller Controller
101200	Absorption Chiller Controller
102000	Water Heat Storage Controller
103000	Secondary Pump System Controller (C)
103001	Secondary Pump System Controller (H)
104101	Controller of AHU1-1 (1F North)
104102	Controller of AHU1-2 (1F North)
104103	Controller of AHU1-3 (1F South)
104104	Controller of AHU1-4 (1F South)
104105	Controller of AHU1-5 (1F Entrance Hall)
104201	Controller of AHU2-1 (2F North)
104202	Controller of AHU2-2 (2F North)
104203	Controller of AHU2-3 (2F South)
104204	Controller of AHU2-4 (2F South)
104301	Controller of AHU3-1 (3F North)
104302	Controller of AHU3-2 (3F North)
104303	Controller of AHU3-3 (3F South)
104304	Controller of AHU3-4 (3F South)
104401	Controller of AHU4-1 (4F North)
104402	Controller of AHU4-2 (4F North)
104403	Controller of AHU4-3 (4F South)
104404	Controller of AHU4-4 (4F South)
104501	Controller of AHU5-1 (5F North)
104502	Controller of AHU5-2 (5F North)
104503	Controller of AHU5-3 (5F South)
104504	Controller of AHU5-4 (5F South)
104601	Controller of AHU6-1 (6F North)
104602	Controller of AHU6-2 (6F North)
104603	Controller of AHU6-3 (6F South)
104604	Controller of AHU6-4 (6F South)
104701	Controller of AHU7-1 (7F North)
104702	Controller of AHU7-2 (7F North)
104703	Controller of AHU7-3 (7F South)
104704	Controller of AHU7-4 (7F South)
105100	Controller of FCU 1F
105200	Controller of FCU 2F
105300	Controller of FCU 3F
105400	Controller of FCU 4F
105500	Controller of FCU 5F
105600	Controller of FCU 6F
105700	Controller of FCU 7F
106100	Blind Controller-1F North
106101	Blind Controller-1F South
106200	Blind Controller-2F North
106201	Blind Controller-2F South

Device ID	Description
106300	Blind Controller-3F North
106301	Blind Controller-3F South
106400	Blind Controller-4F North
106401	Blind Controller-4F South
106500	Blind Controller-5F North
106501	Blind Controller-5F South
106600	Blind Controller-6F North
106601	Blind Controller-6F South
106700	Blind Controller-7F North
106701	Blind Controller-7F South
107101	Occupants Controller-1F (Clo Value)
107201	Occupants Controller-2F (Clo Value)
107301	Occupants Controller-3F (Clo Value)
107401	Occupants Controller-4F (Clo Value)
107501	Occupants Controller-5F (Clo Value)
107601	Occupants Controller-6F (Clo Value)
107701	Occupants Controller-7F (Clo Value)
107102	Occupants Controller-1F (Thermal Sensation)
107202	Occupants Controller-2F (Thermal Sensation)
107302	Occupants Controller-3F (Thermal Sensation)
107402	Occupants Controller-4F (Thermal Sensation)
107502	Occupants Controller-5F (Thermal Sensation)
107602	Occupants Controller-6F (Thermal Sensation)
107702	Occupants Controller-7F (Thermal Sensation)
107103	Occupants Controller-1F (Stay at Desk)
107203	Occupants Controller-2F (Stay at Desk)
107303	Occupants Controller-3F (Stay at Desk)
107403	Occupants Controller-4F (Stay at Desk)
107503	Occupants Controller-5F (Stay at Desk)
107603	Occupants Controller-6F (Stay at Desk)
107703	Occupants Controller-7F (Stay at Desk)
107104	Occupants Controller-1F (Stay Zone Number)
107204	Occupants Controller-2F (Stay Zone Number)
107304	Occupants Controller-3F (Stay Zone Number)
107404	Occupants Controller-4F (Stay Zone Number)
107504	Occupants Controller-5F (Stay Zone Number)
107604	Occupants Controller-6F (Stay Zone Number)
107704	Occupants Controller-7F (Stay Zone Number)
107105	Occupants Controller-1F (Dissatisfied)
107205	Occupants Controller-2F (Dissatisfied)
107305	Occupants Controller-3F (Dissatisfied)
107405	Occupants Controller-4F (Dissatisfied)
107505	Occupants Controller-5F (Dissatisfied)
107605	Occupants Controller-6F (Dissatisfied)
107705	Occupants Controller-7F (Dissatisfied)
199999	Emulator System controller
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Device ID	Instance Number	BACnet Type	Default Value	Description
100000	0	OBJECT_DATETIME_VALUE	1980/6/14 0:00	Date and time
100000	1	OBJECT_ANALOG_INPUT	20	Outdoor air drybulb temperature [C]
100000	2	OBJECT_ANALOG_INPUT	50	Outdoor air relative humidity [%]
100000	3	OBJECT_CALENDAR	FALSE	Holidays
100000	4	OBJECT_CALENDAR	FALSE	Calendar 1
100000	5	OBJECT_CALENDAR	FALSE	Calendar 2
100000	6	OBJECT_CALENDAR	FALSE	Calendar 3
100000	6	OBJECT_CALENDAR	FALSE	Calendar 4
100000	7	OBJECT_CALENDAR	FALSE	Calendar 5
100000	8	OBJECT_CALENDAR	FALSE	Calendar 6
100000	9	OBJECT_CALENDAR	FALSE	Calendar 7
100000	10	OBJECT_CALENDAR	FALSE	Calendar 8
100000	11	OBJECT_CALENDAR	FALSE	Calendar 9
100000	12	OBJECT_CALENDAR	FALSE	Calendar 10
100000	13	OBJECT_CALENDAR	FALSE	Calendar 11
100000	14	OBJECT_CALENDAR	FALSE	Calendar 12
100000	15	OBJECT_CALENDAR	FALSE	Calendar 13
100000	16	OBJECT_CALENDAR	FALSE	Calendar 14
100000	17	OBJECT_CALENDAR	FALSE	Calendar 15
100000	18	OBJECT_CALENDAR	FALSE	Calendar 16
100000	19	OBJECT_CALENDAR	FALSE	Calendar 17
100000	20	OBJECT_CALENDAR	FALSE	Calendar 18
100000	21	OBJECT_CALENDAR	FALSE	Calendar 19
100000	22	OBJECT_CALENDAR	FALSE	Calendar 20
100000	23	OBJECT_CHARACTERSTRING_V	Holidays	Calendar 1 name
100000	24	OBJECT_CHARACTERSTRING_V	Winter season	Calendar 2 name
100000	25	OBJECT_CHARACTERSTRING_V	Summer season	Calendar 3 name
100000	26	OBJECT_CHARACTERSTRING_V	Mid season	Calendar 4 name
100000	27	OBJECT_CHARACTERSTRING_V	Calendar 5	Calendar 5 name
100000	28	OBJECT_CHARACTERSTRING_V	Calendar 6	Calendar 6 name
100000	29	OBJECT_CHARACTERSTRING_V	Calendar 7	Calendar 7 name
100000	30	OBJECT_CHARACTERSTRING_V	Calendar 8	Calendar 8 name
100000	31	OBJECT_CHARACTERSTRING_V	Calendar 9	Calendar 9 name
100000	32	OBJECT_CHARACTERSTRING_V	Calendar 10	Calendar 10 name
100000	33	OBJECT_CHARACTERSTRING_V	Calendar 11	Calendar 11 name
100000	34	OBJECT_CHARACTERSTRING_V	Calendar 12	Calendar 12 name
100000	35	OBJECT_CHARACTERSTRING_V	Calendar 13	Calendar 13 name
100000	36	OBJECT_CHARACTERSTRING_V	Calendar 14	Calendar 14 name
100000	37	OBJECT_CHARACTERSTRING_V	Calendar 15	Calendar 15 name
100000	38	OBJECT_CHARACTERSTRING_V	Calendar 16	Calendar 16 name
100000	39	OBJECT_CHARACTERSTRING_V	Calendar 17	Calendar 17 name
100000	40	OBJECT_CHARACTERSTRING_V	Calendar 18	Calendar 18 name
100000	41	OBJECT_CHARACTERSTRING_V	Calendar 19	Calendar 19 name
100000	42	OBJECT_CHARACTERSTRING_V	Calendar 20	Calendar 20 name
101000	0	OBJECT_ANALOG_OUTPUT	2	Calendar number of schedule 1
101000	1	OBJECT_ANALOG_OUTPUT	3	Calendar number of schedule 2
101000	2	OBJECT_ANALOG_OUTPUT	4	Calendar number of schedule 3
101000	3	OBJECT_ANALOG_OUTPUT	5	Calendar number of schedule 4
101000	4	OBJECT_SCHEDULE	0	Operation Schedule 1(0:Shutoff; 1:Cooling; 2:Heating; 3:Cooling And Heating)
101000	5	OBJECT_SCHEDULE	0	Operation Schedule 2(0:Shutoff; 1:Cooling; 2:Heating; 3:Cooling And Heating)
101000	6	OBJECT_SCHEDULE	0	Operation Schedule 3(0:Shutoff; 1:Cooling; 2:Heating; 3:Cooling And Heating)
101000	7	OBJECT_SCHEDULE	0	Operation Schedule 4(0:Shutoff; 1:Cooling; 2:Heating; 3:Cooling And Heating)
101000	8	OBJECT_ANALOG_OUTPUT	20	Time to delay changing operating stage. [min]
101000	9	OBJECT_ANALOG_OUTPUT	0.9	Limit to increase operating stage.
101000	10	OBJECT_ANALOG_OUTPUT	0.6	Limit to decrease operating stage.
101000	11	OBJECT_ANALOG_OUTPUT	12	Limit temperature to increase operating stage (Cooling) for schedule 1.
101000	12	OBJECT_ANALOG_OUTPUT	12	Limit temperature to increase operating stage (Cooling) for schedule 2.
101000	13	OBJECT_ANALOG_OUTPUT	12	Limit temperature to increase operating stage (Cooling) for schedule 3.
101000	14	OBJECT_ANALOG_OUTPUT	12	Limit temperature to increase operating stage (Cooling) for schedule 4.
101000	15	OBJECT_ANALOG_OUTPUT	35	Limit temperature to increase operating stage (Heating) for schedule 1.
101000	16	OBJECT_ANALOG_OUTPUT	35	Limit temperature to increase operating stage (Heating) for schedule 2.
101000	17	OBJECT_ANALOG_OUTPUT	35	Limit temperature to increase operating stage (Heating) for schedule 3.
101000	18	OBJECT_ANALOG_OUTPUT	35	Limit temperature to increase operating stage (Heating) for schedule 4.
101000	19	OBJECT_SCHEDULE	3	AHP Operation Stage Schedule 1(0~3)
101000	20	OBJECT_SCHEDULE	3	AHP Operation Stage Schedule 2(0~3)
101000	21	OBJECT_SCHEDULE	3	AHP Operation Stage Schedule 3(0~3)
101000	22	OBJECT_SCHEDULE	3	AHP Operation Stage Schedule 4(0~3)
101000	23	OBJECT_SCHEDULE	2	AR Operation Stage Schedule 1(0~3)
101000	24	OBJECT_SCHEDULE	2	AR Operation Stage Schedule 2(0~3)
101000	25	OBJECT_SCHEDULE	2	AR Operation Stage Schedule 3(0~3)
101000	26	OBJECT_SCHEDULE	2	AR Operation Stage Schedule 4(0~3)
101000	27	OBJECT_SCHEDULE	1	HEX Operation Stage Schedule 1(0~3)
101000	28	OBJECT_SCHEDULE	1	HEX Operation Stage Schedule 2(0~3)
101000	29	OBJECT_SCHEDULE	1	HEX Operation Stage Schedule 3(0~3)
101000	30	OBJECT_SCHEDULE	1	HEX Operation Stage Schedule 4(0~3)
101000	31	OBJECT_SCHEDULE	TRUE	Heat storage Schedule 1(false:Shutoff; true:Storage)
101000	32	OBJECT_SCHEDULE	TRUE	Heat storage Schedule 2(false:Shutoff; true:Storage)
101000	33	OBJECT_SCHEDULE	FALSE	Heat storage Schedule 3(false:Shutoff; true:Storage)
101000	34	OBJECT_SCHEDULE	FALSE	Heat storage Schedule 4(false:Shutoff; true:Storage)

