Changes for the Better
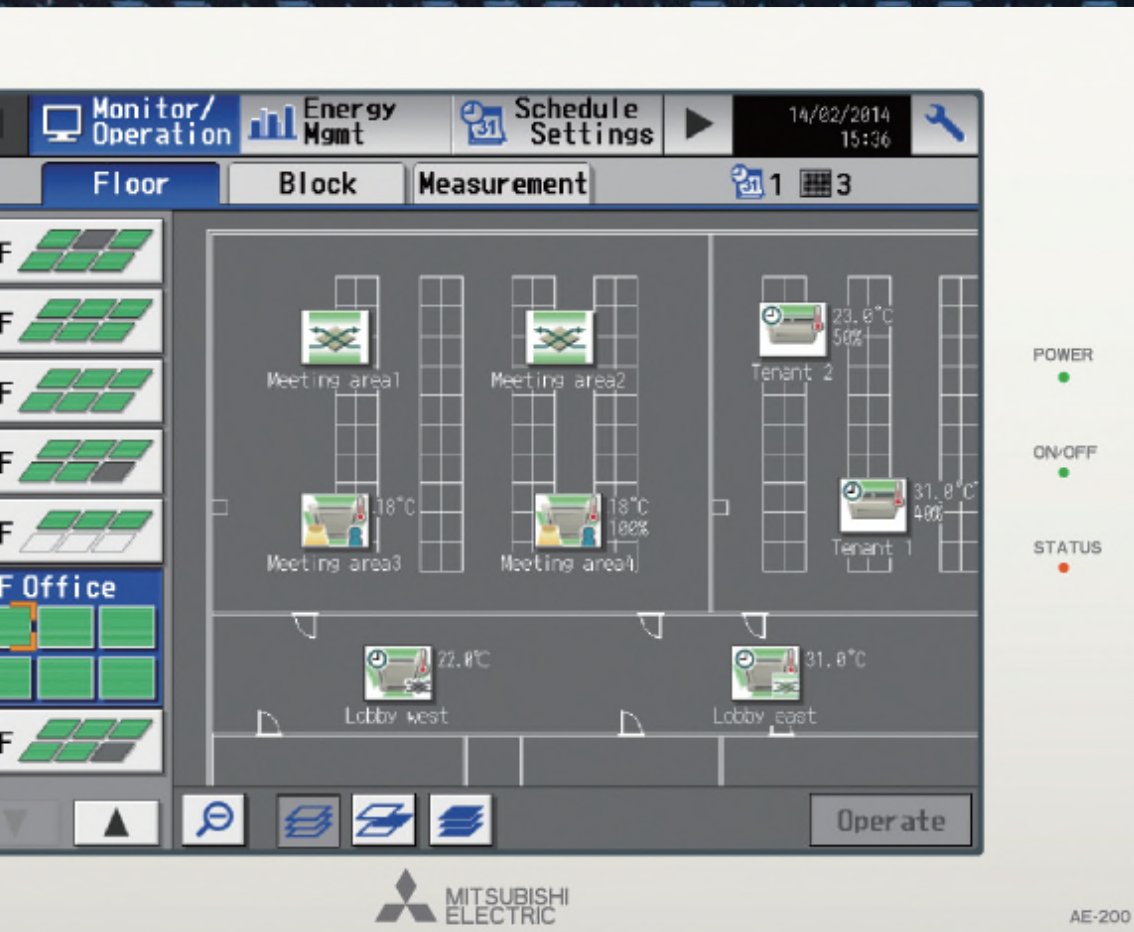
MITSUBISHI ELECTRIC

**Centralized Controller
AE-200**

Centralized controller
with 10.4-in color LCD touch panel

AE-200

Applicable to a wider range of models and more convenience

Mounted with 10.4-in LCD touch and resolution Centralized

Full scale

Mounted with color LCD touch panel excelling in visibility and operability.

A 10.4-in LCD touch panel with high definition is used. The large display screen and the floor screen image* are excellent in visibility, and the equipment can be operated by touching the icons on the touch panel.

* The floor plan image function is optional.

Up to 2000 indoor units can be controlled centrally.

Up to 200 indoor units can be controlled centrally by adding expansion controllers (AE-50/EW-50). Operation of up to 2000 indoor units can be controlled from the Web browsers on personal computers and tablets by registering the Integrated centralized control license (optional).
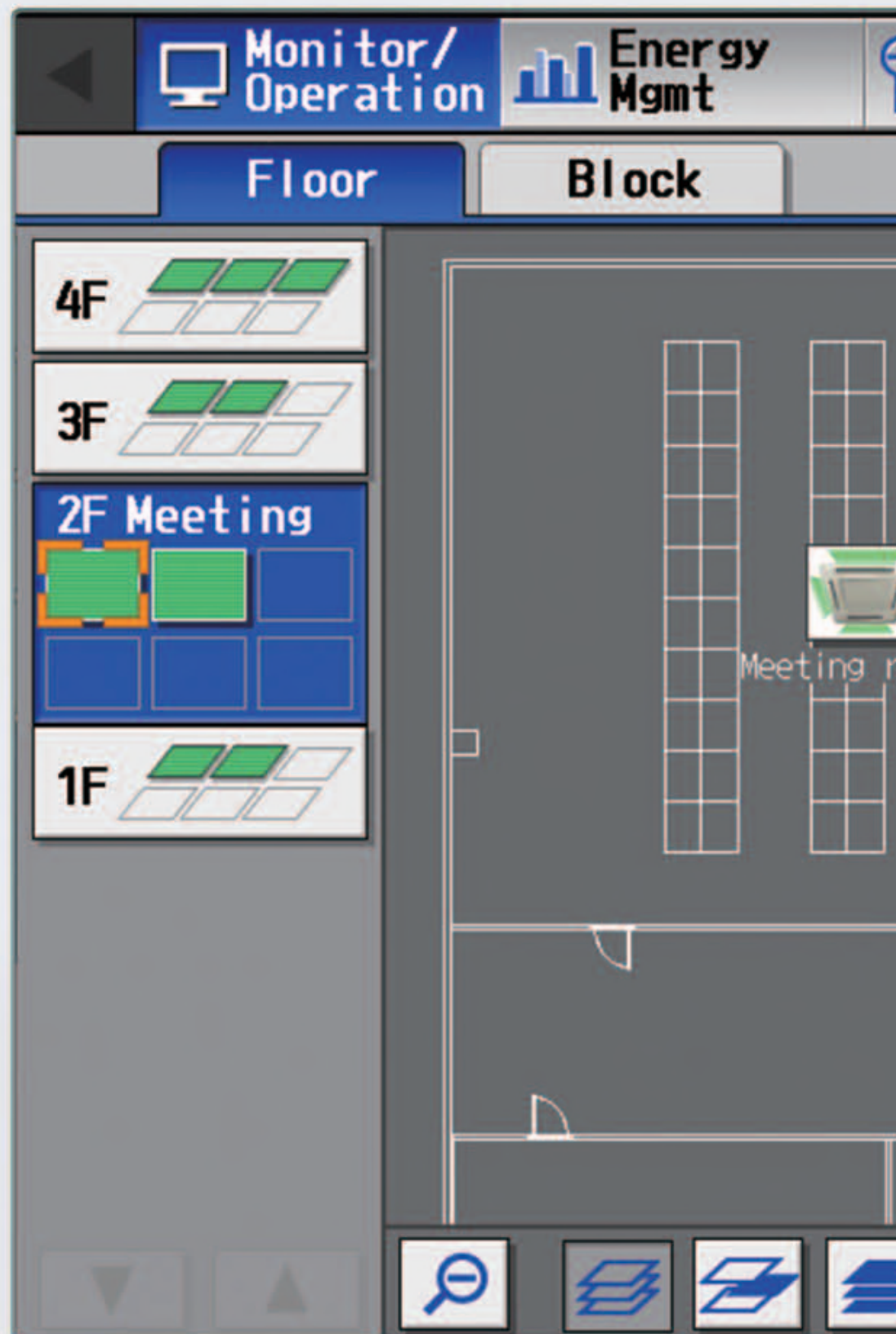
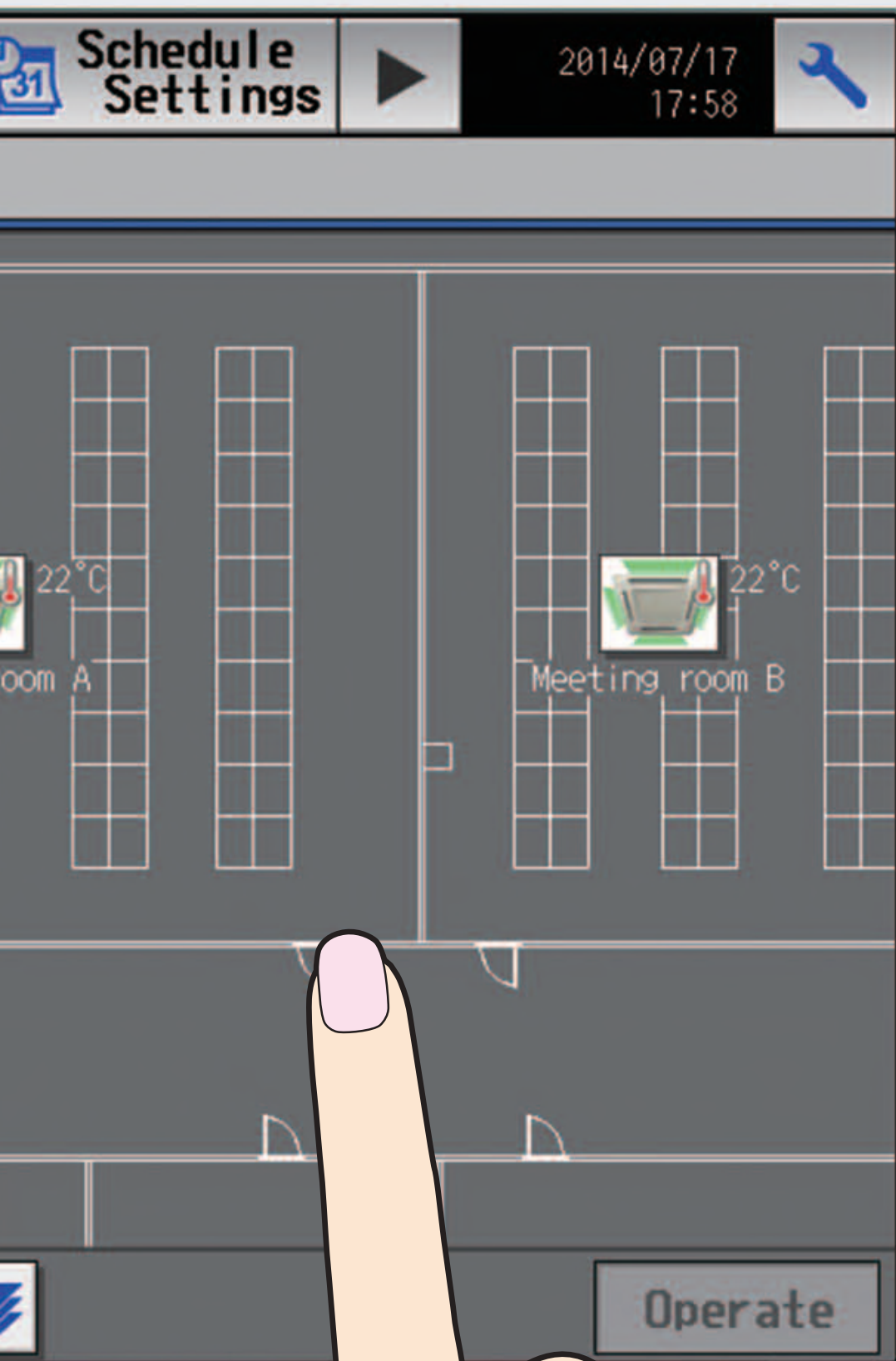## Air conditioners can be monitored and operated remotely.

Air conditioners can be monitored and operated from the browser screens* on remote personal computers by connecting the personal computers to the Internet through Internet connection modem and VPN router on the LAN wiring.

* In the case of Windows, Microsoft® Internet Explorer 11 or Google Chrome is required. In the case of Macintosh, Safari 7 is required. Windows and Microsoft® Internet Explorer are registered trademarks of Microsoft Corporation in the United States and other countries.

panel with high definition

controller AE-200

Schedule Settings

2014/07/17 17:58

22°C

22°C

Meeting room B

oom A

Operate

POWER

ON/OFF

STATUS

TSUBISHI
ECTRIC

AE-200

Enables energy management for air conditioners.*

The power consumption* and operating time of air conditioners are displayed on the AE-200. The usage of air conditioners and the effect of energy saving control can be checked.
In addition to the graphic display, the data can be displayed in rank order.

* Energy Management License
  Pack (optional) is required.
* Electric energy pulse signal
  input is required.

Air flow direction and speed can be adjusted finely according to the schedule.

The controller has a function for setting annual schedule and five patterns of weekly schedule in each term (season), so that the time to start and stop, temperature and air flow direction and speed in each time slot can be preset.

Centralized controller with large-screen color

10.4-in color LCD touch panel with backlight

The 10.4-in high resolution color LCD improves the visibility.
The panel has a backlight to enable operation in a dark room, and it can be operated by lightly touching the screen with a finger.

Can be operated by lightly touching with a finger.
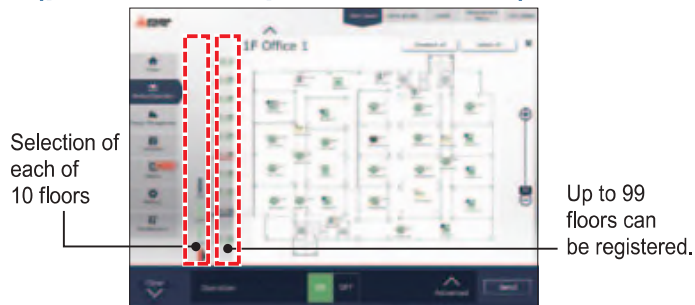
Touch panel

Centralized control by using Web browser

Air conditioners can be operated and monitored from personal computers, tablets and smartphones connected through the LAN. You can easily see the operating conditions of the air conditions in the same manner as when you visit a Web page.
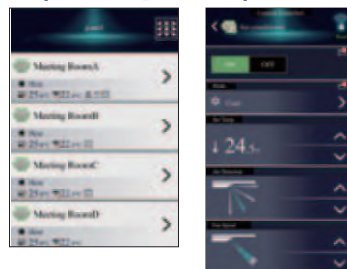
Switching hub

Wi-fi

Tablet

Smartphone

Web display

LAN cable

Wireless LAN

M-NET

■ Operation/monitoring screen

● **Monitoring screen (personal computer and tablet)**

Selection of each of 10 floors

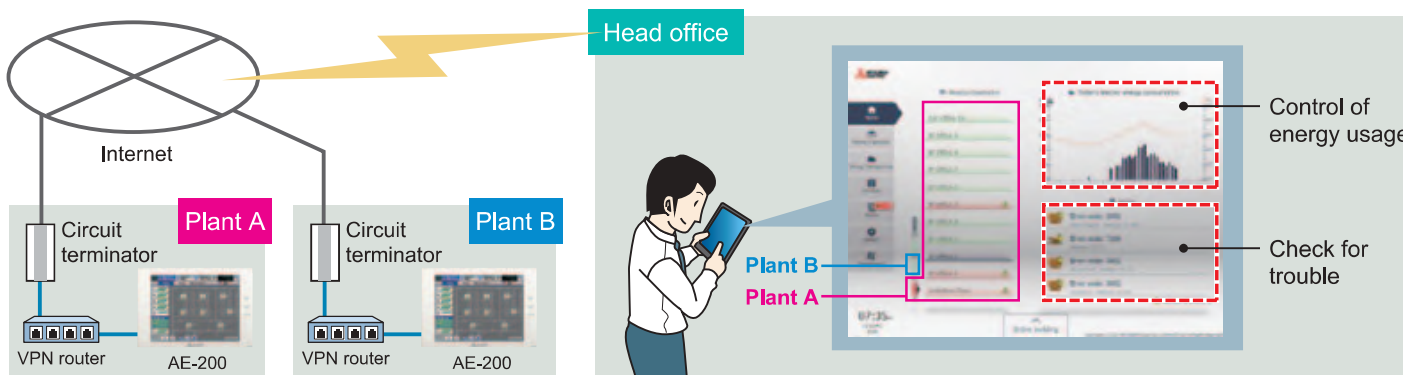Up to 99 floors can be registered.

● **Monitoring screen (smartphone)**

From smartphones, air conditioners can be operated only by group.

* For initial setting, the initial setting tool is required.
* On a system provided only with EW-50, floor layouts can be registered with the initial setting tool.
  The plan view creating function is optional.
* Since centralized control of air conditioners can be performed by using the Web browser on a personal computer, the personal computer can be used for other purposes.
* In the case of Windows, Microsoft® Internet Explorer 11 or Google Chrome is required. In the case of Macintosh, Safari 7 is required. Windows and Microsoft® Internet Explorer are registered trademarks of Microsoft Corporation in the United States and other countries.
  iPad and Safari are registered trademarks of Apple Inc. in the United States and other countries. Google Chrome is a registered trademark of Google Inc.

● **Through Internet connection**

You can remotely operate the air conditioners and monitor the energy usage and for trouble on your tablet from the outside.

Head office

Internet

Circuit terminator

Plant A

Circuit terminator

Plant B

VPN router

AE-200

VPN router

AE-200

Plant B
Plant A

Control of energy usage

Check for trouble

* Consult with the network administrator in advance.
* When connecting AE-200/EW-50 via the Internet, use a VPN router to ensure the security.
* It is necessary to establish an account with an Internet provider.

Operation menu with various functions

Group icon
Start/Stop
Operation mode
Set temperature
Air flow direction
Air speed

Floor name or group name
Start/Stop of interlocked LOSSNAY
Air volume of interlocked LOSSNAY

Prohibition of remote controllers operation
Schedule

Filter sign reset

3
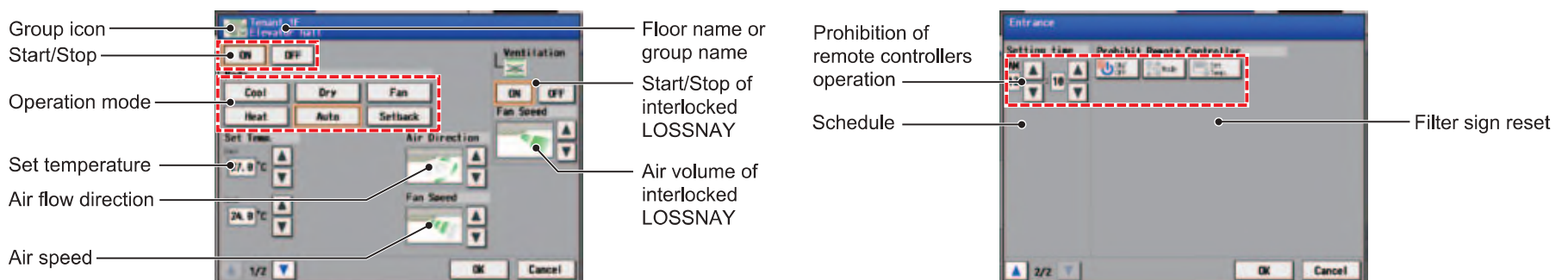
LCD touch panel

Image of system configuration

One AE-200 can control up to 50 indoor units. Up to 200 units can be controlled by connecting EW-50 or AE-50.