Device ID	Instance Number	BACnet Type	Default Value	Description
101000	35	OBJECT_ANALOG_INPUT	7	Chilled water supply header temperature [C]
101000	36	OBJECT_ANALOG_INPUT	7	Chilled water return header temperature [C]
101000	37	OBJECT_ANALOG_INPUT	7	Chilled water return temperature [C]
101000	38	OBJECT_ANALOG_INPUT	0	Chilled water supply flow rate [L/min]
101000	39	OBJECT_ANALOG_INPUT	0	Chilled water supply heat flow [kW]
101000	40	OBJECT_ANALOG_INPUT	0	Chilled water supply-supply header bypass flow rate [L/min]
101000	41	OBJECT_ANALOG_INPUT	0	Chilled water supply-return header bypass flow rate [L/min]
101000	42	OBJECT_ANALOG_INPUT	7	Hot water supply header temperature [C]
101000	43	OBJECT_ANALOG_INPUT	7	Hot water return header temperature [C]
101000	44	OBJECT_ANALOG_INPUT	7	Hot water return temperature [C]
101000	45	OBJECT_ANALOG_INPUT	0	Hot water supply flow rate [L/min]
101000	46	OBJECT_ANALOG_INPUT	0	Hot water supply heat flow [kW]
101000	47	OBJECT_ANALOG_INPUT	0	Hot water supply-supply header bypass flow rate [L/min]
101000	48	OBJECT_ANALOG_INPUT	0	Hot water supply-return header bypass flow rate [L/min]
101000	49	OBJECT_ANALOG_INPUT	0	Chilled water secondary pump operating number
101000	50	OBJECT_ANALOG_INPUT	0	Hot water secondary pump operating number
101000	51	OBJECT_ANALOG_OUTPUT	0	Current operating mode (0:Shutoff; 1:Cooling; 2:Heating; 3:Cooling And Heating)
101000	52	OBJECT_BINARY_OUTPUT	0	Is AHP operating or not. (false: Off; true: Operating)
101000	53	OBJECT_BINARY_OUTPUT	0	Is AR operating or not. (false: Off; true: Operating)
101000	54	OBJECT_BINARY_OUTPUT	0	Is water storage tank HEX operating or not. (false: Off; true: Operating)
103000	0	OBJECT_ANALOG_OUTPUT	2	Calendar number of schedule 1
103000	1	OBJECT_ANALOG_OUTPUT	3	Calendar number of schedule 2
103000	2	OBJECT_ANALOG_OUTPUT	4	Calendar number of schedule 3
103000	3	OBJECT_ANALOG_OUTPUT	5	Calendar number of schedule 4
103000	4	OBJECT_SCHEDULE	FALSE	Operation Schedule 1 (false:Shutoff; true:Move)
103000	5	OBJECT_SCHEDULE	FALSE	Operation Schedule 2 (false:Shutoff; true:Move)
103000	6	OBJECT_SCHEDULE	FALSE	Operation Schedule 3 (false:Shutoff; true:Move)
103000	7	OBJECT_SCHEDULE	FALSE	Operation Schedule 4 (false:Shutoff; true:Move)
103000	8	OBJECT_ANALOG_OUTPUT	5	Time to delay changing operating stage. [min]
103000	9	OBJECT_ANALOG_OUTPUT	1	Limit to increase operating stage.
103000	10	OBJECT_ANALOG_OUTPUT	0.8	Limit to decrease operating stage.
103000	11	OBJECT_ANALOG_INPUT	0	Supply water flow rate [L/min]
103000	12	OBJECT_ANALOG_INPUT	0	supply-supply header bypass water flow rate [L/min]
103000	13	OBJECT_ANALOG_INPUT	0	supply-return header bypass water flow rate [L/min]
103000	14	OBJECT_ANALOG_INPUT	0	AHU1-1 water flow rate [L/min]
103000	15	OBJECT_ANALOG_INPUT	0	AHU1-2 water flow rate [L/min]
103000	16	OBJECT_ANALOG_INPUT	0	AHU1-3 water flow rate [L/min]
103000	17	OBJECT_ANALOG_INPUT	0	AHU1-4 water flow rate [L/min]
103000	18	OBJECT_ANALOG_INPUT	0	AHU1-5 water flow rate [L/min]
103000	19	OBJECT_ANALOG_INPUT	0	AHU2-1 water flow rate [L/min]
103000	20	OBJECT_ANALOG_INPUT	0	AHU2-2 water flow rate [L/min]
103000	21	OBJECT_ANALOG_INPUT	0	AHU2-3 water flow rate [L/min]
103000	22	OBJECT_ANALOG_INPUT	0	AHU2-4 water flow rate [L/min]
103000	23	OBJECT_ANALOG_INPUT	0	AHU3-1 water flow rate [L/min]
103000	24	OBJECT_ANALOG_INPUT	0	AHU3-2 water flow rate [L/min]
103000	25	OBJECT_ANALOG_INPUT	0	AHU3-3 water flow rate [L/min]
103000	26	OBJECT_ANALOG_INPUT	0	AHU3-4 water flow rate [L/min]
103000	27	OBJECT_ANALOG_INPUT	0	AHU4-1 water flow rate [L/min]
103000	28	OBJECT_ANALOG_INPUT	0	AHU4-2 water flow rate [L/min]
103000	29	OBJECT_ANALOG_INPUT	0	AHU4-3 water flow rate [L/min]
103000	30	OBJECT_ANALOG_INPUT	0	AHU4-4 water flow rate [L/min]
103000	31	OBJECT_ANALOG_INPUT	0	AHU5-1 water flow rate [L/min]
103000	32	OBJECT_ANALOG_INPUT	0	AHU5-2 water flow rate [L/min]
103000	33	OBJECT_ANALOG_INPUT	0	AHU5-3 water flow rate [L/min]
103000	34	OBJECT_ANALOG_INPUT	0	AHU5-4 water flow rate [L/min]
103000	35	OBJECT_ANALOG_INPUT	0	AHU6-1 water flow rate [L/min]
103000	36	OBJECT_ANALOG_INPUT	0	AHU6-2 water flow rate [L/min]
103000	37	OBJECT_ANALOG_INPUT	0	AHU6-3 water flow rate [L/min]
103000	38	OBJECT_ANALOG_INPUT	0	AHU6-4 water flow rate [L/min]
103000	39	OBJECT_ANALOG_INPUT	0	AHU7-1 water flow rate [L/min]
103000	40	OBJECT_ANALOG_INPUT	0	AHU7-2 water flow rate [L/min]
103000	41	OBJECT_ANALOG_INPUT	0	AHU7-3 water flow rate [L/min]
103000	42	OBJECT_ANALOG_INPUT	0	AHU7-4 water flow rate [L/min]
103000	43	OBJECT_ANALOG_INPUT	0	FCU1-1 water flow rate [L/min]
103000	44	OBJECT_ANALOG_INPUT	0	FCU1-2 water flow rate [L/min]
103000	45	OBJECT_ANALOG_INPUT	0	FCU2-1 water flow rate [L/min]
103000	46	OBJECT_ANALOG_INPUT	0	FCU2-2 water flow rate [L/min]
103000	47	OBJECT_ANALOG_INPUT	0	FCU3-1 water flow rate [L/min]
103000	48	OBJECT_ANALOG_INPUT	0	FCU3-2 water flow rate [L/min]
103000	49	OBJECT_ANALOG_INPUT	0	FCU4-1 water flow rate [L/min]
103000	50	OBJECT_ANALOG_INPUT	0	FCU4-2 water flow rate [L/min]
103000	51	OBJECT_ANALOG_INPUT	0	FCU5-1 water flow rate [L/min]
103000	52	OBJECT_ANALOG_INPUT	0	FCU5-2 water flow rate [L/min]
103000	53	OBJECT_ANALOG_INPUT	0	FCU6-1 water flow rate [L/min]
103000	54	OBJECT_ANALOG_INPUT	0	FCU6-2 water flow rate [L/min]
103000	55	OBJECT_ANALOG_INPUT	0	FCU7-1 water flow rate [L/min]
103000	56	OBJECT_ANALOG_INPUT	0	FCU7-2 flow rate [L/min]
103000	57	OBJECT_ANALOG_INPUT	0	AHU1-1 valve lift [-]
103000	58	OBJECT_ANALOG_INPUT	0	AHU1-2 valve lift [-]