●**When the number of controlled indoor units is 50 or less**

LAN (100BASE-TX) Switching hub
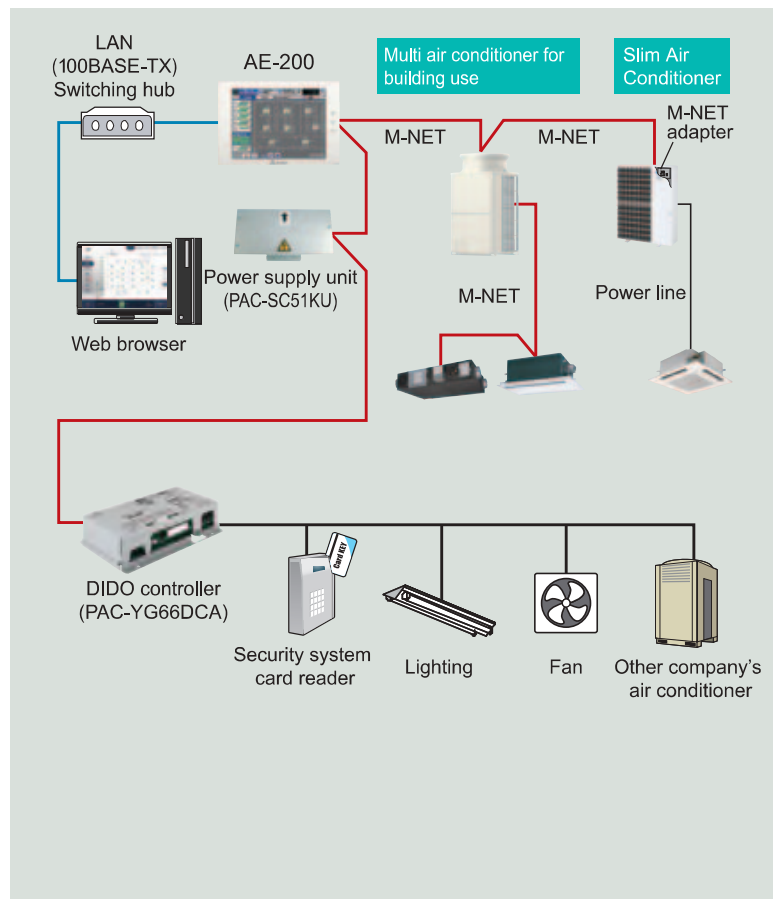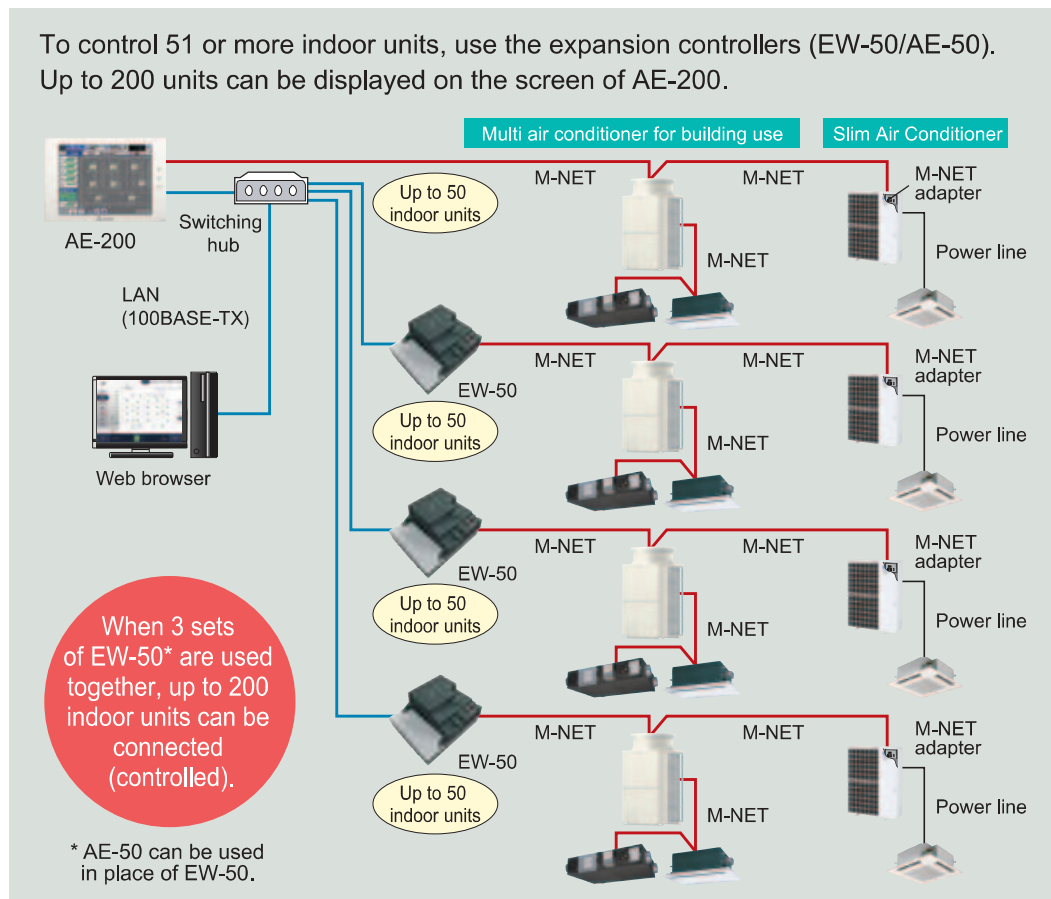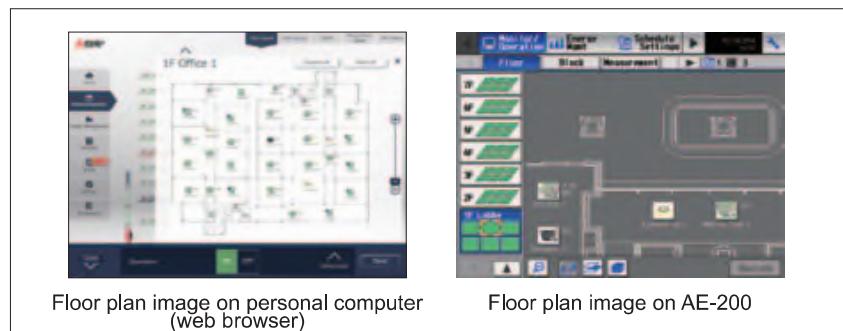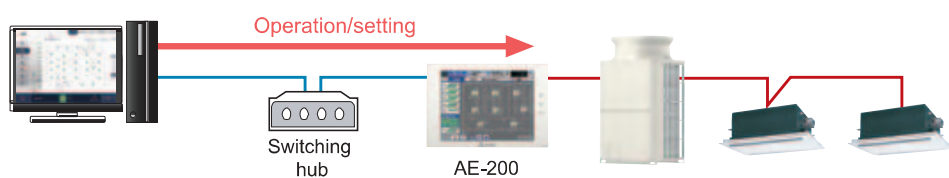AE-200
Multi air conditioner for building use
Slim Air Conditioner
M-NET adapter
M-NET   M-NET
Power supply unit (PAC-SC51KU)
M-NET   Power line
Web browser
DIDO controller (PAC-YG66DCA)
Security system card reader   Lighting   Fan   Other company's air conditioner

●**When the number of controlled indoor units is 51 or more**

To control 51 or more indoor units, use the expansion controllers (EW-50/AE-50). Up to 200 units can be displayed on the screen of AE-200.

Multi air conditioner for building use   Slim Air Conditioner
AE-200
Switching hub
LAN (100BASE-TX)
Web browser
M-NET   M-NET   M-NET adapter
Up to 50 indoor units   M-NET   Power line
M-NET   M-NET   M-NET adapter
EW-50   Up to 50 indoor units   M-NET   Power line
M-NET   M-NET   M-NET adapter
EW-50   Up to 50 indoor units   M-NET   Power line
M-NET   M-NET   M-NET adapter
EW-50   Up to 50 indoor units   M-NET   Power line

When 3 sets of EW-50* are used together, up to 200 indoor units can be connected (controlled).

* AE-50 can be used in place of EW-50.

Centralized control by floor plan image

Air conditioners can be operated and monitored with the air conditioner icons on the floor plan image* on the screen of AE-200 or the Web browser. On the floor plan image, one floor is divided into six sections, and up to 10 floors can be registered.

* The floor plan image function is optional.

Operation/setting
Switching hub   AE-200

Floor plan image on personal computer (web browser)   Floor plan image on AE-200

Data input/output from/to USB memory stick

Setting data (initial setting) and energy management data can be output to a USB memory stick*[1]. Also, the floor plan image data and setting data can be retrieved to AE-200 and AE-50 from the USB memory stick.

USB memory slot
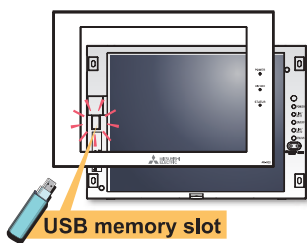
Screen locking function

The screen can be locked to prevent operation by users other than the administrator. The screen can be unlocked by inputting the user name and password which have been input to log in.
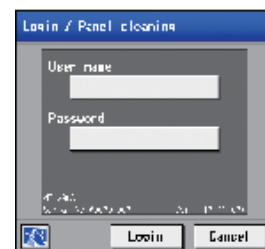
Error display
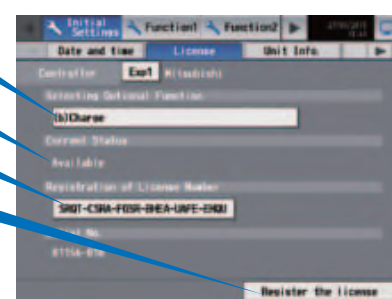
A list of units which are in trouble can be displayed. Touch a error code button, to display the error details.

License registration screen

Optional function selection button
Current status of use
License number input button
License registration button

* It is necessary to register the licenses in each of AE-200, EW-50 and AE-50.

Detailed weekly and annual schedules can be set from AE-200.

Air conditioners can be controlled without troublesome adjustments by using the scheduling function.

For the air conditioners, LOSSNAY and general-purpose devices controlled by AE-200, schedules by group, block and floor and for the entire building can be set.

Presetting of set temperature
Even if the set temperature is changed on a remote controller, the temperature can be automatically returned to the standard temperature at the specified time.

Prevention of forgetting to turn off
A command to stop can be given to prevent forgetting to turn off.

Change of set temperature according to time slot
The set temperature in each time slot can be changed.

Prohibition of operation of remote controllers
It is possible to prohibit operation (ON/OFF, change operation mode, set temperature.) of the remote controllers.

Air flow direction and fan speed can be set
The air flow direction and fan speed can be set. The detailed setting improves the comfort.

Operation items to be prohibited can be selected arbitrarily.

24 times of actions per day can be set in minutes.

Can be set from the Web browser.

■ Weekly schedule setting

Weekly operation schedules can be set according to the day of the week and time. Five kinds of seasonal schedules can be set, and the schedules can be used according to the season by changing the term.

■Day of week selection screen

Schedule details button   Day of week menu

■Schedule details setting screen

Schedule details setting screen (air conditioners)

■Weekly pattern (season) setting screen

Enable/disable button (Week 2)

Term in which Week 1 is applied

Page number   Term in which Week 2 is applied

■ Annual schedule setting

5 patterns of operation schedules for 50 days can be set up to 24 months ahead. The annual scheduling is suitable for setting the operation on national holidays to which weekly schedules are not applicable.

■Annual schedule setting screen

Pattern setting   Pattern editing

■Pattern setting screen

Pattern menu

■ Today's schedule setting

It is possible to set only the today's schedule without making changes in the weekly or annual schedule. This function can deal with sudden changes in schedule.

■Today's schedule setting screen

Various functions of AE-200 improve the energy saving performance and comfort.
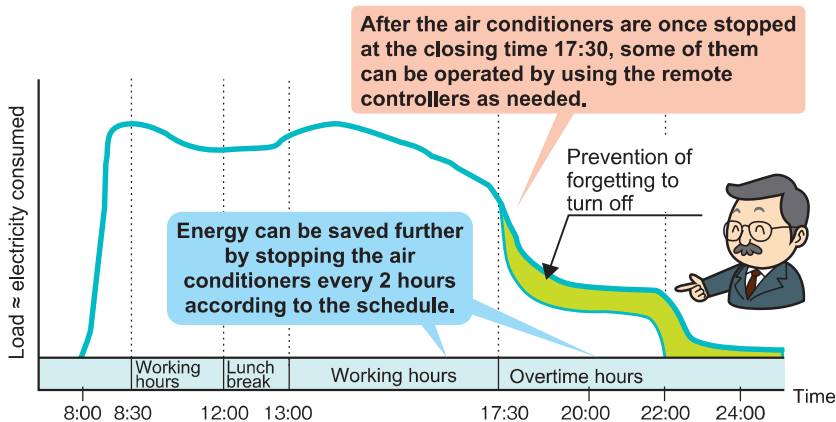
Energy-saving operation utilizing the schedule function
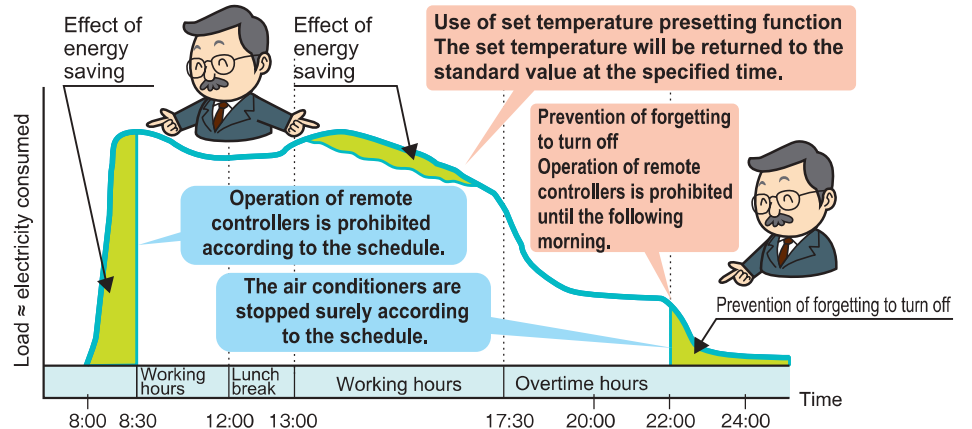
Utilization of schedule function of AE-200

AE-200 is provided with the daily, weekly, seasonal and annual schedule function as standard. If all air conditioners are once stopped at the closing time, it is possible to prevent waste of energy caused by workers forgetting to turn off.

Energy-saving air conditioning can be realized by setting the daily operation pattern. Failure to turn off can be prevented by inputting the quitting time.

For saving electricity during overtime hours

After the air conditioners are once stopped at the closing time 17:30, some of them can be operated by using the remote controllers as needed.

Prevention of forgetting to turn off

Energy can be saved further by stopping the air conditioners every 2 hours according to the schedule.

Load ≈ electricity consumed

Time

| Working hours | Lunch break | Working hours | Overtime hours |

8:00 8:30   12:00 13:00   17:30 20:00 22:00 24:00

For saving electricity frequently throughout the day

Effect of energy saving

Effect of energy saving

Use of set temperature presetting function
The set temperature will be returned to the standard value at the specified time.

Prevention of forgetting to turn off
Operation of remote controllers is prohibited until the following morning.

Operation of remote controllers is prohibited according to the schedule.

The air conditioners are stopped surely according to the schedule.

Prevention of forgetting to turn off

Load ≈ electricity consumed

Time

| Working hours | Lunch break | Working hours | Overtime hours |

8:00 8:30   12:00 13:00   17:30 20:00 22:00 24:00

Convenient functions to improve energy saving performance and comfort
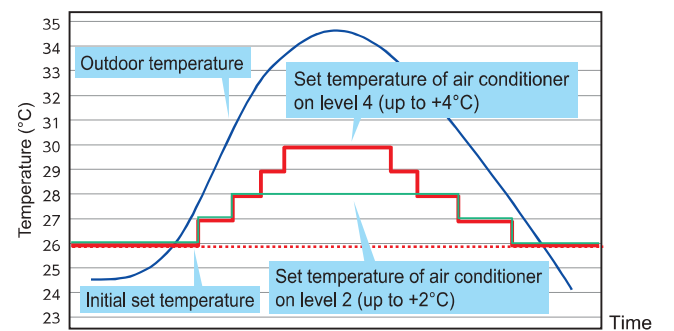
Energy saving effect

Operation according to outdoor temperature

During the cooling or heating season, the air conditions are controlled to reduce the difference between outdoor temperature and indoor temperature (around the entrance) and avoid physical effect of sudden temperature change. This function is effective also in energy saving. The control according to the outdoor temperature can be set for each group.

* Thermometers and AI controller (PAC-YG63MC) are required.

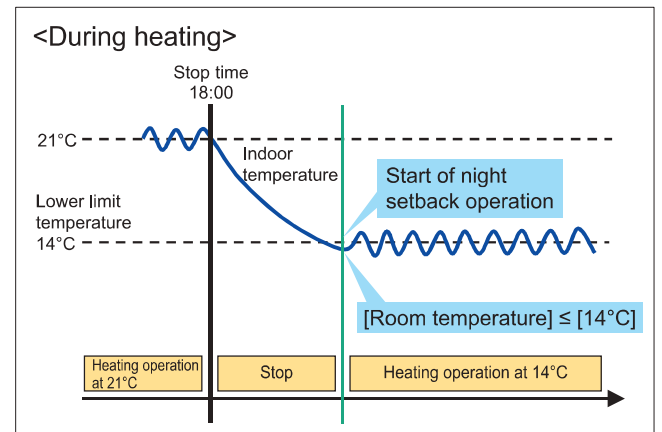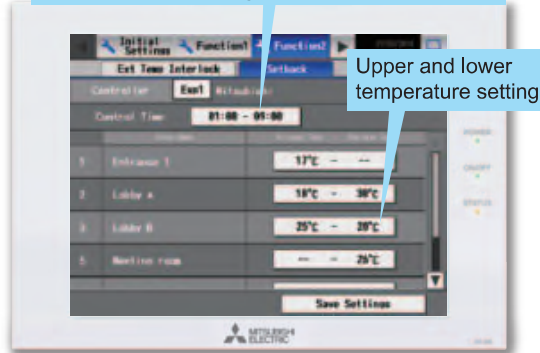Any of the set temperature change levels 1 (1°C) to 4 (4°C) can be set for each air conditioner.

Outdoor temperature

Set temperature of air conditioner on level 4 (up to +4°C)

Temperature (°C)

35 34 33 32 31 30 29 28 27 26 25 24 23

Initial set temperature

Set temperature of air conditioner on level 2 (up to +2°C)

Time

Improved comfort

Night setback function

This function is designed to automatically operate air conditioners to keep the room temperature within a certain range when the temperature becomes higher or lower than the preset upper or lower limit.

Time slots in which night setback control is used

Upper and lower temperature setting

<During heating>

Stop time 18:00

21°C

Indoor temperature

Start of night setback operation

Lower limit temperature 14°C

[Room temperature] ≤ [14°C]

| Heating operation at 21°C | Stop | Heating operation at 14°C |

Optimum start control function

This function is used to start air conditioners 5 to 60 minutes before the set time so that the set temperature can be obtained at the set time.

The optimum start can be scheduled by setting temperature and time on the schedule setting screen.

Optimum start button

Air conditioners are started before the set time so that the room temperature reaches 24°C (26°C) at 9:00.

26°C

[Start] [Cooling] [26°C]

Room temperature

24°C

[Start] [Heating] [24°C]

Room temperature

9:00

| Precooling control (9:00, 26°C) [Cooling] | Preheating control (9:00, 24°C) [Heating] |

6
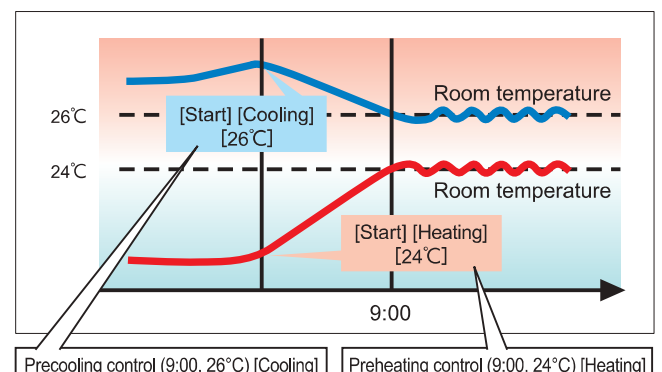
Integrated centralized control function

Up to 2000 indoor units can be integrally controlled

Examples of use

Up to 2000 indoor units can be integrally controlled by registering the Web integrated control license.
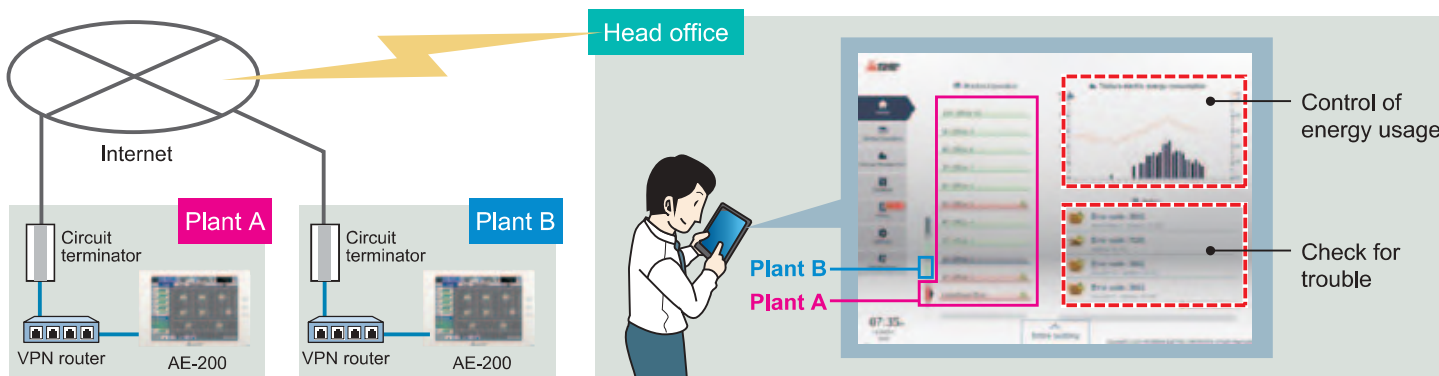When AE-200 is not connected and two or more sets of EW-50 are connected, the units can be integrally controlled on the same screen.