Device ID	Instance Number	BACnet Type	Default Value	Description
103000	59	OBJECT_ANALOG_INPUT	0	AHU1-3 valve lift [-]
103000	60	OBJECT_ANALOG_INPUT	0	AHU1-4 valve lift [-]
103000	61	OBJECT_ANALOG_INPUT	0	AHU1-5 valve lift [-]
103000	62	OBJECT_ANALOG_INPUT	0	AHU2-1 valve lift [-]
103000	63	OBJECT_ANALOG_INPUT	0	AHU2-2 valve lift [-]
103000	64	OBJECT_ANALOG_INPUT	0	AHU2-3 valve lift [-]
103000	65	OBJECT_ANALOG_INPUT	0	AHU2-4 valve lift [-]
103000	66	OBJECT_ANALOG_INPUT	0	AHU3-1 valve lift [-]
103000	67	OBJECT_ANALOG_INPUT	0	AHU3-2 valve lift [-]
103000	68	OBJECT_ANALOG_INPUT	0	AHU3-3 valve lift [-]
103000	69	OBJECT_ANALOG_INPUT	0	AHU3-4 valve lift [-]
103000	70	OBJECT_ANALOG_INPUT	0	AHU4-1 valve lift [-]
103000	71	OBJECT_ANALOG_INPUT	0	AHU4-2 valve lift [-]
103000	72	OBJECT_ANALOG_INPUT	0	AHU4-3 valve lift [-]
103000	73	OBJECT_ANALOG_INPUT	0	AHU4-4 valve lift [-]
103000	74	OBJECT_ANALOG_INPUT	0	AHU5-1 valve lift [-]
103000	75	OBJECT_ANALOG_INPUT	0	AHU5-2 valve lift [-]
103000	76	OBJECT_ANALOG_INPUT	0	AHU5-3 valve lift [-]
103000	77	OBJECT_ANALOG_INPUT	0	AHU5-4 valve lift [-]
103000	78	OBJECT_ANALOG_INPUT	0	AHU6-1 valve lift [-]
103000	79	OBJECT_ANALOG_INPUT	0	AHU6-2 valve lift [-]
103000	80	OBJECT_ANALOG_INPUT	0	AHU6-3 valve lift [-]
103000	81	OBJECT_ANALOG_INPUT	0	AHU6-4 valve lift [-]
103000	82	OBJECT_ANALOG_INPUT	0	AHU7-1 valve lift [-]
103000	83	OBJECT_ANALOG_INPUT	0	AHU7-2 valve lift [-]
103000	84	OBJECT_ANALOG_INPUT	0	AHU7-3 valve lift [-]
103000	85	OBJECT_ANALOG_INPUT	0	AHU7-4 valve lift [-]
103000	86	OBJECT_ANALOG_OUTPUT	0	Outlet Pressure Setpoint [kPa]
103000	87	OBJECT_BINARY_OUTPUT	0	Is operating or not
103000	88	OBJECT_ANALOG_OUTPUT	0	Secondary Pump Operating Number
103000	88	OBJECT_ANALOG_OUTPUT	0	Secondary Pump Rotation Ratio
103000	88	OBJECT_ANALOG_OUTPUT	0	Supply-Return header bypass valve Lift
103001	0	OBJECT_ANALOG_OUTPUT	2	Calendar number of schedule 1
103001	1	OBJECT_ANALOG_OUTPUT	3	Calendar number of schedule 2
103001	2	OBJECT_ANALOG_OUTPUT	4	Calendar number of schedule 3
103001	3	OBJECT_ANALOG_OUTPUT	5	Calendar number of schedule 4
103001	4	OBJECT_SCHEDULE	FALSE	Operation Schedule 1 (false:Shutoff; true:Move)
103001	5	OBJECT_SCHEDULE	FALSE	Operation Schedule 2 (false:Shutoff; true:Move)
103001	6	OBJECT_SCHEDULE	FALSE	Operation Schedule 3 (false:Shutoff; true:Move)
103001	7	OBJECT_SCHEDULE	FALSE	Operation Schedule 4 (false:Shutoff; true:Move)
103001	8	OBJECT_ANALOG_OUTPUT	5	Time to delay changing operating stage. [min]
103001	9	OBJECT_ANALOG_OUTPUT	1	Limit to increase operating stage.
103001	10	OBJECT_ANALOG_OUTPUT	0.8	Limit to decrease operating stage.
103001	11	OBJECT_ANALOG_INPUT	0	Supply water flow rate [L/min]
103001	12	OBJECT_ANALOG_INPUT	0	supply-supply header bypass water flow rate [L/min]
103001	13	OBJECT_ANALOG_INPUT	0	supply-return header bypass water flow rate [L/min]
103001	14	OBJECT_ANALOG_INPUT	0	AHU1-1 water flow rate [L/min]
103001	15	OBJECT_ANALOG_INPUT	0	AHU1-2 water flow rate [L/min]
103001	16	OBJECT_ANALOG_INPUT	0	AHU1-3 water flow rate [L/min]
103001	17	OBJECT_ANALOG_INPUT	0	AHU1-4 water flow rate [L/min]
103001	18	OBJECT_ANALOG_INPUT	0	AHU1-5 water flow rate [L/min]
103001	19	OBJECT_ANALOG_INPUT	0	AHU2-1 water flow rate [L/min]
103001	20	OBJECT_ANALOG_INPUT	0	AHU2-2 water flow rate [L/min]
103001	21	OBJECT_ANALOG_INPUT	0	AHU2-3 water flow rate [L/min]
103001	22	OBJECT_ANALOG_INPUT	0	AHU2-4 water flow rate [L/min]
103001	23	OBJECT_ANALOG_INPUT	0	AHU3-1 water flow rate [L/min]
103001	24	OBJECT_ANALOG_INPUT	0	AHU3-2 water flow rate [L/min]
103001	25	OBJECT_ANALOG_INPUT	0	AHU3-3 water flow rate [L/min]
103001	26	OBJECT_ANALOG_INPUT	0	AHU3-4 water flow rate [L/min]
103001	27	OBJECT_ANALOG_INPUT	0	AHU4-1 water flow rate [L/min]
103001	28	OBJECT_ANALOG_INPUT	0	AHU4-2 water flow rate [L/min]
103001	29	OBJECT_ANALOG_INPUT	0	AHU4-3 water flow rate [L/min]
103001	30	OBJECT_ANALOG_INPUT	0	AHU4-4 water flow rate [L/min]
103001	31	OBJECT_ANALOG_INPUT	0	AHU5-1 water flow rate [L/min]
103001	32	OBJECT_ANALOG_INPUT	0	AHU5-2 water flow rate [L/min]
103001	33	OBJECT_ANALOG_INPUT	0	AHU5-3 water flow rate [L/min]
103001	34	OBJECT_ANALOG_INPUT	0	AHU5-4 water flow rate [L/min]
103001	35	OBJECT_ANALOG_INPUT	0	AHU6-1 water flow rate [L/min]
103001	36	OBJECT_ANALOG_INPUT	0	AHU6-2 water flow rate [L/min]
103001	37	OBJECT_ANALOG_INPUT	0	AHU6-3 water flow rate [L/min]
103001	38	OBJECT_ANALOG_INPUT	0	AHU6-4 water flow rate [L/min]
103001	39	OBJECT_ANALOG_INPUT	0	AHU7-1 water flow rate [L/min]
103001	40	OBJECT_ANALOG_INPUT	0	AHU7-2 water flow rate [L/min]
103001	41	OBJECT_ANALOG_INPUT	0	AHU7-3 water flow rate [L/min]
103001	42	OBJECT_ANALOG_INPUT	0	AHU7-4 water flow rate [L/min]
103001	43	OBJECT_ANALOG_INPUT	0	FCU1-1 water flow rate [L/min]
103001	44	OBJECT_ANALOG_INPUT	0	FCU1-2 water flow rate [L/min]
103001	45	OBJECT_ANALOG_INPUT	0	FCU2-1 water flow rate [L/min]

Device ID	Instance Number	BACnet Type	Default Value	Description
103001	47	OBJECT_ANALOG_INPUT	0	FCU3-1 water flow rate [L/min]
103001	48	OBJECT_ANALOG_INPUT	0	FCU3-2 water flow rate [L/min]
103001	49	OBJECT_ANALOG_INPUT	0	FCU4-1 water flow rate [L/min]
103001	50	OBJECT_ANALOG_INPUT	0	FCU4-2 water flow rate [L/min]
103001	51	OBJECT_ANALOG_INPUT	0	FCU5-1 water flow rate [L/min]
103001	52	OBJECT_ANALOG_INPUT	0	FCU5-2 water flow rate [L/min]
103001	53	OBJECT_ANALOG_INPUT	0	FCU6-1 water flow rate [L/min]
103001	54	OBJECT_ANALOG_INPUT	0	FCU6-2 water flow rate [L/min]
103001	55	OBJECT_ANALOG_INPUT	0	FCU7-1 water flow rate [L/min]
103001	56	OBJECT_ANALOG_INPUT	0	FCU7-2 flow rate [L/min]
103001	57	OBJECT_ANALOG_INPUT	0	AHU1-1 valve lift [-]
103001	58	OBJECT_ANALOG_INPUT	0	AHU1-2 valve lift [-]
103001	59	OBJECT_ANALOG_INPUT	0	AHU1-3 valve lift [-]
103001	60	OBJECT_ANALOG_INPUT	0	AHU1-4 valve lift [-]
103001	61	OBJECT_ANALOG_INPUT	0	AHU1-5 valve lift [-]
103001	62	OBJECT_ANALOG_INPUT	0	AHU2-1 valve lift [-]
103001	63	OBJECT_ANALOG_INPUT	0	AHU2-2 valve lift [-]
103001	64	OBJECT_ANALOG_INPUT	0	AHU2-3 valve lift [-]
103001	65	OBJECT_ANALOG_INPUT	0	AHU2-4 valve lift [-]
103001	66	OBJECT_ANALOG_INPUT	0	AHU3-1 valve lift [-]
103001	67	OBJECT_ANALOG_INPUT	0	AHU3-2 valve lift [-]
103001	68	OBJECT_ANALOG_INPUT	0	AHU3-3 valve lift [-]
103001	69	OBJECT_ANALOG_INPUT	0	AHU3-4 valve lift [-]
103001	70	OBJECT_ANALOG_INPUT	0	AHU4-1 valve lift [-]
103001	71	OBJECT_ANALOG_INPUT	0	AHU4-2 valve lift [-]
103001	72	OBJECT_ANALOG_INPUT	0	AHU4-3 valve lift [-]
103001	73	OBJECT_ANALOG_INPUT	0	AHU4-4 valve lift [-]
103001	74	OBJECT_ANALOG_INPUT	0	AHU5-1 valve lift [-]
103001	75	OBJECT_ANALOG_INPUT	0	AHU5-2 valve lift [-]
103001	76	OBJECT_ANALOG_INPUT	0	AHU5-3 valve lift [-]
103001	77	OBJECT_ANALOG_INPUT	0	AHU5-4 valve lift [-]
103001	78	OBJECT_ANALOG_INPUT	0	AHU6-1 valve lift [-]
103001	79	OBJECT_ANALOG_INPUT	0	AHU6-2 valve lift [-]
103001	80	OBJECT_ANALOG_INPUT	0	AHU6-3 valve lift [-]
103001	81	OBJECT_ANALOG_INPUT	0	AHU6-4 valve lift [-]
103001	82	OBJECT_ANALOG_INPUT	0	AHU7-1 valve lift [-]
103001	83	OBJECT_ANALOG_INPUT	0	AHU7-2 valve lift [-]
103001	84	OBJECT_ANALOG_INPUT	0	AHU7-3 valve lift [-]
103001	85	OBJECT_ANALOG_INPUT	0	AHU7-4 valve lift [-]
103001	86	OBJECT_ANALOG_OUTPUT	0	Outlet Pressure Setpoint [kPa]
103001	87	OBJECT_BINARY_OUTPUT	0	Is operating or not
103001	88	OBJECT_ANALOG_OUTPUT	0	Secondary Pump Operating Number
103001	88	OBJECT_ANALOG_OUTPUT	0	Secondary Pump Rotation Ratio
103001	88	OBJECT_ANALOG_OUTPUT	0	Supply-Return header bypass valve Lift
101100	0	OBJECT_ANALOG_OUTPUT	2	Calendar number of schedule 1
101100	1	OBJECT_ANALOG_OUTPUT	3	Calendar number of schedule 2
101100	2	OBJECT_ANALOG_OUTPUT	4	Calendar number of schedule 3
101100	3	OBJECT_ANALOG_OUTPUT	5	Calendar number of schedule 4
101100	4	OBJECT_BINARY_OUTPUT	0	Is cooling mode or not. (season 1)
101100	5	OBJECT_BINARY_OUTPUT	1	Is cooling mode or not. (season 2)
101100	6	OBJECT_BINARY_OUTPUT	1	Is cooling mode or not. (season 3)
101100	7	OBJECT_BINARY_OUTPUT	1	Is cooling mode or not. (season 4)
101100	8	OBJECT_ANALOG_OUTPUT	7	Chilled water outlet setpoint temperature for season 1 [C]
101100	9	OBJECT_ANALOG_OUTPUT	7	Chilled water outlet setpoint temperature for season 2 [C]
101100	10	OBJECT_ANALOG_OUTPUT	7	Chilled water outlet setpoint temperature for season 3 [C]
101100	11	OBJECT_ANALOG_OUTPUT	7	Chilled water outlet setpoint temperature for season 4 [C]
101100	12	OBJECT_ANALOG_OUTPUT	44	Hot water outlet setpoint temperature for season 1 [C]
101100	13	OBJECT_ANALOG_OUTPUT	44	Hot water outlet setpoint temperature for season 2 [C]
101100	14	OBJECT_ANALOG_OUTPUT	44	Hot water outlet setpoint temperature for season 3 [C]
101100	15	OBJECT_ANALOG_OUTPUT	44	Hot water outlet setpoint temperature for season 4 [C]
101100	16	OBJECT_ANALOG_OUTPUT	5	Charging chilled water outlet setpoint temperature for season 1 [C]
101100	17	OBJECT_ANALOG_OUTPUT	5	Charging chilled water outlet setpoint temperature for season 2 [C]
101100	18	OBJECT_ANALOG_OUTPUT	5	Charging chilled water outlet setpoint temperature for season 3 [C]
101100	19	OBJECT_ANALOG_OUTPUT	5	Charging chilled water outlet setpoint temperature for season 4 [C]
101100	20	OBJECT_ANALOG_OUTPUT	46	Charging hot water outlet setpoint temperature for season 1 [C]
101100	21	OBJECT_ANALOG_OUTPUT	46	Charging hot water outlet setpoint temperature for season 2 [C]
101100	22	OBJECT_ANALOG_OUTPUT	46	Charging hot water outlet setpoint temperature for season 3 [C]
101100	23	OBJECT_ANALOG_OUTPUT	46	Charging hot water outlet setpoint temperature for season 4 [C]
101100	24	OBJECT_ANALOG_INPUT	0	Operating number
101100	25	OBJECT_ANALOG_INPUT	20	Chilled and hot water outlet temperature [C]
101100	26	OBJECT_ANALOG_INPUT	0	Chilled and hot water flow rate [L/min]
101100	27	OBJECT_ANALOG_INPUT	0	Chilled and hot water heat flow [kW]
101100	28	OBJECT_ANALOG_INPUT	0	Chilled and hot water pump electricity [kW]
101100	29	OBJECT_BINARY_OUTPUT	0	Is cooling mode or not.
101100	30	OBJECT_ANALOG_OUTPUT	7	Chilled water outlet setpoint temperature [C]
101100	31	OBJECT_ANALOG_OUTPUT	44	Hot water outlet setpoint temperature [C]
101100	32	OBJECT_ANALOG_OUTPUT	5	Charging chilled water outlet setpoint temperature [C]
101100	33	OBJECT_ANALOG_OUTPUT	46	Charging hot water outlet setpoint temperature [C]