■ Integrated control of whole building (up to 2000 indoor units)

Up to 99 floors can be registered.

8F	Restaurants
7F	Quality assurance department
6F	Service department
5F	Manufacturing department
4F	Accounting department
3F	Sales department
2F	General affairs department
1F	Lobby

■ Internet connection

It is possible to check the operating conditions and energy usage of air conditioners in other places and for trouble from the head office (a remote place) via the Internet.
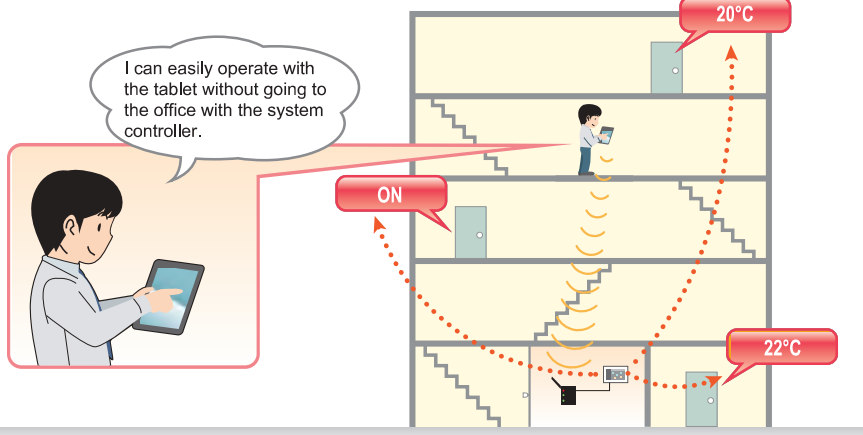

Head office

Internet

Plant A
Circuit terminator
VPN router   AE-200

Plant B
Circuit terminator
VPN router   AE-200

Plant B
Plant A

Control of energy usage

Check for trouble

* Consult with the network administrator in advance.
* When connecting AE-200/EW-50 via the Internet, use a VPN router to ensure the security.
* It is necessary to establish an account with an Internet provider.

■ With use of tablet (example)

With AE-200E, you can monitor and operate the air conditioners from the tablet.

▶ When AE-200E and tablet terminal are used:

I can easily operate with the tablet without going to the office with the system controller.

ON

20°C

22°C

With AE-200E, you can monitor and operate the air conditioners from the tablet.

▶ With only AE-200E:

It's on the wall, and I'm tired of standing while operating.

▶ With AE-200E + tablet terminal:

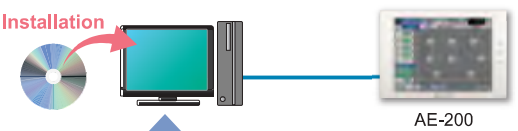I can operate it comfortably sitting in a chair.

by the Web browser.

Air conditioners can be integrally controlled by using the Web browser on a personal computer (it is unnecessary to install the software).

● In the case of conventional integrated software TG-2000

The software TG-2000 must be installed on a personal computer.

Installation

AE-200

A personal computer only for TG-2000 is required. Other software cannot be installed on the computer.

● In the case of Web integrated control license

It is unnecessary to install the software on a personal computer.

Web integrated control license

Installation not required

AE-200

A personal computer used for other purposes can be used.

[User classification]

	Administrator	Tenant	General user
Accessible air conditioners	All	Air conditioners specified by administrator	

■ **Function list** * The functions and specifications are subject to change.

Function		Details	PC/tablet			Smartphone
			Building manager	Tenant manager	General user	
Monitor/ operation	Floor layout	The operating state of the air conditioners is displayed on the floor layout.	✓	–	–	–
	Show groups	The operating state of the air conditioners is displayed on the list screen.	✓	✓	✓	✓
	HWHP	The operating state of HWHP is displayed on the list screen.	✓	✓	✓	✓
	Measurement Status	The temperature/humidity data and electric energy data are displayed.	✓	–	–	–
	AHC Status	The input/output status of Advanced HVAC CONTROLLERs can be displayed.	✓	–	–	–
	Advanced	The air conditioners can be operated.	✓	✓	✓	✓
Energy management	Energy Use Status	The power consumption, outdoor temperature and operation time can be displayed in bar graphs or line graphs for comparison.	✓	✓	–	–
	Energy management table[1]	The results of apportionment of energy consumption to energy management blocks, meters, indoor units and outdoor units are displayed.	✓	✓	–	–
	Ranking	The air conditioners are displayed in descending order of power consumption or fan operation time.	✓	✓	–	–
	Target Value[2]	The target values of power consumption in one year, in each month and in each block can be checked.	✓	✓	–	–
	Peak-Cut[3]	The peak-cut control level and average electric power are displayed. Note: The energy-saving/peak-cut control license is required.	✓	–	–	–
Schedule	Schedule settings[4]	It is possible to set the weekly schedule based on the day-of-the-week pattern (for each season), annual schedule and daily schedule for the units in each group, in each block or on each floor or all units collectively.	✓	✓	–	–
	Date range setting	The periods for weekly schedules 1 to 5 can be set.	✓	–	–	–
Notice	Error List	The addresses of units in trouble and error codes and the addresses of units whose troubles have been detected are displayed.	✓	–	–	–
	Unit error log/ Communication error log	128 errors which have occurred in each set of AE-200/AE-50/EW-50 are displayed. (64 unit errors and 64 communication errors)	✓	–	–	–
	Filter sign	A list of units on which the filter sign is on is displayed.	✓	–	–	–

*1: The table can be displayed only when the charge license has been registered.
*2: The target values cannot be set on the integrated control browser.
*3: The data can be displayed only when the energy-saving/peak-cut control license has been registered.
*4: The tenant management users cannot set the weekly schedule for each season.

BACnet® connection function

AE-200/AE-50/EW-50 can be connected to the

* BACnet® is a registered trademark of ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) in each country.

BACnet® connection (The BACnet license is required.)

Major features

○**The controllers can be connected to the centralized monitoring unit through BACnet®.**
When air conditioners are monitored and operated by the centralized monitoring unit, AE-200/AE-50/EW-50 can be connected to the centralized monitoring unit through the open-protocol BACnet® by registering the license (BACnet® connection) in the controllers.

○**Amounts of power consumption apportioned to air conditioners can be output.**
Electric energy consumed by air conditioners (outdoor units and indoor units) is apportioned to the groups according to the operating conditions of the indoor units, and the results can be output.
(The charge license must be registered.)
The apportioned power consumption can be used for calculation of air conditioning charge by the centralized monitoring unit.

○**BACnet® standard**
AE-200, AE-50 and EW-50 conform to the following BACnet® standard.
• ISO 16484-5 (ANSI/ASHRAE 135-2010)
(They conform also to ANSI/ASHRAE 135-2004 and ANSI/ASHRAE 135-2008.)

○**BACnet® devices**
Each of the controllers AE-200, AE-50 and EW-50 works as a device on the BACnet®, and up to 50 indoor units can be connected to each device.
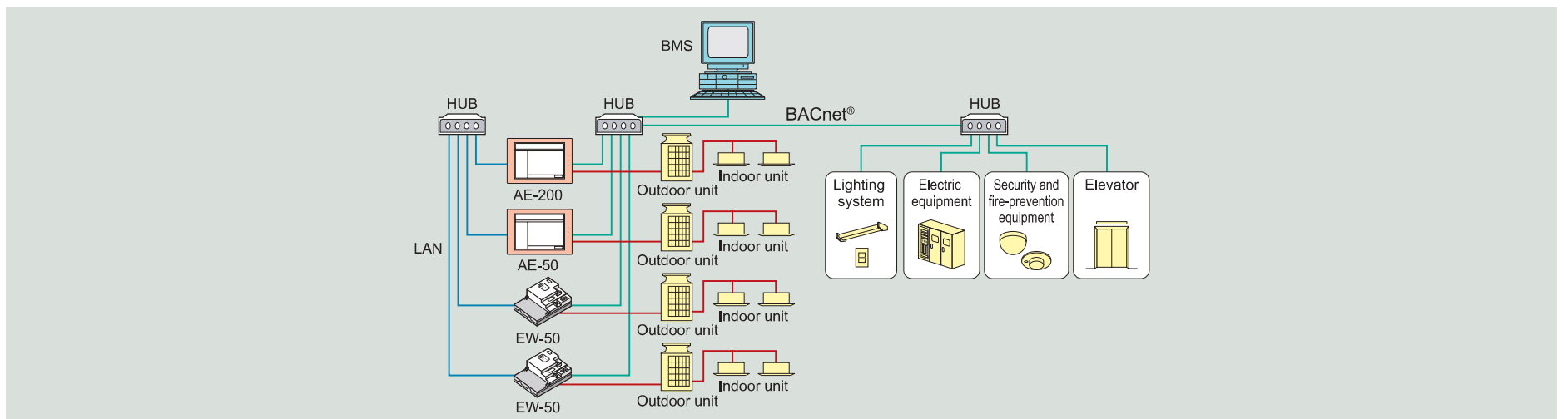
System configuration (example)

○**Configuration for monitoring and operation of air conditioners by centralized monitoring unit (example)**
(Air conditioners are not monitored or operated on LCD screens of AE-200/AE-50)
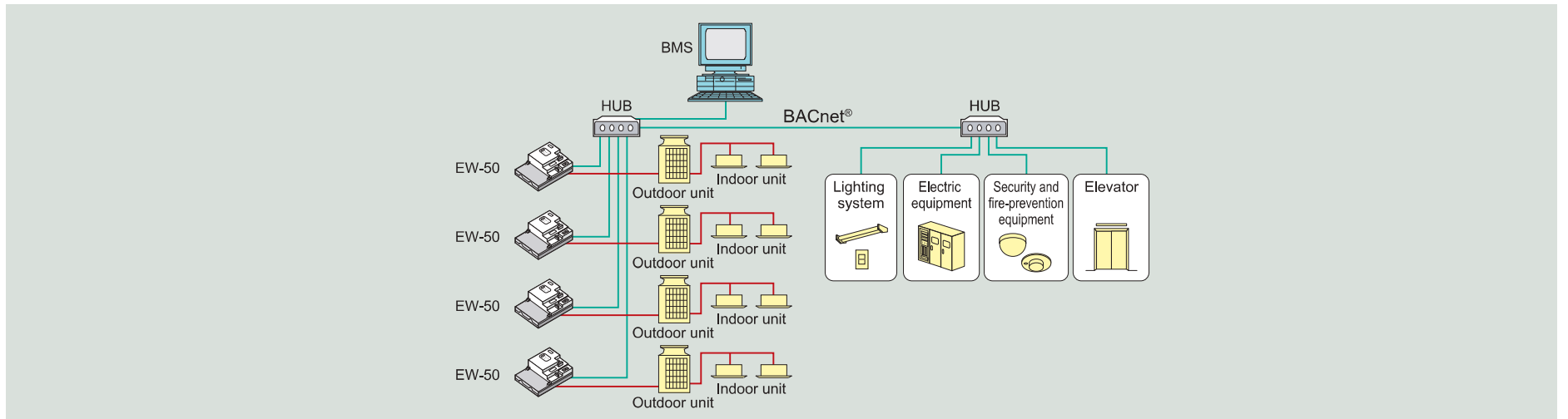
○**Configuration for monitoring and operation of air conditioners on LCD screens of centralized monitoring unit and AE-200/AE-50 (example)**

○**Configuration for registration of charge license in AE-200/AE-50/EW-50 (example)**
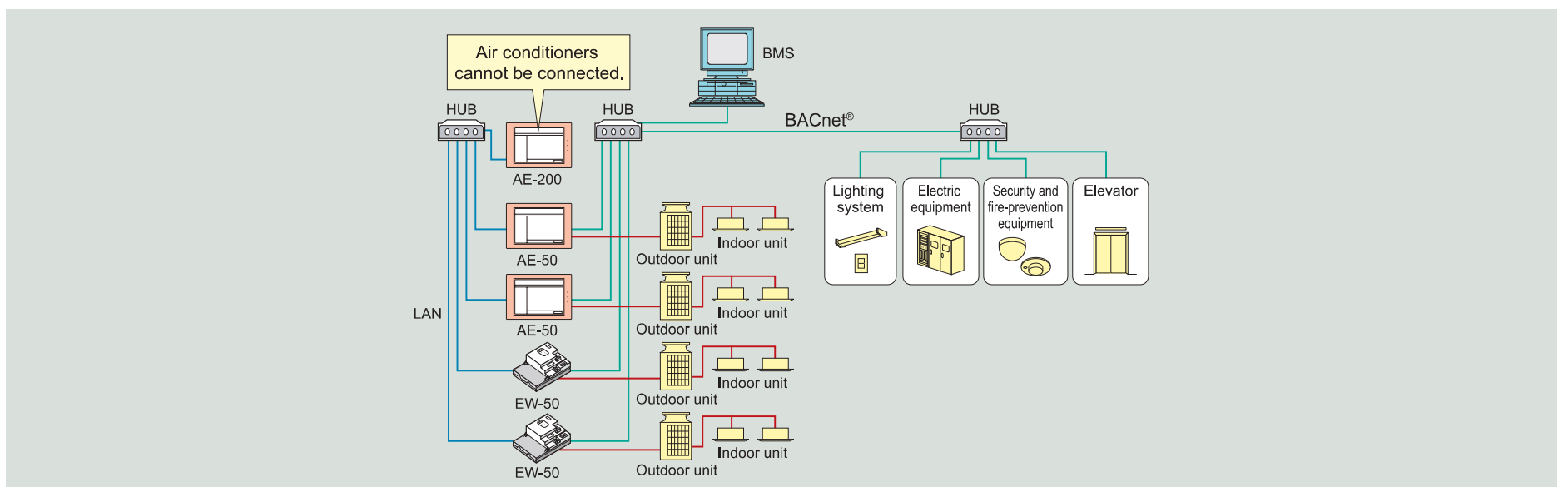
centralized monitoring unit through BACnet®.

■ Function list * The functions and specifications are subject to change.

The following items can be transferred between the centralized monitoring unit and BACnet®.

✓ : Function provided

Item	Description	Indoor unit	OA processing unit (IC attribute)	OA processing unit (FU attribute)	LOSSNAY not interlocked	State monitoring	Setting/operation
Start/stop	The units in each group can be started and stopped. It is possible to monitor in which state, started or stopped, the units in each group are.	✓	✓		✓	✓	✓
Operation mode	The operation modes (cooling, heating, fan, auto or drying) of the units in each group can be set. The operation modes (cooling, heating, fan, auto or drying) of the units in each group can be monitored.	✓	✓			✓	✓
Air speed	The air speeds (low, high, medium 2, medium 1 or auto) of the units in each group can be set. The air speeds (low, high, medium 2, medium 1 or auto) of the units in each group can be monitored.	✓	✓		✓	✓	✓
Air flow direction	The air flow directions (horizontal, downward 60%, downward 80%, downward 100% or swing) of the units in each group can be set. The air flow directions (horizontal, downward 60%, downward 80%, downward 100% or swing) of the units in each group can be monitored.	✓				✓	✓
Indoor temperature	The current value of room temperature of each group can be monitored. The past log (*4) can be read out.	✓	✓			✓	
Set temperature	The temperature for the units in each group can be set, and the setting can be read out (in 0.5°C steps). Some of the four temperature settings (indoor temperature, cooling temperature, heating temperature and auto 1 temperature) are used depending on the use and setting of the dual auto mode.	✓	✓			✓	✓
Filter sign	The filter signs of the units in each group can be monitored.	✓	✓		✓	✓	
Filter sign reset	The filter signs of the units in each group can be reset.	✓	✓		✓		✓
Prohibition of remote controller operations	The operations of the units in each group from the remote controller can be enabled or disabled. It is possible to monitor whether the operations of the units in each group from the remote controller are enabled or disabled. (The operations for start/stop, operation mode, set temperature and filter sign reset can be prohibited.)	✓	✓		✓	✓	✓
Emergency stop	It is possible to stop the units in each group or all units and disable the operations (start/stop) of the units in each group or all units from the remote controller.	✓	✓		✓		✓
Ventilation mode	The ventilation modes (heat exchange, normal or auto) of the units in each group can be set. The ventilation modes (heat exchange, normal or auto) of the units in each group can be monitored.		✓		✓	✓	✓
Night purge	The night purge state (stopped or started) of the units in each group can be monitored.		✓		✓	✓	
Thermo ON/OFF	The thermos ON/OFF state of the units in each group can be monitored.	✓	✓			✓	
Communication state	It is possible to monitor whether or not the M-NET communication among the units in each group is normally performed. When the state changes, a notification can be received.	✓	✓		✓	✓	
Alarm signal	It is possible to monitor whether or not the air conditioners in each group are normally running. When the state changes, a notification including an error code can be received.	✓	✓		✓	✓	
Error code	The error codes (classified into 9 kinds of codes) of the units in each group can be monitored. When the state changes, a notification can be received.	✓	✓		✓	✓	
System alarm signal	The system error state can be monitored. When the state changes, a notification including an error code can be received.					✓	
Power distribution and billing support function *1 *2	The current value of electric energy on the electricity meter connected to the pulse input of PI controller/AE-50/EW-50 can be monitored. The past log (*4) can be read out.					✓	✓
	When an electricity meter is connected, the current value of the electric energy (consumed by indoor and outdoor units) apportioned to each group/each interlocked unit (*3) by the power distribution and billing support function of AE-200 can be monitored. The past log (*4) can be read out. When an electricity meter is not connected, the current value of the apportionment parameter (consumed by outdoor units) apportioned to each group by the power distribution and billing support function of AE-200 can be monitored. The past log (*4) can be read out.	✓	✓	✓	✓	✓	✓

*1: To use the function, the charge license is required. The charge information cannot be read out from BACnet®.
*2: To use the function, an electricity meter is required.
*3: The interlocked unit refers to the OA processing unit set in the energy management block.
*4: The default values for log collection cycle are one minute (indoor temperature) and one day (values other than indoor temperature).
 To use a collection cycle other than the default values, it is necessary to set the cycle on the building management system. The collection cycle setting units and ranges are one minute and 1 minute to 1 day (indoor temperature) and 30 minutes and 30 minutes to 1 day (temperatures other than indoor temperature).

AE-200 can monitor the power consumption

Visualization of energy consumption by air conditioners on easy-to-see display

The power consumption and operating time of air conditioners can be clearly displayed.

Graph display function

AE-200 is provided with an energy management function as standard. With this function, you can understand the current status of usage of air conditioners and verify the effect of energy saving measures.

- The data of an area in different terms can be compared.
- The data of two areas in the same term can be compared.
- The effect of energy saving measures can be verified.