Device ID	Instance Number	BACnet Type	Default Value	Description
101200	1	OBJECT_ANALOG_OUTPUT	3	Calendar number of schedule 2
101200	2	OBJECT_ANALOG_OUTPUT	4	Calendar number of schedule 3
101200	3	OBJECT_ANALOG_OUTPUT	5	Calendar number of schedule 4
101200	4	OBJECT_BINARY_OUTPUT	1	Is cooling mode or not. (season 1)
101200	5	OBJECT_BINARY_OUTPUT	1	Is cooling mode or not. (season 2)
101200	6	OBJECT_BINARY_OUTPUT	1	Is cooling mode or not. (season 3)
101200	7	OBJECT_BINARY_OUTPUT	1	Is cooling mode or not. (season 4)
101200	8	OBJECT_ANALOG_OUTPUT	7	Chilled water outlet setpoint temperature for season 1 [C]
101200	9	OBJECT_ANALOG_OUTPUT	7	Chilled water outlet setpoint temperature for season 2 [C]
101200	10	OBJECT_ANALOG_OUTPUT	7	Chilled water outlet setpoint temperature for season 3 [C]
101200	11	OBJECT_ANALOG_OUTPUT	7	Chilled water outlet setpoint temperature for season 4 [C]
101200	12	OBJECT_ANALOG_OUTPUT	44	Hot water outlet setpoint temperature for season 1 [C]
101200	13	OBJECT_ANALOG_OUTPUT	44	Hot water outlet setpoint temperature for season 2 [C]
101200	14	OBJECT_ANALOG_OUTPUT	44	Hot water outlet setpoint temperature for season 3 [C]
101200	15	OBJECT_ANALOG_OUTPUT	44	Hot water outlet setpoint temperature for season 4 [C]
101200	16	OBJECT_ANALOG_OUTPUT	32	Cooling water outlet setpoint temperature for season 1 [C]
101200	17	OBJECT_ANALOG_OUTPUT	32	Cooling water outlet setpoint temperature for season 2 [C]
101200	18	OBJECT_ANALOG_OUTPUT	32	Cooling water outlet setpoint temperature for season 3 [C]
101200	19	OBJECT_ANALOG_OUTPUT	32	Cooling water outlet setpoint temperature for season 4 [C]
101200	20	OBJECT_ANALOG_OUTPUT	2	Temperature difference of cooling tower On/Off control [C]
101200	21	OBJECT_ANALOG_OUTPUT	32	Current cooling water outlet setpoint temperature [C]
101200	22	OBJECT_ANALOG_INPUT	32	Cooling water inlet temperature [C]
101200	23	OBJECT_ANALOG_INPUT	37	Cooling water outlet temperature [C]
101200	24	OBJECT_ANALOG_INPUT	0	Cooling water flow rate [L/min]
101200	25	OBJECT_ANALOG_INPUT	20	Chilled and hot water outlet temperature [C]
101200	26	OBJECT_ANALOG_INPUT	0	Chilled and hot water flow rate [L/min]
101200	27	OBJECT_ANALOG_INPUT	0	Chilled and hot water heat flow [kW]
101200	28	OBJECT_ANALOG_INPUT	0	Absorption chiller and cooling water pump electricity [kW]
101200	29	OBJECT_ANALOG_INPUT	0	Cooling tower and makeup pump electricity [kW]
101200	30	OBJECT_ANALOG_INPUT	0	Chilled and hot water pump electricity [kW]
101200	31	OBJECT_BINARY_OUTPUT	1	Is cooling mode or not.
101200	32	OBJECT_ANALOG_OUTPUT	7	Chilled water outlet setpoint temperature [C]
101200	33	OBJECT_ANALOG_OUTPUT	44	Hot water outlet setpoint temperature [C]
102000	0	OBJECT_ANALOG_OUTPUT	2	Calendar number of schedule 1
102000	1	OBJECT_ANALOG_OUTPUT	3	Calendar number of schedule 2
102000	2	OBJECT_ANALOG_OUTPUT	4	Calendar number of schedule 3
102000	3	OBJECT_ANALOG_OUTPUT	5	Calendar number of schedule 4
102000	4	OBJECT_BINARY_OUTPUT	0	Is cooling mode or not. (season 1)
102000	5	OBJECT_BINARY_OUTPUT	1	Is cooling mode or not. (season 2)
102000	6	OBJECT_BINARY_OUTPUT	1	Is cooling mode or not. (season 3)
102000	7	OBJECT_BINARY_OUTPUT	1	Is cooling mode or not. (season 4)
102000	8	OBJECT_ANALOG_OUTPUT	44	Supply hex outlet water setpoint temperature for season 1 [C]
102000	9	OBJECT_ANALOG_OUTPUT	7	Supply hex outlet water setpoint temperature for season 2 [C]
102000	10	OBJECT_ANALOG_OUTPUT	7	Supply hex outlet water setpoint temperature for season 3 [C]
102000	11	OBJECT_ANALOG_OUTPUT	7	Supply hex outlet water setpoint temperature for season 4 [C]
102000	12	OBJECT_ANALOG_OUTPUT	45	Water tank setpoint temperature for season 1 [C]
102000	13	OBJECT_ANALOG_OUTPUT	6	Water tank setpoint temperature for season 2 [C]
102000	14	OBJECT_ANALOG_OUTPUT	6	Water tank setpoint temperature for season 3 [C]
102000	15	OBJECT_ANALOG_OUTPUT	6	Water tank setpoint temperature for season 4 [C]
102000	16	OBJECT_ANALOG_OUTPUT	0.5	Proportional gain of supply temperature control PID
102000	17	OBJECT_ANALOG_OUTPUT	600	Integral time of supply temperature control PID [sec]
102000	18	OBJECT_ANALOG_OUTPUT	0	Derivative time of supply temperature control PID [sec]
102000	19	OBJECT_ANALOG_OUTPUT	0.5	Proportional gain of supply temperature control PID
102000	20	OBJECT_ANALOG_OUTPUT	600	Integral time of supply temperature control PID [sec]
102000	21	OBJECT_ANALOG_OUTPUT	0	Derivative time of supply temperature control PID [sec]
102000	22	OBJECT_ANALOG_INPUT	20	Water tank temperature 1 [C]
102000	23	OBJECT_ANALOG_INPUT	20	Water tank temperature 2 [C]
102000	24	OBJECT_ANALOG_INPUT	20	Water tank temperature 3 [C]
102000	25	OBJECT_ANALOG_INPUT	20	Water tank temperature 4 [C]
102000	26	OBJECT_ANALOG_INPUT	20	Water tank temperature 5 [C]
102000	27	OBJECT_ANALOG_INPUT	20	Water tank temperature 6 [C]
102000	28	OBJECT_ANALOG_INPUT	20	Water tank temperature 7 [C]
102000	29	OBJECT_ANALOG_INPUT	20	Water tank temperature 8 [C]
102000	30	OBJECT_ANALOG_INPUT	20	Water tank temperature 9 [C]
102000	31	OBJECT_ANALOG_INPUT	20	Heat charging HEX inlet temperature [C]
102000	32	OBJECT_ANALOG_INPUT	20	Heat charging HEX outlet temperature [C]
102000	33	OBJECT_ANALOG_INPUT	20	Heat supply HEX inlet temperature [C]
102000	34	OBJECT_ANALOG_INPUT	20	Heat supply HEX outlet temperature [C]
102000	35	OBJECT_ANALOG_INPUT	0	Heat charging HEX water flow rate [L/min]
102000	36	OBJECT_ANALOG_INPUT	0	Heat supply HEX water flow rate [L/min]
102000	37	OBJECT_ANALOG_INPUT	0	Heat charging HEX heat flow [kW]
102000	38	OBJECT_ANALOG_INPUT	0	Heat supply HEX heat flow [kW]
102000	39	OBJECT_ANALOG_INPUT	0	Supply temperature [C]
102000	40	OBJECT_ANALOG_INPUT	0	Supply water flow rate [L/min]
102000	41	OBJECT_ANALOG_INPUT	0	Supply water heat flow [kW]
102000	42	OBJECT_ANALOG_INPUT	0	Heat charged in water tank [MJ]
102000	43	OBJECT_ANALOG_INPUT	0	Electricity of primary pump [kW]
102000	44	OBJECT_ANALOG_INPUT	0	Electricity of secondary pump [kW]
102000	45	OBJECT_BINARY_OUTPUT	0	Is cooling mode or not.