- The energy management data for the past 24 months (daily or monthly data) or the past 2 years (annual data) from the present can be retained.
- The energy management data (for the past 5 years) can be output to a USB memory stick or a personal computer.
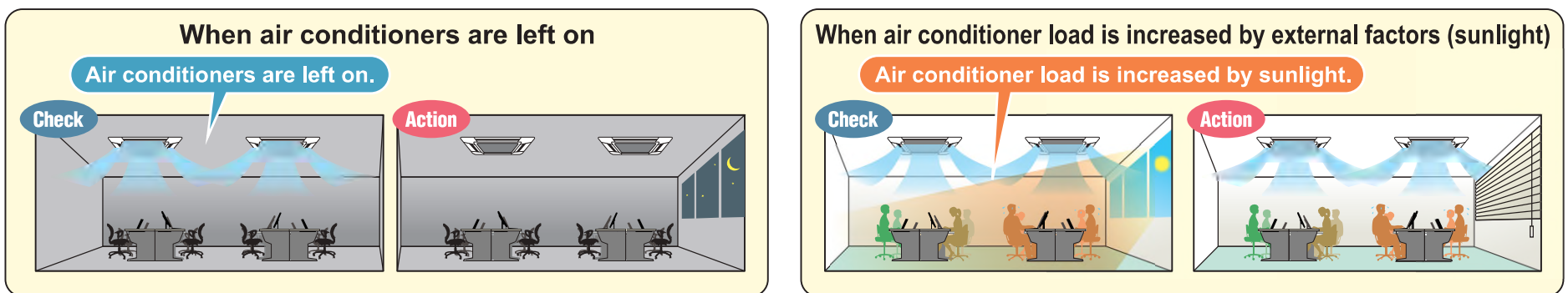
Graph display screen

Display setting screen
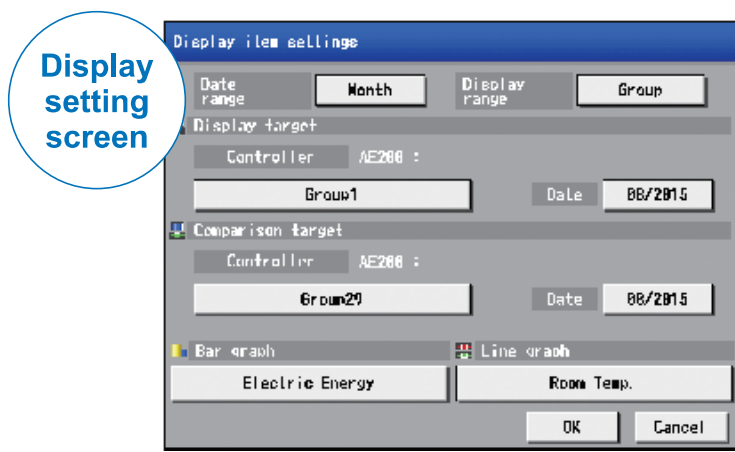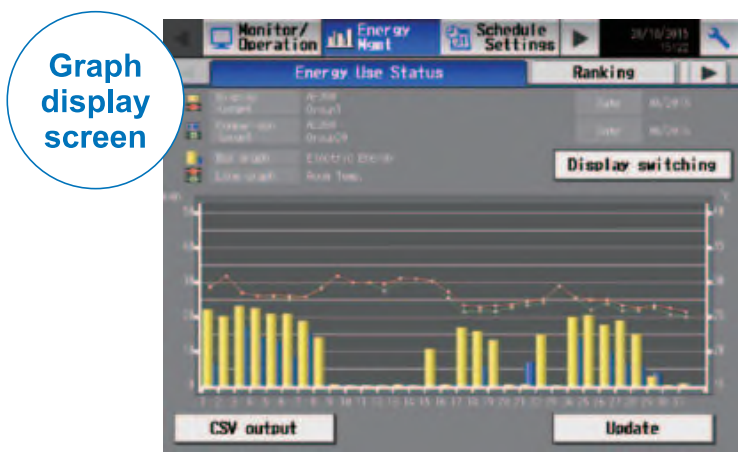
■ Contents of display

Example of bar graph items ● Target electric energy ● Power consumption*1 ● Fan operation time ● Thermo ON time (cooling/heating/total) ● Calculated values*1 (electric energy, etc.)

Example of line graph items ● Indoor temperature ● Set cooling temperature ● Set heating temperature ● Measured values*2 (outdoor temperature, humidity, etc.)

*1. It is necessary to input electric energy pulse signals from the PI controller or the pulse input for measurement in the AE-200.   *2. Analog signals must be input from the AI controller.
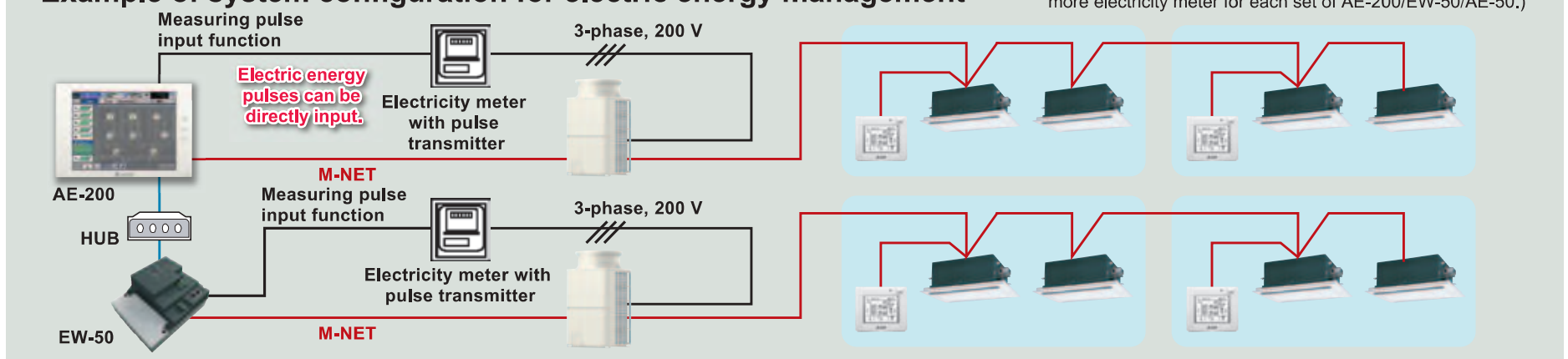
■ Display period   Daily (hourly graph for 24 hours), monthly (daily graph for 31 days) and annual (monthly graph for 1 year)

When air conditioners are left on

Air conditioners are left on.

Check   Action

When air conditioner load is increased by external factors (sunlight)

Air conditioner load is increased by sunlight.

Check   Action

Solution!

AE-200 ensures detailed comparison and clearly shows the operating conditions.

<Example of system configuration for electric energy management>

* Prepare the required number of electricity meters. (Install one or more electricity meter for each set of AE-200/EW-50/AE-50.)

Measuring pulse input function

Electric energy pulses can be directly input.

Electricity meter with pulse transmitter

3-phase, 200 V

M-NET

Measuring pulse input function

Electricity meter with pulse transmitter

3-phase, 200 V

AE-200

HUB

EW-50

M-NET

and operating time of air conditioners.

■ Ranking display function

The air conditioners controlled by each set of AE-200 or AE-50 can be displayed in rank order (in descending order of consumption).

Ranking display screen

Display setting screen
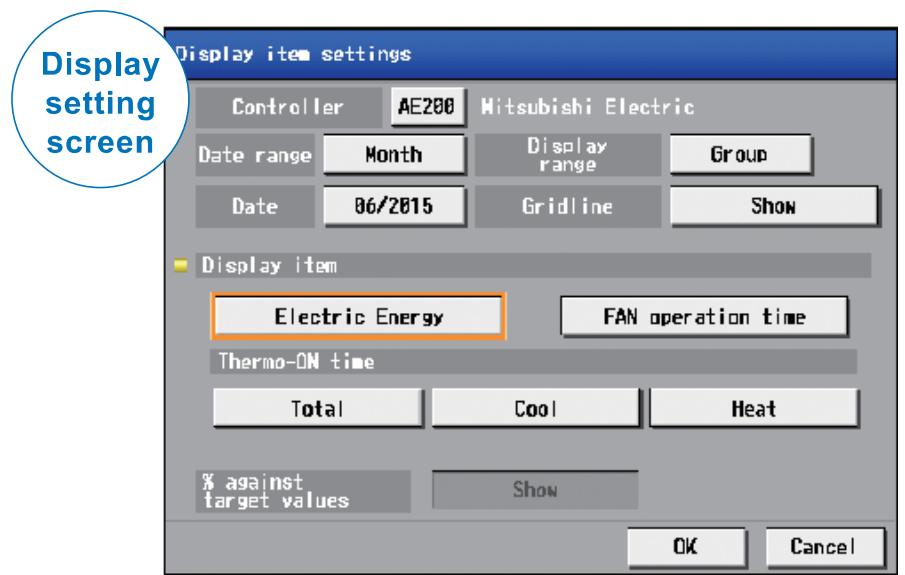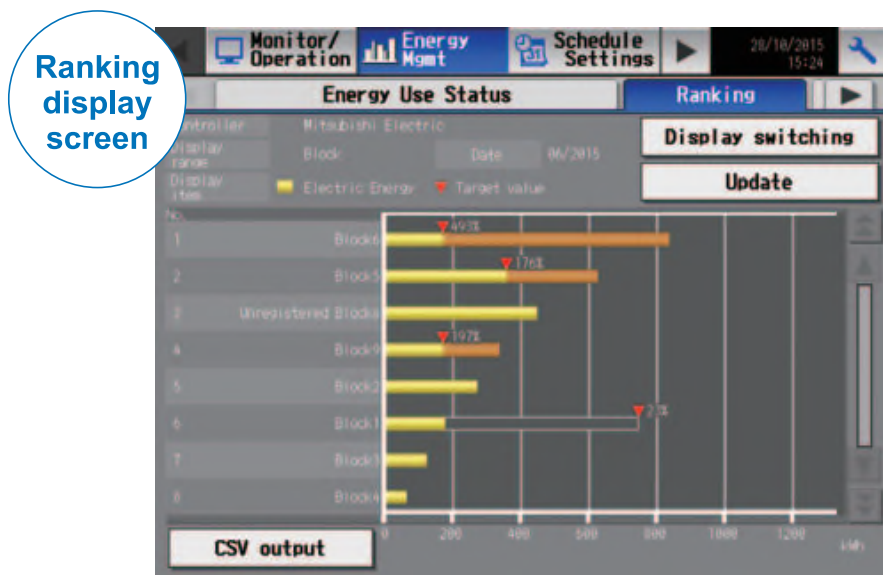
■ More efficient energy management can be realized by combining with license functions.

▌ When the energy management license is introduced

• The history of average power for 30 minutes and peak-cut control level is graphically displayed.
• The data can be output to a USB memory stick as a CSV file.
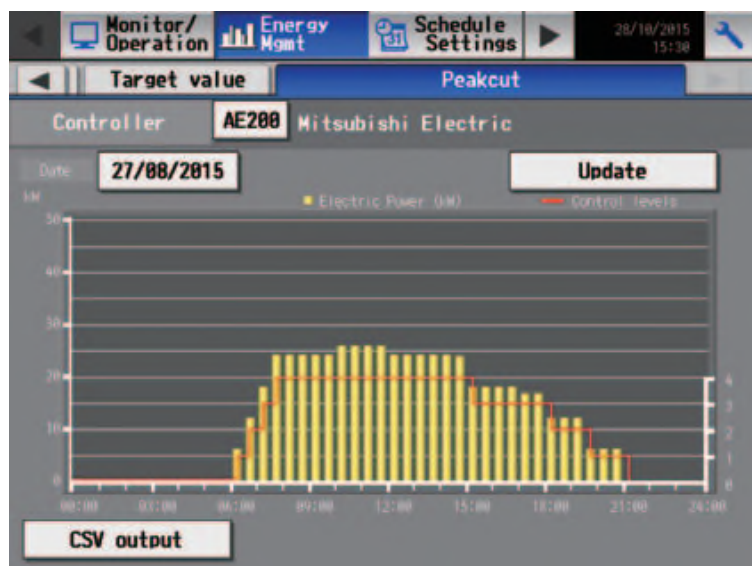
▌ When the charge license is introduced

• The electric energy consumed in each block can be displayed as a list on the energy management table screen.
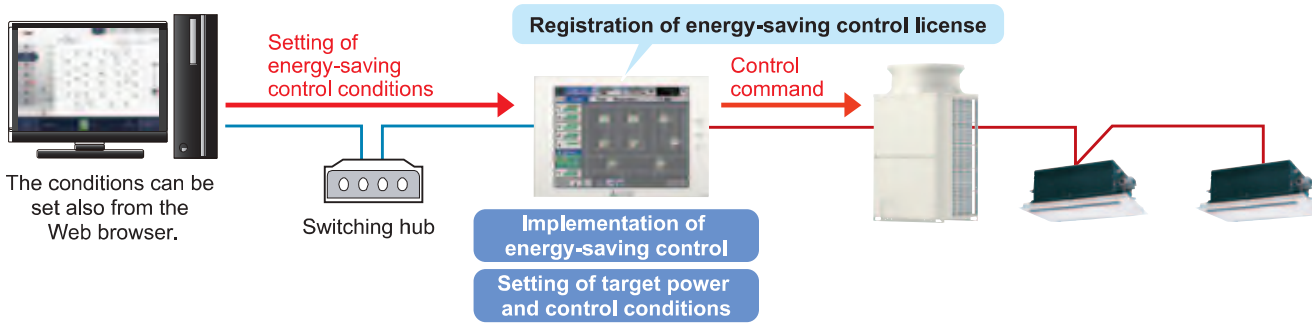• The data can be output to a USB memory stick as a CSV file.

* The data in the past 24 months including this month can be retained (Ver. 7.3 or later). In Ver. 7.2 or earlier, the data is retained for 3 days.

12

Energy-saving control function

Reliable energy-saving by AE-200

Reduction of power consumption for air conditioning by energy-saving control function

When the energy-saving control license (option) is registered, the set temperature will be automatically changed, and the energy can be saved without significant deterioration of comfort. The conditions can be set on AE-200.

The conditions can be set also from the Web browser.

Setting of energy-saving control conditions

Switching hub

Registration of energy-saving control license

Control command

Implementation of energy-saving control

Setting of target power and control conditions

Energy-saving control in service

Energy-saving control out of service

When the energy-saving control is in service, the group icon on the floor screen is displayed as the energy-saving control icon.
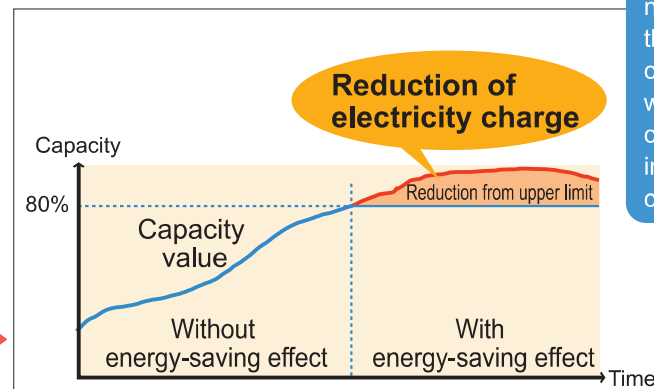
Energy-saving control in service:
　Under temperature control
　Under air blowing control
Energy-saving control out of service:
　Under stop control

Control menu **1** Control command

Detailed energy-saving control is implemented to maintain the indoor environment.

Indoor unit control	•**Temperature control (±2°C)** Example) If the energy-saving control is enabled during operation for cooling at 25°C, the set temperature will be increased by +2°C and changed to 27°C. The temperature displayed on the remote controllers will be changed. •**Fan control (thermos OFF)*** Example) If the energy-saving control is enabled during operation for cooling at 25°C, the operation capacity will be forcibly set to 0%. The temperature displayed on the remote controllers will be kept at 25°C. •**Stop control**
Outdoor unit control	•**Capacity upper limit saving control (50/60/70/80/90%)*** Example) The upper limit value is specified to keep the maximum value of the outdoor unit capacity within 80%. The values displayed on the remote controllers will not be changed.

* This function cannot be used for some models of air conditioners.

Reduction of electricity charge

Capacity

80%

Capacity value

Reduction from upper limit

Without energy-saving effect

With energy-saving effect

Time

Since energy is saved not by forcibly stopping the compressors, but by controlling the capacity with the aid of the air conditioner control, the impact on the air conditioners is low.


Control menu **2** Intervals of rotation

The control is implemented with a balanced rotation to avoid control only in the same room for a long time.

•**Specify the units to be controlled, and set the energy-saving control time.**
　Set the control time, 0, 3, 6, 9, 15 or 30 minutes (arbitrarily set), in 30 minutes. One slot is 3 minutes, and the control is rotated in 30 minutes.

[When one block has 5 groups and the indoor units are exposed to energy-saving control for 6 minutes]

0　3　6　9　12　15　18　21　24　27　30 (min)

Group1
Group2
Group3
Group4
Group5
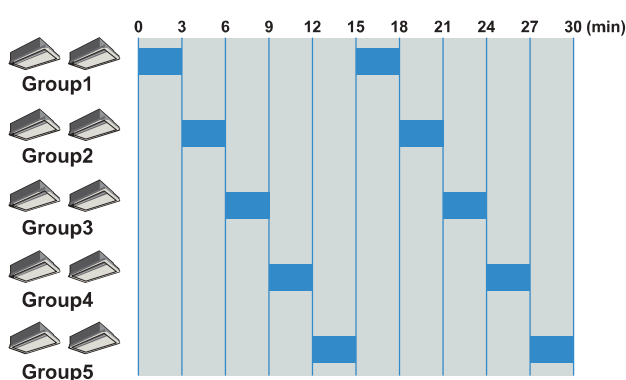
①**Number of times of rotation**

3-minute control is repeated twice (= 6 min/3min) for 6-min control.

②**Rotation cycle**

The rotation cycle in 30 minutes is 15 minutes (= 30 min/2 times) according to the number of times of rotation determined in ①.

③**Rotation interval**

According to the rotation cycle determined in ②, the rotation interval between groups in the block is 3 minutes (= 15 min/5 groups). (If the value cannot be divided, round it off to the nearest whole number.)

The control is rotated sequentially to the following groups after execution and is not concentrated in the same room (air conditioner).

• When the rotation control is used for indoor units during heating operation, it takes time to restart the operation to prevent sense of cold air, and the indoor units may not show their capacity for a certain time after the restart of operation.
• When the energy-saving control is used for heating, to avoid insufficient capacity, it is recommended to use the capacity saving control for outdoor units (energy saving without stopping the compressors).
• When using the rotation control for indoor units, set the control time shorter (setting of 3 minutes is recommended).

Energy-saving/peak-cut control function

Energy-saving/peak-cut control function (external contact input method)

Detailed demand control can be realized by using a commercially available demand controller.

Registration of energy-saving/peak-cut control license

Setting of energy-saving operation conditions

Control command

External input/output adapter (PAC-YG10HA)

Control appropriate for level

Commercially available demand controller

Setting of target demand value (highest level 4)
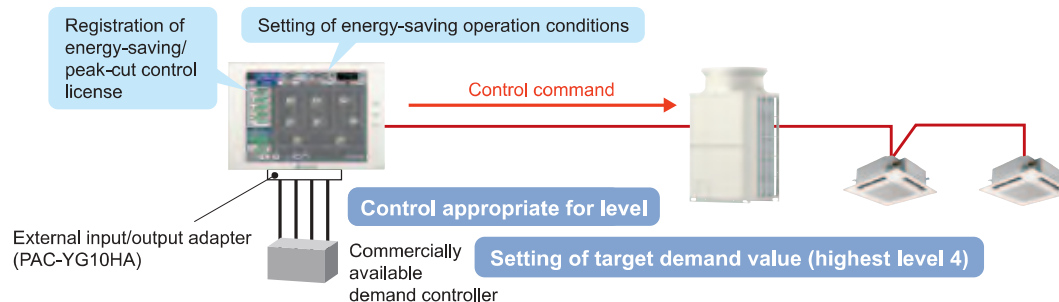
Energy-saving/peak-cut control function (power consumption monitoring method)

Detailed energy-saving control can be implemented according to the target power consumption for systematic energy saving.

Registration of energy-saving/peak-cut control license

Setting of energy-saving operation conditions

Control command
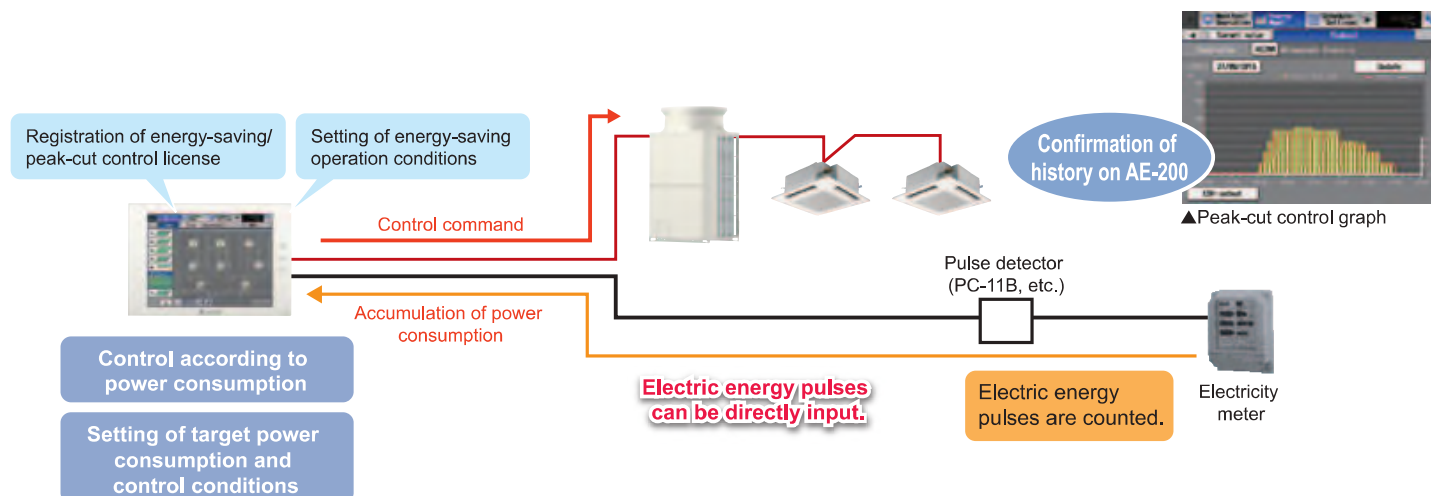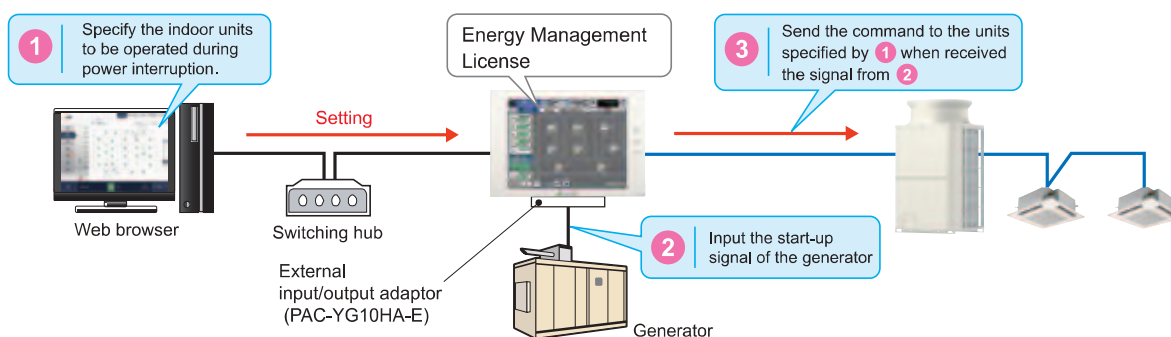
Confirmation of history on AE-200

▲Peak-cut control graph

Accumulation of power consumption

Pulse detector (PC-11B, etc.)

Control according to power consumption

Setting of target power consumption and control conditions

Electric energy pulses can be directly input.

Electric energy pulses are counted.

Electricity meter

Applications After the generator starts, the air conditioners will be operated in the energy saving mode.

System configuration

1 Specify the indoor units to be operated during power interruption.

Energy Management License

3 Send the command to the units specified by 1 when received the signal from 2

Setting

Web browser

Switching hub

External input/output adaptor (PAC-YG10HA-E)

2 Input the start-up signal of the generator

Generator

Peak cut function

	Outdoor unit operation	Indoor unit operation
Normal operation	100% operation	Air conditioning operation
Generator-powered operation	Upper capacity limits (from 60% to 90%) can be set for each outdoor unit.	Fan RUN/STOP, or 2°C higher than set temperature.

*Function on Outdoor and/or Indoor unit can be set separately or simultaneously.

Image of room during normal operation

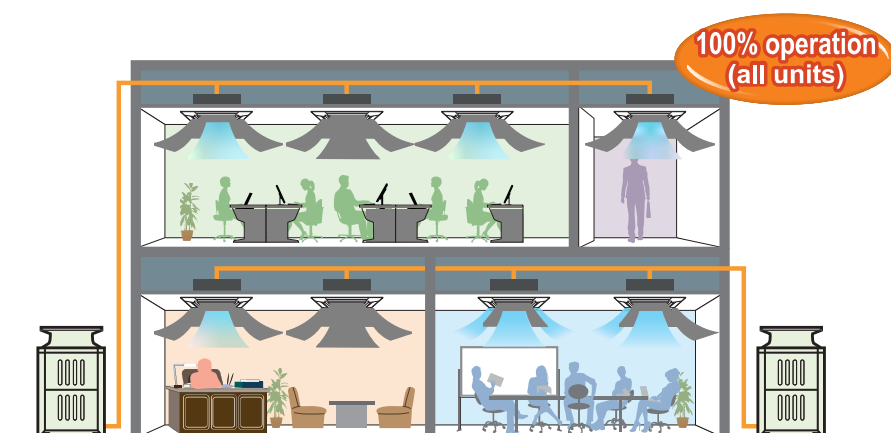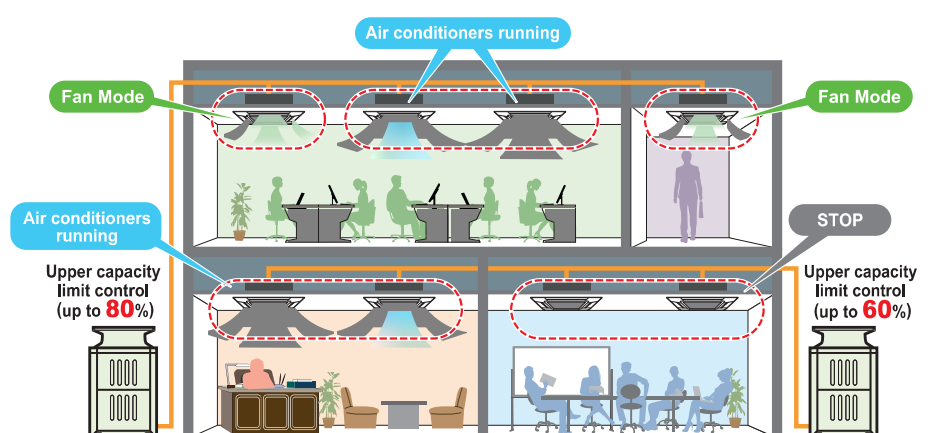100% operation (all units)

Image of room during generator-powered operation

Air conditioners running

Fan Mode

Fan Mode

Air conditioners running

STOP

Upper capacity limit control (up to **80**%)
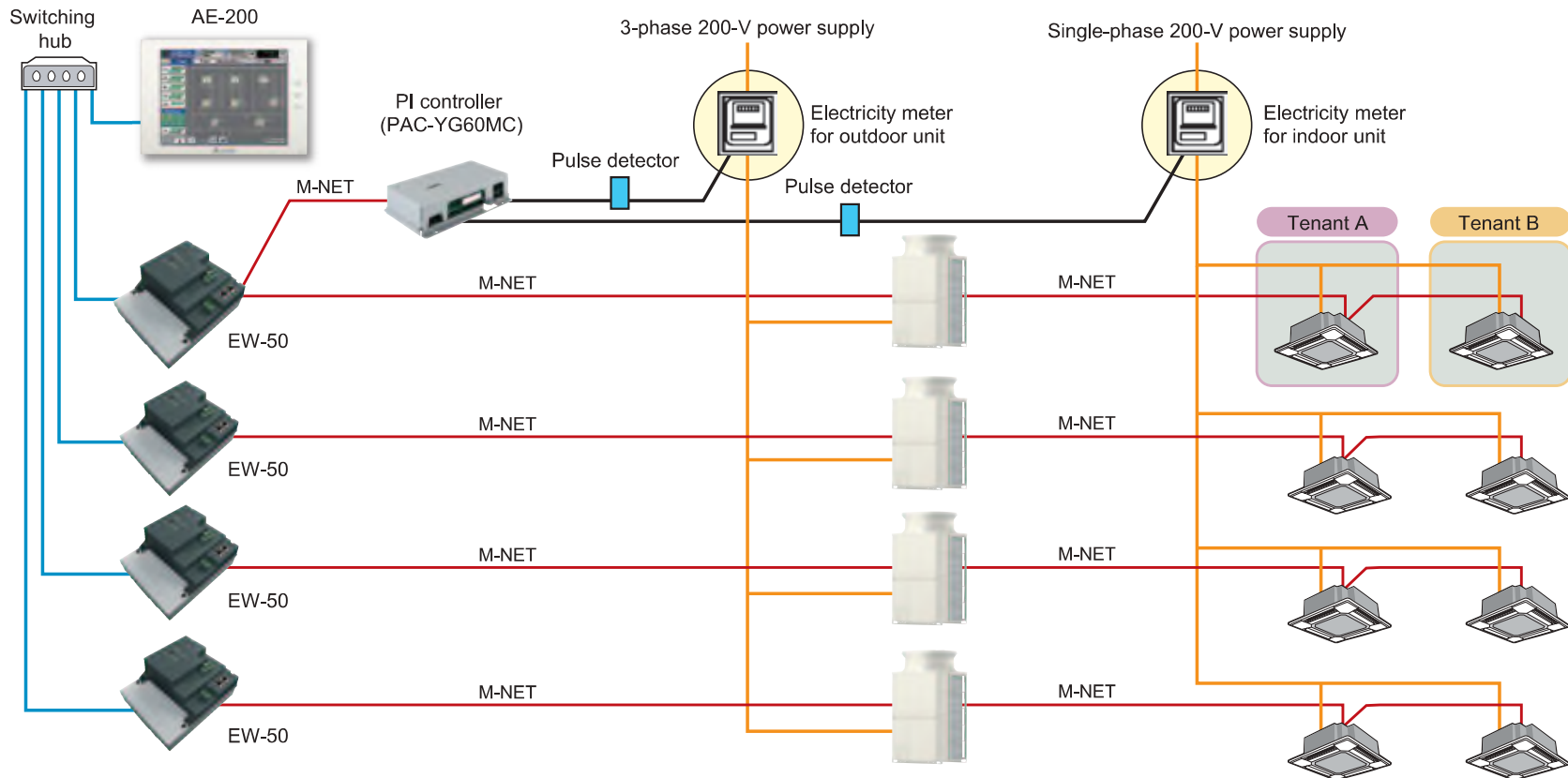
Upper capacity limit control (up to **60**%)

Charge function

AE-200 supports charging for air conditioning

Recommended

Example of system configuration for apportionment by AE-200

Switching hub
AE-200
3-phase 200-V power supply
Single-phase 200-V power supply
PI controller (PAC-YG60MC)
Pulse detector
Electricity meter for outdoor unit
Electricity meter for indoor unit
Pulse detector
M-NET
Tenant A
Tenant B
EW-50
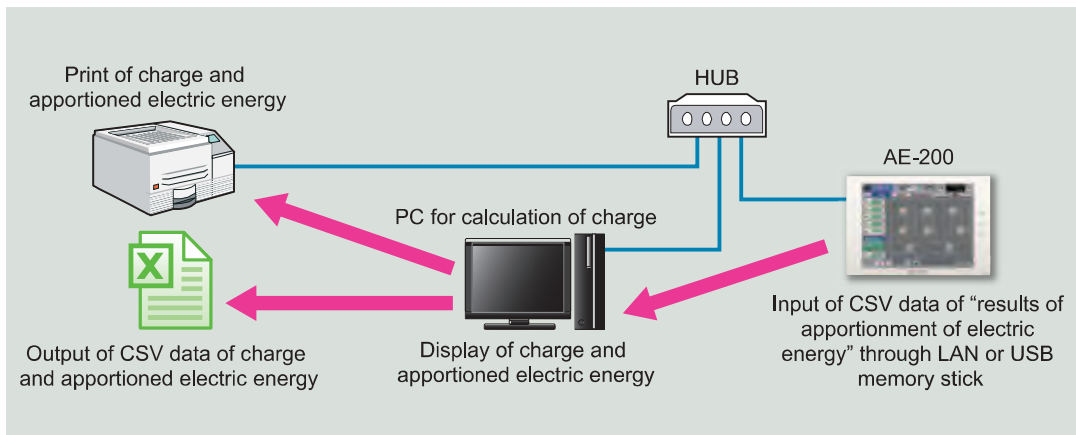M-NET
M-NET
EW-50
M-NET
M-NET
EW-50
M-NET
M-NET
EW-50
M-NET
M-NET

* EW-50 can be replaced with AE-50.
* Electric energy pulses can be directly input. However, install an uninterruptible power system.

Print of charge and apportioned electric energy
HUB
AE-200
PC for calculation of charge
Output of CSV data of charge and apportioned electric energy
Display of charge and apportioned electric energy
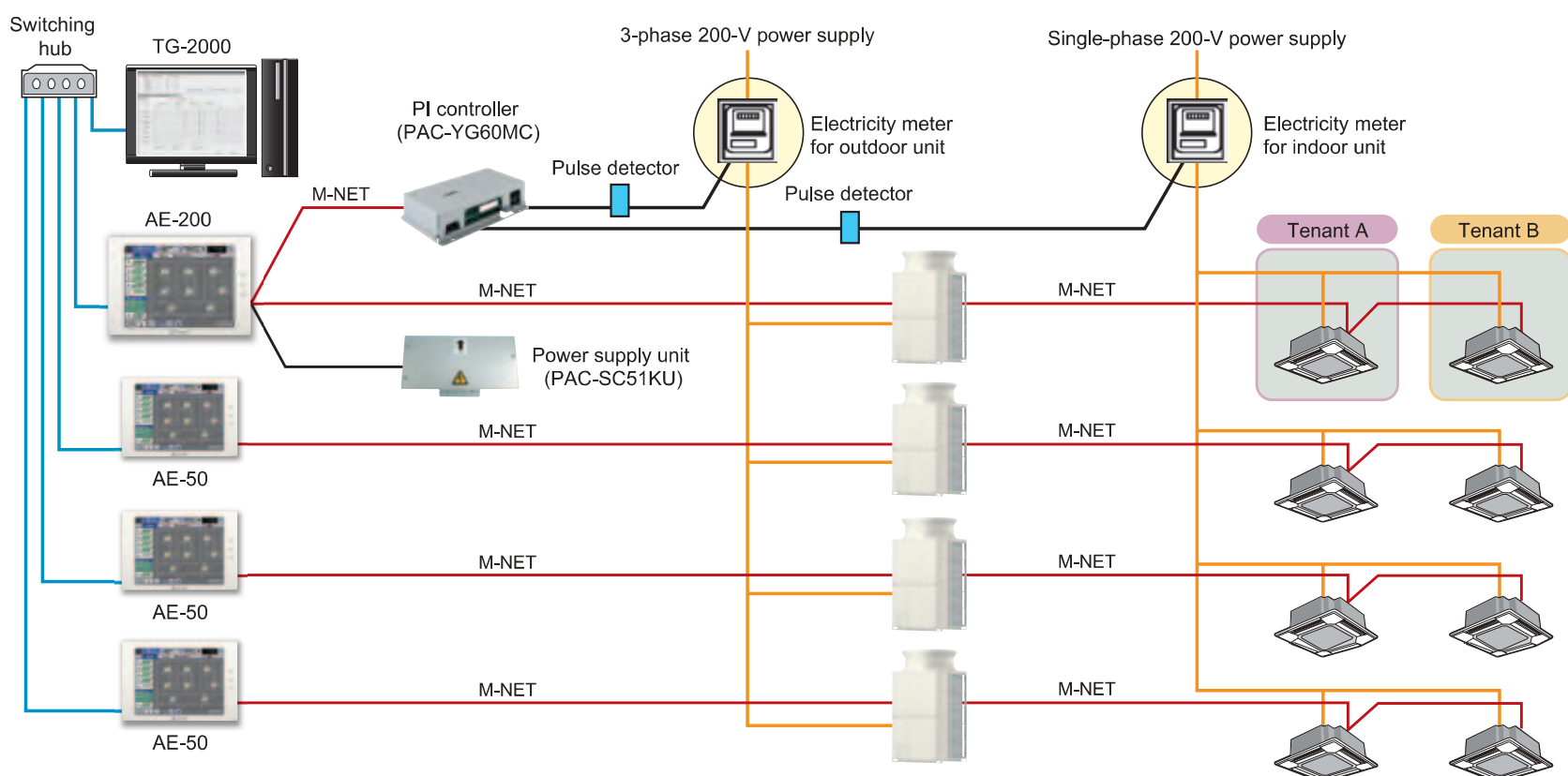Input of CSV data of "results of apportionment of electric energy" through LAN or USB memory stick

The PC for calculation of charge is used to calculate the charge. (It does not need to be constantly connected to AE-200. Although the charge calculation tool must be installed, other software can be used on the computer.)

Notes on configuration
● Even if the number of indoor units is less than 50, AE-200 and EW-50/AE-50 must be contained in the configuration (to back up the data related to billing).
● The M-NET of AE-200 cannot be used.
● Electric energy pulses for apportionment must be input to each set of AE-200 and EW-50.
● It is impossible to use both of the apportionment and billing functions of TG-2000 and AE-200. (One of them can be used.)
● When AE-200 is used for apportionment and TG-2000 is used for monitoring and operation, it is necessary to use TG-2000 of Ver. 6.61 or later. (When apportionment is performed with AE-200, it is recommended to use the Web integrated control function of AE-200.)

Example of system configuration for apportionment by TG-2000

Switching hub
TG-2000
3-phase 200-V power supply
Single-phase 200-V power supply
PI controller (PAC-YG60MC)
Pulse detector
Electricity meter for outdoor unit
Electricity meter for indoor unit
Pulse detector
AE-200
M-NET
M-NET
Tenant A
Tenant B
Power supply unit (PAC-SC51KU)
M-NET
AE-50
M-NET
M-NET
AE-50
M-NET
M-NET
AE-50
M-NET
M-NET

Notes on configuration ● To connect TG-2000 to AE-200/AE-50, it is necessary to use TG-2000 of Ver. 6.51A or later. ● To connect TG-2000 to EW-50, it is necessary to use TG-2000 of Ver. 6.61 or later.

according to operation results of indoor units.

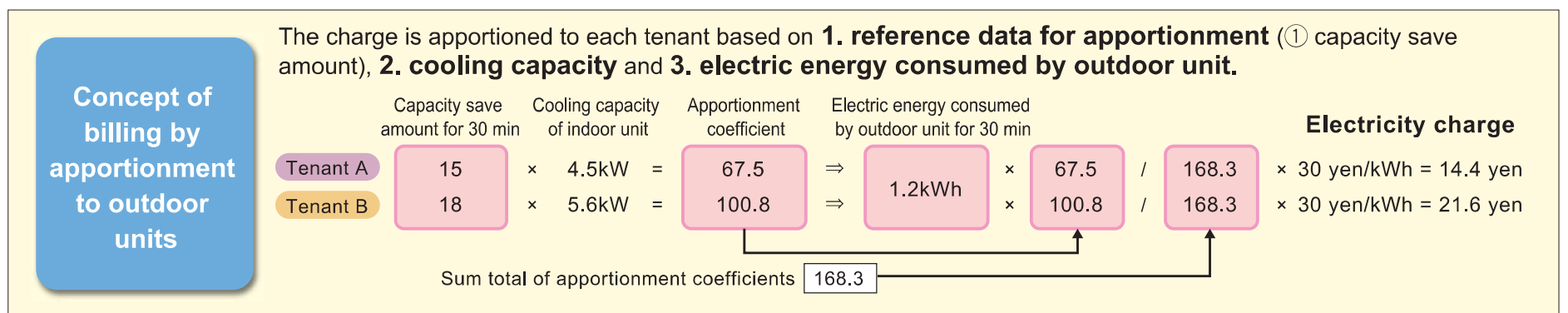## Support for charging for air conditioning

Information on operation of indoor units in minutes can be obtained by registering the charge license (option) in AE-200. Electric energy can be apportioned according to the results of operation of indoor units to support charging for air conditioning.

* The calculation system for the support for charging for air conditioning cannot be used for trading or explanation defined by the Measurement Act (based on measurement). The billing support function for air conditioning is designed to support the apportionment by our unique method. Use the function after understanding its features.