Device ID	Instance Number	BACnet Type	Default Value	Description
102000	46	OBJECT_ANALOG_OUTPUT	44	Supply hex outlet water setpoint temperature [C]
102000	47	OBJECT_ANALOG_OUTPUT	45	Water tank setpoint temperature [C]
104101	0	OBJECT_ANALOG_OUTPUT	2	Calendar number of schedule 1
104101	1	OBJECT_ANALOG_OUTPUT	3	Calendar number of schedule 2
104101	2	OBJECT_ANALOG_OUTPUT	4	Calendar number of schedule 3
104101	3	OBJECT_ANALOG_OUTPUT	5	Calendar number of schedule 4
104101	4	OBJECT_SCHEDULE	0	Operation Schedule 1(0:Shutoff; 1:Ventilation; 2:Cooling; 3:Heating)
104101	5	OBJECT_SCHEDULE	0	Operation Schedule 2(0:Shutoff; 1:Ventilation; 2:Cooling; 3:Heating)
104101	6	OBJECT_SCHEDULE	0	Operation Schedule 3(0:Shutoff; 1:Ventilation; 2:Cooling; 3:Heating)
104101	7	OBJECT_SCHEDULE	0	Operation Schedule 4(0:Shutoff; 1:Ventilation; 2:Cooling; 3:Heating)
104101	8	OBJECT_BINARY_OUTPUT	1	Load reset control is enabled or not
104101	9	OBJECT_ANALOG_OUTPUT	1	Opening rate of OA Damper [-]
104101	10	OBJECT_ANALOG_OUTPUT	30	Outdoor air-cutting minutes during precooling or preheating [min]
104101	11	OBJECT_SCHEDULE	28.5	Setpoint of Supply Air Drybulb Temperature[C] for season 1
104101	12	OBJECT_SCHEDULE	16.5	Setpoint of Supply Air Drybulb Temperature[C] for season 2
104101	13	OBJECT_SCHEDULE	16.5	Setpoint of Supply Air Drybulb Temperature[C] for season 3
104101	14	OBJECT_SCHEDULE	26.5	Setpoint of Supply Air Drybulb Temperature[C] for season 4
104101	15	OBJECT_ANALOG_OUTPUT	1.05	Proportional gain for supply air temperature control
104101	16	OBJECT_ANALOG_OUTPUT	1680	Integral time for supply air temperature control
104101	17	OBJECT_ANALOG_OUTPUT	0	Derivative time for supply air temperature control
104101	18	OBJECT_ANALOG_OUTPUT	40	SetPoint of Return Air Relative Humidity[%]
104101	19	OBJECT_ANALOG_OUTPUT	10	On/Off band of Relative Humidity control[%]
104101	20	OBJECT_ANALOG_OUTPUT	25	Setpoint of Zone 1 Drybulb Temperature[C] for season 1
104101	21	OBJECT_ANALOG_OUTPUT	25	Setpoint of Zone 1 Drybulb Temperature[C] for season 2
104101	22	OBJECT_ANALOG_OUTPUT	25	Setpoint of Zone 1 Drybulb Temperature[C] for season 3
104101	23	OBJECT_ANALOG_OUTPUT	24	Setpoint of Zone 1 Drybulb Temperature[C] for season 4
104101	24	OBJECT_ANALOG_OUTPUT	25	Setpoint of Zone 2 Drybulb Temperature[C] for season 1
104101	25	OBJECT_ANALOG_OUTPUT	25	Setpoint of Zone 2 Drybulb Temperature[C] for season 2
104101	26	OBJECT_ANALOG_OUTPUT	25	Setpoint of Zone 2 Drybulb Temperature[C] for season 3
104101	27	OBJECT_ANALOG_OUTPUT	24	Setpoint of Zone 2 Drybulb Temperature[C] for season 4
104101	28	OBJECT_ANALOG_OUTPUT	25	Setpoint of Zone 3 Drybulb Temperature[C] for season 1
104101	29	OBJECT_ANALOG_OUTPUT	25	Setpoint of Zone 3 Drybulb Temperature[C] for season 2
104101	30	OBJECT_ANALOG_OUTPUT	25	Setpoint of Zone 3 Drybulb Temperature[C] for season 3
104101	31	OBJECT_ANALOG_OUTPUT	24	Setpoint of Zone 3 Drybulb Temperature[C] for season 4
104101	32	OBJECT_ANALOG_OUTPUT	25	Setpoint of Zone 4 Drybulb Temperature[C] for season 1
104101	33	OBJECT_ANALOG_OUTPUT	25	Setpoint of Zone 4 Drybulb Temperature[C] for season 2
104101	34	OBJECT_ANALOG_OUTPUT	25	Setpoint of Zone 4 Drybulb Temperature[C] for season 3
104101	35	OBJECT_ANALOG_OUTPUT	24	Setpoint of Zone 4 Drybulb Temperature[C] for season 4
104101	36	OBJECT_ANALOG_OUTPUT	25	Setpoint of Zone 5 Drybulb Temperature[C] for season 1
104101	37	OBJECT_ANALOG_OUTPUT	25	Setpoint of Zone 5 Drybulb Temperature[C] for season 2
104101	38	OBJECT_ANALOG_OUTPUT	25	Setpoint of Zone 5 Drybulb Temperature[C] for season 3
104101	39	OBJECT_ANALOG_OUTPUT	24	Setpoint of Zone 5 Drybulb Temperature[C] for season 4
104101	40	OBJECT_ANALOG_OUTPUT	25	Setpoint of Zone 6 Drybulb Temperature[C] for season 1
104101	41	OBJECT_ANALOG_OUTPUT	25	Setpoint of Zone 6 Drybulb Temperature[C] for season 2
104101	42	OBJECT_ANALOG_OUTPUT	25	Setpoint of Zone 6 Drybulb Temperature[C] for season 3
104101	43	OBJECT_ANALOG_OUTPUT	24	Setpoint of Zone 6 Drybulb Temperature[C] for season 4
104101	44	OBJECT_ANALOG_OUTPUT	0.3	P value of Zone 1 VAV PID Control
104101	45	OBJECT_ANALOG_OUTPUT	0.3	P value of Zone 2 VAV PID Control
104101	46	OBJECT_ANALOG_OUTPUT	0.3	P value of Zone 3 VAV PID Control
104101	47	OBJECT_ANALOG_OUTPUT	0.3	P value of Zone 4 VAV PID Control
104101	48	OBJECT_ANALOG_OUTPUT	0.3	P value of Zone 5 VAV PID Control
104101	49	OBJECT_ANALOG_OUTPUT	0.3	P value of Zone 6 VAV PID Control
104101	50	OBJECT_ANALOG_OUTPUT	4140	I value of Zone 1 VAV PID Control
104101	51	OBJECT_ANALOG_OUTPUT	4140	I value of Zone 2 VAV PID Control
104101	52	OBJECT_ANALOG_OUTPUT	4140	I value of Zone 3 VAV PID Control
104101	53	OBJECT_ANALOG_OUTPUT	4140	I value of Zone 4 VAV PID Control
104101	54	OBJECT_ANALOG_OUTPUT	4140	I value of Zone 5 VAV PID Control
104101	55	OBJECT_ANALOG_OUTPUT	4140	I value of Zone 6 VAV PID Control
104101	56	OBJECT_ANALOG_OUTPUT	0	D Value of Zone 1 VAV PID Control
104101	57	OBJECT_ANALOG_OUTPUT	0	D Value of Zone 2 VAV PID Control
104101	58	OBJECT_ANALOG_OUTPUT	0	D Value of Zone 3 VAV PID Control
104101	59	OBJECT_ANALOG_OUTPUT	0	D Value of Zone 4 VAV PID Control
104101	60	OBJECT_ANALOG_OUTPUT	0	D Value of Zone 5 VAV PID Control
104101	61	OBJECT_ANALOG_OUTPUT	0	D Value of Zone 6 VAV PID Control
104101	62	OBJECT_ANALOG_INPUT	24	Zone 1 Drybulb Temperature[C]
104101	63	OBJECT_ANALOG_INPUT	24	Zone 2 Drybulb Temperature[C]
104101	64	OBJECT_ANALOG_INPUT	24	Zone 3 Drybulb Temperature[C]
104101	65	OBJECT_ANALOG_INPUT	24	Zone 4 Drybulb Temperature[C]
104101	66	OBJECT_ANALOG_INPUT	24	Zone 5 Drybulb Temperature[C]
104101	67	OBJECT_ANALOG_INPUT	24	Zone 6 Drybulb Temperature[C]
104101	68	OBJECT_ANALOG_INPUT	50	Zone 1 Relative Humidity[%]
104101	69	OBJECT_ANALOG_INPUT	50	Zone 2 Relative Humidity[%]
104101	70	OBJECT_ANALOG_INPUT	50	Zone 3 Relative Humidity[%]
104101	71	OBJECT_ANALOG_INPUT	50	Zone 4 Relative Humidity[%]
104101	72	OBJECT_ANALOG_INPUT	50	Zone 5 Relative Humidity[%]
104101	73	OBJECT_ANALOG_INPUT	50	Zone 6 Relative Humidity[%]
104101	74	OBJECT_ANALOG_OUTPUT	24	Setpoint of Zone 1 Drybulb Temperature[C]
104101	75	OBJECT_ANALOG_OUTPUT	24	Setpoint of Zone 2 Drybulb Temperature[C]
104101	76	OBJECT_ANALOG_OUTPUT	24	Setpoint of Zone 3 Drybulb Temperature[C]













































[illegible][illegible]



Appendix 6    Analysis of HVAC operation data



## 1. はじめに

本資料では、エミュレータシステムで生成した BEMS データの分析結果を示す。

## 2. 熱源システム

システムの月別の熱負荷と一次エネルギー消費量および COP を Fig.1 に示す。熱負荷はヘッドでの往還温度差計測値から計算した値である。消費電力量は一次側熱源システムと二次側空調システムの合算値である。インテリア系統の AHU は年間冷房、ペリメータ系統の AHU は 12~3 月のみ暖房で運転している。年間の暖房負荷は 672 GJ、冷房負荷は 1,186 GJ であり、延床面積あたりでは 67 MJ/m<sup>2</sup> と 119 MJ/m<sup>2</sup> である。年間の一次 COP は 0.48 となった。COP は冬季に悪く、極低負荷の冷房需要が非効率な運転の原因となっている可能性がある。

熱源別の熱製造割合を Fig.2 に示す。半分以上は蓄熱槽の放熱運転によってまかなわれることがわかる。直熱吸収冷温水器が 1 段目に動作するが、冬季に関しては冷房運転に対応するため、空気熱源の方が比率が大きくなっている。

年間の負荷デュレーションカーブを Fig.3 に示す。

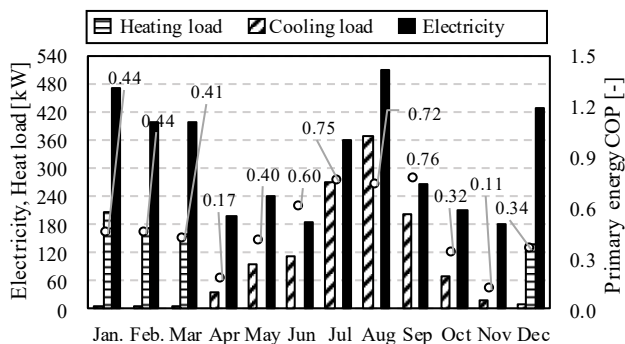


Fig.1 Trends of electricity, heat load and COP

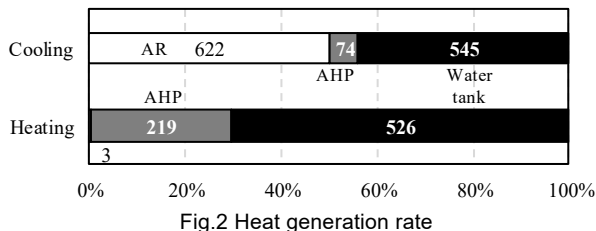


Fig.2 Heat generation rate

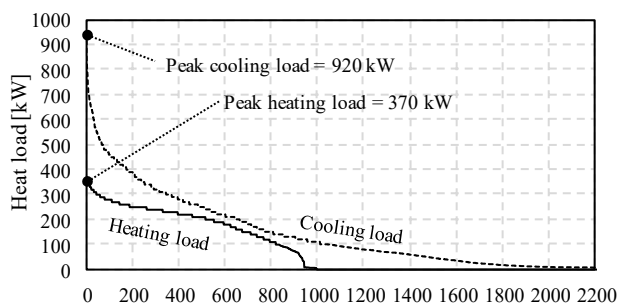


Fig.3 Duration curve of heat load

一次エネルギー消費の内訳を Fig.4 に示す。VAV を導入している割には空気搬送のエネルギー消費が大きい。VAV 制御の不良が示唆される。

システムの負荷率と一次 COP の関係を暖房冷房別に Fig.5 に示す。ただし、負荷率は設計能力を最大値として計算した。暖房運転時に

は 50%を超える負荷率での運転は無かった。本計画では水蓄熱システムが導入されているため、熱源の稼働時刻と負荷発生時とがずれる。やや低めの負荷で極端に大きなシステム COP が表れるが、これは水蓄熱槽の放熱運転によりポンプ動力のみが計上されているためである。Fig.6 は、この影響を取り除くために日積算の負荷と日積算の一次 COP の関係を示したものである。空気熱源ヒートポンプはインバータ式のため、冷房運転時は負荷率の低下によって COP が上昇するが、補機類や二次側システムのエネルギー消費の影響があるため、システム全体としては負荷率の低下とともに COP が低下する傾向となる。特に暖房負荷率は小さいため、かなり低い COP で運用となっている。負荷率の低い状態での運転をどのように改善するかが課題である。