Number	Data	Description	Tenant A	Tenant B
1	Reference data for apportionment	One of the following three modes is selected as the apportionment method, and the reference data (time) for apportionment is calculated based on the information on the operation of indoor units.	①An example of calculation in the case of capacity save amount is shown.	
		①Capacity save amount: Approximate value of amount of refrigerant used by indoor unit obtained by counting the capacity save amount (100 to 0%) every minute and dividing the integrated value by 100. [Example] 8:1: 100%, 8:2: 0%, … 8:30: 100% (100 + 0 + …100)/100 = capacity save amount for 30 min	15 min	18 min
		②Thermo ON time: Thermo ON time is integrated.	(20 min)	(23 min)
		③Fan operation time: The time during which the fan is operating is integrated.	(25 min)	(30 min)
2	Cooling capacity	The cooling capacity of each indoor unit has been determined for each model name.	4.5 kW	5.6 kW
3	Electric energy for outdoor unit	Power consumption by outdoor unit measured by electricity meter.	1.2 kWh (30 min)	
4	Electricity charge	Unit price of 1 kWh of electricity. * Five kinds of unit price can be set for each time slot. In this example, one kind of unit price is used for time slot 1.	30 yen/kWh	

Below is shown the method for apportioning the electric energy consumed by outdoor units for 30 minutes when the capacity save amount is selected as the apportionment mode.

* Although the standby electricity consumed by outdoor units and electric energy consumed by indoor units can be apportioned, these values are omitted in this explanation.

Concept of billing by apportionment to outdoor units

The charge is apportioned to each tenant based on **1. reference data for apportionment** (① capacity save amount), **2. cooling capacity** and **3. electric energy consumed by outdoor unit.**

	Capacity save amount for 30 min		Cooling capacity of indoor unit		Apportionment coefficient		Electric energy consumed by outdoor unit for 30 min					Electricity charge
Tenant A	15	×	4.5kW	=	67.5	⇒	1.2kWh	×	67.5	/	168.3	× 30 yen/kWh = 14.4 yen
Tenant B	18	×	5.6kW	=	100.8	⇒		×	100.8	/	168.3	× 30 yen/kWh = 21.6 yen

Sum total of apportionment coefficients 168.3

Electric energy pulse input

In the previous versions, the pulses were input by using the PI controller (PAC-YG60MC). In Ver. 7.20 or later, the pulses can be input to the main unit of AE-200/EW-50/AE-50.
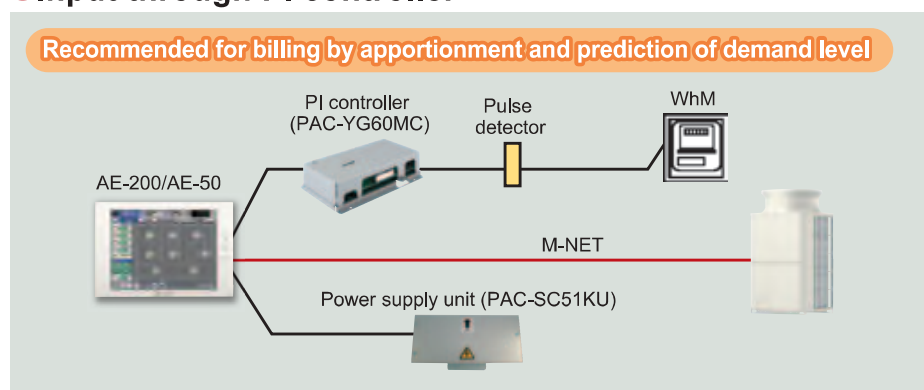
ⓐUp to 4 pulses can be input to one set of AE-200/EW-50/AE-50.   **ⓑ**No power supply is required for pulse input. (Power is applied from AE-200, EW-50 and AE-50.)
ⓒThe external input/output adapter (PAC-YG10HA) is not required. (Connection by screwing)

The electric energy pulses input to the main unit of AE-200/EW-50/AE-50 can be used for the following purposes.
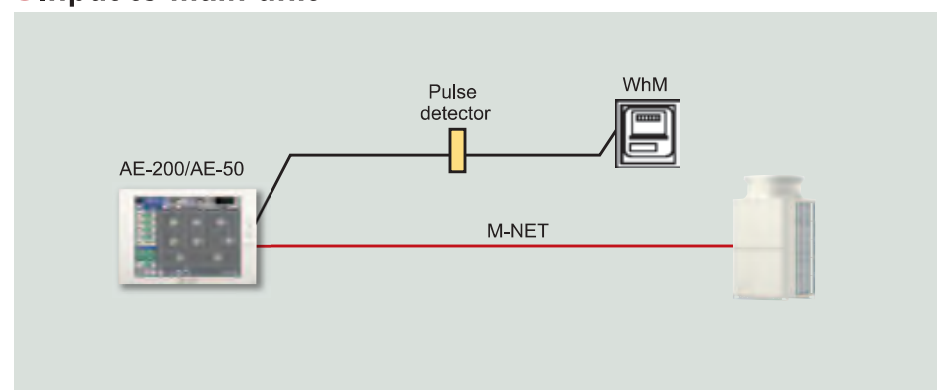
• Electric energy to be apportioned for energy management (electric energy consumed by outdoor unit)
• Electric energy for prediction of demand level (demand electric energy)
• Electric energy to be apportioned for billing (electric energy consumed by outdoor and indoor units) * The pulses cannot be input to AE-200.

40 When inputting the electric energy pulses for apportionment or demand level prediction to the main unit of AE-200/EW-50/AE-50, supply power to AE-200/EW-50/AE-50 from an UPS to prevent failing in receiving electric energy pulses during power failure (supply for 5 minutes or more).

●**Input through PI controller**

Recommended for billing by apportionment and prediction of demand level

PI controller (PAC-YG60MC)
Pulse detector
WhM
AE-200/AE-50
M-NET
Power supply unit (PAC-SC51KU)

●**Input to main unit**

Pulse detector
WhM
AE-200/AE-50
M-NET

Notes on configuration   ● TG-2000 cannot use the electric energy pulses input to the main unit of AE-200/AE-50/EW-50.   ● When the charge is apportioned by AE-200, the electric energy pulses cannot be input to the AE-200 main unit.
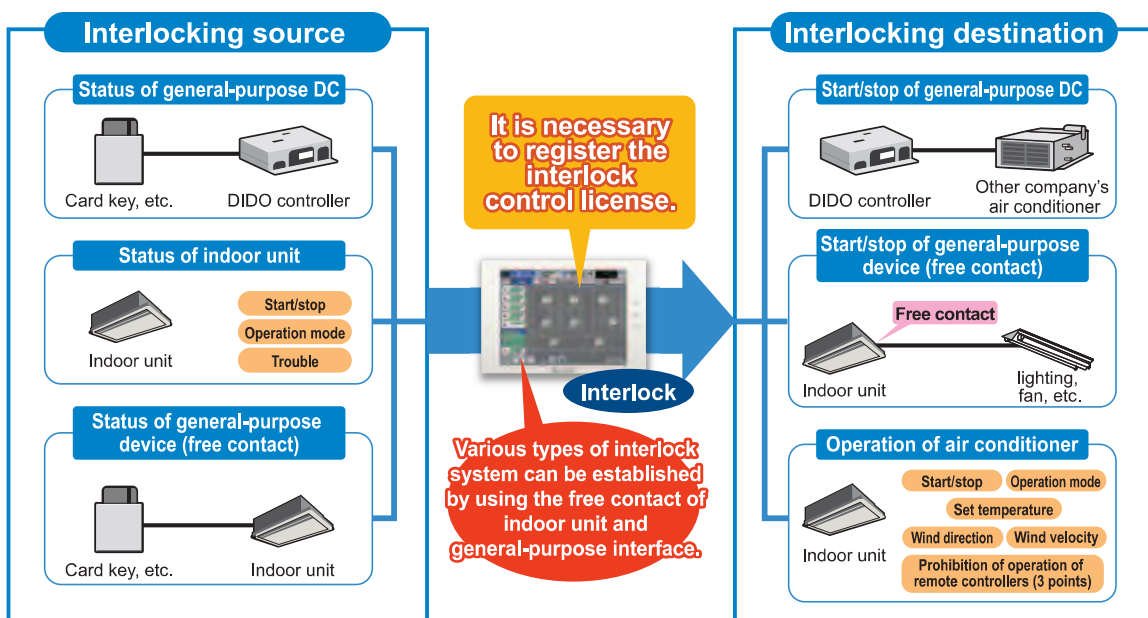
Interlock control function

AE-200 can provide, operate with general-purpose devices

Interlock control is realized by using an indoor unit as an interlocking source.

Interlocks with air-conditioning, ventilation and general-purpose devices can be set* using the changes in status of input contact of the DIDO controller (PAC-YG66DCA) and the start/stop status of indoor unit as input conditions of the interlocking source.

* Set the interlocks on the browser screen. * However, interlocks cannot be provided between controllers.

■ Interlock control in wide range of air-conditioning, ventilation and general-purpose devices
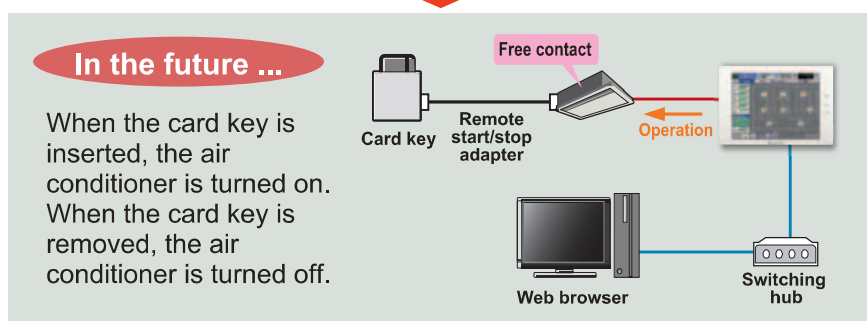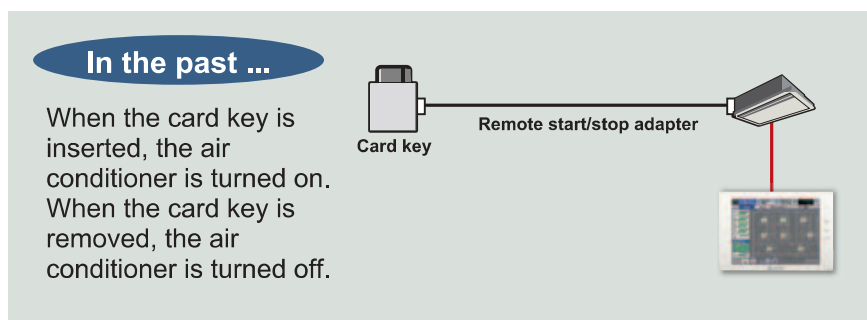

Interlocking source

Status of general-purpose DC
- Card key, etc.
- DIDO controller

Status of indoor unit
- Indoor unit
  - Start/stop
  - Operation mode
  - Trouble

Status of general-purpose device (free contact)
- Card key, etc.
- Indoor unit

It is necessary to register the interlock control license.

Interlock

Various types of interlock system can be established by using the free contact of indoor unit and general-purpose interface.

Interlocking destination

Start/stop of general-purpose DC
- DIDO controller
- Other company's air conditioner

Start/stop of general-purpose device (free contact)
- Free contact
- Indoor unit
- lighting, fan, etc.

Operation of air conditioner
- Indoor unit
  - Start/stop
  - Operation mode
  - Set temperature
  - Wind direction
  - Wind velocity
  - Prohibition of operation of remote controllers (3 points)

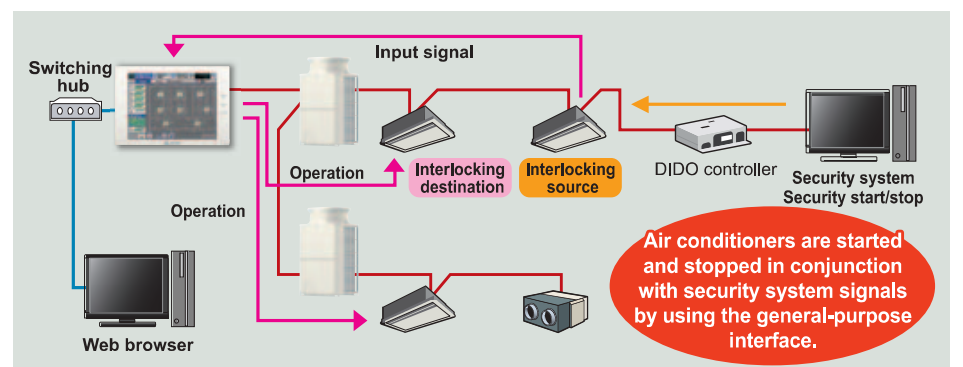### ■ Examples of use of interlock control

Interlock between card key and air conditioners	The air conditioners are turned on and off by inserting and removing the card key.
Security interlock	•The representative indoor unit is stopped by a security signal (last exit signal). All air conditioners are stopped by using this representative indoor unit used as the interlocking source. •The security release signal generated by the first person entering the room starts the target ventilation equipment.
Mode change	The air conditioner mode is switched by an external contact.
Interlock with ventilation equipment	Other manufacturer's ventilation equipment is started in conjunction with operation of an indoor unit.
Interlock among air conditioners	When an indoor unit is out of order, an auxiliary air conditioner is started.
Interlock with lighting equipment	The ON/OFF state of lighting equipment is controlled in conjunction with the ON/OFF state of an indoor unit.

* Do not use this function for control relating to disaster prevention (to open and close fire shutters, etc.). Do not use it particularly for life-critical applications.

■ Interlock with card key in hotel

In the past ...

When the card key is inserted, the air conditioner is turned on. When the card key is removed, the air conditioner is turned off.

Card key — Remote start/stop adapter

In the future ...

When the card key is inserted, the air conditioner is turned on. When the card key is removed, the air conditioner is turned off.

Card key — Remote start/stop adapter — Free contact — Operation

Web browser — Switching hub

■ Security interlock in tenant building

Switching hub — Input signal — Operation — Interlocking destination — Interlocking source — DIDO controller — Security system Security start/stop

Operation — Web browser

Air conditioners are started and stopped in conjunction with security system signals by using the general-purpose interface.

● **Prevention of forgetting to turn off air conditioners**
The security start signal is input to the DIDO controller. → All indoor units are stopped.

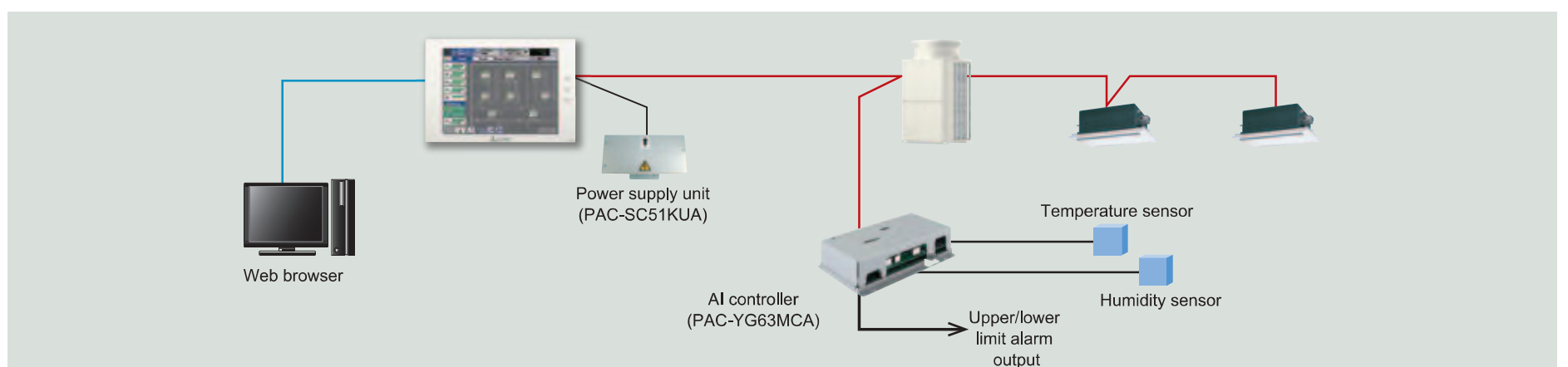● **Prevention of wasteful operation of air conditioners**
The security is released by the first person entering the room. → Only LOSSNAY is turned on to prevent wasteful operation of air conditioners.

It is possible to exclude the air conditioners to be operated for 24 hours a day from the range of security interlock.

The temperature and humidity can be monitored by the AI controller.

Analog information in commercially available temperature and humidity sensors can be measured by the AI controller (PAC-YG63MC) and retrieved to AE-200. This enables to monitor and record the temperature and humidity on AE-200 and personal computers. When the temperature or humidity is higher or lower than the upper or lower limit, an alarm can be output (relay contact output) also from the AI controller.

Web browser — Power supply unit (PAC-SC51KUA) — AI controller (PAC-YG63MCA) — Temperature sensor — Humidity sensor — Upper/lower limit alarm output

and monitor the interlocks
and monitor the temperature and humidity.

Interlock function with AHC

Dimensions: 4-9/16(W) x 3-1/2(H) x 1-9/16(D) in.
: 116(W) x 90(H) x 40(D) mm

Advanced HVAC CONTROLLER (hereafter referred to as AHC) comprises of MITSUBISHI ELECTRIC's AHC ADAPTER (PAC-IF01AHC-J) and α2 SIMPLE APPLICATION CONTROLLER* (hereafter referred to as ALPHA2).
*α2 SIMPLE APPLICATION CONTROLLER is one of the Programming Logic Controllers that are manufactured by MITSUBISHI ELECTRIC CORPORATION.

AHC allows for the connection of MITSUBISHI ELECTRIC's air conditioning network system (hereafter referred to as M-NET) to other systems, which was not possible with the use of ALPHA2 alone. AHC provides the following functions.

① Controls external devices using the sensor data of the air conditioning units connected to M-NET.
② Interlocks the operation of air conditioning units and external devices that are connected to ALPHA2.
③ Controls air conditioning units that are connected to M-NET.
④ Allows for the combined use of the items ① - ③ above.
⑤ Monitors the input/output status of ALPHA2 via a remote controller or a centralized controller.

Compatible controllers
• Remote Controller: PAR-U02MEDA
• Centralized Controller: AE-200, AE-50, EW-50, EB-50GU-J

* Refer to the manual that came with ALPHA2 for information about ALPHA2.
* The use of AHC ADAPTER requires either a remote controller or a centralized controller.
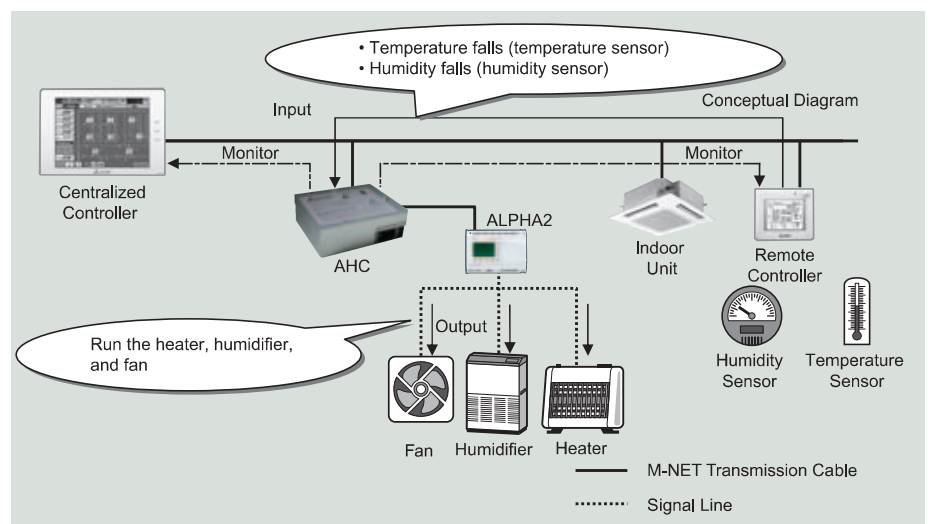
■ Specifications

(1) Device specifications

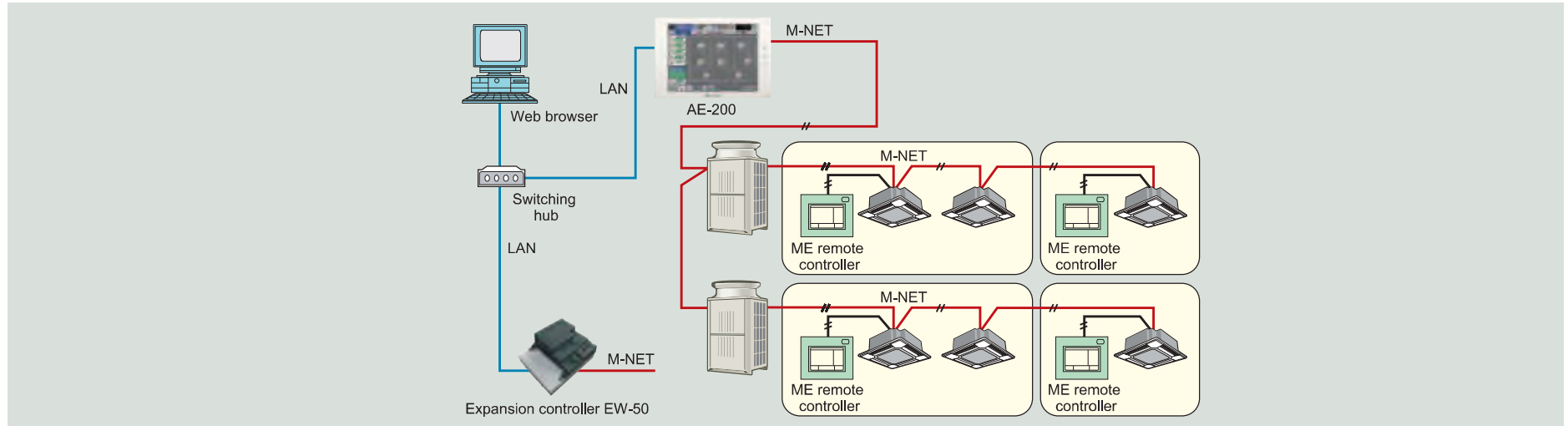| Item		Specifications
Power supply	M-NET	17–32 VDC
Interface	M-NET transmission terminal	Exclusively for connection to M-NET
	Connector for ALPHA2	Exclusively for connection to ALPHA2
Ambient conditions	Temperature — Operating temperature range	-10°C – +55°C [+14°F – +131°F]
	Temperature — Storage temperature range	-20°C – +60°C [-4°F – +140°F]
	Humidity	30%–90% RH [Non-condensing]
Dimensions (W × H × D)		116 × 90 × 40 mm [4-9/16 × 3-1/2 × 1-9/16 in.]
Weight		0.4 kg [0.9lbs]
Installation conditions		Inside the metal control box * To be used in a business office or similar environment

■ Examples of system
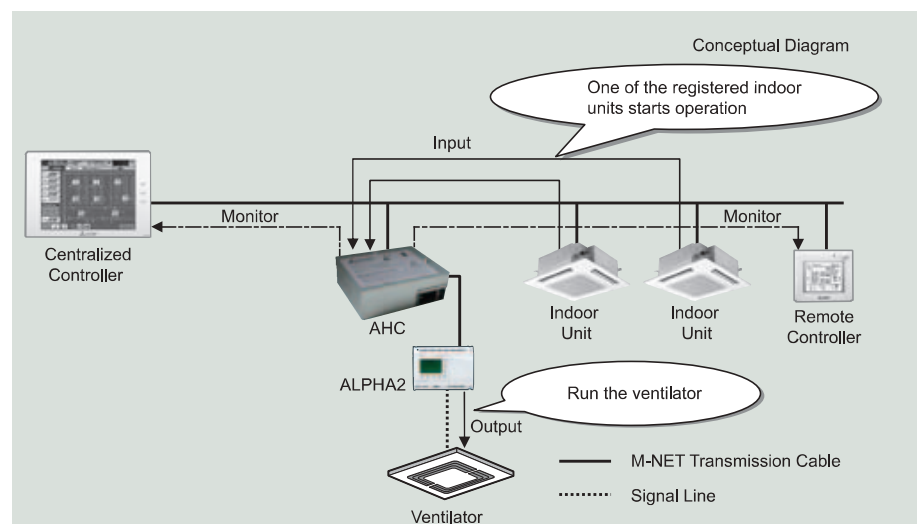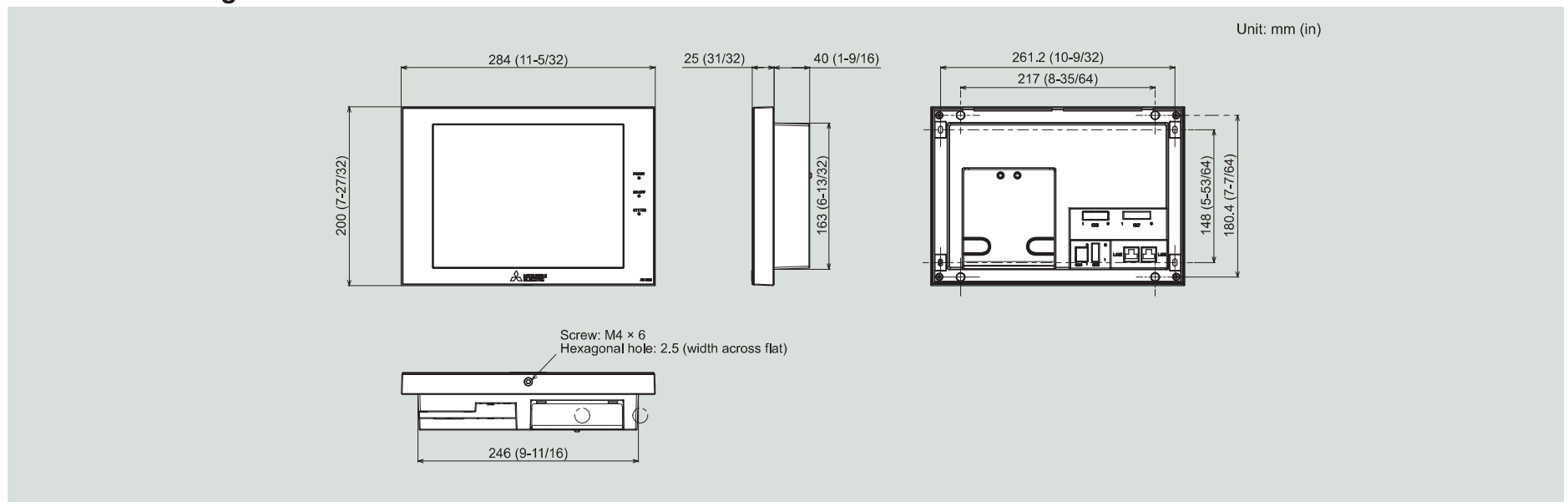

Interlocking the Heater, Humidifier, and Fan

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Centralized Air Conditioning Control System AE-200 Basic specifications

■ Example of system configuration

■ Outline drawing

Unit: mm (in)

284 (11-5/32) 25 (31/32) 40 (1-9/16) 261.2 (10-9/32) 217 (8-35/64) 200 (7-27/32) 163 (6-13/32) 148 (5-53/64) 180.4 (7-7/64)

Screw: M4 × 6
Hexagonal hole: 2.5 (width across flat)

246 (9-11/16)

■ Specification table
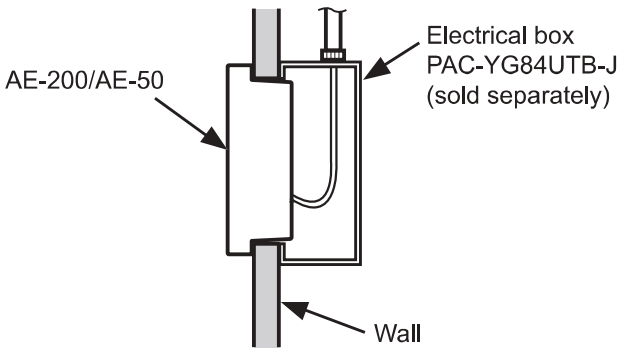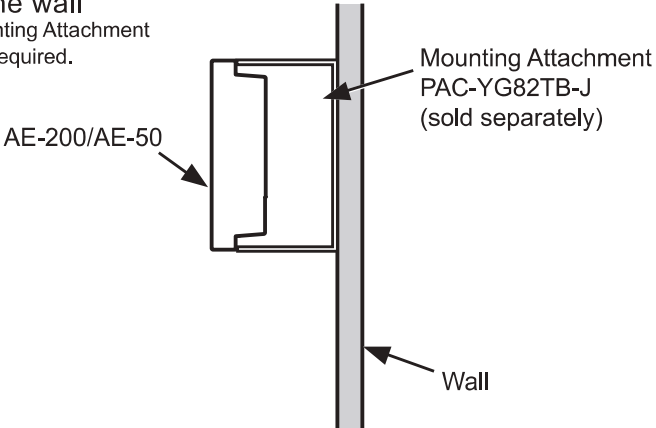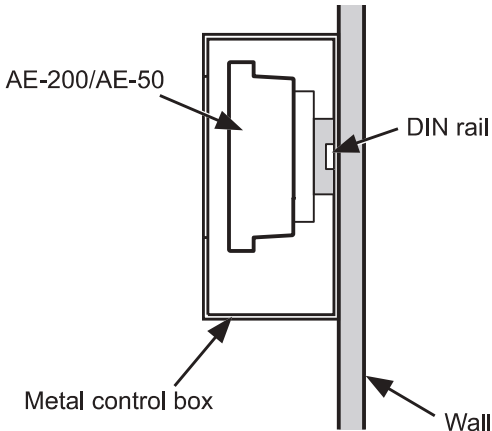
Item			Specifications
Power supply	Rated input		100–240 VAC ± 10%; 0.3–0.2 A 50/60 Hz Single-phase
M-NET power feeding coefficient			No specifications *Only an MN converter can be connected.
Ambient conditions	Temperature	Operating temperature range	0°C – +40°C [+32°F – +104°F]
		Storage temperature range	-20°C – +60°C [-4°F – +140°F]
	Humidity		30%–90% RH [Non-condensing]
Dimensions (W × H × D)			284 × 200 × 65 mm [11-5/32 × 7-55/64 × 2-17/32 in] *When installed, AE-200/AE-50 will protrude 25.0 mm (31/32 in) from the wall or the metal control box.
Weight			2.3 kg [5-5/64 lbs]
Installation conditions			Indoor only *To be used in a business office or similar environment

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■ **Functions** * The functions and specications are subject to change.

□: Each unit ○: Each group ●: Each block △: Each floor ◎: Collective ×: Not available

Item	Description	Operations	Display
Controllable number of unit	Up to 50 units/50 groups		
ON/OFF	ON and OFF operation for the air conditioning units and general equipment. (To operate general equipment, PAC-YG66DCA is required.)	○◎△●	○◎
Operation mode	Switches between several operation modes depending on the air conditioning unit. 　Air conditioning unit : Cool/Dry/Auto(*)/Fan/Heat 　LOSSNAY unit : Heat Recovery/Bypass/Auto 　CAHV, CRHV, Air To Water (PWFY) units : Heating, Heating ECO, Hot Water, Anti-freeze, Cooling(**) 　* Auto mode is for CITY MULTI R2 and WR2 series only. 　** Only PWFY	○◎△●	○
Temperature setting	Cool/Dry : 19°C (67°F) -35°C (95°F) [14°C (57°F) -30°C (87°F)] Heat : 4.5°C (40°F) -28°C (83°F) [17°C (63°F) -28°C (83°F)] Auto : 19°C (67°F) -28°C (83°F) [17°C (63°F) -28°C (83°F)] The range of temperature depends on the air conditioning unit. [ ] in case of using middle-temperature on PDFY, PEFY-VML/VMR/VMS/VMH-by setting DipSW7-1 to ON. Yet, PEFY-P-VMH-E-F is excluded.	○◎△●	○
Fan speed setting	Models with 4 air fl ow speed settings : Hi/Mid-2/Mid-1/Low Models with 3 air fl ow speed settings : Hi/Mid/Low Models with 2 air fl ow speed settings : Hi/Low Fan speed setting (including Auto) varies depending on the model.	○◎△●	○
Air flow direction setting	Air fl ow direction angles, 4-angles or 5-angles Swing, Auto (Louver cannot be set)	○◎△●	○
Schedule operation	Weekly schedule can be set by groups based on daily operation pattern.	○◎△●	○
Permit/prohibit local operation	Individually prohibits operation of each local remote controller function. (ON/OFF, Operation mode, Set temperature, Filter sign reset, Air Direction*, Fan Speed*, Timer*) * This function depends on the model.	○◎△●	○
Indoor unit intake temperature	Measures the intake temperature of the indoor unit only when the indoor unit is operating.	×	○
Error	When an error is currently occuring on an air conditioning unit, the afflicated unit and the error code are displayed.	×	□◎
Test run	This operates air conditioning units in test run mode.	○◎△●	○
Ventilation interlock	The ventilation unit (LOSSNAY) is able to automatically start its operation when operation of the interlocked indoor unit starts.	○◎△●	○
External input/output	By using optional external input/output adapter (PAC-YG10HA-E) you can set and monitor the following. Input :　By level signal : "Batch ON/OFF", "Batch emergency stop" 　　　　By pulse signal : "Batch ON/OFF", "Enable/disable local remote controller" Output : "ON/OFF", "Error/Normal"	◎	◎
Energy Management	Bar Graph :　Indoor unit Electric Energy, FAN operation time, Thermo-ON time (TOTAL, Cooling, 　　　　　　Heating) can be displayed hourly, daily and monthly. Line Graph : Outdoor temp., Room temp., Set temp. (Heating, Cooling) input from PAC-YG63MCA and 　　　　　　temp. from AHC.	×	□○●

🟩 Optional parts for AE-200/AE-50

Embedded box　PAC-YE84UTB

Wall-embedded installation with an electrical box

AE-200/AE-50

Electrical box
PAC-YG84UTB-J
(sold separately)

Wall

Box for installation on wall　PAC-YE82TB

Installation on the wall
*Separately-sold Mounting Attachment
(PAC-YG82TB-J) is required.

Mounting Attachment
PAC-YG82TB-J
(sold separately)

AE-200/AE-50

Wall

Fitting for installation in control panel　PAC-YE86TK

Installation inside a metal control box
*Separately-sold mounting kit (PAC-YG86TK-J) is required.
(The kit includes DIN rail attachments and L-fittings).

AE-200/AE-50

DIN rail

Metal control box

Wall

EW-50 suitable for remote control from personal
Usable as expansion controller for AE-200

Centralized air conditioning control system EW-50

Flexibly applicable to centralized control in large- to small-scale buildings

Major features

○ **Usable as expansion controller for AE-200**

When 3 sets of EW-50 are connected to AE-200, up to 200 indoor units can be operated and monitored by AE-200.

EW-50 without LCD screen

AE-200 — HUB — Up to 50 units — M-NET adapter — Power line
EW-50 — Up to 50 units — M-NET adapter — Power line
EW-50 — Up to 50 units — M-NET adapter — Power line
EW-50 — Up to 50 units — M-NET adapter — Power line

* When the M-NET of AE-200 is not used, up to 4 sets of EW-50 can be connected.

○ **Air conditioners can be operated and monitored only with EW-50 by using a personal computer, tablet or smartphone.**
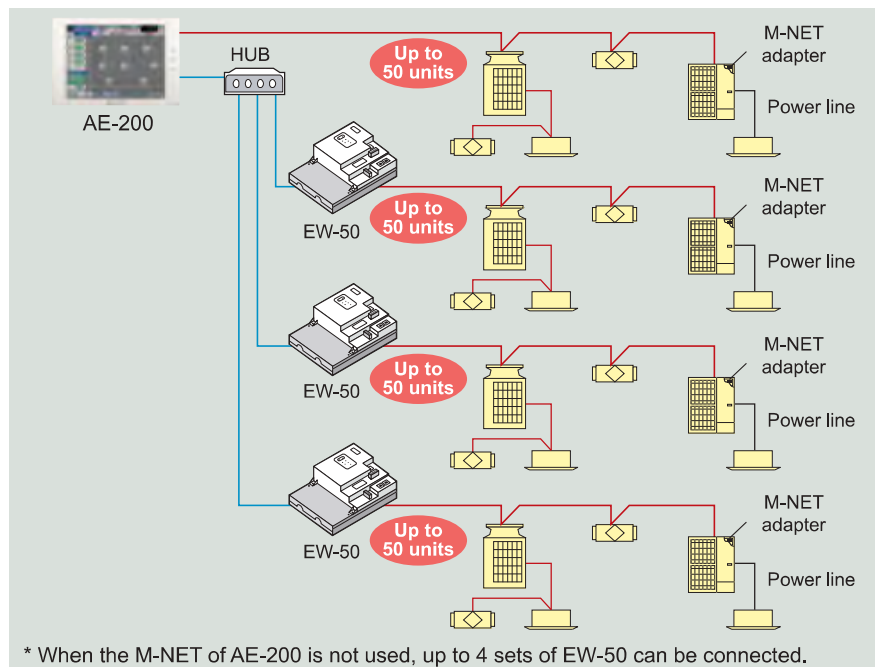
Without AE-200, air conditioners can be monitored and operated only with this controller by using the browser software*1 of a personal computer. They can be monitored and operated remotely by using the Internet, and the air conditioners in some buildings can be operated simultaneously.*2

EW-50
Unnecessary
Power supply unit
LAN cable
Web browser

*1. In the case of Windows, Microsoft® Internet Explorer 11 or Google Chrome is required. In the case of Macintosh, Safari 7 is required.
Windows and Microsoft® Internet Explorer are registered trademarks of Microsoft Corporation in the United States and other countries.
iPad and Safari are registered trademarks of Apple Inc. in the United States and other countries.
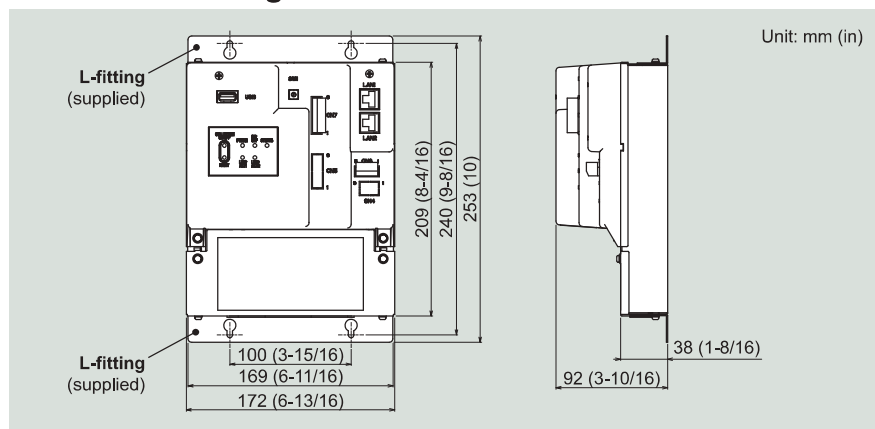Google Chrome is a registered trademark of Google Inc.

*2. The company names and product names in the text may be trademarks or registered trademarks of their respective companies.
When connecting EW-50 via the Internet, avoid connecting it directly to the Internet. Connect it through a router or the like provided with the VPN function to ensure the security.

■ **Outline drawing**

Unit: mm (in)

L-fitting (supplied)
L-fitting (supplied)

209 (8-4/16)
240 (9-8/16)
253 (10)
100 (3-15/16)
169 (6-11/16)
172 (6-13/16)
38 (1-8/16)
92 (3-10/16)

■ **Specification table**

Item			Specifications
Power supply			100–240 VAC ± 10%; 50/60 Hz Single-phase
M-NET power feeding coefficient			1.5
Ambient conditions	Temperature	Operating temperature range	-10°C – +55°C [+14°F – +131°F]
		Storage temperature range	-20°C – +60°C [-4°F – +140°F]
	Humidity		30%–90% RH [Non-condensing]
Dimensions (W × H × D)			172 × 209 × 92 mm (6-13/16 × 8-4/16 × 3-10/16 in] *172 × 253 × 92 mm [6-13/16 × 10 × 3-10/16 in] when using L-fittings
Weight			1.7 kg [4 lbs]
Installation conditions			Only in a metal control box indoors

computer!

■ **Functions** * The functions and specications are subject to change.