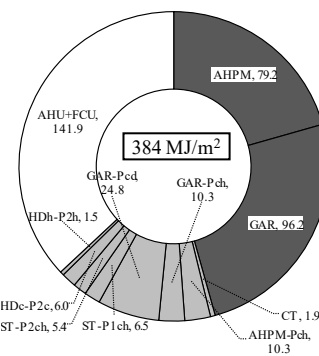


Fig.4 Primary energy use

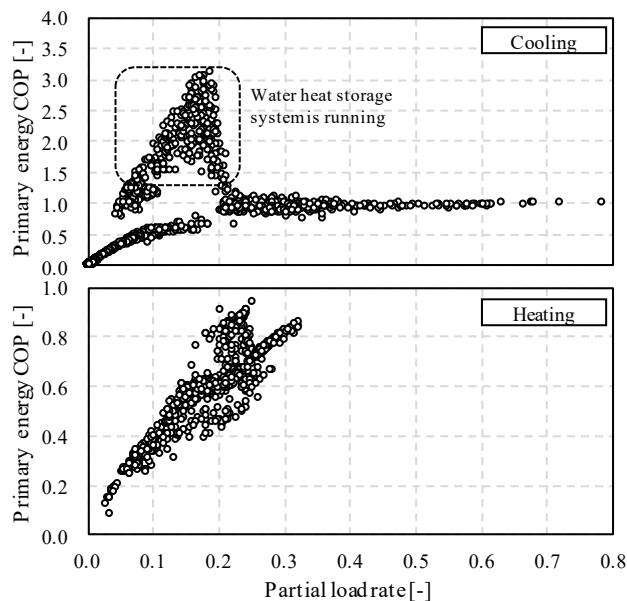


Fig.5 Partial load rate and primary energy COP of system

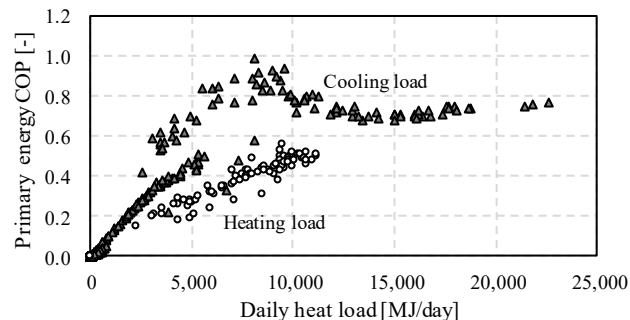


Fig.6 Daily heat load and primary energy COP

熱源別の負荷率と一次 COP の関係を Fig.7 に示す。吸収式冷凍機は殆どの時間で 70%を下回る負荷率で運転している。空気熱源ヒートポンプはインバータ式のため、負荷率の低下とともに COP が向上するが、50%程度で極大値を示した後にやや低下に転じる。

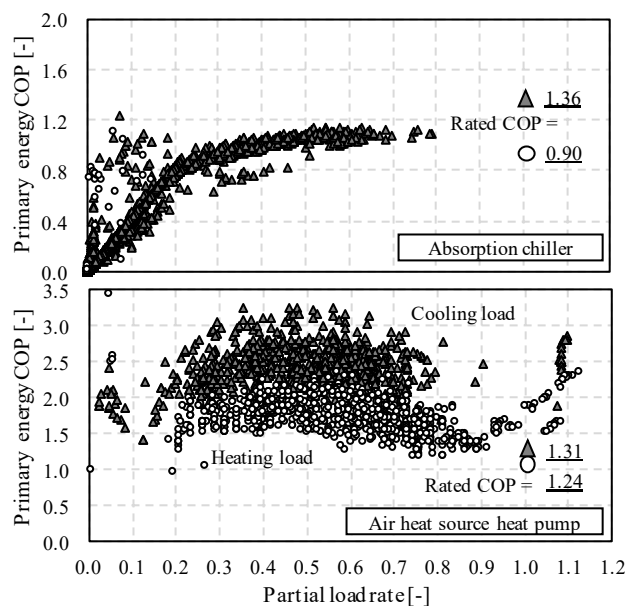


Fig.7 Partial load rate and primary energy COP of heat sources

二次側往還温度差と二次ポンプの水搬送効率 (WTF: Water transfer factor) の関係を Fig.8 に示す。往還温度差の低下とともに効率が低下する傾向が確認できる。冷水搬送に関しては非常に WTF の小さい範囲に広がる点がある。これは中間期および冬季の極低負荷時の冷房運転である。不要な冷房運転を停止するなどの運用改善が必要である。

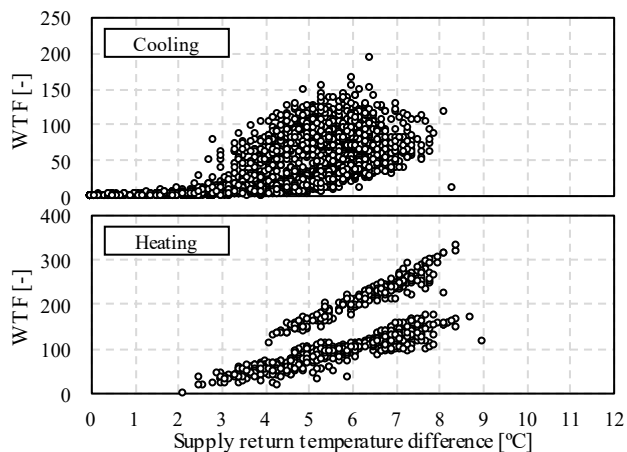


Fig.8 Supply return temperature and WTF of secondary pump

冷温水負荷率と二次ポンプの消費電力および運転台数の関係を Fig.9 に示す。負荷率の低下とともに消費電力と運転台数が低下しており、インバータによる回転数制御と台数制御が機能していることが確認できる。ただし、50%程度で 3 台運転に到達している点に注意が必要である。運転台数は水量と負荷率で決まるが、二次側で設計値よりも温度差が取れないため、冷温水負荷率としては低い値で増段したと考えられる。

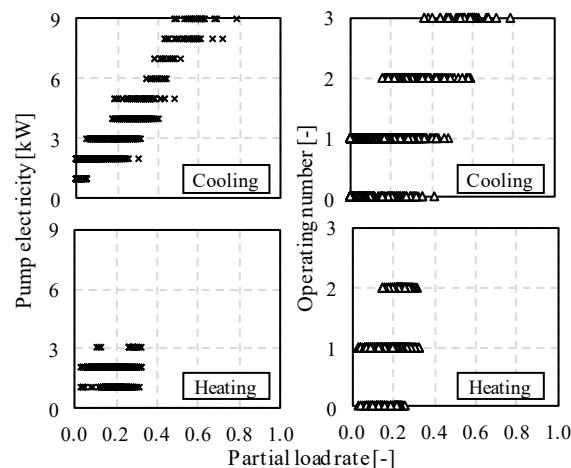


Fig.9 Partial load rate and pump electricity

Fig.10 に代表日における蓄熱槽の温度プロフィールを示す。やや熱が使い切れておらず、日中の追い掛け運転（増段判定が早すぎる可能性がある。

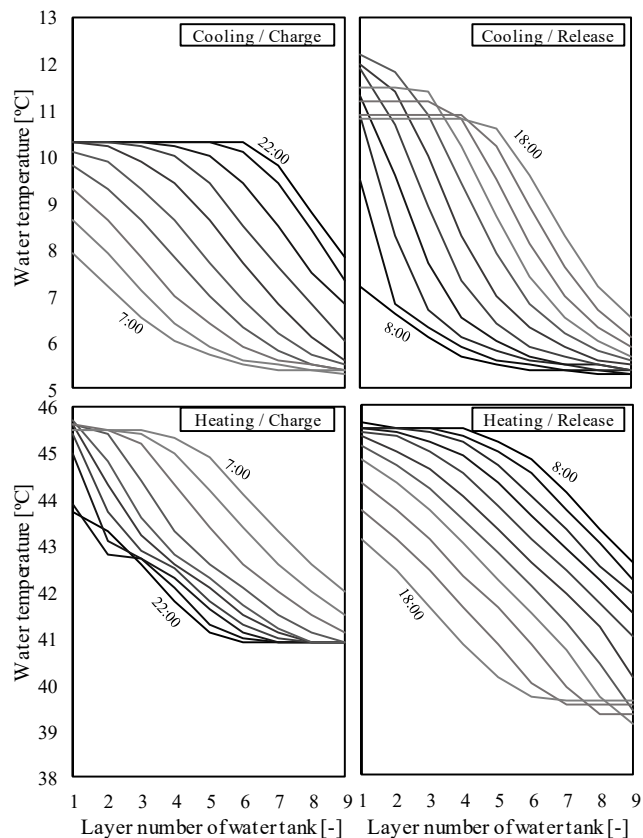


Fig.10 Water temperature profile of storage tank

Fig.11 に冷温水負荷率と熱源の運転台数の関係を示す。運転台数は負荷流量と供給温度によって制御をしており、負荷率の上昇に伴って運転台数が増える様子が確認できる。ただし暖房運転時は低負荷で 2 台運転が行われている場合がある。冬季は外気処理を行うために二次側で大きな温度差が取れ、供給温度が低下することで増段の判定がなされた可能性がある。

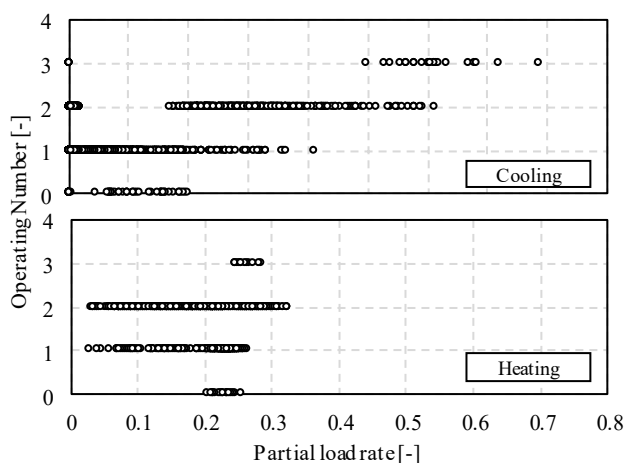


Fig.11 Operating number of heat source

熱源起動時の給水温度の推移を Fig.12 に示す。上は暖房時の温水供給温度、下は冷房時の冷水供給温度である。いずれも蓄熱負荷が大きいと予想される月曜日朝のデータである。本施設では8時より熱源の予冷予熱運転を開始し、8:30 から二次側空調機の予冷予熱運転を開始している。配管系や熱源機自体の蓄熱負荷により、熱源起動時刻から 10~15 分ほどで設定温度に達することがわかる。空調機が起動すると還温度が大きく変化し、熱源が過負荷となる結果、供給温度も設定値に維持できなくなるが、9:00 には概ね供給温度設定値まで回復できることがわかる。

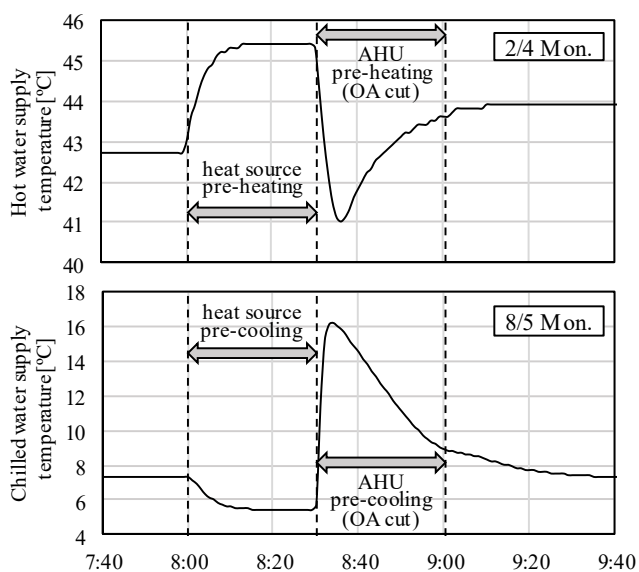


Fig.12 Startup trend of supply water temperature

各月の平均外気状態を Fig.13 に示す。湿球温度は平均的には、冬季が 6℃ 未満、中間期が 15℃ 未満となっている。標準設定では冷却水温度は一定となっているが、外気湿球温度に応じた設定値とすることで効率向上を図る必要がある。

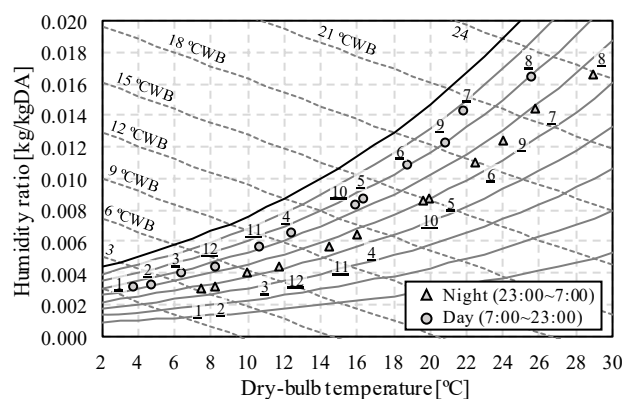


Fig.13 Average outdoor air state

### 3. 空調システム

4F を代表階として、二次側空調システムの性能を確認した。

北側と南側の執務室の CO<sub>2</sub> 濃度の推移を Fig.14 に示す。両ゾーンともに 1,000ppm を下回っていることが確認できる。本施設では休日には AHU を完全に停止して換気も行わないが、気積が充分であるため、休日出勤者がいる場合にも 1,000ppm までは上昇しないことがわかる。本例では土曜日に北側事務室の出勤者が多かったようである。各階の CO<sub>2</sub> 濃度の頻度分布を Fig.16 に示す。7 階や 4 階に関してはもう少し外気量を絞っても 1,000ppm を満足できそうである。室ごとの平均 CO<sub>2</sub> 濃度の推移を Fig.17 に示す。テナント毎に営業時間が異なるため、1F や 5F では朝方に CO<sub>2</sub> 濃度が大きく上昇する部屋がある。テナントの活動に合わせた AHU 起動スケジュールの設定が必要である。

AHU4-1 の空調ゾーン VAV-1 の温湿度を Fig.15 に示す。ただし、データは空調時間帯である 9:00~19:00 のみのデータを抽出した。破線と実線の枠は PMV±5 の範囲である。概ね、範囲内に収まっていることがわかる。乾球温度の設定値は各ゾーンとも年間を通じて 25°C で一定である。冬季は相対湿度 30~50% の範囲で加湿器の ON/OFF 制御を行っており、適切に機能していることがわかる。また、夏季の相対湿度は成り行きであるが、概ね 55% 未満におさえられていることがわかる。

AHU4-1 の給気温度設定値と給気ファンの回転数の関係を Fig.18 に示す。ロードリセット制御が有効となっているため、例えば夏季であれば給気温度設定値が低下するとファン回転数が大きくなり、上限値に達すると風量が絞られることになる。冬季の関係性はやや不明瞭である。

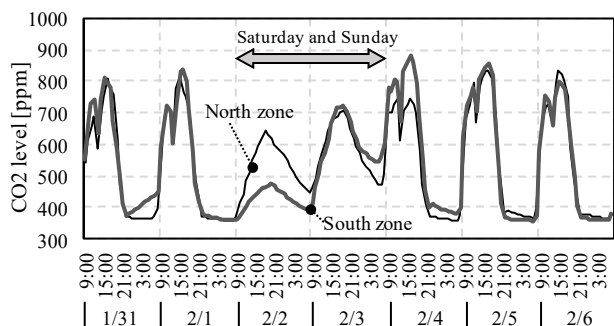


Fig.14 CO<sub>2</sub> level of 4<sup>th</sup> floor

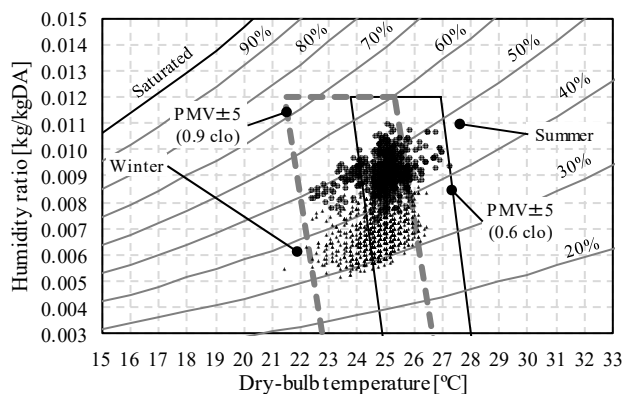


Fig.15 Indoor air state of AHU4-1, VAV zone 1

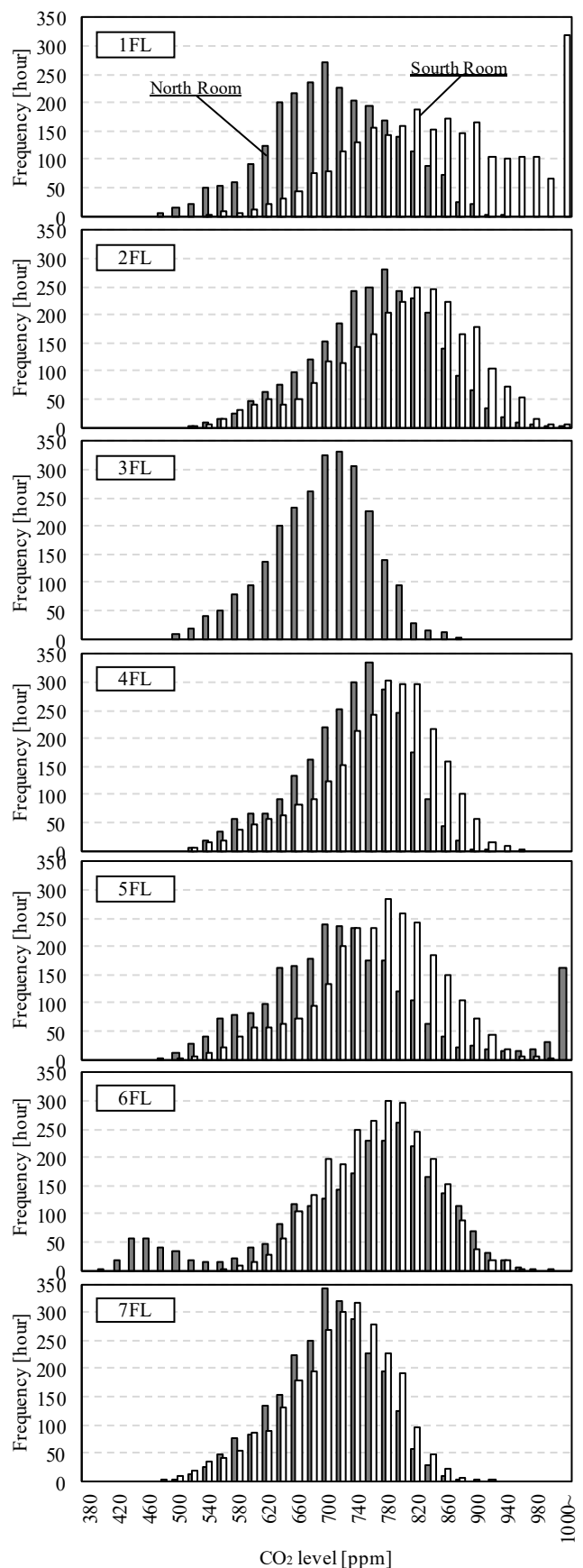


Fig.16 Frequent distribution of CO<sub>2</sub> level

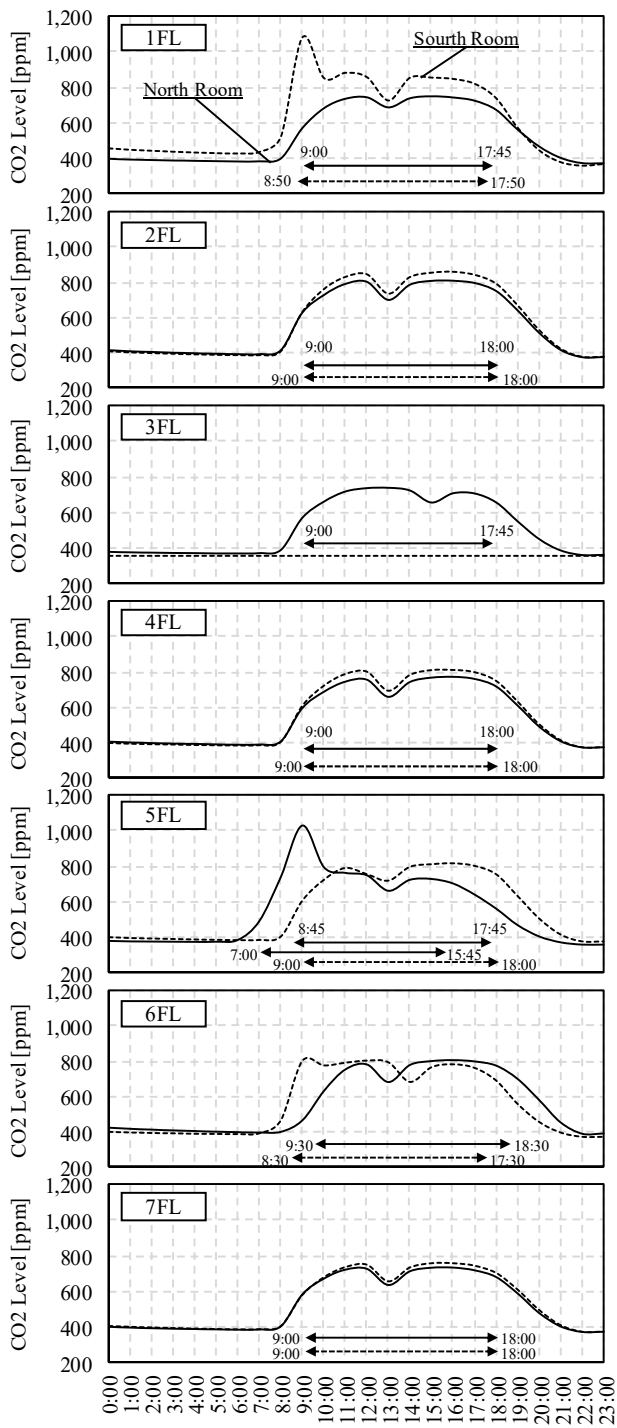


Fig.17 CO2 level trend of each room

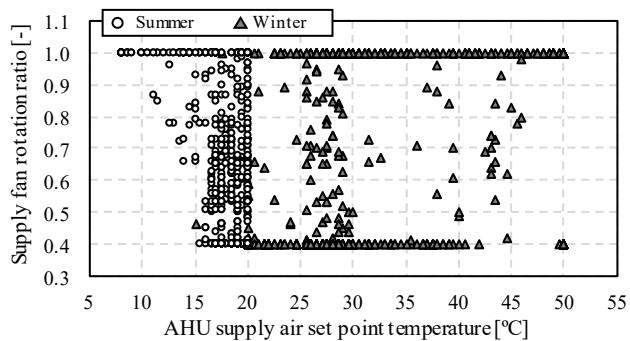


Fig.18 AHU supply air set-point temperature and fan rotation ratio

Fig.19にAHU-4-1の温水コイルと冷水コイルの二方弁開度と水量の関係を示す。開度を上げると流量も大きくなる関係となるが、他の二方弁の状態にも影響されるため、完全な正相関とはならない。