◎: By group or multiple groups ○: By group □: Batch only

Item	Description	Setting Display	Display
ON/OFF	Switches to ON or OFF air conditioners and general equipment.	◎	◎
Operation mode switching	Switches to cool, dry, auto, fan, or heat operation. * Depending on the unit, some modes are not available.	◎	○
Room temperature setting	The temperature can be set in the following range. The values inside the parenthesis are for indoor units for medium temperature. * Depending on the model, the setting temperature range differs. · Cooling/dry : 19°C to 35°C (4.5°C to 30°C) · Heating : 17°C to 28°C (17°C to 28°C) · Auto (single set point): 19°C - 28°C · Auto (dual set points) 　[Cool] Same as the set temp. range for Cool mode. [Heat] Same as the set temp. range for Heat mode. · Setback (dual set points) 　[Cool] Same as the set temp. range for Cool mode. [Heat] Same as the set temp. range for Heat mode.	◎	○
Set temperature 0.5°C increments	The temperature can be set and displayed in 0.5°C increments. * With some unit combinations, the temperature is set in 1°C increments.	◎	○
Fan speed setting	The fan speed can be set to 4 levels, 3 levels, 2 levels or automatic. * Available fan speeds differ depending on the unit.	◎	○
Air direction setting	Fixed swing in five levels or auto air direction can be set. * Available air directions differ depending on the unit.	◎	○
Prohibition of local remote controller operation	It is possible to disable the ability to use to local remote controller to run or stop, the operation mode, set temperature, filter sign reset, wind speed, wind direction and timer operation. * In the Lossnay group, only ON/OFF and filter reset can be disabled. * Disabling of the fan speed, air direction, and timer operation can be set for the PAC-SF50AT, PAR-36MA, PAR-F30ME, and PAC-YT52CR models.	◎	○
Room temperature display	Displays the suction temperature of the indoor unit.	–	○
Error display	Displays the current error content together with the address.	–	◎
Schedule operation	Today/weekly/weekly by season/yearly Setting content: ON/OFF, operation mode, set temperature, disable local remote controller, air direction/fan	◎	○
Energy management	Displays the power consumption* or operating hours. * Requires an optional part.	–	◎
Ventilator operation (solo)	Group operation can be possible for free plan Lossnay units only. * The above group operation mode includes auto ventilation, heat exchange, and normal ventilation.	◎	○
Ventilator operation (interlocked)	Free plan Lossnay units and indoor units can be interlocked and operated together. * At this point, air volume can be operated but the ventilation mode cannot be selected.	◎	○
External input (timer connection, emergency stop input, etc.)	Using a level signal or pulse signal, it is possible to input the following. Level signal: Emergency Stop Input, Batch ON/OFF, and Demand Input. Pulse signal: Batch ON/OFF or Operation Disable/Enable * Requires an external power supply and separately sold external I/O adapter (PAC-YG10HA). 　Of the above inputs, only one input can be selected.	□	–
External output (error output, operation output)	Using the level signal, ON/OFF and Error/Normal are output. * Requires an external power supply and separately sold external I/O adapter (PAC-YG10HA).	–	□
Web browser	Monitor/operation, failure, filter sign monitoring, schedule setting, interlocked control setting (option), energy saving control setting (option), energy saving peak cut setting (option), set temperature range restrictions, other	◎*1	◎*1
Filter reset	Filter sign reset	○	○
Connectable location	Centralized system transmission line: Connectable Recommended Indoor and outdoor transmission line: Connectable	–	–

* The functions and specifications differ depending on the connected equipment and model.
* Electric energy can be proportionally divided using the EW-50 alone.
　But the apportioned electricity charge function requires an AE-200 or TG-2000A.

■Notes
*1. Some items do not support the multi group setting and display.
*2. Use only items for which the unit has the function.

■Connectable equipment: Free plan direct expansion system air conditioner
　Inverter air conditioner for facility
　Package air conditioner for facility (the AW control model can be connected using an M control compatible indoor unit)
　A Control Mr. Slim (Can be connected using an M-NET adapter or special outdoor unit)
　Kirigamine room air conditioner (Requires a system control interface or M-NET control interface)
　Free plan Lossnay/Lossnay with heating and humidification
　Independent humidification unit *2
　Environmental measuring controller, metering measurement controller, general interface

Integrated software TG-2000A

Air conditioning equipment is controlled by using the dedicated software.

Integrated software TG-2000

Major features

○ Up to 2000 indoor units can be operated and monitored. Also general-purpose devices can be operated and monitored.
  * The general-purpose interface or general-purpose control PLC software (use of PLC) is required.
    When the interlock function of the general-purpose control PLC is used, only AE-200/AE-50/EW-50 (control of 50 units) can be used.
○ The layout of air conditioners can be displayed, so that the air conditioners can be controlled and operated on the plan view.
○ Weekly and annual schedules can be controlled easily (five weekly master schedules can be stored).
○ The air conditioning billing support function (option) enables to store the data on electric energy apportionment ratio or apportioned electric energy for each block in CSV format on a personal computer.
○ The operation status and error status are automatically updated.
○ Automatically output files of trend data on error history, temperature and start/stop status and data on air conditioning charge (when the license has been registered in AE-200) can be e-mailed.

■ We recommend the following software and hardware when using this application (TG-2000A).

Item		Requirement	Recommended
PC		PC/AT compatible machine (Business model is recommended)	Operation confirmed using HP and Dell computers
CPU		Core™ 2 Duo 1.66GHz or faster	Core™ i3 1.6GHz or faster
Memory		In the case of Windows® 8.1 / 7 (64bit) : 2GB or more	4GB or more
		In the case of Windows® 7 / Vista® (32bit) : 1GB or more	2GB or more
OS		Windows® 8.1 Pro (64bit)	English version only Only compatible with "Pro" and "64 bit" versions of Windows® 8.1 Not compatible with Windows® 8
		Windows® 7 Professional (64/32bit) Service Pack 1 (*1)	English version only
		Windows Vista® Business (32bit) Service Pack 2 (*1)	English version only
HDD	Standard	6GB or more (2GB or more of C drive free space necessary)	40GB or more of C drive free space necessary when using the trend function. The drive used for automatic output must have the following free space according to the number of groups. 200 groups = 2GB, 500 groups = 5GB, 1000 groups = 10GB, 2000 groups = 20GB
	Wide area	20GB or more (Free space)	Standard : max. 200MB/site
Storage device		CD-ROM drive / DVD-ROM drive (*2)	Devices other than those shown at the left may also be installed.
Resolution		1024 × 768 or higher, 65536 colors or more	
LAN		1 port (100BASE-TX /10BASE-T)	(*3)
USB		2 port or more	For the data backup.
Other		Computer must be dedicated for this use (TG-2000A).	Must be used for 24-hour constant operation (*4)

*1: It is necessary to correspond to each Service Pack. TG-2000A is not normally set up at the uncorrespondence.
    Please apply Service Pack of the correspondence.
*2: To set up ".NET Framework 3.5" using the Windows® 8.1 setup disk (DVD), a DVD-ROM drive is required.
*3: Purchase the option, or use the equipment recommended for the computer when purchasing the computer.
*4: Reboot the computer where TG-2000A is installed, once a week. (Refer to 8.3.2 for details.)

■ Functions
The ✓ symbol indicates that the operation can be performed and the – symbol indicates that the operation cannot be performed.

Operation	Function select button	Display units buttons (display object)				System equipment*1
		Whole building	Block	Floor Group	Floor	
On/off (Run/stop) switching	Monitor/Operation	✓	✓	✓	✓	–
Operation status (run/stop/abnormality) check	Monitor/Operation	✓	✓	✓	✓	✓*2
Detailed setting of operation mode, temperature, etc.	Monitor/Operation	✓	✓	✓	✓	–
Operation prohibition setting from loca remote controller	Monitor/Operation	✓	✓	✓	✓	–
Annual schedule, weekly schedule and today's schedule setting (Option)	Monitor/Operation	✓	✓	✓	✓	–
Temperature/humidity display	Monitor/Operation	–	–	–	✓	–
Abnormality history and operation history check (Option)	History	✓	✓	✓	✓	✓
Cumulative time check (Option)	Cumulative time	–	–	✓	–	–
Filter sign reset	Filter reset	–	–	✓	✓	–
Energy monitoring (Option)	Energy monitoring	–	✓	–	–	–

*1: System equipment includes Centralized controller, Expansion controller (EC), the units other than the indoor units and general equipment.
*2: Normal/abnormal display only.

PI controller PAC-YG60MCA

Applicable to billing support system and energy-saving control system

Product size : 120 (H) ×200 (W) × 45 (D) mm

Major features

Up to 4 units of Pulse-input measuring instruments (watt-hour meter, gas meter, water meter, and calorimeter) are connectable to PI controller and accumulate the amount based on the pulse unit designated from the AE-200/AE-50/EW-50. AE-200/AE-50/EW-50 monitors the current value of the PI Controller regularly (in 1 minute interval).
The current value can be displayed on AG-200/AE-50 LCD, AE-200/AE-50/EW-50 Web browser or TG-2000A. In a control system (with four M-NET lines) with AE-200 (1 set) and 200 expansion controllers (AE-50/EW-50), up to 20 PI controllers (80 ch. in all) can be connected. Up to 40 PI controllers (160 ch. in all) can be connected to 1 system of TG-2000.

■ Table of functions and specifications

Item		Rating and specification		
Power supply	24 VDC±10%: 5 W			Screw terminal block (M3) [*3]
Interface	M-NET communication	17 to 30 VDC [*1]		Screw terminal block (M3) [*3]
	Non-voltage a-contact input	Number of contacts: 4 Pulse signal:　a-contact Pulse width:　100 ms to 300 ms 　　　　　　(Idle period until next pulse: 100 ms or more) 100 ms or more 100 ms – 300 ms Rated voltage: 24 VDC Rated current: 1 mA or less [*2]		Screwless terminal block
Environment conditions	Temperature	Operating temperature range	0 to 40°C [32°F to 104°F]	
		Storage temperature range	-20 to 60°C [-4°F to 140°F]	
	Humidity	30 to 90%RH (no condensation)		
Dimensions	200 (W) × 120 (H) × 45 (D) mm / 7 7/8 (W) × 4 3/4 (H) × 1 25/32 (D) in			
Weight	0.6 kg [1 3/8 lbs.]			
Time backup during power failure	In the event of power failure or shut-off, the internal capacitor will continue to track time for approximately one week. (The internal capacitor takes about 24 hours to fully charge; a replacement battery is not necessary.)			
Installation environment	Inside a metal control panel (indoors) * Use this product in a hotel, a business office environment or similar environment.			

*1: Supply electric power from a power unit for the transmission line or an outdoor unit. Furthermore, the power consumption factor of M-NET circuitry of this device is "1/4" (equivalent to one ME Remote Controller).
*2: Supply electric power from the main unit to the contacts of the meters.
*3: M3 is the size of the screw on the terminal block (ISO metric screw thread). The number indicates the screw diameter (mm).

DIDO controller PAC-YG66DCA

Realizes reasonable method for building devices in M-NET.

Product size : 120 (H) ×200 (W) × 45 (D) mm

Major features

The DIDO Controller have Max. 6 sets of contact input/output terminals and can monitor and operate ON/OFF/Malfunction of up to 6 general equipments.
The general equipments can be monitored or operated from AE-200/AE-50 LCD, AE-200/AE-50/EW-50 Web browser or TG-2000A.
Also, Run/Stop schedule of the general equipments can be set.
DIDO Controller has 6 contact points per M-NET address. But one contact is equivalent for one indoor unit. So if all six contact points are used, it will take up 6 M-NET address.

■ Table of functions and specifications

Item					Rating and specification		
Power supply	24 VDC±10%: 5 W						Screw terminal block (M3) [*8]
Interface	M-NET communication				17 to 30 VDC [*1]		Screw terminal block (M3) [*8]
	Standard	Output [*2]	ON/OFF, (ON) [*3]	Non-voltage relay contact (2)	Applied load 　MAX: 24 VDC, 5 W 　MIN: 5 VDC, 2 mW 　* AC loads cannot be connected.		Screw terminal block (M3.5) [*8]
				Transistor (2)	24 VDC 40 mA or less [*5]		Screwless terminal block
			(OFF) [*3]	Non-voltage relay contact (2)	Applied load 　MAX: 24 VDC, 5 W 　MIN: 5 VDC, 2 mW 　* AC loads cannot be connected.		Screw terminal block (M3.5) [*8]
				Transistor (2)	24 VDC 40 mA or less [*4]		Screwless terminal block
		Input	ON/OFF Error/Normal	Non-voltage a contact (2 each)	24 VDC 1 mA or less [*5]		Screwless terminal block
	Expansion	Output	ON/OFF, (ON) [*3] (OFF) [*3]	Transistor (4 each)	24 VDC 40 mA or less [*4]		9 pin connector
		Input	ON/OFF Error/Normal	24 VDC input (4 each)	24 VDC 1 mA or less [*6]		9 pin connector
	Output pulse width			1 s ± 30 ms		1s ± 30 ms	
Interlock function	Interlock M-NET devices and output contacts according to status of input contacts.[*7]						
Environment conditions	Temperature			Operating temperature range	0 to 40°C [32°F to 104°F]		
				Storage temperature range	-20 to 60°C [-4°F to 140°F]		
	Humidity			30 to 90%RH (no condensation)			
Dimensions	200 (W) × 120 (H) × 45 (D) mm / 7 7/8 (W) × 4 3/4 (H) × 125/32 (D) in						
Weight	0.6 kg [1 3/8 lbs.]						
Time backup during power failure	In the event of power failure or shut-off, the internal capacitor will continue to track time for approximately one week. (The internal capacitor takes about 24 hours to fully charge; a replacement battery is not necessary.)						
Installation environment	Inside a metal control panel (indoors) * Use this product in a hotel, a business office environment or similar environment.						

*1: Supply electric power from a power unit for the transmission line or an outdoor unit. Furthermore, the power consumption factor of M-NET circuitry of this device is "1/4" (equivalent to one ME Remote Controller).
*2: Non-voltage Relay contact or transistor is available for output. Only one can be used at a time.
*3: ( ) is in the case of a pulse.
*4: The output is open collector type. Power must be supplied from an external power source to the output circuit of this device.

*5: Power is supplied from this device to the external contacts.
*6: Power must be supplied from an external power source.
*7: Interlock control is performed from the Maintenance Tool. For details, refer to the operation manual for the Maintenance Tool.
*8: M3 and M3.5 are sizes of the screw on the terminal block (ISO metric screw thread). The number indicates the screw diameter (mm).

AI controller PAC-YG63MCA

Values measured by commercially available temperature and humidity sensors can be introduced into M-NET communication.
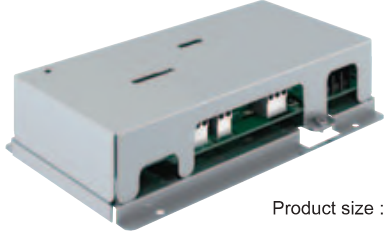
Product size : 120 (H) ×200 (W) × 45 (D) mm

Major features

AI controller has 2 ports and can control temperature or humidity.
AE-200/AE-50/EW-50 monitors the status of the AI-controller regularly (in 1-minute interval) and keeps the measured data.
Also, when the value exceeds preset upper or lower limit, or recovers. AE-200/AE-50/EW-50 sends alarm e-mail which includes the trend data for the last 10mins (in 1-minute interval) before the occurrence or recovery.
Temperature/Humidity can be displayed on AE-200/AE-50 LCD, AE-200/AE-50/EW-50 Web browser or TG-2000A.

■ Table of functions and specifications

Item				Rating and specification			
Power supply	24 VDC±10%: 5 W						Screw terminal block (M3) *4
Interface	M-NET communication			17 to 30 VDC			Screw terminal block (M3) *4
	Input	Ch	Sensor	Measurement target	Measurement range	Measurement error	External connection method
		Ch1	Pt100 (3-wire system)	Temperature	-30 to 60°C [-22 to 140°F]	±0.3%FS ±0.1°C (0.18°F) *2 [at 25°C (77°F)]	Screwless terminal block (3 poles)
			Analog 4 to 20 mADC	Temperature/ humidity	(Set by system controller)	±0.5%FS ±0.1°C (0.18°F) *2 ±0.5%FS ±0.1%RH [at 25°C (77°F)]	Screwless terminal block (2 poles)
			Analog 1 to 5 VDC				
			Analog 0 to 10 VDC				
		Ch2	Analog 4 to 20 mADC	Temperature/ humidity	(Set by system controller)	±0.5%FS ±0.1°C (0.18°F) *2 ±0.5%FS ±0.1%RH [at 25°C (77°F)]	Screwless terminal block (2 poles)
			Analog 1 to 5 VDC				
			Analog 0 to 10 VDC				
	Output	Upper/lower limit alarm interlock output (non-voltage contact)		Applied load MAX: 24 VDC, 5 W MIN: 5 VDC, 2 mW * AC loads cannot be connected.			Screw terminal block (M3.5) *4
Interlock function	Interlock M-NET devices according to measurement data values. *3						
Environment conditions	Temperature			Operating temperature range	0 to 40°C [32°F to 104°F]		
				Storage temperature range	-20 to 60°C [-4°F to 140°F]		
	Humidity			30 to 90%RH (no condensation)			
Dimensions	200 (W) × 120 (H) × 45 (D) mm / 7 7/8 (W) × 4 3/4 (H) × 12 5/32 (D) in						
Weight	0.6 kg [1 3/8 lbs.]						
Time backup during power failure	In the event of power failure or shut-off, the internal capacitor will continue to track time for approximately one week. (The internal capacitor takes about 24 hours to fully charge; a replacement battery is not necessary.)						
Installation environment	Inside a metal control panel (indoors) * Use this product in a hotel, a business office environment or similar environment.						

*1: Configure the dip switch settings for the analog input method to use while referring to "9. Dip Switch Functions".
*2: The measurement error for the system includes the measurement error for this unit, sensor, and wiring.
   a%FS (full scale) = a% × ([measurement range's upper limit value] - [lower limit value])
*3: Settings for the interlock function are performed from the Maintenance Tool. For details, refer to the operation manual for the Maintenance Tool.
*4: M3 and M3.5 are sizes of the screw on the terminal block (ISO metric screw thread). The number indicates the screw diameter (mm).

Power supply unit for transmission line PAC-SC51KUA

Unit for supplying power to related components

○ For connection of remote controllers and system controllers to the transmission line for centralized control, the power supply unit for transmission line (PAC-SC51KU) is recommended. (Except AE-200, EW-50, AE-50, BM adapter, LM adapter, GB-50AD and PAC-YG50EC)

■ Specification table

Item		Specifications	
Electrical requirements	Rated input voltage and current	100-240VAC ±10%; 0.8A - 0.4A 50Hz/60Hz Single-phase	
	Fuse: 250VAC 6.3A Time-delay type (IEC127-2 S.S.5)		
Output voltage/current	M-NET	23.0 - 32.0VDC	
	DC power supply	24VDC ±5% 0 - 0.75A	
Load capacity (24V)	Number of the loading unit: AG-150A Centralized Controller 1 unit		
Environmental conditions	Temperature	Operating range	-10 to +55ºC / +14 to +131ºF
		Storage range	-20 to +60ºC / -4 to +140ºF
	Humidity	30~90%RH (No condensation)	
Dimensions	169 (H) × 271 (W) × 72 (D) mm (6-11/16 [H] × 10-11/16 [W] × 2-7/8 [D] in.)		
Weight	1.4 kg (3-1/8 lbs.)		
Installation Environment	In the metal control panel or in the mounting attachment A type (PAC-YG85KTB) (sold separately) * This unit is designed for a business office or similar environment.		

Centralized Air Conditioning Control System AE-200

You can experience demonstrations of AE-200 at the experience Web site on your personal computer.

Access **http://www.mitsubishielectric.co.jp/ldg/ja/products/air/lineup/control/ae200e/app/index.html**

(The site can be accessed from WIN²K.)

Experience the operations on the main unit screen.

Experience the operation screen on the Web.

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for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.

⚠ Warning

■ Do not use refrigerant other than the type indicated in the manuals provided with the unit and on the nameplate.
  - Doing so may cause the unit or pipes to burst, or result in explosion or fire during use, during repair, or at the time of disposal of the unit.
  - It may also be in violation of applicable laws.
  - MITSUBISHI ELECTRIC CORPORATION cannot be held responsible for malfunctions or accidents resulting from the use of the wrong type of refrigerant.
■ Our air-conditioning equipments and heat pumps contain a fluorinated greenhouse gas, R410A.

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www.MitsubishiElectric.com