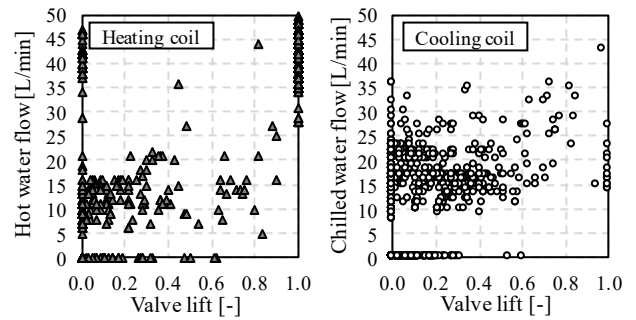


Fig.19 Valve lift and water flow rate of AHU coils

冬季と夏季の代表日におけるAHU-4-1のVAVゾーン1の乾球温度の推移をFig.20に示す。概ね設定値 $\pm 0.5^{\circ}\text{C}$ 程度に制御できているが、冬季の3日目午後に $2^{\circ}\text{C}$ ほどオーバーシュートしている。ゾーン1はペリメータであり、日射が入り込んだ効果と推測できる。

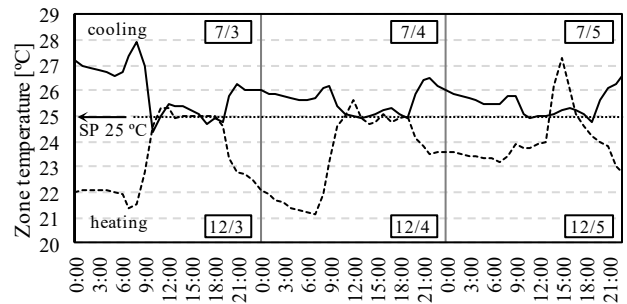


Fig.20 Dry-bulb temperature of AHU-4-1, VAV zone 1

夏季と冬季の代表日における執務者アンケート結果をFig.21とFig.22に示す。夏季は午前午後ともに暑い側の申告が多く、半分以上の人が不満を感じている。冬季の午前は概ね中立で問題がないが、午後になると主に南側の居室の室温が上昇し、暑いと感じる者が増える。

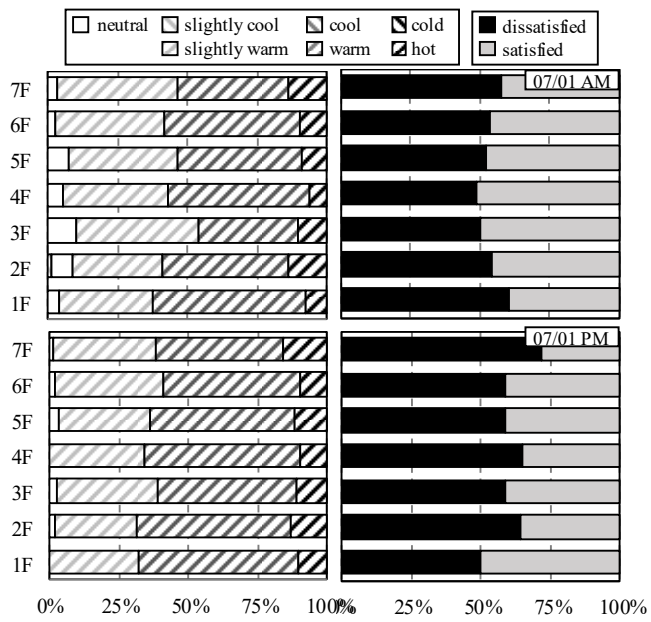


Fig.21 Result of thermal sensation vote (Summer)

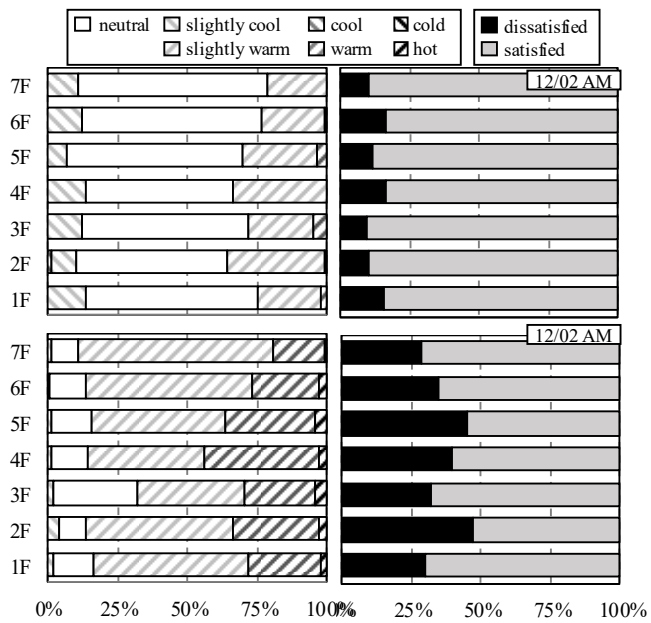


Fig.22 Result of thermal sensation vote (Winter)



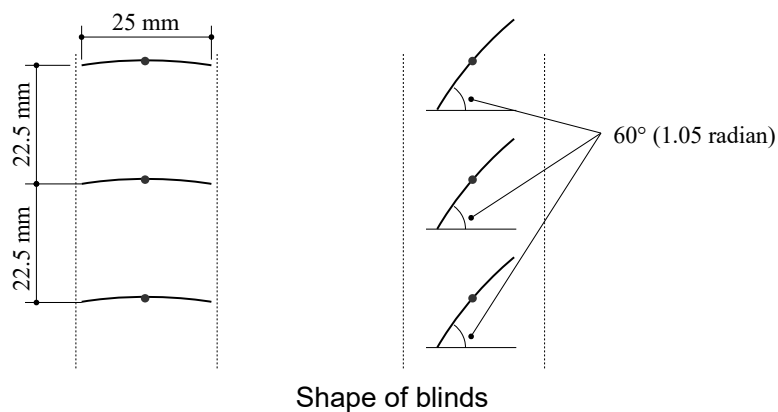
## Appendix 7   Calculation of energy and dissatisfaction



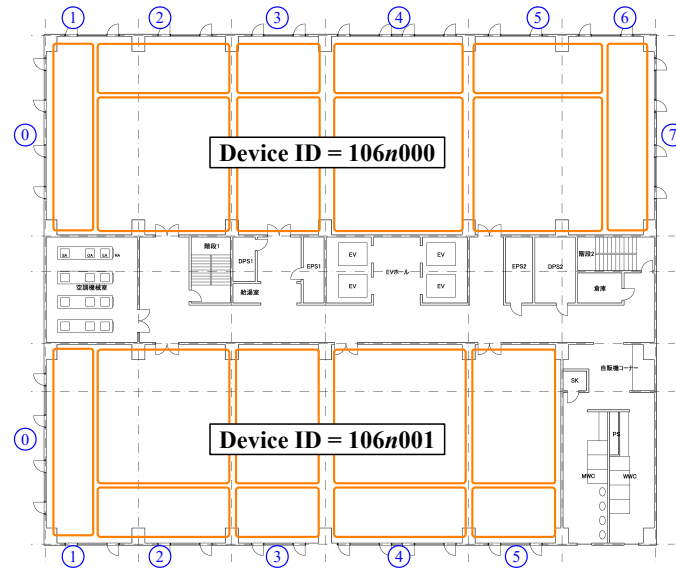
## 1. Method of calculating primary energy

The target of calculation of primary energy consumption is electricity, gas and water supply. The power conversion factor follows the law of energy conservation in Japan. That is, 9.97 MJ/kWh for day from 8:00 to 22:00 and 9.28 MJ/kWh for night from 22:00 to 8:00. Gas conversion factor is 45 MJ/Nm<sup>3</sup> on the premise of city gas 13 A. The conversion factor of clean water is 8.5 MJ/m<sup>3</sup>.

Not only electricity consumption of air conditioning heat source equipment, but the electricity consumption by tenant's outlet and lighting energy consumption are calculated. Power consumption by outlets is stochastically determined by the behavior of the office workers and cannot be changed by the operation of facilities. For lighting, set the standard energy consumption to 12 W/m<sup>2</sup> ( $=750 / (120 \cdot 0.9 \cdot 0.6)$ ) with an illuminance of 750 lx, a maintenance rate of 0.9, an illumination rate of 0.6, and a luminous efficiency of 120 lm/W. When there is a change in the amount of daylight introduced by the slat angle control of the blind, it is considered that the lighting fixture is turned on or off by the change from the reference illuminance of 750 lx, and the energy consumption of the light is increased or decreased. It is necessary to pay attention to the fact that when solar radiation enters directly, dissatisfaction occurs because the visual environment deteriorates, so that the operation is not improved merely by opening the blind. The shape of the blind is as follows. By default, it is fixed at 60° all year round, as shown on the right side of the figure.



Blinds can be controlled for each zone, and the ID and object number of the BACnet Device are as shown below.



BACnet Device ID and object number of blind controller

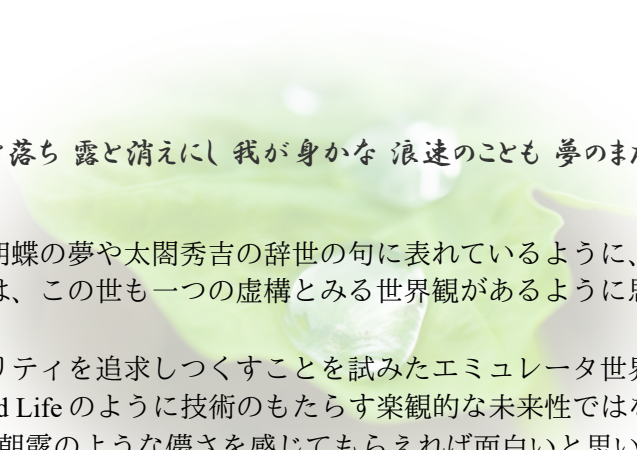
## 2. Calculation method of dissatisfaction

The occurrence of dissatisfaction is stochastically calculated from three factors: thermal environment, air quality (CO<sub>2</sub> concentration), and visual environment. When the maximum value of dissatisfaction probability ( $PPD_{thermal}$ ,  $PPD_{CO_2}$ ,  $PPD_{light}$ ) based on each environment is larger than the uniform random number  $U_{rnd}$ , dissatisfaction occurs.

$$D = U_{rnd} < \text{Max}(PPD_{thermal}, PPD_{CO_2}, PPD_{light}) \quad (\text{A.1})$$

First, estimate the thermal sensation of the occupant using a model by Takada, and apply the PPD formula by Fanger. Skin temperature required to apply the Takada model is calculated using the TwoNode model. Calculation is performed using the height and weight that are stochastically generated based on the age and sex of the worker (Appendix 3), without assuming the standard body. In addition, adding the normal random number  $N(0,0.64)$  expresses the thermal preference (hot and cold) for each office worker. The TwoNode model is calculated using the dry bulb temperature, relative humidity, and mean radiant temperature of the zone in which the worker stays. Relative air velocity is 0.1 m/s, and metabolic rate is a fixed value for office workers. The amount of clothes shall be adjusted within the range of 0.5 to 1.0 by the office worker<sup>24)</sup>.





露と落ち 露と消えにし 我が身かな 浪速のことも 夢のまた夢

胡蝶の夢や太閤秀吉の辞世の句に表れているように、  
東洋には、この世も一つの虚構とみる世界観があるように思います

リアリティを追求しつくすことを試みたエミュレータ世界に、  
Second Life のように技術のもたらす楽観的な未来性ではなく、  
一雫の朝露のような儚さを感じてもらえれば面白いと思いました

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“The First World Championship in Cybernetic Building Optimization”

The Society of Heating, Air-Conditioning and Sanitary Engineers of Japan

10/27/2018